Mapping the Renewable Energy Sector to the Sustainable Development Goals: An Atlas

June 2019

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

EQUITABLE ORIGIN

Columbia Center on Sustainable Investment
A JOINT CENTER OF COLUMBIA LAW SCHOOL AND THE EARTH INSTITUTE, COLUMBIA UNIVERSITY

Business & Human Rights Resource Centre

About the Columbia Center on Sustainable Investment

The Columbia Center on Sustainable Investment (CCSI), a joint center of Columbia Law School and the Earth Institute at Columbia University, is the only university-based applied research center and forum dedicated to the study, practice and discussion of sustainable international investment. Its mission is to develop critical understanding, practical approaches and governance tools for governments, investors, communities and other stakeholders to maximize the benefits of international investment for sustainable development.

About Equitable Origin

Equitable Origin is the world's first stakeholder-led, independent, voluntary standards system designed to enable high social and environmental performance, transparency and accountability in energy development. Equitable Origin works with communities, companies and governments to deliver practical tools and guidelines, disseminate best practices, and provide independent recognition of social and environmental performance of energy projects. The Equitable Origin System drives positive change that reduces the social and environmental impact of energy development operations by fostering stakeholder dialogue and helping companies measure and benchmark their performance against the EO100™ Standard.

About Business & Human Rights Resource Centre

Business & Human Rights Resource Centre tracks the human rights impacts of over 8,000 companies in more than 180 countries, making information available on its eight-language website. Its three primary approaches are empowering human rights advocates in business, strengthening corporate accountability, and building corporate transparency. The Resource Centre seeks responses from companies when concerns are raised by civil society. The response rate is approximately 75% globally.

About the Sustainable Development Solutions Network

The UN Sustainable Development Solutions Network (SDSN) has been operating since 2012 under the auspices of the UN Secretary-General. SDSN mobilizes global scientific and technological expertise to promote practical solutions for sustainable development, including the implementation of the Sustainable Development Goals (SDGs) and the Paris Climate Agreement.

Table of Contents

Executive Summary

The Renewable Energy Industry and the SDGs

The renewable energy industry is instrumental to the achievement of the UN Sustainable Development Goals (SDGs), which aim to realize a better and more sustainable future for all. In addition to core contributions to the achievement of SDG 7, which focuses on access to affordable, reliable, sustainable and modern energy for all, and SDG 13, on urgent action to combat climate change, the renewable energy sector can also make critical contributions to the other 15 SDGs, including helping to alleviate poverty, fight hunger, increase access to healthcare, education, and clean water, and protect life on land and in water.

There are numerous examples of the positive contributions that renewable energy companies are already making to the SDGs; several examples of these contributions are noted throughout the Atlas. In East Africa, for example, manufacturers and developers are partnering to source and install solar arrays locally while stimulating regional economic development and creating jobs. In Taiwan, offshore wind developers are working with local fisherman to negotiate cooperation agreements that compensate communities for impacts, employ community members, establish standards of environmental protection, and share of local weather data. And in Puerto Rico, companies are re-electrifying the island in the wake of Hurricane Maria and providing for future disaster resilience.

Nevertheless, given the urgency and scale at which renewables must be deployed to meet the world's sustainable development and climate goals, it is critical that the industry understand the full range of its potential opportunities and impacts on all of the SDGs. These opportunities and impacts can stem from provision of renewable energy itself, production practices, supply chain sourcing, and corporate governance. While the industry is critical to the transition to a sustainable, low-carbon global economy, some renewable energy projects have been linked to allegations of human rights abuse, including labor rights concerns, harm to indigenous peoples' livelihoods, land, and territories, and attacks against human rights defenders.[1]

As the SDGs "seek to realize the human rights of all," and more than 90% of the SDG targets are linked to international human rights and labor standards,[2] companies must respect human rights in their core operations, in line with responsibilities under the UN Guiding Principles on Business and Human Rights. Respect for human rights is essential for the renewable energy industry to maximize its positive contributions to the SDGs, enable both a fast and sustainable transition to a low-carbon economy, and ensure that contributions to some SDGs do not come at the expense of others.

Atlas Organization

This Atlas intends to serve as a guide for renewable energy developers, operators, and investors, as well as their government partners, to maximize the renewable energy sector's contributions to the SDGs. Each chapter in this Atlas corresponds to one of the 17 SDGs, and includes the following:

- An **explanation of potential renewable energy sector impacts on each Sustainable Development Goal.**
- A list of **key SDG targets** relevant for the sector.
- A description of potential opportunities for renewable energy companies to **integrate the goal into their core business practices.**
- A description of potential opportunities for renewable energy companies to **collaborate with other stakeholders** and **leverage resources** to achieve the SDGs.
- Case studies highlighting existing innovative initiatives and good practices.[3]
- Suggested further reading.

While government investment, regulation, and planning will be essential to achieve the SDGs, this Atlas focuses on what companies can do, both alone and in collaboration with communities, governments, investors, and industry peers, to promote sustainable development.

The Business Case for Alignment to the SDGs and Human Rights Principles[4]

There is a strong business case for companies to adopt the recommendations in this Atlas and contribute to the SDGs in a way that is meaningful and lives up to evolving global expectations of business actors. By aligning conduct to the SDGs and respecting human rights and environment through core business, supply chain management, and collaboration with other stakeholders, companies can:

- **Bolster company and sector reputations and find new market opportunities:** By integrating the SDGs and human rights principles into core business and mapping and reporting SDG contributions grounded in respect for human rights and environment, renewable energy companies can differentiate themselves from other energy providers to gain competitive advantages, thereby potentially attracting new customers hoping to procure energy from environmentally sound and socially inclusive projects. These benefits may also improve employee recruitment and morale.[5] Inclusive project design can reduce costs and potentially unearth new business and revenue structures that increase access and demand.

- **Attract and retain investors:** Investors have a responsibility to respect human rights throughout their business activities and are increasingly concerned about the social and environmental impacts of their investments. Accordingly, many investors expect the companies that they work with to adhere to international sustainability and human rights principles and standards including the UN Guiding Principles on Business and Human Rights, the IFC Performance Standards, and OECD Guidelines for Multinational Enterprises, among others. By integrating the SDGs and human rights principles into core business and conducting human rights due diligence, renewable energy companies can be better prepared to meet investor needs and expectations, access competitive sources of capital, and may be able to attract more favorable financial terms than they would otherwise.

- **Minimize environmental, social, regulatory, financial, reputational, and legal risk:** By continuing to consult with affected stakeholders from the early stages of project planning though project closure, and engaging in robust environmental and human rights due diligence, renewable companies can reduce project risks, including risks of cancellation of licenses or permits, project disruption and delay, bad press, unintended environmental impacts, environmental or economic liabilities, and increased remediation costs, among others. Moreover, reduced environmental, social, regulatory, financial, and legal risks increase company and project bankability and attractiveness to investors.

Summary of Recommendations

To positively contribute to the SDGs, renewable energy companies should:

- **Increase access to clean, sustainable energy** through renewable energy production.
- **Share the benefits of renewable development** with local communities in the form of access to electricity, cost savings, rents and fees, and infrastructure.
- **Collaborate with governments, grid operators, utilities, and other stakeholders** to reduce reliance on fossil fuels.
- **Treat host communities as partners, conduct inclusive community consultations** prior to project development through project closure, and **respect land tenure and indigenous peoples' collective rights to land, territories, and resources.**
- **Train and employ local workers and source goods and services domestically where possible** to contribute to economic development.
- **Adopt strong labor policies** in line with the ILO Core Conventions, including paying workers living wages and providing benefits, protecting employees from discrimination and work-related safety risks, preventing child and forced labor, and respecting workers' rights to bargain collectively and associate freely.
- **Adopt human rights policies and perform human rights due diligence** in line with the UN Guiding Principles on Business and Human Rights, including by **conducting consultative human rights and environmental impact assessments and mitigating any negative impacts** and externalities throughout project life.
- Develop systems to **identify and monitor supply chain** impacts, especially as they relate to scope 3 GHG emissions, environmental impacts, labor protections, human rights abuses, and tax avoidance, and require suppliers, joint venture partners, and other business partners to respect human rights.
- **Introduce accessible grievance mechanisms** in line with the UN Guiding Principles on Business and Human Rights' effectiveness criteria, designed and monitored with communities and workers.

Mapped onto the SDGs, these overarching recommendations guide companies as follows:

SDG 1: End Poverty

- Pay fair taxes, fees, rent, and tariffs to governments, households, or community owners of land or generation capacity, as appropriate
- Champion inclusive employment policies and practices
- Procure goods and services locally and develop local workforce capacity when possible
- Respect tenure rights
- Broaden implementation of anti-poverty strategies via Community Benefit Agreements
- Support non-project-related job creation in communities to build goodwill and meet project employment expectations
- Develop third-party administered community benefit funds that earmark benefits from projects for poverty reduction

SDG 2: Zero Hunger

- Explore synergies with food systems and support local industries
- Site projects on non-arable land
- Protect farmland from unintended consequences
- Support local farmers
- Strengthen watershed management

SDG 3: Good Health and Well-Being

- Champion occupational health and safety
- Ensure that project development does not adversely affect community health
- Promote employee wellness
- Combat infectious diseases among employees
- Support electrification of healthcare services
- Support community health programs

SDG 4: Quality Education

- Assess and upgrade the local skills base
- Train and educate workers
- Collaborate with universities to craft curricula around workforce needs
- Support electrification of schools

SDG 5: Gender Equality

- Provide equal opportunities for women and establish gender-inclusive work environments
- Remove barriers to women's participation in both the workforce and consultation processes and facilitate involvement throughout project lifecycles
- Deploy renewable energy to increase access to electric heating and outdoor lighting
- Make gender-inclusive social investments and commitments

SDG 6: Clean Water and Sanitation

- Manage water holistically and develop a company water use policy
- Conserve and recycle water
- Develop plans to reduce or eliminate storm water and other pollution during construction and operations
- Monitor and disclose water quality and usage
- Leverage power generation for desalination, groundwater pumps, and sanitation systems
- Collaborate with other stakeholders to plan watershed management
- Share benefits of water infrastructure

SDG 7: Affordable and Clean Energy

- Deploy utility-scale renewable projects to increase access to clean energy
- Deploy distributed generation to improve access to reliable electricity
- Diversify power sources and deploy storage to overcome intermittency challenges
- Educate customers about consumption patterns to optimize renewable energy use
- Leverage economies of scale to provide non-grid connected communities access to energy generation technologies and transmission infrastructure
- Support local energy initiatives
- Work with governments and other actors to reduce reliance on fossil fuels
- Invest in clean energy research and development to decrease costs, improve efficiency, and overcome intermittency challenges
- Share knowledge with governments, communities, and civil society about electrification initiatives
- Integrate renewable generation capacity into local electrification schemes
- Include affected communities, and especially indigenous communities, in electrification efforts

SDG 8: Decent Work and Economic Growth

- Invest in clean energy research and explore development models to decrease costs, improve efficiency, and overcome intermittency challenges
- Establish strong public labor policies and practices
- Pay taxes and royalties to governments and compensate communities and households fairly for project land or generation capacity that they provide
- Drive economic growth through local procurement
- Promote worker, consumer, and community ownership of companies and projects
- Provide safe and affordable housing for temporary workers
- Collaborate with local chambers of commerce, finance institutions, and NGOs to promote economic linkages and induce economic development benefits from projects
- Establish business incubators
- Connect suppliers with external markets
- Support a just transition to a low-carbon society

SDG 9: Industry, Innovation and Infrastructure

- Invest in clean energy research and explore development models to decrease costs, improve efficiency, and overcome intermittency challenges
- Support industrialization through local hiring, procurement, and training and skills development
- Support advanced industrialization by providing zero greenhouse gas and non-polluting clean electricity
- Leverage economies of scale to hasten development of generation and transmission infrastructure
- Conduct transparent and meaningful consultations for every project and respect rights to free, prior, and informed consent
- Partner with government, industrial firms, and communities to power new industrial development through renewable targets
- Advocate for local government policy to increase access and deployment
- Collaborate with governments and other sectors to create renewable innovation spillovers and share knowledge
- Use convening power to create business clusters
- Explore potential collaborations with domestic research and development initiatives

SDG 10: Reduced Inequalities

- Conduct human rights due diligence and provide access to remedy
- Champion inclusivity
- Anticipate inequality-related risks
- Promote worker, consumer, and community ownership of companies and projects
- Support community ownership of renewable energy projects
- Support marginalized peoples through social investment
- Encourage participatory budgeting in local communities

SDG 11: Sustainable Cities and Communities

- Deploy renewable energies to provide for disaster resilience for vulnerable and coastal populations
- Pursue ownership models tailored to urban communities
- Share workforce requirements and planned operations early so local authorities can assess adequacy of local services
- Collaborate with local authorities to develop and increase green space
- Collaborate for increased resilience through participation in microgrids

SDG 12: Responsible Consumption and Production

- Minimize inputs and waste
- Source materials and products from manufacturers with adequate labor standards, small carbon footprints, and records of responsible practice
- Plan for technology recycling from early stages of project development, especially for solar panels and batteries
- Partner with other renewable companies to encourage adoption of governmental and sectoral recycling programs
- Work with mining companies to improve sustainability of minerals in clean energy technology production

SDG 13: Climate Action

- Deploy renewable projects to decarbonize energy systems
- Reduce operating and supply chain emissions
- Audit input and avoided emissions associated with projects
- Account for climate change in planning and investment
- Prioritize project siting in locations with greatest emissions reduction potential
- Deploy renewable energies to increase climate resilience in host communities
- Work with governments to mitigate climate change
- Participate in climate-related research and development and pilots
- Engage in intra- and cross-industry climate dialogues

SDG 14: Life Below Water

- Incorporate life under water into impact assessments and mitigate habitat destruction (especially for offshore wind, solar, hydroelectric, bioenergy, and tidal)
- Incorporate effects on coastal communities and livelihoods into impact assessments and related management plans
- Develop multi-stakeholder coastal zone management plans
- Collaborate with local authorities to establish conservation areas and marine reserves

SDG 15: Life on Land

- Conduct environmental impact assessments and prioritize project siting on brownfields or previously-developed land to minimize impact on or displacement of existing ecosystems
- Preserve ecosystems and achieve net positive or no net loss impact
- Support projects that link communities and biodiversity
- Contribute to research initiatives
- Encourage and participate in landscape-level planning
- Restore historic habitats and engage in reforestation and anti-poaching efforts

SDG 16: Peace, Justice and Strong Institutions

- Respect communities' land tenure and human rights, including indigenous peoples' collective rights to lands, territories, and resources
- Preempt and address grievances and conflict
- Comply with regulations and disclose information regarding the project, including project-related payments and contracts, to decrease corruption risk
- Conduct transfer pricing of intra-company transactions via arm's-length rule
- Foster safe work environments and good community relationships

SDG 17: Partnerships for the Goals

- Work with industry groups to advance the SDGs and the collective goals of the sector
- Mobilize financial resources and technology
- Support development of other industries and infrastructure needed to grow the renewable sector
- Incorporate the SDGs into company policies and apply SDG indicators
- Engage in dialogue with governments, civil society, and development partners
- Strengthen coordination among initiatives
- Join with bottom-up grassroots movements and top-down leadership initiatives

References

1. Business & Human Rights Resource Centre. 2018. "Renewable Energy: Risking Rights and Returns" https://www.business-humanrights.org/sites/default/files/Solar%2C%20Bioenergy%2C%20Geothermal%20Briefing%20-%20Final_0.pdf Accessed 10 September 2018.

2. The Danish Institute for Human Rights. "Human Rights and the SDGs" https://www.humanrights.dk/our-work/sustainable-development/human-rights-sdgs Accessed 8 May 2019.

3. The case studies included are based on desk research and the authors have not spoken directly with the actors involved in each case. The case studies do not represent endorsements of any company but are rather included to illustrate opportunities for SDG-alignment in practice.

4. For more information, see Shift. November 2016. "Business, Human Rights, and the Sustainable Development Goals: Forging a Coherent Vision and Strategy" Commissioned by the Business and Sustainable Development Commission. 9 - 14 http://s3.amazonaws.com/aws-bsdc/BSDC-Biz-HumanRights-SDGs.pdf Accessed 10 May 2019.

5. See, e.g., the results of a 2016 study that found that 64% of millennials would not work for a potential employer that does not have strong corporate social responsibility practices. Cone Communications. 2016. "Millennial Employee Engagement Study" 1 https://static1.squarespace.com/static/56b4a7472b8dde3df5b7013f/t/5819e8b303596e3016ca0d9c/1478092981243/2016+Cone+Communications+Millennial+Employee+Engagement+Study_Press+Release+and+Fact+Sheet.pdf Accessed 15 May 2019.

Acronyms

CBRES – Community-Based Renewable Energy Systems

DESCOs – Decentralized Energy Services Companies

FAO – Food and Agriculture Organization of the United Nations

FPIC – Free, Prior, and Informed Consent

GHG – Greenhouse Gas

HRIA – Human Rights Impact Assessment

kW – Kilowatt

kWh – Kilowatt hour

IPCC – Intergovernmental Panel on Climate Change

IRENA – International Renewable Energy Agency

LDCs – Least Developed Countries

MW – Megawatt

NREL – National Renewable Energy Laboratory

PACE – Property Assessed Clean Energy

PAYG – Pay-As-You-Go

PPA – Power Purchase Agreement

PPM – Parts Per Million

SDGs – Sustainable Development Goals

SEIA – Solar Energy Industries Association

TFEC – Total Final Energy Consumption

UNDP – United Nations Development Programme

Introduction

The Sustainable Development Goals and Their Relevance for the Renewable Energy Industry

In 2015, the 193 United Nations member states unanimously adopted a set of 17 Sustainable Development Goals (SDGs), establishing a consensus development agenda and accompanying targets to be met by 2030. The SDGs built upon the successes of the Millennium Development Goals to create a common framework for equitable, inclusive, and environmentally sound economic development. The 2030 Agenda is grounded in the Universal Declaration of Human Rights and international human rights treaties, and "seek[s] to realize the human rights of all."[6]

In committing to achieve the goals by 2030, the international community called for a new era of collaboration among all stakeholders, including the private sector, to improve global wellbeing. SDG 17 explicitly recognizes that a "successful sustainable development agenda requires partnerships between governments, the private sector and civil society," and that "[u]rgent action is needed to mobilize, redirect and unlock the transformative power of trillions of dollars of private resources to deliver on sustainable development objectives."[7]

The renewable energy industry is instrumental to the success of SDGs. Renewable energy—defined by the International Energy Agency as "energy that is derived from natural processes (e.g. sunlight and wind) that are replenished at a higher rate than they are consumed"[8] —is core to the implementation of SDG 7, which focuses on access to affordable, reliable, sustainable, and modern energy for all, and SDG 13, which centers on urgent action to combat climate change. Accelerated deployment of renewable energy technologies—solar, wind, hydroelectric,[9] and geothermal, among others—can help to bring modern, affordable, and clean energy to the nearly 1.1 billion people around the world who lack access to electricity and the 2.5 billion people who rely on biomass, coal, or kerosene for cooking.[10]

The SDGs are by nature "integrated and indivisible."[11] Alleviating energy poverty is instrumental to achieving many of the other SDGs: for example, increasing access to energy can help increase productivity, therefore potentially contributing to the achievement of SDG 1 on ending poverty, SDG 8 on promoting sustainable economic growth, and SDG 10 on reducing inequalities (assuming that productivity gains benefit the poor). Electrification of (or otherwise providing clean energy for) agricultural equipment, health centers, and schools can also help to achieve SDGs 2, 3, and 4 on eradicating hunger and ensuring access to healthcare and education for all.

In addition, renewable energy is critically important to displace climate-destabilizing fossil fuels in the global energy system, which in 2016 provided more than 81% of global energy supply and 65% of electricity generation.[12] In addition to contributing to SDG 13 on climate action, reducing use of fossil fuels can prevent environmental degradation and social disruption from hydrocarbon and coal extraction (though many renewable technologies also rely on potentially disruptive mineral extraction). This fossil fuel displacement, possible through collaboration with governments, electric utilities, grid operators, and other stakeholders, may also indirectly support the achievement of other SDGs. Indeed, ending hunger (SDG 2), ensuring good health and access to clean water (SDGs 3 and 6), protecting life below water and on land (SDGs 14 and 15), and providing the opportunity to reduce inequalities and foster global peace (SDGs 10 and 16) all depend to some degree on our ability to maintain a livable climate and transition away from fossil fuel dependence.

Finally, renewable energy presents an unprecedented opportunity to promote equitable and inclusive economic development through democratized energy generation capacity. Where fossil fuel-based energy sources are unusually consolidated and lend themselves to large-scale deployment to achieve economies of scale, the modular nature of some renewable energy technologies could allow for the provision of rents to institutions, communities, or actors that have not traditionally profited from energy provision. Renewables could also provide economic development benefits more broadly in the form of cost savings from near-zero marginal cost generation, which in turn could free up public and private funds for other uses. However, like other contributions mentioned above, these potential benefits also depend on government policy, planning, and regulation to ensure shared benefits from the energy transition.

Many renewable energy companies are already making contributions to the SDGs; several examples of these contributions are noted throughout the Atlas. In East Africa, for example, manufacturers and developers are partnering to source and install solar arrays locally while stimulating regional economic development and creating jobs. In Taiwan, offshore wind developers are working with local fisherman to negotiate cooperation agreements that compensate communities for impacts, employ community members, establish standards of environmental protection, and share of local weather data. And in Puerto Rico, companies are re-electrifying the island in the wake of Hurricane Maria and providing for future disaster resilience.

Nevertheless, given the urgency and scale at which renewables must be deployed to meet the world's sustainable development and climate goals, it is critical that the industry understand the full range of its potential opportunities and impacts on all of the SDGs. These opportunities and impacts can stem from provision of renewable energy itself, production practices, supply chain sourcing, and corporate governance. While the industry is critical to the transition to a sustainable, low-carbon global economy, some renewable energy projects have been linked to allegations of human rights abuse, including labor rights concerns, harm to indigenous peoples' livelihoods, land, and territories, and attacks against human rights defenders.[13] In addition, the renewable energy sector's reliance on minerals, such as copper, nickel, and cobalt, sourced from countries with poor governance and human rights records and conflict-affected areas can threaten the rights of workers and communities.

As the SDGs "seek to realize the human rights of all," and more than 90% of the SDG targets are linked to international human rights and labor standards,[14] an important step for companies to help advance the SDGs is to respect human rights in their core operations and supply chains, in line with their responsibilities under the UN Guiding Principles on Business and Human Rights. These steps are essential for the renewable energy industry to maximize its positive contributions to the SDGs, enable both a fast and sustainable transition to a low-carbon economy, and ensure that contributions to some SDGs do not come at the expense of others.

This Atlas, focused largely on project developers and operators, intends to serve as a guide for companies to maximize contributions to the SDGs (though it may be of use also to investors, governments, and communities to help understand potential project impacts and opportunities). In order to advance the SDGs, renewable energy companies should first identify their most salient risks to people and planet and map those priorities to the SDGs. They should then devise ways to minimize those risks and maximize positive contributions in support of the goals.[15] For each goal, this Atlas recommends specific actions to help companies incorporate responsible practices into their core business operations and to leverage resources and collaborate with other stakeholders to amplify impact.

The Business Case for Contributing to the Sustainable Development Goals[16]

There is a strong business case for companies to adopt the recommendations in this Atlas and contribute to the SDGs in a way that is meaningful and lives up to evolving global expectations of business actors. By aligning conduct to the SDGs and respecting human rights and environment through core business, supply chain management, and collaboration with other stakeholders, companies can:

- **Bolster company and sector reputations and find new market opportunities**: By integrating the SDGs and human rights principles into core business and mapping and reporting SDG contributions grounded in respect for human rights and environment, renewable energy companies can differentiate themselves from other energy providers to gain competitive advantages, thereby potentially attracting new customers hoping to procure energy from environmentally sound and socially inclusive projects. These benefits may also improve employee recruitment and morale.[17] Inclusive project design can reduce costs and potentially unearth new business and revenue structures that increase access and demand.

- **Attract and retain investors:** Investors have a responsibility to respect human rights throughout their business activities and are increasingly concerned about the social and environmental impacts of their investments. Accordingly, many investors expect the companies that they work with to adhere to international sustainability and human rights principles and standards including the UN Guiding Principles on Business and Human Rights, the IFC Performance Standards, and OECD Guidelines for Multinational Enterprises, among others. By integrating the SDGs and human rights principles into core business and conducting human rights due diligence, renewable energy companies can be better prepared to meet investor needs and expectations, access competitive sources of capital, and may be able to attract more favorable financial terms than they would otherwise.
- **Minimize environmental, social, regulatory, financial, reputational, and legal risk:** By continuing to consult with affected stakeholders from the early stages of project planning though project closure, and engaging in robust environmental and human rights due diligence, renewable companies can reduce project risks, including risks of cancellation of licenses or permits, project disruption and delay, bad press, unintended environmental impacts, environmental or economic liabilities, and increased remediation costs, among others. Moreover, reduced environmental, social, regulatory, financial, and legal risks increase company and project bankability and attractiveness to investors.

Stakeholder Roles and Responsibilities in Implementing the SDGs

The 2030 Development Agenda requires cooperation and collaboration to ensure sustainable and rights-respecting global development for all. It also recognizes that different actors have different roles to play in achieving the SDGs.

The role of **governments** is to create SDG-consistent laws, standards, and regulations, including both to attract investment and to regulate its impact. Governments are also responsible for public investment to reduce poverty and hunger, provide education and health, and plan infrastructure for sustainable development. Capital-exporting states have a responsibility to ensure that their outward investors contribute to the SDGs in their host jurisdictions, and to support developing countries in meeting their SDG financing needs.

The role of **companies** is to carry out core business operations while complying with local and national regulations and adhering to national, international, and sectoral norms and standards, including but not limited to international human rights standards. When operations are consistent with the SDGs, the private sector can contribute to the achievement of the SDGs through employment generation, tax and other payments, technology transfer, infrastructure development, training and other direct benefits. While companies should consider their potential contributions to each SDG, *this Atlas does not suggest direct company delivery of social services that should be provided by governments.* Companies' greatest responsibility is to ensure their operations do no harm for their host communities and environment; although, as outlined throughout this Atlas, there are other opportunities for companies to coordinate with other stakeholders to contribute to the SDGs.

Investors and other financial actors accelerate the growth of the renewable energy industry by providing capital for project and company development. Since investors and other financial actors are companies, they also have a responsibility under the UN Guiding Principles and the OECD Guidelines on Responsible Business Conduct to respect human rights throughout their operations and business activities. As such, they should establish clear human rights policies and processes and engage portfolio companies on their efforts to respect human rights and minimize environmental, social, regulatory, and legal risk throughout their operations and value chains. Compliance with the OECD guidance for Responsible Business Conduct for Institutional Investors[18] and the Equator Principles' standards and processes on impact assessment, management systems, stakeholder engagement, grievance mechanisms, and transparent reporting, among other practices, can help investors to ensure that renewable energy actors and the projects they develop demonstrate respect for people and planet.[19]

Civil society organizations and development partners can support governments and the private sector to fill governance gaps and help actors to maximize their contributions to sustainable development. This may include advocating for policy or practice change, providing capacity support, assisting in monitoring and enforcement, documenting project impacts, facilitating partnerships and knowledge-sharing, and providing direct services.

Atlas Organization

Each chapter in this Atlas corresponds to one of the 17 SDGs, and includes the following:

- An **explanation of potential renewable energy sector impacts on each Sustainable Development Goal.**
- A list of **key SDG targets** relevant for the sector. In total, this Atlas includes 92 of the 169 SDG associated targets.
- A description of potential opportunities for renewable energy companies to **integrate the goal into their core business practices** (see below for discussion of what is meant by "core business").
- A description of potential opportunities for renewable energy companies to **collaborate with other stakeholders** and **leverage resources** to achieve the SDGs (see below for discussion of what is meant by "collaborate and leverage").
- Case studies highlighting existing innovative initiatives and good practices.[20]
- Suggested further reading.

Integrating the SDGs into Core Business

This Atlas intends to encourage companies to consider how they can maximize contributions to the SDGs through **core business practices** (as opposed to contributing through corporate philanthropy or social investment, for example). Each chapter explores opportunities for renewable energy companies to support achievement of the SDGs in the course of their core business. The Atlas also emphasizes the importance of companies' responsibilities to respect human rights throughout operations and supply chains for the success of the Sustainable Development Agenda.

"Core business" refers to the range of activities required to conduct primary business activities. Core business activities can relate to production and operational processes, supply chain management, and corporate governance decisions, including on transparency, payment of taxes, gender equity, lobbying, and worker compensation and representation in decision-making, among other things. The core business best practice recommendations that this Atlas suggests may also help companies to reduce risks, increase profits, meet sustainability or other goals, and maintain social licenses to operate. While companies may define core business activities differently, common activities beyond project development or operation may include:

- **Policies, standards, and monitoring systems:** companies' policy frameworks should align with the SDGs, including by providing guidelines for community consultation, prevention and mitigation of environmental damage, and workplace safety protection.
- **Social and environmental baseline and impact assessments:** companies often use impact assessments to anticipate and manage risks for communities and their surroundings. Greater integration and explicit inclusion of the SDGs and human rights into assessments can help companies to more comprehensively plan for and mitigate negative impacts.
- **Risk and opportunity management assessments and planning:** companies typically use risk and opportunity management assessments to consider and plan for factors that could impede the long-term viability of projects. Companies should include human rights due diligence in their risk assessment practices, which involves identifying salient human rights risks, taking action to mitigate those risks, reporting on those actions, and providing remedy to affected individuals and communities.

Ways to Collaborate with Stakeholders and Leverage Resources

Each chapter also contains a section outlining opportunities for companies to contribute to the SDGs by collaborating with other key stakeholders and leveraging company resources. While many contributions can be made through companies' core business practices, some contributions are outside of companies' direct control and therefore require multi-stakeholder coordination to maximize impact.

While opportunities to "collaborate and leverage" might include formal partnerships or regular multi-stakeholder dialogues, companies can also leverage their position and resources to:

- Convene people, organizations, and institutions to close communications gaps, and to discuss the challenges and opportunities related to achieving the SDGs;
- Share information, data, and analysis, for instance on tax and royalty payments, environmental impacts, and safety statistics, among other things;
- Help implement social impact initiatives by mobilizing resources through social investment programs.

General Recommendations

While the Atlas provides recommendations on how to align conduct to each SDG through core business and collaboration, these recommendations fall into several primary categories. Companies should prioritize the following actions:

- **Increase access to clean, sustainable energy** through renewable energy production.
- **Share the benefits of renewable development** with local communities in the form of access to electricity, cost savings, rents and fees, and infrastructure.
- **Collaborate with governments, grid operators, utilities, and other stakeholders** to reduce reliance on fossil fuels.
- **Treat host communities as partners, conduct inclusive community consultations** prior to project development through project closure, and **respect land tenure and indigenous peoples' collective rights to land, territories, and resources**.
- **Train and employ local workers and source goods and services domestically where possible** to contribute to economic development.
- **Adopt strong labor policies** in line with the ILO Core Conventions, including paying workers living wages and providing benefits, protecting employees from discrimination and work-related safety risks, preventing child and forced labor, and respecting workers' rights to bargain collectively and associate freely.
- **Adopt human rights policies and perform human rights due diligence** in line with the UN Guiding Principles on Business and Human Rights, including by **conducting consultative human rights and environmental impact assessments and mitigating any negative impacts** and externalities throughout project life.
- Develop systems to **identify and monitor supply chain** impacts, especially as they relate to scope 3 GHG emissions, environmental impacts, labor protections, human rights abuses, and tax avoidance, and require suppliers, joint venture partners, and other business partners to respect human rights.
- **Introduce accessible grievance mechanisms** in line with the UN Guiding Principles on Business and Human Rights' effectiveness criteria, designed and monitored with communities and workers.

Dialogue and Engagement with Communities and Stakeholders

To successfully integrate the SDGs into their core business activities, companies must prioritize dialogue and consultation with communities that could be affected by their operations.[21] To better understand the potential impacts and human rights risks and to confirm that the company has a social license to operate, these consultations should be transparent, inclusive, accessible, and meaningful, including by creating opportunities for communities to participate in and influence decision-making about the project. Meaningful consultations and participation should take place prior to the development of renewable energy projects and continue throughout project lifespan.

While companies must hold participatory consultations with all communities, consultation processes are particularly important where projects may affect indigenous peoples. As detailed in the UN Declaration on the Rights of Indigenous Peoples, indigenous peoples have the right to self-determination, including freely pursuing their economic, social and cultural development.[22] International law, and some domestic laws, also require that host governments obtain the free, prior, and informed consent (FPIC) of indigenous and tribal peoples prior to authorizing any investment project that will use and/or affect their lands, territories, or resources;[23] companies must respect this right to FPIC as well.

In addition, industry bodies, certification schemes, and companies in other industries have also made commitments to obtain the FPIC of all project-affected communities, including non-indigenous communities.[24] To comply with international best practice, renewable companies should obtain the consent of all communities that stand to be affected by their operations. Importantly, respecting communities' rights to FPIC requires acceptance of the possibility that communities may decide not to sell, lease, or otherwise provide access to their land.

Community engagement requires sustained conversation with a wide array of local and national stakeholders to build trust, share information, and find consensus solutions to common problems. This exchange must be transparent and premised upon mutual respect.

Industry-Related Aspects to Consider

This Atlas focuses on the ways that renewable energy companies can contribute to the achievement of the SDGs. However, the renewable energy sector includes a vast array of private sectors actors, including manufacturers, distributors, developers, and operators, not to mention renewable energy financiers, companies that supply the raw materials used for renewable energy technology production, or utility companies that dispatch grid-connected renewable installations. The term "renewable energy" itself also contains myriad diverse sources, among them solar photovoltaic, concentrated solar, onshore wind, offshore wind, hydroelectric, geothermal, bioenergy, and ocean energy.

The recommendations in this Atlas are directed primarily to project developers and operators, though many apply to companies at other points along supply chains as well. Companies not covered in this scope can still make significant positive contributions to the SDGs, and the Atlas includes ways that project developers and operators should work to partner with companies upstream or downstream to prioritize responsible business practices throughout the renewable energy value chain. The recommendations included in the Atlas may help investors, governments, and communities to understand potential project impacts and opportunities and guide their relationship with and expectations of companies.

Because substantial differences exist by renewable energy source, not every recommendation herein included will apply to every company. Nevertheless, the recommendations are included side by side for general applicability. Where possible, the Atlas specifies if a given recommendation applies particularly to specific renewable sources.

Finally, some impacts depend upon whether a renewable energy project intends to connect to centralized utility grids or to provide electricity off-grid. For example, the type of infrastructure involved in on-grid renewable installation as compared to off-grid projects will greatly affect the types of infrastructure that can be shared between companies and communities. The Atlas specifies if recommendations apply only to off- or on-grid renewable projects where applicable.

Additional Resources

Business & Human Rights Resource Centre. 2016. "Towards Responsible Renewable Energy" https://www.business-humanrights.org/en/towards-responsible-renewable-energy.

Business & Human Rights Resource Centre. 2017. "Investor briefing: Renewable Energy Impacts on Communities - Managing Investors' Risks and Responsibilities" https://www.business-humanrights.org/sites/default/files/Investor%20briefing%20-%20Renewable%20energy%20-%20Apr%202017.pdf

Business & Human Rights Resource Centre. 2018. "Renewable Energy Risking Rights & Returns: An Analysis of Solar, Bioenergy & Geothermal Sectors" https://www.business-humanrights.org/en/renewable-energy-risking-rights-returns-an-analysis-of-solar-bioenergy-geothermal-sectors

Business Fights Poverty. 2017. "Embedding the Sustainable Development Goals into Business" http://businessfightspoverty.org/articles/embedding-the-sustainable-development-goals-into-business/

David McCollum et al. March 2018. "Connecting the sustainable development goals by their energy inter-linkages" http://iopscience.iop.org/article/10.1088/1748-9326/aaafe3/meta

Food and Agriculture Organization of the United Nations. 2016. "Free, Prior and Informed Consent Manual" http://www.fao.org/3/a-i6190e.pdf

International Renewable Energy Agency. 2016. "Renewable Energy Benefits: Measuring the Economics" http://www.irena.org/documentdownloads/publications/irena_measuring-the-economics_2016.pdf

Just Transition Centre and the B Team. May 2018. "Just Transition: A Business Guide." https://www.ituc-csi.org/IMG/pdf/just_transition_-_a_business_guide.pdf

Shift. November 2016. "Business, Human Rights and the Sustainable Development Goals: Forging a Coherent Vision and Strategy." https://www.shiftproject.org/resources/publications/business-human-rights-sustainable-development-coherent-strategy/

UN Global Compact. 2015. "A Guide for Business: How to Develop a Human Rights Policy" https://www.unglobalcompact.org/docs/issues_doc/human_rights/Resources/HR_Policy_Guide.pdf

UN Special Representative on Business and Human Rights. 2011. "Guiding Principles on Business and Human Rights: Implementing the United Nations 'Protect, Respect and Remedy' Framework" https://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf

United Nations. 2015. "Transforming Our World: the 2030 Agenda for Sustainable Development" https://sustainabledevelopment.un.org/post2015/transformingourworld.

References

6. United Nations. 2015. "Transforming Our World: the 2030 Agenda for Sustainable Development" Preamble, Para. 10. https://sustainabledevelopment.un.org/post2015/transformingourworld Accessed 21 August 2018.

7. United Nations. "Sustainable Development Goals: Goal 17." https://www.un.org/sustainabledevelopment/global-partnerships/ Accessed 20 August 2018.

8. International Energy Agency. "Glossary" https://www.iea.org/about/glossary/ Accessed 7 May 2019.

9. This Atlas recognizes that there is some disagreement about whether hydroelectric power should be considered renewable energy. Nevertheless, hydropower has been included in this Atlas, as hydropower projects continue to be categorized as renewable energy by many in the sector and international funders.

10. International Energy Agency. October 2017. "Energy Access Outlook 2017" http://www.iea.org/access2017/ Accessed 10 September 2018.

11. United Nations. 2015. "Transforming Our World." Para. 5.https://sustainabledevelopment.un.org/post2015/transformingourworld Accessed 21 August 2018.

12. International Energy Agency. 2018. "Key World Energy Statistics" 2, 14 https://webstore.iea.org/download/direct/2291?fileName=Key_World_2018.pdf Accessed 26 March 2019.

13. Business & Human Rights Resource Centre. 2018. "Renewable Energy: Risking Rights and Returns" https://www.business-humanrights.org/sites/default/files/Solar%2C%20Bioenergy%2C%20Geothermal%20Briefing%20-%20Final_0.pdf Accessed 10 September 2018.

14. The Danish Institute for Human Rights. "Human Rights and the SDGs" https://www.humanrights.dk/our-work/sustainable-development/human-rights-sdgs Accessed 8 May 2019.

15. Shift. "The Human Rights Opportunity: 15 real-life cases of how business is contributing to the Sustainable Development Goals by putting people first." https://www.shiftproject.org/sdgs Accessed 16 May 2019.

16. For more information, see Shift. November 2016. "Business, Human Rights, and the Sustainable Development Goals: Forging a Coherent Vision and Strategy" Commissioned by the Business and Sustainable Development Commission. 9 - 14 http://s3.amazonaws.com/aws-bsdc/BSDC-Biz-HumanRights-SDGs.pdf Accessed 10 May 2019.

17. See, e.g., the results of a 2016 study that found that 64% of millennials would not work for a potential employer that does not have strong corporate social responsibility practices. Cone Communications. 2016. "Millennial Employee Engagement Study" 1 https://static1.squarespace.com/static/56b4a7472b8dde3df5b7013f/t/5819e8b303596e3016ca0d9c/1478092981243/2016+Cone+Communications+Millennial+Employee+Engagement+Study_Press+Release+and+Fact+Sheet.pdf Accessed 15 May 2019.

18. OECD. 2017. "Responsible Business Conduct for Institutional Investors: Key Considerations for Due Diligence under the OECD Guidelines for Multinational Enterprises"https://mneguidelines.oecd.org/RBC-for-Institutional-Investors.pdf Accessed 16 May 2019.

19. "The Equator Principles." June 2013. https://equator-principles.com/wp-content/uploads/2017/03/equator_principles_III.pdf Accessed 7 May 2019.

20. The case studies included are based on desk research and the authors have not spoken directly with the actors involved in each case. The case studies do not represent endorsements of any company but are rather included to illustrate opportunities for SDG-alignment in practice.

21. This Atlas uses the term "community" broadly, borrowing from the International Institute for Environment and Development, "to mean a group of people who are connected to a particular locality," and who do not necessarily "have the power to exercise government authority." Lorenzo Cotula and Mika Schroder. 2017. "Community Perspectives in Investor-State Arbitration" International Institute for Environment and Development. 10. http://pubs.iied.org/pdfs/12603IIED.pdf Accessed 11 September 2018.

22. United Nations. 2007. "United Nations Declaration on the Rights of Indigenous Peoples" https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf Accessed 15 May 2019.

23. See International Labour Organization. 1989. "Indigenous and Tribal Peoples Convention (No. 169)" Art. 16. https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C169 Accessed 11 September 2018.

24. See, for example, China Chamber of Commerce and Metals Minerals and Chemicals Importers and Exporters, Guidance for Sustainable Natural Rubber, Art. 4.1.3.1, http://images.mofcom.gov.cn/shfw/201802/20180226075955558.pdf Accessed 15 November 2018 (calling on companies to "[r]espect affected communities' right to Free, Prior and Informed Consent."); China Chamber of Commerce and Metals Minerals and Chemicals Importers and Exporters, Guidelines for Social Responsibility in Outbound Mining Investments, Art. 2.4.5, http://www.cccmc.org.cn/docs/2014-10/20141029161135692190.pdf Accessed 15 November (calling on companies to "[p]rotect the rights for free, prior and informed consent of local communities including indigenous peoples"); Roundtable on Sustainable Palm Oil, Principles and Criteria for the Production of Sustainable Palm Oil (2013), Principle 2.3 ("Use of the land for oil palm does not diminish the legal, customary or user rights of other users without their free, prior and informed consent"); Forest Stewardship Council, FSC Principles and Criteria for Forest Stewardship, para. 2.2. ("Local communities with legal or customary tenure or use rights shall maintain control, to the extent necessary to protect their rights or resources, over forest operations unless they delegate control with free and informed consent to other agencies"); Coca-Cola Company, The Coca-Cola Company Commitment - Land Rights and Sugar ("The Coca-Cola Company will adhere to the principle of Free, Prior and Informed Consent across our operations (including bottling partners) and will require our suppliers to adhere to this principle."), https://www.coca-colacompany.com/content/dam/journey/us/en/private/fileassets/pdf/2013/11/proposal-to-oxfam-on-land-tenure-and-sugar.pdf Accessed 15 November.

SDG 1: End Poverty

End Poverty in All Its Forms, Everywhere

According to the 2030 Agenda for Sustainable Development, "eradicating poverty in all its forms and dimensions... is the greatest global challenge and an indispensable requirement for sustainable development."[25] While significant progress has been made to reduce extreme poverty—the number of people living on less than US$1.25 per day was reduced by half between 1990 to 2015—over 800 million people remain too poor to meet basic human needs.[26] Poverty is highest among those traditionally marginalized, including among women, racial and ethnic minorities, indigenous peoples, people with disabilities, and those living in the Global South. The commitment to end poverty by 2030 intersects with all other SDGs, including those on food security, health, education, the environment, and access to affordable, reliable, and sustainable energy sources.

All renewable energy companies can contribute to ending poverty by helping to increase access to electricity, support local economic development through local procurement of goods and employment, and pay appropriate taxes and other fees to governments and communities.

The potential to expand access to power can enable new productive activities, thereby also increasing household income, by improving access to lighting, refrigeration, digital communication, and operation of machinery. For communities currently powered by off-grid diesel generators, new renewable developments and grid connection can also contribute to cost savings by lowering the marginal cost of power.

In addition, renewable projects can help to alleviate poverty indirectly through payment of fair taxes to governments—which can fund public expenditures—and directly through rent, tariffs, or other fees to communities and individuals for use of land or generation technologies. Conversely, companies should commit not to bribe or otherwise make illicit payments to corrupt officials. Companies should also contribute to local economic development by championing inclusive employment practices, providing decent work that pays a living wage, and supporting local businesses through procurement of goods for business operations. Finally, to avoid entrenching poverty, companies must respect land tenure rights and consult with communities about all project aspects early to ensure that they do not undermine livelihoods.

Key Indicators Related to SDG 1 and Renewables

1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day.

1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.

SDG 1 RECOMMENDATIONS

Integrate into Core Business

- Pay fair taxes, fees, rent, and tariffs to governments, households, or community owners of land or generation capacity, as appropriate
  - › Honor fair and previously agreed upon rates for land use or generation capacity
  - › Use arm's-length rule for transfer pricing
  - › Publicly disclose details of payments to and from governments
  - › Deploy innovative models to enable the poorest in communities to benefit from renewable energy, focusing on direct employment and skills building in addition to electrification and compensation for land use
- Champion inclusive employment policies and practices
  - › Facilitate equitable and gender-sensitive access to employment opportunities
  - › Offer training and apprenticeship programs
  - › Provide decent work and a living wage
- Procure goods and services locally and develop local workforce capacity when possible
  - › Develop local supplier capacity
  - › Strengthen local value chains where possible
- Respect tenure rights
  - › Begin land access planning early in projects
  - › Conduct inclusive and participatory community consultations
  - › Continue open dialogue and consultations with communities throughout project's operations
  - › Respect indigenous peoples' right to self-determination and obtain indigenous and tribal peoples' free, prior, and informed consent (FPIC) for projects that will impact them
  - › Respect affected community tenure rights (including rights to natural resources), including when not documented or legally recognized
  - › Avoid community displacement
  - › Provide adequate compensation for resettlement to resettled communities agreed on during consultations

Collaborate and Leverage

- Broaden implementation of anti-poverty strategies via Community Benefit Agreements
- Support non-project-related job creation in communities to build goodwill and meet project employment expectations
- Develop third-party administered community benefit funds that earmark benefits from projects for poverty reduction

Integrate SDG 1 Into Core Business

Pay fair taxes, fees, rent, and tariffs to governments, households, or community owners of land or generation capacity

Renewable energy companies can contribute to government revenues through the payment of relevant fees and taxes. These can include income taxes on power sales, royalty payments to local communities and/or landowners, property taxes to local governments, and permitting fees. When handled transparently, revenues from all required taxation can increase economic growth—providing resources for the realization of economic, social, and cultural rights—as well as supporting poverty reduction programs (if revenues are used appropriately). Conversely, avoidance of tax by companies can exacerbate poverty and limit the resources available for states to realize human rights, while threatening to damage company and industry reputations. Renewable energy companies should also promote responsible taxation practices in supply chains and should be aware that the extraction of materials to manufacture renewable energy technologies has been linked to tax avoidance.[27] Companies should establish tax planning policy processes, report payments publicly and transparently in adherence to the Global Reporting Initiative or other standard,[28] and engage in open dialogue about tax strategies and practices with stakeholders across their supply chains.[29] Similarly, companies should be transparent about the fiscal arrangements they make with government to adequately inform public discussions about government budgets, energy subsidies, and the solvency of publicly-owned utilities.

Companies must adequately compensate communities and households for use of land or electricity generation, depending on the generation capacity ownership model. Companies can support poverty alleviation and preempt potential future conflict by encouraging communities to use participatory tools to determine the value that community members get from their land before contract negotiation.[30]

Champion inclusive employment policies and practices

Renewable energy companies can contribute to poverty reduction through direct and indirect employment, the payment of living wages, and the development of transferable skills, especially for women[31] and youth (see chapters on SDG 4 for more information on education and SDG 8 for more information on labor). Where possible, companies should prioritize permanent employment that offers job security, health care, and development opportunities. Companies should not only adhere to, but also aim to exceed, the minimum requirements of national labor laws through their own policies, procedures, and training related to occupational health and safety, labor rights, workplace discrimination, and sexual harassment.[32]

The UN Guiding Principles on Business and Human Rights and the UN Global Compact (see additional resources) offer guidance for companies to implement these responsibilities. In addition, renewable energy companies should monitor and engage with their workforces to prevent accidents, violations of labor rights, and discriminatory practices. Companies should also monitor labor practices throughout supply chains and include labor standards clauses in supplier contracts and business partner agreements.

Procure goods and services locally and develop local workforce capacity when possible

Renewable energy companies can leverage their activity to increase economic development impacts by prioritizing local procurement of goods and services in their supply chains thereby inducing growth by contributing to the development of other sectors of host country economies. Where local provision of goods and services in question are not available, companies can work with local suppliers and civil society actors to build capacity for the adequate provision of goods and services, similar to initiatives to increase local employment. Local sourcing can include anything from equipment and manufactured goods to raw materials (as needed)

to food and lodging for employees. If capacity is built for these suppliers, they can then service other businesses as well. Similarly, companies can invest to develop local workforce capacity in communities where new projects are planned, building goodwill and decreasing marginal employment costs for subsequent project development.

Respect tenure rights

Renewable energy companies should establish and adhere to policies to respect legal tenure rights. These policies should ensure respect for traditionally-recognized tenure of both local landowners and users, including respect for the collective customary rights of indigenous communities that inhabit, rely on, or otherwise have claims to land suitable for renewable projects. Companies must identify the women, men, and children who use or otherwise rely on potential project land and resources in order to avoid infringing on their legitimate land rights, including rights that may not be formally documented or recognized. Ensuring that renewable energy projects do not displace communities or undermine communities' legitimate tenure rights, cultural heritage, and access to land is one way that companies can avoid contributing to poverty, food insecurity, and human rights abuses. Furthermore, companies that respect legitimate tenure rights can establish beneficial long-term relationships and reduce costs from legal action, protests, and damage to infrastructure that have resulted from questionable land acquisition.[33]

In addition, renewable energy companies should meaningfully involve all affected communities in consultations from the early stages of projects, including in project design and location. Where possible and appropriate, companies should consider including opportunities for benefit sharing in agreements as a means to provide fair compensation for the use of the land and to offset potential adverse impacts on affected communities; and to better enable companies to provide affordable, clean power to all. Holding such consultations will help the company to build support and secure a long-term "social license" to operate. Even if companies have government permits or concessions for project land, early and collaborative consultation with local communities is essential, and can help companies provide for local economic development while preserving local communities' rights and cultural practices. Companies that seek to operate on indigenous or tribal lands are required by international law, and often by the host country's laws, to obtain indigenous or tribal peoples' free, prior and informed consent[34] before proceeding; they should also ensure that all affected individuals are involved throughout the human rights due diligence process. Companies should be aware that communities have different definitions of resource and land rights, and that some have a strong traditional socioeconomic, cultural, and/or spiritual connection to lands and resources.[35] The Jeffreys Bay case study below provides an example of community consultation, partnership, and benefit sharing practices that can be pursued as part of efforts to achieve long-term collaborative relationships between the community and company.

Collaborate and Leverage

Broaden implementation of anti-poverty strategies via Community Benefit Agreements

Communities, governments, and civil society organizations may already have existing initiatives to alleviate poverty. Companies can enter into formal agreements with affected communities to support these efforts. In some cases, local communities may require a benefit sharing arrangement as a condition for providing their consent to the project. Community agreements can include environmental, social, and health protections, obligations to share financial and other benefits with the community, and rules and processes to govern the ongoing relationship between the community and the company. Such agreements should be legally enforceable. In addition, project developers can look for opportunities for communities to benefit directly from renewable project developments, for example through community ownership of generation technologies, which could provide direct cost savings or income to communities. Especially if negotiated and implemented only once the community is ready, organized, informed, and has access to the technical and legal support it needs, such community partnerships can foster trust and form the basis of strong community-company relationships.

Support non-project-related job creation in communities to build goodwill and meet project employment expectations

Similar to efforts to strengthen local economies through the procurement of local goods and services, companies can look for other indirect opportunities to support job creation within communities. This can be strategic for companies in places where expectations of job creation from developments exceeds realistic job creation projections. Potential initiatives could include investment in agricultural technologies to increase production, support of microfinance initiatives to seed local entrepreneurship, or infrastructure development to connect local goods to markets, for example.

Case Studies

Jeffreys Bay Wind Farm: South Africa[36]

The Jeffreys Bay Wind Farm is a 138 MW, 60 turbine project, based in the Eastern Cape of South Africa.[37] Before breaking ground on the wind farm, the company conducted a full stakeholder consultation and environmental impact assessment, with an emphasis on the importance of community engagement and open communication. Environmental and planning authorities then assessed community concerns and created various socio-economic programs to address them. Now operational, the project has worked to help reduce poverty by employing local community members to maintain the wind farm. In addition, the wind farm is also partly owned by the community's Amandla Omoya Trust (a 6% shareholder in the project), which uses 80% of its budget for education projects in the low-income area of Port Elizabeth.

Additional Resources

Lily O'Neill, Kathryn Thorburn, and Janet Hunt. 2019. "Ensuring Indigenous Benefit from Large Scale Renewable Energy Project: Drawing on Experience from Extractive Industry Agreement Making" Centre for Aboriginal Economic Policy Research, Australian National University http://caepr.cass.anu.edu.au/sites/default/files/docs/2019/3/Working_Paper_127_2019.pdf

SOMO. 2017. "SOMO Annual Report 2017" Centre for Research on Multinational Corporations. https://www.somo.nl/wp-content/ uploads/2018/05/SOMO-Annual-Report-2017.pdf.

Stephen Spratt. "Power to the People: Pro-Poor Electricity Provision" Institute for Development Studies http://www.eldis.org/keyissues/power-people-pro-poor-electricity-provision#chapter-86.

United Nations Development Program. "Goal 1: No Poverty" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-1-no-poverty.html.

References

25. United Nations. 2015. "Transforming Our World: The 2030 Agenda for Sustainable Development." 3. http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E Accessed 21 August 2018.

26. United Nations Development Program. "Goal 1: No Poverty." http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-1-no-poverty.html Accessed 21 August 2018.

27. SOMO. 2017. "SOMO Annual Report 2017." Centre for Research on Multinational Corporations https://www.somo.nl/wp-content/uploads/2018/05/SOMO-Annual-Report-2017.pdf Accessed 21 August 2018.

28. GRI. "Global Reporting Initiative." www.globalreporting.org/Pages/default.aspx Accessed 21 August 2018.

29. Actionaid, U.K. March 2015. "Responsible Tax Practice By Companies" 4 https://www.actionaid.org.uk/sites/default/files/publications/responsible_tax_practice.pdf Accessed 21 August 2018.

30. Indufor. 8 November 2017. "Rural Valuation Tool Helps Communities Determine Land Value on their Own Terms" https://induforgroup.com/rural-valuation-tool-helps-communities-determine-land-value-on-their-own-terms/ Accessed 13 November 2018; Land Portal. December 2017. "Rights and Value: Rural Valuation Tool Helps Communities Determine Land Value on their Terms" https://landportal.org/event/2017/11/rights-and-value-rural-valuation-tool-helps-communities-determine-land-value-their Accessed 13 November 2018.

31. World Resources Institute. November 2017. "Can Renewable Energy Jobs Help Reduce Poverty in India?" http://www.wri.org/publication/can-renewable-energy-jobs-help-reduce-poverty-india Accessed 21 August 2018.

32. Business for Social Responsibility. 2018. "10 Human Rights Priorities for the Extractives Sector." https://www.bsr.org/our-insights/primers/10-human-rights-priorities-for-the-extractives-sector Accessed 21 August 2018.

33. Business & Human Rights Resource Centre. April 2017. "Investor Briefing: Renewable Energy Impact on Communities" 8. https://www.business-humanrights.org/sites/default/files/Investor%20briefing%20-%20Renewable%20energy%20-%20Apr%202017.pdf Accessed 7 September 2018.

34. Food and Agricultural Organization of the United Nations. 2016. "Free, Prior and Informed Consent." 17. http://www.fao.org/3/a-i6190e.pdf Accessed 21 August 2018.

35. Steve Sawyer. Global Wind Energy Council Representative. 20 March 2018. Author Interview.

36. Business & Human Rights Resource Centre. "So. Africa: Jeffreys Bay Wind Farm impacts communities in Jeffreys Bay." https://www.business-humanrights.org/en/so-africa-jeffreys-bay-wind-farm-impacts-communities-in-jeffreys-bay Accessed 21 August 2018.

37. Jeffrey Bay Wind Farm. https://jeffreysbaywindfarm.co.za/#faqs Accessed 21 August 2018.

SDG 2: Zero Hunger

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Regular, permanent, and unrestricted access to food is a fundamental human right.[38] While the global rate of undernourishment fell from 15% to 11% from 2000 to 2015,[39] the total number of undernourished people grew by 38 million in 2016, reaching 815 million worldwide.[40] The UN Food and Agriculture Organization (FAO) attributes this increase partially to increased conflict and more frequent extreme climate events in food insecure regions.[41] Meanwhile, the rate of stunted growth—a proxy for childhood chronic malnutrition—continues to fall globally, though an estimated 155 million children under the age of five are still too short for their age.[42] Like poverty, food insecurity is unevenly distributed across regions, with Asia and Africa suffering most from food shortage-related health issues.[43] Global food systems are also crucial to people's livelihoods; agriculture is the world's largest single employer, providing income or subsistence to 40% of the world's population.[44] The fight for food security appears likely to remain a key development challenge in the decades to come: the FAO projects global agricultural output may need to increase by 50% from 2012 levels by 2050 in order to keep up with population growth-driven food, feed, and bioenergy demands.[45]

Renewable energy companies' contributions to SDG 2 will therefore largely relate to impacts on food systems, and predominantly on local agriculture. The provision of electricity, especially in remote areas, can increase agricultural productivity and allow for refrigeration to preserve food and enable it to reach new markets. Renewable energy can also support local farmers by supplementing income through land-leasing and co-siting of renewable technologies and farms. However, the fact that many renewable energy technologies are well tailored for use on farmland also creates risks, including competition for arable land and potential for land-intensive renewable sources like solar or bioenergy to displace land formerly used for food production. Hydroelectric projects can also disrupt food production by flooding land or altering watersheds, and production of biofuels and drilling of geothermal wells can contaminate water sources and farmland. In order to help advance SDG 2 and fulfill their human rights responsibilities, renewable energy companies must avoid practices that destabilize local food systems.

Key Indicators Related to SDG 2 and Renewables

2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.

2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality.

2.3 By 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets, and opportunities for value addition and non-farm employment.

2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries.

SDG 2 RECOMMENDATIONS

Integrate into Core Business

- Explore synergies with food systems and support local industries
  - › Manage water resources transparently
  - › Seek out partnerships with small farms to provide additional income and strengthen economic viability
  - › Site projects on non-arable land
  - › Minimize land take
  - › Avoid competition for arable land by siting land-intensive projects on monitored brownfield sites, former industrial sites, or dual-use sites. These can include capped landfills, abandoned mining sites, former manufacturing sites, or parking canopies, among others
- Protect farmland from unintended consequences
  - › Conduct baseline and ongoing environmental impact assessments
  - › Monitor water quality and soil fertility regularly

Collaborate and Leverage

- Support local farmers
- Strengthen watershed management

Integrate SDG 2 Into Core Business

Explore synergies with food systems and support local industries

Renewable energy companies can contribute to ending hunger through the development of shared landscapes and associated infrastructure. Renewable projects like solar and wind farms can be developed alongside or around crop-producing land. Wind farms are particularly well-suited for co-siting with livestock-grazing pastures,[46] and some solar projects have planted flowers and other ground cover beneath arrays to maintain soil quality, reduce runoff, and attract pollinators.[47] Collaborative landscape management plans for food and energy can improve provision of services while respecting traditional land rights and local farming practices. Companies should consult with local stakeholders, including marginalized individuals and groups, to identify opportunities where infrastructure or land can be shared. This can enable companies to build long-term sustainable relationships with communities. Companies can also look for opportunities to produce and share (or sell) co-products at a low cost with communities. Products such as press cakes (the solids produced following biofuel production), can be used as livestock feed[48] and biogas from livestock manure can be used locally for energy.[49] Bioenergy produced from agricultural wastes, such as the bagasse from sugar production, can also be burned for heat or electricity to power food production. Using agricultural wastes, as opposed to crops, as a form of bioenergy can also help to reduce land change and contribute to the achievement of SDG 15 (life on land). However, the use of agricultural waste as a bioenergy should not compromise farmers' ability to use waste as animal feed and or to maintain soil quality, if they so choose.[50]

Site projects on non-arable land

Renewable energy companies can reduce the displacement of communities and slow the effects of land use change by using brownfields, abandoned, or degraded lands for project siting or bioenergy crop production. Before developing projects on active or potential farmland, companies should explore possibilities to develop projects on alternative, less fertile or non-arable sites, including monitored brownfields and capped landfills; former industrial, manufacturing, or mining sites; or dual-use sites like parking canopies. This applies to bioenergy developers as well, since many bioenergy crops can thrive in areas with low soil quality and water availability.[51] However, that a potential project site is less fertile does not guarantee that there will be no other land-use conflicts, and so prioritization of less fertile lands for project development cannot substitute for early and participatory community consultation practices.

Protect farmland from unintended consequences

Renewable energy project developers and operators must ensure that their installations do not jeopardize farms' abilities to produce by contaminating neighboring farmland. This includes conducting inclusive baseline and ongoing environmental impact assessments, and monitoring soil and water quality regularly. It also requires companies to develop plans to ensure that project-related environmental impacts are remediated after projects are concluded.

Collaborate and Leverage

Support local farmers

Companies can leverage their resources and expertise in myriad ways to support local farmers, including by buying agricultural products from local farms and by supporting policies and practices that strengthen agricultural productivity and local food systems. For example, agricultural waste products like straw, sawdust, and corn cobs can be sold to the bioenergy industry to create an additional revenue source for farmers.[52] Bioenergy companies can also buy harvested cover crops (the crops that restore soil during field rotation), thus providing further incentive and revenue for sustainable soil management. Planting cover crops confers long-term soil management advantages including reducing erosion, polluted runoff, and nutrient loss.[53]

Companies can also work with farmers to assess opportunities for project co-siting, as described above, to supplement existing income.

Strengthen watershed management

Especially for bioenergy and hydroelectric, companies should collaborate with local stakeholders to ensure responsible and sustainable watershed management to safeguard availability for agricultural needs. Where avoidable, bioenergy crop production should not compete for resources like farmland and water with farms. To manage this potential for competition, companies, governments, and communities can engage in regional planning for land and water management systems to ensure that bioenergy crops are not produced at the expense of food security.[54]

Case Studies

Intercropping with Gliricidia: Malawi[55]

In Malawi, the intercropping of maize with gliricidia, a nitrogen-fixing tree used for bioenergy, has helped to increase local crop yields. On average, this intercropping yields 3.7 tons of maize per hectare, compared to 0.5 - 1 tons per hectare without intercropping. Such an increase in yield can contribute to food security either by providing food to farmers directly, or by increasing income for food and other discretionary spending. The World Agroforestry Center is testing this technique with partners in Malawi in order to improve soil fertility and increase crop production. Gliricidia branches also serve as feedstock for a small power plant that provides electricity to smallholder farmers in the area, with excess sold to the national electricity grid. Intercropping thus simultaneously can increase crop yields, access to electricity, and community income. Biomass companies can encourage use of this technique to promote food security alongside electricity generation.

Additional Resources

Rabia Ferroukhi et al. January 2015. "Renewable Energy in the Water, Energy and Food Nexus" International Renewable Energy Agency http://www.irena.org/documentdownloads/publications/irena_water_energy_food_nexus_2015.pdf.

Scope. 2015. "Bioenergy & Sustainability: Bridging the Gaps" http://bioenfapesp.org/scopebioenergy/images/chapters/bioen-scope_introducao.pdf.

United Nations Development Program. "Goal 2: Zero Hunger" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-2-zero-hunger.html.

United Nations Food and Agriculture Organization. 2017. "The Future of Food and Agriculture: Trends and Challenges" http://www.fao.org/3/a-i6583e.pdf.

References

38. United Nations Human Rights, Office of the High Commissioner. "Special Rapporteur on the Right to Food" http://www.ohchr.org/EN/Issues/Food/Pages/FoodIndex.aspx. Accessed 21 August 2018.

39. United Nations Economic and Social Council. 2017. "Progress of Goal 2 in 2017" United Nations. https://sustainabledevelopment.un.org/sdg2. Accessed 23 August 2018.

40. United Nations Food and Agriculture Organization. 2017. "The State of Food Security and Nutrition in the World 2017" FAO, IFAD, UNICEF, WFP and WHO. ii. https://docs.wfp.org/api/documents/WFP-0000022419/download/?_ga=2.23551034.1896431468.1533659545-515532746.1533659545 Accessed 23 August 2018.

41. Ibid.

42. Id., 15

43. United Nations Economic and Social Council. 2017. "Progress of Goal 2 in 2017" United Nations https://sustainabledevelopment.un.org/sdg2 Accessed 23 August 2018.

44. United Nations. "Sustainable Development Goals: Goal 2" https://www.un.org/sustainabledevelopment/hunger/ Accessed 20 August 2018.

45. United Nations Food and Agriculture Organization. 2017. "The Future of Food and Agriculture; Trends and Challenges" http://www.fao.org/3/a-i6583e.pdf Accessed 23 August 2018.

46. Mark Kinver. December 2013. "Wind Turbines on Farms 'Can Help UK Meet Food and Energy Needs" BBC. https://www.bbc.co.uk/news/science-environment-25305454. Accessed 23 August 2018; US Department of Energy. 2004. "Wind Energy for Rural Economic Development" 4. https://www.nrel.gov/docs/fy04osti/33590.pdf. Accessed 23 August 2018.

47. Rural Solar Champions. "Pollinators." http://ruralsolarstories.org/pollinators/. Accessed 23 August 2018.

48. Rabia Ferroukhi et al. January 2015. "Renewable Energy in the Water, Energy and Food Nexus" International Renewable Energy Agency. http://www.irena.org/documentdownloads/publications/irena_water_energy_food_nexus_2015.pdf. Accessed 23 August 2018.

49. United Nations Food and Agriculture Organization. 2017. "The Future of Food and Agriculture: Trends and Challenges." 36. http://www.fao.org/3/a-i6583e.pdf. Accessed 23 August 2018.

50. Rabia Ferroukhi et al. January 2015. "Renewable Energy in the Water, Energy and Food Nexus" International Renewable Energy Agency. http://www.irena.org/documentdownloads/publications/irena_water_energy_food_nexus_2015.pdf. Accessed 23 August 2018.

51. Ibid.

52. University of East Anglia. March 2015. "Agricultural Waste Could Be Used As Biofuel" ScienceDaily. https://www.sciencedaily.com/releases/2015/03/150326083304.htm

53. Natural Resources Defense Council. March 2011. "Second Harvest: Bioenergy from Cover Crop Biomass" 8. https://www.nrdc.org/sites/default/files/covercrop_ip.pdf Accessed 10 September 2018.

54. David Tenenbaum. June 2008. "Food vs. Fuel: Diversion of Crops Could Cause More Hunger" Environmental Health Perspective. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2430252/ Accessed 10 September 2018.

55. Rabia Ferroukhi et al. January 2015. "Renewable Energy in the Water, Energy and Food Nexus." International Renewable Energy Agency. 80. http://www.irena.org/documentdownloads/publications/irena_water_energy_food_nexus_2015.pdf Accessed 23 August 2018.

SDG 3: Good Health and Well-Being

Ensure healthy lives and promote well-being for all at all ages

The human right to health is universal and interdependent with other human rights, including access to food, housing, work, education, sanitation, information, and participation.[56] Access to basic health services has improved significantly in recent decades, but progress remains uneven. For example, while the under-five mortality rate decreased by 44% globally to 40.8 deaths per 1,000 live births from 2000 to 2015,[57] the mortality rate remained twice that in Sub-Saharan Africa.[58] Furthermore, the UN reports that children born into poverty are more than twice as likely to die as their wealthier peers and that "only half of women in developing regions receive the recommended amount of health care they need."[59]

Renewable energy companies can contribute to the achievement of SDG 3 in several ways. Off-grid renewable energy developments can help power remote healthcare providers, and on-grid developments can increase electricity reliability and affordability for hospitals and other providers. Distributed renewable resources can also be deployed to provide much needed electricity in response to epidemics and disasters if electrical grid service is interrupted. Renewable energy can also improve health outcomes where it displaces dependence on polluting and harmful fossil fuels or indoor cooking fuels, which can in turn reduce negative health effects from air and water pollution.

However, while renewable energy can contribute to improvements in health and well-being, renewable energy projects can also negatively impact health outcomes. Companies must work to understand and mitigate these potential impacts throughout the project lifecycle, from material sourcing to technology manufacture, project development, operations, and disposal. This will involve efforts to anticipate and manage potential project-related harm, including by writing health and safety performance requirements into procurement contracts, creating company health and safety policies, offering occupational health and safety training for workers, and providing healthcare benefits for employees. In order to realize these benefits, companies must also perform inclusive human rights due diligence assessments, and, especially in the case of flooding from hydroelectric projects, ensure that projects do not threaten the safety of surrounding communities.

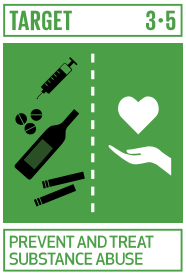
Key Indicators Related to SDG 3 and Renewables

3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

3.4 By 2030, reduce by one-third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and wellbeing.

3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.



3.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol.

3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents.

SDG 3 RECOMMENDATIONS

Integrate into Core Business

- Champion occupational health and safety
  - › Establish rigorous workplace health and safety policies, monitoring, and reporting
- Ensure that project development does not adversely affect community health
  - › Perform supply chain due diligence and do not source from companies with records of environmental contamination
  - › Consider and address project-related changes in community diet or hygiene with the potential to cause harm
  - › Incorporate safety and well-being requirements into construction contracts where applicable, including adequate dust control, construction vehicle speed limits, and time-of-day noise restrictions
- Promote employee wellness
  - › Provide healthcare benefits for employees
  - › Screen for non-communicable diseases
  - › Provide healthy canteen food options and good hygiene protocols
- Combat infectious diseases among employees
  - › Run HIV/AIDS education, prevention, and counseling programs for employees

Collaborate and Leverage

- Support electrification of healthcare services
- Support community health programs

Integrate SDG 3 Into Core Business

Champion occupational health and safety

First and foremost, companies should contribute to SDG 3 by minimizing potential health and safety risks for workers. The development of health impact assessments, prior to and throughout project implementation, can help companies to create health and safety policies tailored to risks. Appropriate clothing and equipment and access to health care should also be provided for all workers. Renewable energy companies can further promote worker health by providing occupational health and safety training for workers. Because renewable energy is a recent and rapidly growing industry, there may be a lack of collective awareness of potential work-related risks and hazards, including those related to electric shock, arc flash, or working from height. In order to manage the industry's rapid growth responsibly, companies must also ensure that inexperienced workers are not placed in risky situations for which they have not been adequately trained.[60]

Ensure that project development does not adversely affect community health

Companies must anticipate and mitigate potential project-related harm to community health and wellbeing. Ideally, this would include measuring baseline community health metrics against which to identify impacts. Where applicable, companies should incorporate safety and well-being requirements into construction contracts, including with respect to adequate dust control, construction vehicle speed limits, and time-of-day noise restrictions.

Companies should also work to avoid adverse health impacts throughout their supply chains, including incorporating safeguards against exposure of employees or communities to toxic contamination in procurement contracts. Solar operators and developers should perform due diligence on manufacturers and not source panels from firms that pollute the environment or subject workers to unsafe conditions.[61] They should also plan for end-of-life management from the beginning of project development to avoid the potential for toxics to leach into the soil or groundwater sources while in e-waste dumps.[62]

In addition, project developers and operators should consider the potential for projects to alter community diet or hygiene in a way that negatively impacts health. For example, sugarcane is a common crop for producing bioenergy; where bioenergy companies encourage farmers to increase sugarcane production, they should be cognizant of potential increases in sugar consumption in local diets and take efforts to mitigate negative health impacts.

Promote employee wellness

Workforce health is essential for company productivity. Companies should provide health benefits to employees where not provided by the state and create and implement company wellness programs to promote employee health and wellbeing. Such programs can include those to promote good lifestyle hygiene, serve healthy canteen food, and offer and encourage regular preventative health screenings.

Combat infectious diseases among employees

Renewable energy projects can drive an influx of new residents to neighboring communities in search of employment opportunities. This can exert pressure on local water, sanitation, and health infrastructure, which can increase the risk of infectious disease transmission. The construction phase of renewable energy projects in particular can attract a high volume of temporary workers, which can also increase the risk of sexual violence and the transmission of sexually transmitted infections.[63] Companies must establish prevention and response strategies, such as vaccination programs, sexual health education, and safe and confidential systems for reporting rape and sexual violence by employees to protect workers and maintain community health. The inclusion of local stakeholders in such healthcare initiatives can help to build relationships between companies and communities and can reduce the risk of disease for both the workforce and communities by increasing overall understanding of risks and the steps that can be taken to prevent transmission.[64]

Collaborate and Leverage

Support electrification of healthcare services

Health facilities need access to reliable power to perform a wide range of essential functions, from storing vaccines to conducting tests and operating on patients. However, according to the World Health Organization, as many as one in four health facilities in some regions lack access to electricity, and many more suffer reliability challenges.[65] Companies can help to promote health and wellbeing by providing renewable energy for local health clinics and education centers, especially through off-grid projects in remote areas. Health clinics can also serve to anchor microgrids and promote community electrification. Because health clinics and hospitals need reliable and consistent energy, hydroelectric technology has often been used for electrification of health services in water-rich regions.[66] Nevertheless, solar, geothermal, and wind energy can also supplement traditional energy sources or with storage technologies to minimize intermittency.

Support community health programs

In addition to health programs focused on employee wellbeing, companies can sponsor or support healthcare provision to other community members as part of social investment programs. This support may be especially impactful in areas where company resources allow for the provision of far more extensive services to employees than surrounding community members typically receive. Company contributions can also include public health campaigns, distribution of mosquito netting, or spraying of insecticide to prevent malaria.

Case Studies

Powering health clinics with off-grid solar: Sarguja, India[67]

In Surguja, a district in India's central Chhattisgarh state, the National Health Mission and Chhattisgarh Renewable Energy Development Agency have installed two kW off-grid solar photovoltaic systems (with a battery backup) in over 570 primary health centers since 2012. These renewable systems were designed to address power deficits plaguing one in three health centers in the state. The facilities now equipped with solar arrays have performed significantly better than those without, treating 50% more out-patients each month and providing 24-hour services. This performance is particularly impressive for "power-deficit" health centers that still receive less than 20 hours of electricity from the grid on a typical day. These centers also experienced fewer power disruptions throughout the day, and 80% reported electricity cost savings. While this program was implemented by a public agency, it can nevertheless serve as an instructive model for private sector developers hoping to share benefits from electrification or find new business opportunities.

Off-grid solar photovoltaic power: Zambia[68]

The United Nations Development Programme (UNDP) offers another potential model for the private sector. In the Eastern Province of Zambia, the Ministry of Health and UNDP identified three primary health care clinics that are inaccessible during the six-month rainy season to install off-grid solar photovoltaic power systems. The solar arrays have allowed the hospitals to improve equipment sterilization and safely maintain cold-chain storage for antiretroviral treatments and vaccines. The solar panels also power diagnostic equipment for malaria, tuberculosis, and HIV patient monitoring, as well as pumps for water purification. Private sector renewable companies can partner with public agencies on similar projects to earn and maintain a social license to operate and increase market penetration while also improving public health.

Additional Resources

Kirk Smith et al. 2013. "Annual Review of Public Health" https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-031912-114404.

United Nations Development Programme. "Goal 3: Good Health and Well Being" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-3-good-health-and-well-being.html.

United Nations Development Programme. 24 July 2017. "Mapping the Oil and Gas Industry to the Sustainable Development Goals: An Atlas" http://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/mapping-the-oil-and-gas-industry-to-the-sdgs--an-atlas.html.

World Health Organization. 2010. "Managing the Public Health Impacts of Natural Resource Extraction Activities" 18 https://commdev.org/wp-content/uploads/2015/06/WHO-Managing-the-public-health-impacts.pdf.

References

56. World Health Organization. 29 December 2017. "Human rights and health." http://www.who.int/news-room/fact-sheets/detail/human-rights-and-health Accessed 23 August 2018.

57 UNICEF, WHO, World Bank, UN DESA Population Division. "Mortality rate." The World Bank. https://data.worldbank.org/indicator/SH.DYN.MORT Accessed 23 August 2018.

58. Ibid.

59. United Nations. "Sustainable Development Goals: Goal 3." https://www.un.org/sustainabledevelopment/health/ Accessed 23 August 2018.

60. European Agency for Health and Safety. 2013. "Occupational Safety and Health in the Wind Energy Sector" https://osha.europa.eu/en/tools-and-publications/occupational-safety-and-health-in-the-wind-energy-sector Accessed 23 August 2018; William Steel. "Minimizing Worker Safety Risks in the Wind Energy Industry." Renewable Energy World. 25 May 2016. https://www.renewableenergyworld.com/articles/print/volume-19/issue-6/features/wind/minimizing-worker-safety-risks-in-the-wind-energy-industry.html Accessed 23 August 2018.

61. For example, according to China Dialogue, solar manufacturing can cause contamination where "large amounts of hydrofluoric acid used at solar-panel manufacturers result in large quantities of fluoride waste. Industry insiders say that rivers near solar-panel factories frequently show fluoride levels at least 10 times above mandated levels, sometimes as much as 100 times or more." Yu Dawei. 14 October 2011. "A Darker Side of Chinese Clean Tech" China Dialogue. https://www.chinadialogue.net/article/show/single/en/4583-A-darker-side-of-Chinese-clean-tech Accessed 23 August 2018.

62. See Bibek Bhandari and Nicole Lim. 27 July 2018. "The Dark Side of China's Solar Boom" Sixth Tone. https://www.sixthtone.com/news/1002631/the-dark-side-of-chinas-solar-boom- Accessed 12 September 2018; Michael Shellenberger. 23 July 2018. "If Solar Panels Are So Clean, Why Do They Produce So Much Waste?" Forbes. https://www.forbes.com/sites/michaelshellenberger/2018/05/23/if-solar-panels-are-so-clean-why-do-they-produce-so-much-toxic-waste/#123eb26a121c Accessed 12 September 2018.

63. Inter-American Development Bank. November 2014. "Gender and Renewable Energy: Wind, Solar, Geothermal and Hydroelectric Energy" Gender and Diversity Division; Social Sector. https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/idb_englishgetdocument.pdf Accessed 23 August 2018.

64. United Nations Development Programme. 24 July 2017. "Mapping the Oil and Gas Industry to the Sustainable Development Goals: An Atlas." http://www.undp.org/content/undp/en/home/presscenter/articles/2017/07/24/mapping-the-oil-and-gas-industry-to-the-sustainable-development-goals.html Accessed 23 August 2018; World Health Organization. 2010. "Managing the Public Health Impacts of Natural Resource Extraction Activities" 18. https://commdev.org/wp-content/uploads/2015/06/WHO-Managing-the-public-health-impacts.pdf Accessed 23 August 2018.

65. United Nations Development Programme. 24 September 2015. “Solar Panels Improve Health Care in Rural Zambia.” http://www.undp.org/content/undp/en/home/presscenter/articles/2015/09/24/running-health-facilities-on-solar-panels-in-remote-rural-zambia0.html Accessed 23 August 2018.

66. Andrea Franco et al. 2017. “A Review of Sustainable Energy Access and Technologies for Healthcare Facilities in the Global South.” Sustainable Energy Technologies and Assessments. https://infoscience.epfl.ch/record/230329/files/Franco%20et%20al_2017.pdf Accessed 23 August 2018.

67. Hem Dholakia. 19 October 2017. “What Renewable Energy Can Do for Healthcare in India.” World Economic Forum. https://www.weforum.org/agenda/2017/10/solar-power-can-reshape-our-health-future/ Accessed 23 August 2018.

68. UNDP. “Solar Panels Improve Health Care in Rural Zambia.” 24 September 2015. http://www.undp.org/content/undp/en/home/presscenter/articles/2015/09/24/running-health-facilities-on-solar-panels-in-remote-rural-zambia0.html. Accessed 23 August 2018.

SDG 4: Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Access to universal quality education is crucial to sustainable development. Education is essential to countries' long-term development,[69] civic and political discourse, health, and peace and security.[70] The human right to education requires states to provide for equal, available, and accessible education.[71] While global education enrollment continues to increase, in 2014 263 million children and adolescents between 6 and 17 still did not attend schools.[72] For many other students, poverty, low educational quality, or unsuitable or unsafe learning conditions threaten continued attendance. As is true for all of the SDGs, the achievement of SDG 4 is tied to the achievement of the Sustainable Development Agenda. For instance, as many as half of all school age children who do not attend school lived in conflict-affected areas in 2018, and disparities remain in access to education by gender.[73]

The renewable energy sector's most direct contribution to SDG 4 will likely be through offering workforce education and providing electricity to support students to attend school and to study at night. The renewable energy workforce is growing rapidly and potential employees need skills training in order to meet the demand for many jobs in the sector. Companies can contribute to this capacity development directly by providing training programs. They can also collaborate with schools and universities to develop curricula relevant for renewable jobs preparation. In addition, renewable energy companies can contribute to SDG 4 by partnering with local governments and civil society to provide power to schools and homes, thereby helping to improve learning environments.

Key Indicators Related to SDG 4 and Renewables

4.3 By 2030, ensure equal access for all women and men to affordable quality technical, vocational and tertiary education, including university.

4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples, and children in vulnerable situations.

4.7 By 2030, ensure all learners acquire knowledge and skills needed to promote sustainable development, including among others through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of cultures contribution to sustainable development.

4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.

4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries.

SDG 4 RECOMMENDATIONS

Integrate into Core Business

- Assess and upgrade the local skills base
  - Conduct skills baseline assessments and gap analyses
  - Sponsor apprenticeships, scholarships, and graduate programs
- Train and educate workers
  - Train workers in technical and management skills
  - Ensure training opportunities are made available to employees at all levels and across all backgrounds

Collaborate and Leverage

- Collaborate with universities to craft curricula around workforce needs
- Support electrification of schools

Integrate SDG 4 Into Core Business

Assess and upgrade the local skills base

To analyze skills gaps in the available workforce, renewable companies can assess and document skills baselines as part of workforce planning. In some cases, governments or other organizations may already be collecting and sharing data on skills and education of the population. Companies can work with these organizations or partner with schools, universities, or job-training providers to assess skills and better match potential workers with available jobs, identify skills gaps, design future training programs, and sponsor apprenticeships, scholarships, and graduate education.

Train and educate workers

Companies can contribute most directly to the achievement of SDG 4 through workforce training and education programs. Especially for jobs that require technical skills—from electrical technicians in the field to researchers in laboratories or lawyers in contract negotiations—workforce training programs may allow companies to enhance local capacity, hire more local employees, and thus meet local content requirements (where applicable) and build trust with communities. Innovative workforce training programs can expand on workers' existing skill sets and interests,[74] or increase opportunities for target groups like former fossil fuel workers,[75] veterans,[76] and women.[77] Training programs can also support the development of management skills required for upward mobility within the company. These skills will crucially improve workforce productivity for companies and contribute

to longer-term economic development as workers may be able to use transferable skills in future employment. In some cases, governments may offer tax or other financial incentives to encourage workforce development.

Collaborate and Leverage

Collaborate with universities to craft curricula around workforce needs

Renewable energy companies can partner with governments and universities to improve education curricula and alignment with business workforce needs. Global employment in the renewable energy sector grew by 5.3% to 10.3 million jobs from 2016 to 2017. However, in the US, employers are struggling to fill vacancies, with 75% of employers in the solar industry reporting difficulties recruiting qualified candidates.[78] Renewable energy companies can also create work-study programs and traineeships that help to train the next generation of renewable energy practitioners. Community education can be key to the success of renewable energy operations, ensuring the provision of a local, skilled workforce, and allowing companies to meet local content requirements, where applicable.[79] By establishing links with local education institutions, companies can also establish long-term relationships with communities and help to increase graduate employment.

Support electrification of schools

Renewable energy companies can partner with governments to connect renewable energy to schools, contributing to the creation of a positive and safe learning environment. Approximately 188 million children attended schools that lacked electricity in 2014.[80] Electrified schools outperform non-electrified schools and have higher staff retention. Furthermore, electricity can also crucially support adult continuing education, as it allows schools to teach classes after dark and can help other community members to complete homework or independent study at night.[81] Renewable energy can also power technological education, which can help students to acquire requisite skills for the digital economy. If companies choose to support community electrification efforts, they should consult with communities to assess needs and create plans to sustainably manage and maintain these technologies.

Case Studies

Enel and Barefoot College: Brazil and Kenya[82]

Multinational electricity producer and distributor Enel generates nearly half of all electricity sold from zero- or low- carbon sources including solar, wind, bioenergy, and hydroelectric.[83] The company also provides technical training on wind and solar technologies around the world. In collaboration with the Indian NGO Barefoot College, Enel trains women in remote areas of Latin America to become solar engineers, equipped to install, operate, and maintain solar panel systems in their local communities.[84] This program improves gender equity and access to job opportunities for people living in isolated areas.

Enel has also donated hundreds of solar lamps to schools in the Amboseli National Park in Kenya as part of their Powering Education program to support inclusive education and increase literacy rates in Africa.

Additional Resources

International Renewable Energy Agency. "IRENA's Renewable Energy Learning Partnership Platform Launched" http://www.irena.org/newsroom/articles/2012/Apr/IRENAs-Renewable-Energy-Learning-Partnership-platform-launched.

Tara Kandpal and Lars Broman. 2014. "Renewable Energy Education A Worldwide Status Review" Strömstad Academy http://www.stromstadakademi.se/sa_pdf/AAS-28.pdf.

United Nations Development Programme. "Goal 5: Quality Education" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-4-quality-education.html.

United Nations Department of Economic and Social Affairs. 2014. "Electricity and Education: The Benefits, Barriers, and Recommendations for Achieving the Electrification of Primary and Secondary Schools" https://sustainabledevelopment.un.org/content/documents/1608Electricity%20and%20Education.pdf.

References

69. Human Rights Watch. 2016. "The Education Deficit: Failures to Protect and Fulfill the Right to Education through Global Development Agendas" http://www.right-to-education.org/sites/right-to-education.org/files/resource-attachments/HRW_The_Education_Deficit_2016_En_0.pdf Accessed 23 August 2018.

70. Alan Smith et al. 2011. "The Role of Education in Peacebuilding: Literature Review." UNICEF https://resourcecentre.savethechildren.net/library/impact-conflict-childrens-health-and-disability-paper-commissioned-efa-global-monitoring Accessed 23 August 2018; Tami Tamashiro. 2010. "Impact of Conflict on Children's Health and Disability." UNESCO https://resourcecentre.savethechildren.net/library/impact-conflict-childrens-health-and-disability-paper-commissioned-efa-global-monitoring Accessed 23 August 2018.

71. For further information on education as a human right, see Right to Education. http://www.right-to-education.org/page/understanding-education-right Accessed 7 September 2018.

72. UNESCO. July 2016. "Leaving No One Behind: How Far on the Way to Universal Primary and Secondary Education?" https://en.unesco.org/gem-report/leaving-no-one-behind-how-far-way-universal-primary-and-secondary-education. Accessed 23 August 2018.

73. United Nations. "Sustainable Development Goals: Goal 4" https://www.un.org/sustainabledevelopment/education/ Accessed 23 August 2018.

74. See e.g., GRID Alternatives. "Get Training". https://gridalternatives.org/get-training Accessed 10 September 2018.

75. Coalfield Development. "Personal and Academic Development for People Facing Barriers to Full Employment" https://coalfield-development.org/personal-and-academic-development/ Accessed 10 September 2018.

76. US Department of Energy. "Solar Ready Vets" Solar Energy Technologies Office https://www.energy.gov/eere/solar/solar-ready-vets Accessed 10 September 2018..

77. See e.g. "Nontraditional Employment for Women." http://www.new-nyc.org Accessed 10 September 2018.

78. Richard Lawrence. "Breaking into the Solar Industry." Let's Go Solar. https://www.letsgosolar.com/consumer-education/solar-jobs-careers-certifications/ Accessed 7 September 2018.

79. Andrea Valcada. Enel Representative. 9 March 2018. Author Interview.

80. UNDESA. 2014. "Electricity and Education: The Benefits, Barriers, and Recommendations for Achieving the Electrification of Primary and Secondary Schools." https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=1608&menu=35 Accessed 23 August 2018.

81. Miquel Muñoz Cabré. Consultant for IRENA. 21 March 2018. Author Interview.

82. Enel. February 2017. "The Sun Reaches Inside Homes in Bahia." https://www.enel.com/stories/a/2017/02/the-sun-reaches-inside-homes-in-bahia Accessed 10 September 2018.

83. Enel. "Who We Are." https://www.enel.com/aboutus/who-we-are Accessed 23 August 2018.

84. Enel. February 2017. "The Sun Reaches Inside Homes in Bahia." https://www.enel.com/stories/a/2017/02/the-sun-reaches-inside-homes-in-bahia Accessed 10 September 2018.

SDG 5: Gender Equality

Achieve gender equality and empower all women and girls

Across the globe, gender-based discrimination and inequality continue to critically impede sustainable development. Achieving SDG 5 requires that women and girls be able to acquire and use productive assets, access education, healthcare, and employment, and have an equal voice in economic and political decision-making, in addition to the eradication of gender-based violence.

The provision of clean energy can itself contribute to achievement of SDG 5 in areas where energy poverty places disproportionate burdens on women. Renewable energy companies can also contribute to gender equality by providing gender inclusive work environments and by identifying and managing gender-specific project impacts. These contributions entail ensuring women's full and effective participation in business and project-related decisions, including in community consultations and benefit-sharing agreements, and implementing steps to achieve gender parity in employment and management positions.

To the extent possible, renewable companies should work to guarantee that women receive and are able to exercise control over their fair share of revenues associated with renewable projects. It is critical for community-company negotiations to enable all community members to effectively participate in decision-making. Companies should avoid scheduling meetings during times when women are unavailable to join; emphasize the importance of inclusive discussions; and organize separate meetings for women to encourage them to speak more freely.[85] Companies must also create policies and take action to reduce the risk of gender-based violence, both internally and with external operations. Gender-sensitive grievance mechanisms should be established to provide channels for women to seek remedy for complaints or grievances associated with a project's negative impacts, or for employee misconduct.

Key Indicators Related to SDG 5 and Renewables

5.1 End all forms of discrimination against all women and girls everywhere.

5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation.

5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.

5 GENDER EQUALITY

SDG 5 RECOMMENDATIONS

Integrate into Core Business

- Provide equal opportunities for women and establish gender-inclusive work environments
  - › Recruit more women and expand opportunities for women in traditionally male professions like construction and engineering
  - › Pay women and men equally
  - › Promote more women to visible leadership positions
  - › Provide gender-sensitive career development planning
  - › Adopt flexible schedules to accommodate childcare
- Remove barriers to women's participation in both the workforce and consultation processes and facilitate involvement throughout project lifecycles
  - › Ensure women's full and effective participation in business and project-related decisions
  - › Establish gender-sensitive grievance mechanisms
  - › Establish policies and practices to prevent and address gender-based violence

Collaborate and Leverage

- Deploy renewable energy to increase access to electric heating and outdoor lighting
- Make gender-inclusive social investments and commitments

Integrate SDG 5 Into Core Business

Provide equal opportunities for women and establish gender-inclusive work environments

Women remain underrepresented in renewable energy sector employment, especially for larger and grid-connected renewable energy projects.[86] While there may be many causes for this gender disparity, including a broader societal failure to encourage greater gender inclusion in STEM and construction fields, renewable energy companies can do more to promote gender parity in employment and should establish proactive initiatives to recruit and retain female employees. These efforts should start with an honest assessment of factors that might impede overall workforce gender parity and equal representation in company leadership. Companies should then establish interventions to promote improved company gender equity, including creating formal anti-harassment policies, trainings, and grievance mechanisms, offering flexible work schedules to accommodate childcare, and providing specific career development planning opportunities for women. In addition, companies should commit to equal pay for equal work, and should promote women to visible leadership positions.

Remove barriers to women's participation in both the workforce and consultation processes and facilitate involvement throughout project lifecycles

Gender discrimination can result in numerous disparate impacts throughout renewable project development. When renewable companies first propose projects to communities, they must ensure that women participate fully in company-community interactions. Conducting gender-sensitive consultations requires companies to schedule meetings at times when women will not be busy with other work and in a location easily accessible by women in the community. If women in a community are less likely to be literate than men, companies should ensure that information about the project is made available in other ways that women can access. Gender-sensitive consultations may also require separate meetings for women to identify the resources women traditionally own or use and to weigh in on decisions (in some communities, women may be hesitant to speak freely where men are also present and may speak more candidly in all-female meetings).[87] If project development requires compensation for communal lands, renewable companies should work to ensure that compensation is gender-equitable.[88] For example, compensation schemes that involve payments to both spouses (rather than only the heads of households) may help to address inequities between women and men.[89]

Once project development and operations are underway, companies must establish strong protections against project-related gender-based violence that can sometimes result from an influx of male workers into a community. Companies must establish a culture of respect for women with clear policies and procedures regarding sexual misconduct and harassment, both in their operations as well as in their agreements with sub-contractors. If projects are guarded by private security providers, these security providers should receive gender-based violence prevention training and have strict policies prohibiting personnel from engaging in or benefiting from sexual exploitation or gender-based violence. Renewable energy companies should make these policies a prerequisite for contracting with a private security provider and terminate the relationship if abuse does occur.

Collaborate and Leverage

Deploy renewable energy to increase access to electric heating and outdoor lighting

The provision of clean energy can itself contribute to the achievement of SDG 5, especially where energy poverty places disproportionate burdens on women. Nearly one-third of all people lack access to modern forms of energy and rely on combustion of solid biomass to prepare food.[90] The smoke produced by biomass is harmful to inhale, especially in enclosed spaces. Since women are often responsible for household food preparation, access to electricity can critically improve women's health

where it displaces reliance on indoor cooking fuels in favor of electric stoves or ovens.[91] Access to renewable energy may also contribute to decreases in gender based violence where it is used to increase outdoor street lighting.[92] Moreover, where access to electric appliances makes household chores like cooking and cleaning less time consuming, increasing access to electricity can increase the time that women and girls have to receive education and earn income.

Make gender-inclusive social investments and commitments

Renewable energy projects have traditionally offered greater employment opportunities to men.[93] Renewable energy companies should therefore tailor social investment to ensure that women and girls share in the benefits of renewable development. These efforts can include scholarships for education, employment or vocational training offered specifically to women, or support for women's health programs. Where women have less say in political, economic, and social decision-making, companies can work with civil society organizations and local leaders to support culturally sensitive opportunities that promote equal participation and leadership.

Case Studies

Supporting female entrepreneurs through geothermal: El Salvador[94]

LaGeo is an electric generation company whose geothermal fields and power plants generate 27% of El Salvador's electricity with renewable energy. The company created a program for women neighboring its geothermal fields to use waste heat from the geothermal steam to dehydrate fruit for subsistence and for sale. They also grow and sell plants watered with geothermal condensates. Dozens of women from 15 rural communities surrounding the geothermal field have participated in the initiative so far, and more than 45,000 people benefit indirectly from the initiative.

Achieving new standards for equal gender participation: Morocco[95]

ACWA Power's Khalladi Wind Farm in Morocco intends to increase incomes, improve the livelihoods of communities, and empower women. The project provides trainings in cooperative management and focuses on the importance of engaging women in decision-making processes, both as participants and decision makers. This project complies with the W+ standard, developed by Women Organizing for Change in Agriculture and Natural Resource Management, that certifies projects that increase social and economic benefits for women.

Additional Resources

Rebecca Pearl-Martinez and Jennie C. Stephens. 2016. "Toward a Gender Diverse Workforce in the Renewable Energy Transition" Sustainability: Science, Practice and Policy https://www.tandfonline.com/doi/pdf/10.1080/15487733.2016.1190 8149.

Sibyl Nelson and Anne T. Kuriakose. 2017. "Gender and Renewable Energy: Entry Points for Women's Livelihoods and Employment" Climate Investment Funds https://www.climateinvestmentfunds.org/sites/cif_enc/files/gender_and_re_digital.pdf.

United Nations Development Programme. "Goal 5: Gender Equality" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-5-gender-equality.html.

United Nations Food and Agriculture Organization. 2013. "Governing Land for Men and Women: A Technical Guide to Support the Achievement of Responsible Gender-Equitable Governance on Land Tenure" http://www.fao.org/3/a-i3114e.pdf.

United Nations Industrial Development Organization. 2014. "Guide on Gender Mainstreaming: Energy and Climate Change Projects" https://www.unido.org/sites/default/files/2015-01/Guide_on_Gender_Mainstreaming_ECC_0.pdf.

USAID. 2017. "Gender Equality in Renewable Energy in the Lower Mekong: Assessment and Opportunities" https://www.sei.org/media-manager/documents/Publications/Bangkok/SEI_2017_Report_USAID-CleanPowerAsia-GenderEquality-WhitePaper.pdf.

World Bank Energy Sector Management Assistance Program. 2018. "Getting to Gender Equality in Energy Infrastructure: Lessons from Electricity Generation, Transmission and Distribution Projects" http://documents.worldbank.org/curated/en/639571516604624407/Getting-to-gender-equality-in-energy-infrastruc-ture-lessons-from-electricity-generation-transmission-and-distribution-projects

References

85. Columbia Center on Sustainable Investment and Namati. 2017. "Preparing in Advance for Potential Investors" 12. http://ccsi.columbia.edu/work/projects/guidance-for-communities-interacting-with-investors/ Accessed 4 September 2018.

86. Sibyl Nelson and Anne T. Kuriakose. 2017. "Gender and Renewable Energy: Entry Points for Women's Livelihood and Employment." Climate Investment Funds. 4 https://www.climateinvestmentfunds.org/sites/cif_enc/files/gender_and_re_digital.pdf Accessed 23 August 2018.

87. Columbia Center on Sustainable Investment and Namati. 2017. "Preparing in Advance for Potential Investors" 12 http://ccsi.columbia.edu/work/projects/guidance-for-communities-interacting-with-investors/ Accessed 4 September 2018.

88. Resource Equity. 2018. "Gender, Land, and Extractive Development: Issues and Opportunities for Improved Understanding and Practice." Discussion paper. 5 https://landwise.resourceequity.org/record/3000 Accessed 21 August 2018.

89. See United Nations Food and Agriculture Organization. 2013. "Governing Land for Women and Men" 80 http://www.fao.org/3/a-i3114e.pdf Accessed 23 August 2018.

90. International Energy Agency. October 2017. "Energy Access Outlook 2017" http://www.iea.org/access2017/ Accessed 10 September 2018.

91. Sibyl Nelson and Anne T. Kuriakose. 2017. "Gender and Renewable Energy: Entry Points for Women's Livelihood and Employment" Climate Investment Funds. 3 https://www.climateinvestmentfunds.org/sites/cif_enc/files/gender_and_re_digital.pdf Accessed 18 April 2019.

92. Ibid.

93. Sustainable Energy for All. 2017. "Opening Doors: Mapping the Landscape for Sustainable Energy, Gender Diversity, & Social Inclusion" https://www.seforall.org/sites/default/files/Opening_Doors-Full.pdf Accessed 15 May 2019.

94. United Nations Framework Convention on Climate Change. "Harvesting Geothermal Energy: El Salvador" https://unfccc.int/climate-action/momentum-for-change/women-for-results/harvesting-geothermal-energy Accessed 15 October 2018.

95. WOCAN. "W Plus Standard" www.wplus.org Accessed 10 September 2018.

SDG 6: Clean Water and Sanitation

Ensure availability and sustainable management of water and sanitation for all

The human right to safe and clean drinking water and sanitation[96] is critical for the realization of other human rights, and is inextricably linked to public health. However, providing safe drinking water and adequate sanitation remains a significant development challenge globally.[97] At present, 2.1 billion people lack access to safe drinking water and 4.5 billion people do not have access to safely managed sanitation services. Unsafe hygiene practices are widespread, and more than 340,000 children under five die each year from diarrheal diseases due to unsafe drinking water, poor sanitation, or poor hygiene.[98] Alongside health concerns, access to water and sanitation also intersect with other inequalities, including gender inequality. Ensuring availability and sustainable management of water and sanitation for all can help reduce water-related illness, create safer living environments, and create resilient communities.[99]

While some renewable energy sources like wind and solar allow for the generation of electricity in a far less water-intensive manner than traditional fossil fuel energy sources—which can require substantial quantities of water to act as working fluids in power plants or to assist hydrocarbons extraction—renewable energy companies must nevertheless monitor their impacts on local water systems and establish policies and practices for sustainable water use. Companies should consider community needs in project siting and work with communities to plan watershed management and monitor water quality. They should also support governments, communities, and civil society to develop renewable energy projects to power desalination plants with large-scale grid-connected projects, or ground water pumps off grid.

Key Indicators Related to SDG 6 and Renewables

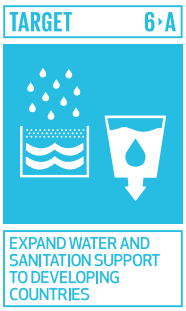
6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally



6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.b Support and strengthen the participation of local communities in improving water and sanitation management

SDG 6 RECOMMENDATIONS

Integrate into Core Business

- Manage water holistically and develop a company water use policy
  - › Comply with government water management policies
  - › Integrate technical, social, economic, and political water concerns
  - › Identify high-value water areas
  - › Maintain long-term water balance throughout projects
- Conserve and recycle water
  - › Consider community water needs in project siting
  - › Reduce water consumption throughout all stages of renewable value chain
  - › Use non-potable water sources (greywater, seawater)
- Develop plans to reduce or eliminate storm water and other pollution during construction and operations
- Monitor and disclose water quality and usage
  - › Monitor water sources both near-project and downstream
  - › Involve communities in monitoring and share water data openly

Collaborate and Leverage

- Leverage power generation for desalination, groundwater pumps, and sanitation systems
- Collaborate with other stakeholders to plan watershed management
- Share benefits of water infrastructure

Integrate SDG 6 Into Core Business

Manage water holistically and develop a company water use policy

Renewable energy companies can help ensure the availability and sustainable management of water and sanitation by developing a company water use policy that promotes holistic management of water resources. This involves assessing water availability, monitoring water quality, and managing competing demands. Companies should identify, document, respect, and procure (where necessary) local and indigenous communities' legal and customary water rights affected by a project's water use. Companies should also adhere to the water management requirements and environmental regulations of the country within which they are operating. Water use must be sustainable relative to community use and renewable supplies.

Strategies to reduce water use, recycle water resources, and improve water storage facilities can help to improve water security. Renewable energy companies can further contribute to the achievement of SDG 6 by monitoring water quality adjacent to their projects and reporting on their water use. While some technologies require little water to develop and operate, bioenergy projects can require significant water inputs depending on the type of feedstock used.[100] Projects should therefore explore alternative feedstocks, such as residue-based bioenergy, which is less water intensive, where possible. They should also be sensitive to local climatic conditions, particularly if operating in areas that are water scarce: for example, in arid environments, operators of large solar voltaic farms may want to consider water-efficient methods to clean panels, either by alternating dry cleaning with efficient wet systems, or investing in electrostatic cleaning and robotic systems that eliminate the need for water to clean all but hard deposits.[101]

Conserve and recycle water

One of the most consequential decisions that a company can make to minimize impact on water systems is the selection of project site location. In conducting feasibility studies and environmental and social impact assessments, companies should consider the impact that projects could have on local water systems, consult with local stakeholders, and avoid siting in high-impact areas. For renewable energy sources like bioenergy and hydroelectric that have larger impacts on water systems, companies should adopt practices to reduce water consumption and mitigate any potential contamination of community water sources. While solar and wind projects are less water intensive once in the development and operational stages of projects, companies should be aware of potential water impacts in project construction and supply chains and prioritize sourcing from responsible manufacturers.[102] Finally, where possible, renewable companies should meet their water needs through non-potable water sources like grey water or seawater.

Develop plans to reduce or eliminate storm water and other pollution during construction and operations

Companies must assess and create plans to prevent potential negative impacts of project development and operations on local water sources. This will be particularly important during project construction for solar and wind installations. Bioenergy companies can also reduce contamination of watersheds and protect human health by closely managing or eliminating pesticide use[103] and fertigation of crops (injecting fertilizer into irrigation systems).[104]

Monitor and disclose water quality and usage

Renewable sources like bioenergy, hydro, concentrated solar, and geothermal can consume substantial amounts of water and potentially put pressure on local water systems. In addition to monitoring and disclosing development impacts on water quality, companies should be transparent and collaborate with communities about their water usage.

Collaborate and Leverage

Leverage power generation for desalination, groundwater pumps, and sanitation systems

Renewable energy-powered technologies like solar pumps offer cost-effective alternatives to grid-connected or diesel groundwater pumps. These pumps can support the expansion of irrigation and reduce dependence on traditional energy sources for water access.[105] These technologies have been underutilized to date because of high capital costs and the lack of adequately trained system installers and operators. Companies could collaborate with governments, communities, and civil society organizations to levelize pump costs over project lifespans and increase capacity through trainings or provision of other instructional materials. Where these pumps are installed though, partners should be aware of the risk that pumps might facilitate over-extraction due to low marginal operating costs.

Collaborate with other stakeholders to plan watershed management

Renewable energy companies should work with local communities, civil society organizations, and other stakeholders when considering project impacts and creating water use management plans. All impacted stakeholders must be represented in these conversations and decisions around water. Companies' convening power around watershed management is especially important when projects have transboundary and cumulative impacts, a major challenge for hydroelectric projects. Inclusive participation can help to reduce potential friction caused by water and energy management in both upstream and downstream countries and reduce the risk of project development delays.[106]

Share benefits of water infrastructure

In areas where companies must build new infrastructure to meet project water needs (either to pump groundwater or transport water from elsewhere), companies should work with governments to alleviate water competition and enable third party (e.g. local community) access to and use of improved water supply. Company projects can critically bring fresh water to areas otherwise lacking reliable access.

Case Studies

Improving water-use efficiency: France[107]

Electricité de France (EDF) has worked to ensure synergies across water-energy and food demands near its Serre-Ponçon hydroelectric plant in France. EDF's Serre-Ponçon hydroelectric system is comprised of 21 hydroelectric plants that generate 6,500 GWh per year. In order to minimize negative impacts on neighboring farms, EDF developed a "Water Saving Convention" agreement on the allocation of water resources between the hydroelectric plants and the two main irrigators nearest to the dam. The agreement, which is reviewed annually, provides that EDF compensate the irrigators for their commitments to reduce water consumption. As a result, irrigators have reduced consumption through technological innovation and better water use management, resulting in a more than 25% decrease in consumption from 2006 to 2015. This conservation has, in turn, allowed EDF to generate more electricity during peak demand periods.

Strengthening water distribution and storage: Tanzania[108]

In Tanzania, insufficient water distribution and storage infrastructure has left approximately 85% of the population without access to safe drinking water. In 2016, the TATU Project, a Tanzanian sustainable development organization, partnered with Energy for All (E4A) to implement a water access project in northern Tanzania. The two villages supported by this project are in the Pangani River Basin, where agricultural use and a hydroelectric dam have stressed the region's surface water supply. Women in the community walk upwards of an hour each day to collect water, limiting time available for education and work. E4A and the TATU Project are working with the local commu-

nity to install a well and irrigation system that will use solar panels to pump 30,000 liters of fresh, clean groundwater daily. After they are trained, local technicians will operate and maintain the well, creating local jobs. Project materials will also be sourced from local manufacturers. Finally, E4A and the TATU Project will educate community members on healthy water, sanitation, and hygiene practices. This model can be adapted and implemented by private renewable companies to improve water distribution and access.

Leveraging existing infrastructure to enhance water-power synergies: United States and South Africa[109]

In 2009, the Valley Center Municipal Water District in California installed a 1.1 MW solar power system, which now offsets nearly 20% of the utility's largest pumping station's electricity needs. Just south of Valley Center, the Idyllwild Water District (IWD) near Palm Springs, California has deployed a 44.1 kW solar PV system that now provides 83% of the district's electricity. This system has also helped to increase the reliability of water supply. Before its installation, when high winds caused outages, the IWD was unable to pump drinking water without backup diesel power generation.

Similarly, in South Africa eThekwini Water and Sanitation serves the more than 3.5 million residents of Durban. eThekwini Water and Sanitation works to identify opportunities to install mini-hydroelectric plants to supply electricity from existing water supply infrastructure. By maximizing benefits from existing infrastructure, they hope to provide a replicable model for other regional water managers, including in rural areas of northern Kwazulu-Natal where water and power availability is limited.

Additional Resources

Rabia Ferroukhi et al. January 2015. "Renewable Energy in the Water, Energy and Food Nexus" International Renewable Energy Agency http://www.irena.org/documentdownloads/publications/irena_water_energy_food_nexus_2015.pdf.

United Nations Development Programme. "Goal 6: Clean Water and Sanitation" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-6-clean-water-and-sanitation.html.

United Nations Economic Commission for Europe. 2017. "Deployment of Renewable Energy: The Water-Energy-Food-Ecosystem Nexus Approach to Support the Sustainable Development Goals" https://www.unece.org/index.php?id=46026.

United Nations Economic Commission for Europe and the World Health Organization. 2012. "No One Left Behind: Good Practices to Ensure Equitable Access to Water and Sanitation in the Pan European Region" https://www.unece.org/fileadmin/DAM/env/water/publications/PWH_No_one_left_behind/No_one_left_behind_E.pdf.

References

96. See e.g., UN General Assembly Resolution 63/292 (explicitly recognizing the human right to water and sanitation); UN Committee on Economic, Social and Cultural Rights, General Comment No. 15 on the right to water; UNECE. 2016. "Guidance Note on the Development of Action Plans to Ensure Equitable Access to Water and Sanitation" https://www.unece.org/fileadmin/DAM/env/water/mop4/Informal_doc/1623154_E_FinalWeb.pdf Accessed 23 August 2018.

97. United Nations. "Thematic Debate of the General Assembly 'Water, Sanitation and Sustainable Energy in the Post-2015 Development Agenda.'" http://www.un.org/en/ga/president/68/settingthestage/1wsse.shtml Accessed 23 August 2018.

98. United Nations. 2017. "Water, Sanitation and Hygiene." http://www.unwater.org/water-facts/water-sanitation-and-hygiene/ Accessed 23 August 2018.

99. UNECE. November 2016. "A Healthy Link: The Protocol on Water and Health and the Sustainable Development Goals" https://www.unece.org/environmental-policy/conventions/water/envwaterpublicationspub/brochures-about-the-protocol-on-water-and-health/2016/a-healthy-link-the-protocol-on-water-and-health-and-the-sustainable-development-goals/doc.html Accessed 23 August 2018.

100. Rabia Ferroukhi et al. January 2015. “Renewable Energy in the Water, Energy and Food Nexus” International Renewable Energy Agency. 80. http://www.irena.org/documentdownloads/publications/irena_water_energy_food_nexus_2015.pdf Accessed 23 August 2018.

101. Ibid.

102. See n. 61 on fluoride contamination from solar manufacturers in China. Yu Dawei. 14 October 2011. “A Darker Side of Chinese Clean Tech” China Dialogue https://www.chinadialogue.net/article/show/single/en/4583-A-darker-side-of-Chinese-clean-tech Accessed 23 August 2018.

103. The pesticides used by some large-scale bioenergy producers have been predicted to have adverse effects on the availability of safe drinking water and aquatic life in Michigan. Bradley J. Love et al. June 2011. “Effects on Aquatic and Human Health Due to Large Scale Bioenergy Crop Expansion” Science of the Total Environment https://www.ncbi.nlm.nih.gov/pubmed/21640371 Accessed 10 September 2018.

104. Douglas Cox. “Best Management Practices (BMPs) to Increase Fertilizer Efficiency and Reduce Runoff” University of Massachusetts Amherst. https://ag.umass.edu/greenhouse-floriculture/fact-sheets/best-management-practices-bmps-to-increase-fertilizer-efficiency Accessed 10 September 2018.

105. UN-Water. January 2014. “Partnerships for Improving Water and Energy Access, Efficiency and Sustainability” http://www.un.org/waterforlifedecade/water_and_energy_2014/pdf/water_and_energy_2014_final_report.pdf Accessed 23 August 2018.

106. United Nations Economic Commission for Europe. June 2017. “Deployment of Renewable Energy: The Water-Energy-Food-Ecosystem Nexus Approach to Support the Sustainable Development Goals” https://www.unece.org/environmental-policy/conventions/water/envwaterpublicationspub/envwaterpublications-pub74/2017/deployment-of-renewable-energy-the-water-energy-food-ecosystem-nexus-approach-to-support-the-sustainable-development-goals/doc.html Accessed 23 August 2018.

107. United Nations Economic Commission for Europe. 2016. “Guidance Note on the Development of Action Plans to Ensure Equitable Access to Water and Sanitation” https://www.unece.org/fileadmin/DAM/env/water/mop4/Informal_doc/1623154_E_FinalWeb.pdf Accessed 23 August 2018.

108. Energy for All. “Tanzania Water Project” http://energyforall.ca/tanzania-clean-water-renewable-energy/ Accessed 15 November 2018.

109. Rabia Ferroukhi et al. January 2015. “Renewable Energy in the Water, Energy and Food Nexus.” International Renewable Energy Agency. 80. http://www.irena.org/documentdownloads/publications/irena_water_energy_food_nexus_2015.pdf Accessed 23 August 2018.

SDG 7: Affordable and Clean Energy

Ensure access to affordable, reliable, sustainable and modern energy for all

Access to energy is directly or indirectly linked to all 17 SDGs. Approximately 1.1 billion people around the world did not have access to electricity in 2017, and 2.5 billion relied on polluting and dangerous solid biomass to cook and heat their homes.[110] As noted in other chapters, access to sustainable and modern energy can help to reduce poverty and hunger (SDGs 1 and 2), support long-term economic growth (SDG 8), improve provision of healthcare, education, and clean water (SDGs 3, 4, and 6), and bridge gender and socioeconomic inequalities (SDGs 5 and 10). In short, lack of access to energy is a major impediment to the achievement of the 2030 Agenda.

The renewable energy industry is therefore instrumental to the success of the SDGs, and the achievement of SDG 7 in particular. Because many renewable energy technologies—including solar, wind, and micro hydro—can be deployed modularly, renewable energies are uniquely positioned to expand electricity access off-grid in remote areas where it is expensive to connect communities to centralized electricity grids (while 97% of urban populations have access to electricity, only 77% of rural populations do).[111]

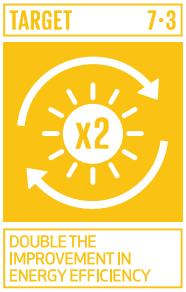
In addition, SDG 7 calls for not only universal access to energy, but universal access to clean energy. Renewables are therefore doubly essential to SDG 7's achievement, helping also to increase availability of sustainable energy when grid-integrated to replace fossil fuels in the energy mix (as discussed in more detail in SDG 13). According to the IEA, fossil fuels accounted for more than 81% of global energy supply and 65% of electricity generation in 2016.[112] Meanwhile, the IPCC projects that renewables will have to supply between 70 – 85% of electricity generation by 2050 in order to hold warming to 1.5° C.[113] This will require massive deployment of renewable projects over the coming decades.

While renewable energy companies will be crucial actors in this effort, displacement of fossil fuels in global energy systems relies critically on government regulation, policy, and planning. Renewable energy companies should therefore partner with governments, as well as electric utilities and independent system operators, to maximize renewable projects' abilities to increase access to clean energy. They should also advocate for pro-renewable policies like renewable portfolio standards to hasten the transition to clean energy, and invest in research and development to make renewable energy technologies cheaper, more productive, and more reliable. Finally, though this Atlas focuses predominantly on improving sustainability of power supply, renewable companies can support these partners to reduce fossil fuel use and dependence in the transportation and building heating and cooling sectors to ensure access to sustainable and modern energy for all.

Key Indicators Related to SDG 7 and Renewables

7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.

7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.



7.3 By 2030, double the global rate of improvement in energy efficiency.

7.a. By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.

7.b. By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and landlocked developing countries, in accordance with their respective programmes of support.

7 AFFORDABLE AND CLEAN ENERGY

SDG 7 RECOMMENDATIONS

Integrate into Core Business

- Deploy utility-scale renewable projects to increase access to clean energy
- Deploy distributed generation to improve access to reliable electricity
- Diversify power sources and deploy storage to overcome intermittency challenges
- Educate customers about consumption patterns and usage to optimize renewable energy use

Collaborate and Leverage

- Leverage economies of scale to provide non-grid connected communities access to energy generation technologies and transmission infrastructure
- Support local energy initiatives
- Work with governments and other actors to reduce reliance on fossil fuels
- Invest in clean energy research and development to decrease costs, improve efficiency, and overcome intermittency challenges
- Share knowledge with governments, communities, and civil society about electrification initiatives
- Integrate renewable generation capacity into local electrification schemes
- Include affected communities, and especially indigenous communities, in electrification efforts

Integrate SDG 7 Into Core Business

Deploy utility-scale renewable projects to increase access to clean energy

As implied above, installed renewable energy capacity will need to grow by nearly 650% over the next three decades to meet global climate goals.[114]

Such a massive and rapid deployment will require leveraging the crucial economies of scale that utility-scale installations provide. For companies like those in the renewables sector for which products themselves inherently contribute to the achievement of the SDGs, efforts to increase availability and deployment without undermining other SDGs and human rights are essential. Utility-scale installations will critically provide the cost efficiencies to replace fossil fuel use and improve affordability.

Deploy distributed generation to improve access to reliable electricity

Renewable energy technologies, especially solar, are uniquely well-positioned for distributed generation of electricity, which can crucially expand power access to remote or other energy poor communities. Distributed energy installations allow for more efficient, flexible, and empowering provision of electricity. Such systems, like solar arrays, allow for generation of energy near to electricity demand, thereby avoiding electricity losses from resistance over long transmission distances. This can translate to financial savings and improved efficiency for the energy system.

These systems can be grid connected, or, where grid connection is prohibitively expensive, deployed off-grid as integrated systems designed to operate with minimal or no diesel power. These off-grid projects should incorporate means to address intermittency challenges from renewables, through source balancing, installation of battery storage, and education to align load demand to supply (see below).[115]

Modular systems can also provide end users with greater control over how electrical currents are directed, for example allowing system operators to prioritize flow to certain electrical loads like medical equipment or refrigerators. Furthermore, modular renewable installations can allow communities and households to own generation technologies themselves, benefiting directly from cost savings or profits from energy production.

Despite these potential benefits, more investment is needed to deploy distributed generation technologies at greater scale. Some of these projects struggle to attract private financing because investment volumes are relatively small and risk-return profiles are less favorable than utility-scale installations.[116] Companies should explore innovative financing models to expand into new markets where there is unmet demand, particularly in isolated and low-income communities. One such model that has worked well in East and West Africa uses a "pay-as-you-go" structure. After customers pay an initial installation fee, decentralized energy services companies ("DESCOs") collect payment at regular intervals through their customers' mobile phones. Users can choose to increase their plans as needed.[117] Or, companies can pursue Power Purchase Agreements (PPAs), which can be structured in ways that allow users or communities to gradually purchase installations that initially are paid for and owned by solar companies.

Diversify power sources and deploy storage to overcome intermittency challenges

While renewable energy technologies can critically expand electricity access and decrease environmental impact, intermittency remains an important impediment to deep decarbonization. Renewable energy companies can manage and overcome these challenges by diversifying power sources and integrating installations with energy storage to create robust systems with buffers to prevent power losses. While ultimate management of electricity grids falls to independent system operators, companies can support greater penetration of renewables into the energy mix by supporting operators to deploy complementary power sources like wind and solar and dispatchable technologies like biomass, geothermal, pumped hydroelectric, or battery storage. In addition, operators can mitigate damage caused by intermittency by using automated switches to direct power to essential services like hospitals, critical infrastructure, emergency shelters, senior housing, schools, and then progressively to end-uses of lesser need.

Educate customers about consumption patterns and usage to optimize renewable energy use

As noted above, many renewable energy sources still suffer from intermittency challenges. Technological solutions to intermittency, including storage, are not the only or necessarily most cost-effective means to address challenges. In many cases, it may be cheaper to adapt consumption patterns to electricity availability. Renewable energy companies can educate customers about managing their electricity use to maximize deferrable loads during the day, when the sun is shining. While not all loads are deferrable, many high-consumption tasks are time-flexible, including water heating, phone charging, computer charging, cooking, and clothes washing.

Collaborate and Leverage

Leverage economies of scale to provide non-grid connected communities access to energy generation technologies and transmission infrastructure

Land intensive renewable energy projects are often sited in rural areas—where land is more accessible—but serve urban population centers. Meanwhile, the rural residents who live near these renewable developments are much less likely than their urban counterparts to have access to electricity. Renewable energy companies should look for opportunities to leverage economies of scale to provide non-grid connected communities access to energy generation technologies and transmission infrastructure. This might include offering to procure extra solar panels and selling them to neighboring communities at bulk rates. Or, if there are opportunities to share transmission infrastructure from developments (specifically where short-range transmission infrastructure is being used or can be easily connected), companies could coordinate with local governments and utility companies to connect nearby communities. For off-grid projects, companies could use project developments to anchor microgrids, and allow other community stakeholders to connect, or increase the size of developments for greater electrification. This is especially true for indigenous communities, which comprise a disproportionate number of the world's rural and energy poor.[118]

Support local energy initiatives

Renewable energy companies and industry organizations can leverage their expertise to support local initiatives that are led by and benefit local communities. Again, Power Purchase Agreements (PPAs) provide an appealing model for communities to gain access to renewable energy without facing large upfront capital costs. Or, companies can encourage local governments or community groups to explore initiatives that provide for greater economies of scale in modular installations. One such model to increase community installation is community shared solar, whereby a community or community members share ownership over a solar array. Another model to manage costs is the Solarize model, in which home and building owners collaborate to negotiate group rates for grid-tied solar energy systems. This model, often organized by municipalities, addresses common barriers to solar adoption, namely upfront costs, perceived complexity, and customer inertia. These programs tend to make use of a tiered pricing structure, whereby rates decline as more customers join the program. In addition to increasing demand for panels and increasing access, the increased visibility of solar panels on roofs in urban and suburban neighborhoods may increase interest in and support for renewable energy.[119]

Companies can support these programs through sponsorships or providing staff for technical advisory or capacity building on a pro-bono basis. They can also support community and government efforts to lower costs and therefore barriers to entry for renewable energy installation. Renewable industry organizations can fill similar gaps and provide valuable research and connections to contractors.[120] Partnering with communities or groups that have traditionally had less access to energy, including indigenous communities, can help ensure equity in access to energy services and make progress toward achieving SDG 7.[121]

Work with governments and other actors to reduce reliance on fossil fuels

While renewable companies are crucial to the provision of clean energy, full achievement of SDG 7 will require companies, governments, civil society, and development partners to collaborate to meet growing electricity demand and replace fossil fuel generation. Renewable energy companies should support governments to develop decarbonization pathways and regionally integrated energy plans that are consistent with the 1.5 °C target. These pathways and plans may include the adoption of policies that (1) promote the rapid deployment of renewable energy, (2) reduce fossil fuel dependence by encouraging or requiring utilities to dispatch renewable energies to their fullest extent and electrifying transportation and building infrastructure, and (3) strengthen energy efficiency measures. Renewable companies can partner with other stakeholders as well to support the infrastructure investments needed to electrify the transportation and building heating and cooling sector, which together account for approximately 70% of global direct energy use.

Invest in clean energy research and development to decrease costs, improve efficiency, and overcome intermittency challenges

According to IRENA, the cost of photovoltaic panels has decreased by 72% since the end of 2009, while the cost of onshore and offshore wind have dropped by 25% and 18% respectively.[122] Such declines were driven in large part by massive advances in technology research and development, and have enabled renewable energy to be cost competitive with other generation sources (depending on the context). Companies should support these initiatives by investing in research, supporting academic institutions, and partnering with researchers to pilot new technologies and innovative models to hasten market penetration. Furthermore, renewable developments can build critical resilience into unreliable, underinvested electricity grids, helping to patch intermittency challenges resulting from fuel shortages or inability to meet peak demand. However, as mentioned previously, many renewable energy sources themselves face intermittency challenges. Where renewable companies are not best positioned to address intermittency through diversification of energy sources themselves, they should encourage governments to consider installation of complementary energy sources and dispatchable technologies, like hydro and battery storage, as well as efficient and fair market mechanisms to recover their cost. Companies can also encourage governments and civil society to research modern storage technologies to decrease costs and improve efficiency.

Share knowledge with governments, communities, and civil society about electrification initiatives

Government planning, regulation, and investment are crucial to the provision of clean energy. Companies can work with local governments and leverage human and institutional capacity to overcome barriers to clean energy access. Capacity building, knowledge sharing, and technology transfer can enable faster uptake of renewable energy globally, increasing renewable energy market share while building and maintaining relationships with other stakeholders. Companies can map resources, help to develop databases of best practices, provide institutional support for local governments, and train policymakers through workshops on renewable energy opportunities.

Renewable energy companies should also ensure that these knowledge sharing projects are inclusive and address the disproportionate lack of access to energy among marginalized groups, such as women and indigenous peoples. For example, projects should also seek to extend energy access through gender-inclusive policies and planning. The UN reports that men use 22% more energy than women and are less willing to alter their consumption behaviors.[123] By providing training on energy planning and improving women's skills and access to financial resources, companies can increase the uptake of renewable energy. This will also help to ensure access to sustainable and modern energy for all, as well as contributing to SDG 5.[124]

Case Studies

Microgrids as a driver for community-based development: Chile and Kenya[125]

In 2017, Enel built the world's first high-altitude microgrid in Ollague, Chile. This microgrid is powered by a mini-wind turbine, a solar PV plant, and a small fossil fuel cogeneration generator. These sources are integrated into an electrochemical storage system, which provides energy to a community of 300 people. The hybrid system also heats the local school. In addition to this project in Chile, Enel is working to build solar microgrids in Kenya to bring clean and sustainable energy to 20,000 homes, businesses, healthcare centers and schools. This project will connect 90,000 people to the electrical grids. To facilitate further ease of payment, customers will be able to pay electricity bills through a mobile phone prepayment application.

Community-Based Renewable Energy Systems (CBRES): Cordillera, The Philippines[126]

Community-Based Renewable Energy Systems (CBRES) are small, decentralized energy supply systems, including micro hydro, solar, and wind technologies, that drive community-based sustainable development in rural communities. These systems are part of an initiative launched in 1994 by the Filipino NGO SIBAT Network, and are established through multi-stakeholder agreements with communities. Local community organizations own, manage, and maintain the systems, which provide household electricity as well as power for food and crop processing. CBRES projects increase access to sustainable energy and clean water while reducing dependence on wood for heating, cooking, and lighting.[127] These energy systems are financed through local community payments, NGO partner investments, and the local government.

Additional Resources

Indigenous Peoples Major Group for Sustainable Development. February 2018. "Doing It Right! Sustainable Energy Access and Indigenous Peoples" https://www.indigenouspeoples-sdg.org/index.php/english/all-resources/ipmg-position-papers-and-publications/ipmg-submission-interventions/83-doing-it-right-sustainable-energy-and-indigenous-peoples/file.

International Energy Agency. 2017. "Key World Energy Statistics 2017" https://www.iea.org/publications/freepublications/publication/KeyWorld2017.pdf.

International Renewable Energy Agency. 2018. "Off-Grid Renewable Energy Solutions" https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jul/IRENA_Off-grid_RE_Solutions_2018.pdf.

International Renewable Energy Agency et al. 2018. "Tracking SDG 7: The Energy Progress Report. https://trackingsdg7.esmap.org/data/files/download-documents/key_messages.pdf.

REN21. 2018. "Distributed Renewables for Energy Access" in Renewables 2018 Global Status Report www.ren21.net/gsr.

United Nations Development Programme. "Goal 7: Affordable and Clean Energy" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-7-affordable-and-clean-energy.html.

United Nations Economic Commission for Europe. 2016. "Guidance Note on the Development of Action Plans to Ensure Equitable Access to Water and Sanitation" https://www.unece.org/fileadmin/DAM/env/water/mop4/Informal_doc/1623154_E_FinalWeb.pdf.

References

110. International Energy Agency. October 2017. "Energy Access Outlook 2017" http://www.iea.org/access2017/ Accessed 10 September 2018.

111. The World Bank. "Access to Electricity (% of population)" SE4ALL. https://data.worldbank.org/indicator/eg.elc.accs.zs Accessed 23 August 2018.

112. International Energy Agency. 2018. "Key World Energy Statistics" 2, 14 https://webstore.iea.org/download/direct/2291?fileName=Key_World_2018.pdf Accessed 26 March 2019.

113. Intergovernmental Panel on Climate Change. 2018. "Global Warming of 1.5 °C: Summary for Policymakers" 17 https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf Accessed 13 May 2019. For other projections, see also The International Renewable Energy Agency, which projects that renewables will need to supply 85% of electricity generation and 67% of global primary energy supply by 2050 to hold warming to 2° C, and the International Energy Agency, which projects that low carbon sources will supply 94% of electricity generation but only 44% of total final energy consumption by 2050 to have a 66% of holding warming to 2° C. International Renewable Energy Agency. 2018. "Global Energy Transformation; A Roadmap to 2050" 9-10 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf Accessed 29 August 2018; International Energy Agency and International Renewable Energy

Agency. 2017. “Perspectives for the Energy Transition: Investment Needs for a Low Carbon Energy System” 85 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Mar/Perspectives_for_the_Energy_Transition_2017.pdf?la=en&hash=56436956B74DBD22A9C6309ED76E3924A879D0C7 Accessed 11 October 2018.

114. Ibid.

115. Adina Rom. February 2017. “The Economic Impact of Solar Lighting: Results from a Randomised Field Experiment in Rural Kenya” 13.https://www.ethz.ch/content/dam/ethz/special-interest/gess/nadel-dam/documents/research/Solar%20Lighting/17.02.24_ETH%20report%20on%20economic%20impact%20of%20solar_summary_FINAL.pdf Accessed 10 September 2018.

116. Abhishek Malhotra et al. 2017. “Scaling Up Finance for Off-Grid Renewable Energy: The Role of Aggregation and Spatial Diversification in Derisking Investments in Mini-Grids for Rural Electrification in India” Energy Policy https://www.researchgate.net/publication/317823053_Scaling_up_finance_for_off-grid_renewable_energy_The_role_of_aggregation_and_spatial_diversification_in_derisking_investments_in_mini-grids_for_rural_electrification_in_India Accessed 10 September 2018.

117. Jeremy Wakeford. January 2018. “When Mobile Meets Modular: Pay-As-You-Go Solar in Rural Africa” African Business Magazine https://africanbusinessmagazine.com/sectors/energy/mobile-meets-modular-pay-go-solar-rural-africa/ Accessed 10 September 2018.

118. Indigenous Peoples Major Group for Sustainable Development. “The Right Energy Partnership with Indigenous Peoples.” https://indigenouspeoples-sdg.org/index.php/english/who-we-are/right-energy-partnership-members Accessed 23 August 2018.

119. US Department of Energy. May 2012. “The Solarize Guidebook: A Community Guide to Collective Purchasing of Residential PV Systems.” https://www.nrel.gov/docs/fy12osti/54738.pdf Accessed 23 August 2018.

120. Ibid.

121. Indigenous Peoples Major Group for Sustainable Development. February 2018. “Doing It Right! Sustainable Energy Access and Indigenous Peoples” https://www.indigenouspeoples-sdg.org/index.php/english/all-resources/ipmg-position-papers-and-publications/ipmg-submission-interventions/83-doing-it-right-sustainable-energy-and-indigenous-peoples/file Accessed 10 September 2018.

122. International Renewable Energy Agency. 2018. “Renewable Power Generation Costs 2017” 17 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf Accessed 24 August 2018.

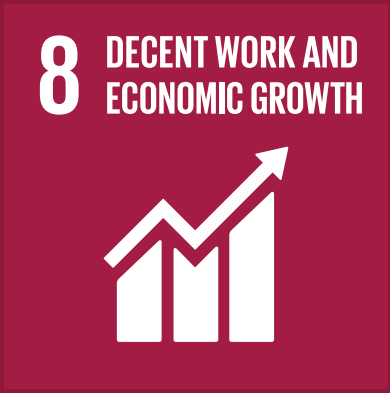
123. United Nations Industrial Development Organization. “Sustainable Energy for All: the Gender Dimensions” https://www.unido.org/sites/default/files/2014-02/GUIDANCENOTE_FINAL_WEB_s_0.pdf Accessed 23 August 2018.

124. UN Women. “SDG 7: Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for All” http://www.unwomen.org/en/news/in-focus/women-and-the-sdgs/sdg-7-affordable-clean-energy Accessed 23 August 2018.

125. Andrew Burger. 1 June 2017. “Enel Green Power Commissions World’s First, and Highest, 24x7 Solar-Hydrogen-Lithium Energy Storage Microgrid” Microgrid Media http://microgridmedia.com/enel-green-power-commissions-worlds-first-highest-24x7-solar-hydrogen-lithium-energy-storage-microgrid/ Accessed 15 November 2018; Enel. 4 May 2018. “Kenya: Women in Africa Go to Micro-grid School” https://www.enelgreenpower.com/stories/a/2018/05/kenya-women-in-africa-go-to-micro-grid-school Accessed 15 November 2018.

126. SIBAT. “Community-Based Renewable Energy System (CBRES)” https://sibat-inc.org/renewable-energy-and-appropriate-technology/cbres/ Accessed 23 August 2018.

127. Indigenous Peoples Major Group for Sustainable Development. February 2018. “Doing It Right! Sustainable Energy Access and Indigenous Peoples” https://www.indigenouspeoples-sdg.org/index.php/english/all-resources/ipmg-position-papers-and-publications/ipmg-submission-interventions/83-doing-it-right-sustainable-energy-and-indigenous-peoples/file Accessed 10 September 2018.



SDG 8: Decent Work and Economic Growth

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Inclusive growth and the right to work are core to the mission of sustainable development. By many metrics, the global economy has grown stronger in the years since the 2008 economic collapse: average annual growth rate of GDP per capita increased to 1.6% annually from 2010 - 2015, compared to only 0.9% from 2005 - 2009,[128] and household income and average annual earnings have increased cumulatively by 8% and 7%, respectively, since 2005.[129] Meanwhile, the global unemployment rate was 5.5% in 2017, holding roughly steady with the rate since 2011.[130] But these topline figures betray a more complex reality. Household debt has risen since the pre-crisis years in most countries, and the financial net worth of governments has fallen.[131] The International Labour Organization estimates that 42% of workers—more than 1.4 billion worldwide—are in vulnerable forms of employment, including self-employment or familial employment.[132] This work is often characterized by low wages and difficult working conditions, and in the absence of formal work arrangements, these workers frequently lack labor protections. Women, youth, migrant workers, and people living in developing countries are disproportionately likely to be underemployed or in vulnerable forms of employment.[133] Decent work and economic growth are also critical to the achievement of SDG 1 on ending poverty and SDG 10 on reducing inequality.

Renewable companies stand to contribute most directly to SDG 8 through their core business practices. That includes adopting strong and fair labor policies and practices, making tax payments to governments and rental or other payments to communities or households, and driving economic growth through electrification, local procurement, and other indirect economic activity. Recent research by the Business & Human Rights Resource Centre indicates that commitment to labor rights within the renewable energy sector is currently uneven. A survey and analysis of 59 solar, geothermal, and bioenergy companies revealed that only about half had public anti-discrimination policies, 42% explicitly prohibited use of child labor, and one-third had policies on the rights of workers to associate freely and bargain collectively.[134]

As the renewable energy industry grows larger and potentially displaces fossil fuel employment, renewable energy companies can also promote the achievement of SDG 8 by supporting a "just transition" to a low-carbon economy. This could include re-training and employing laid off workers, engaging in social dialogue and negotiations with workers and unions, and encouraging and supporting government efforts to invest and revitalize local and regional economies impacted by the energy transition to ensure social and economic protections for affected community members.

Key Indicators Related to SDG 8 and Renewables

8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value-added and labor-intensive sectors.

8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training.

8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium sized enterprises, including through access to financial services.

8.7 Take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour, eradicate forced labour and, by 2025, end child labour in all its forms, including the recruitment and use of child soldiers.

8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.

8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.

8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.

8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all.

8 DECENT WORK AND ECONOMIC GROWTH

SDG 8 RECOMMENDATIONS

Integrate into Core Business

- Invest in clean energy research and explore development models to decrease costs, improve efficiency, and overcome intermittency challenges
- Establish strong public labor policies and practices
  - › Respect workers' right to collective bargaining and freedom of association
  - › Adopt anti-discrimination policies
  - › Prohibit forced or child labor throughout the company's operations and supply chain
- Pay taxes and royalties to governments and compensate communities and households fairly for project land or generation capacity that they provide
- Drive economic growth through local procurement
  - › Work with local suppliers to build capacity and increase product quality
- Promote worker, consumer, and community ownership of companies and projects
- Provide safe and affordable housing for temporary workers

Collaborate and Leverage

- Collaborate with local chambers of commerce, finance institutions, and NGOs to promote economic linkages and induce economic development benefits from projects
- Establish business incubators
- Connect suppliers with external markets
- Support a just transition to a low-carbon society
  - › Engage in social dialogue with workers and their unions
  - › Train and hire former fossil fuel industry employees
  - › Encourage and support government efforts to invest and revitalize local and regional economies impacted by the energy transition

Integrate SDG 8 Into Core Business

Invest in clean energy research and explore development models to decrease costs, improve efficiency, and overcome intermittency challenges

The renewable energy industry is innovative and creative, continually developing new technologies and business models and adapting them for business use. IRENA reports that the cost of photovoltaic panels has decreased 72% since the end of 2009, while the cost of onshore and offshore wind have dropped by 25% and 18% respectively.[135] As noted in the chapter on SDG 7, such declines were driven in large part by massive advances in technology research and development, and have enabled renewable energy to be cost competitive with other generation sources. Companies should continue to support these initiatives by investing in research, supporting academic institutions, and partnering with researchers to pilot new technologies and innovative models to hasten market penetration.

Establish strong public labor policies and practices

Companies most direct contribution to SDG 8 is through decent employment. Companies must adopt strong, fair, and inclusive labor policies and practices grounded in respect for the International Labour Organization's core labor and occupational health and safety standards.[136] This includes respecting workers' right to bargain collectively and unionize, adopting strong anti-discrimination and anti-harassment policies, and eliminating forced and child labor. Renewable energy companies should also commit to pay a living wage. Promoting worker ownership of companies through a cooperative structure can have positive labor and social impacts (see case study below). Companies must also comply with local labor laws and ensure the absence of child labor in their operations and supply chains. Where possible, companies should employ local labor on projects, and offer capacity development for local communities.

Pay taxes and royalties to governments and compensate communities and households fairly for project land or generation capacity that they provide

As with SDG 1, one of the renewable energy industry's main contributions to sustainable economic growth will be through the payment of relevant fees and taxation to governments and rent and tariffs to households and communities. These taxes are of particular importance to economic growth, as the provision of public goods like research, education, infrastructure and social protection programs depends largely on government expenditures.[137] Renewable energy companies should also promote responsible taxation practices in supply chains, and should be aware that some of the companies that extract materials necessary to manufacture renewable energy technologies face allegations of tax avoidance.[138] Companies should establish tax planning processes, report payments publicly and transparently in accordance with established standards like the Global Reporting Initiative,[139] and engage in open dialogue about tax strategies and practices with stakeholders across their supply chains.[140]

Drive economic growth through local procurement

In addition to employment, renewable energy companies can contribute to economic growth and employment through the sourcing of local goods and services. This will require companies to assess local capacity to provide needed goods early in project planning. Local procurement will of course be most important where local content requirements apply or where local procurement is written into requests for proposals. Companies should also report on their experiences engaging with local content policies to expand awareness of the benefits that local labor and procurement can provide and draw attention to local skills and supply gaps that the renewable energy sector can help to address.[141]

Promote worker, consumer, and community ownership of companies and projects

Cooperative ownership of companies and projects can help to ensure that benefits are shared by affected stakeholders. Worker owned cooperatives are of particular relevance for SDG 8, combatting inequality by sharing profits among employees. Because these cooperatives are also governed through worker participation, there is some evidence that cooperatives can be particularly inclusive employers, supporting marginalized community members, including indigenous peoples[142] and people with disabilities.[143] Similarly, as noted in SDG 1, cooperative ownership of renewable energy installations, (such as through community shared solar initiatives) allow community members to share cost savings or profits from projects equitably. As noted in SDG 10, this model can be particularly impactful where it allows those who do not themselves own suitable land to install renewable technologies and share in renewables' benefits by owning a share of generation capacity on public or other private land.

Collaborate and Leverage

Collaborate with governments, local chambers of commerce, finance institutions, and NGOs to promote economic linkages and induce economic development benefits from projects

Beyond the contributions noted above, renewable energy companies can partner with governments, business-oriented associations like chambers of commerce, finance institutions, and NGOs to promote further economic linkages and induce greater economic development benefits from projects. Furthermore, to the extent that renewable projects allow customers or owners to save on electricity, cost savings can be invested elsewhere, also providing economic benefits to the governments, companies, or communities that commission them.

Establish business incubators

In some places, renewable companies are not able to procure goods locally because of insufficient or nonexistent supplier capacity. Where this is the case, companies can support business incubators to build local capacity and entrepreneurship, thereby building local capacity and helping to guide the creation of local businesses toward meeting renewable project needs.

Support a just transition to a low-carbon society

Rapidly replacing fossil fuels with renewable energy sources in our global energy system will be essential to avoid catastrophic climate change (see SDG 13 for further information). However, such a shift may result in employment changes for millions of workers—the US Department of Energy reports that in 2017, the fossil fuel industry employed 1.1 million workers in the US alone.[144] Renewable energy companies can help support a just transition to a low carbon economy—and generate valuable political capital for the renewable energy industry—by engaging in social dialogue and negotiations with workers and unions, creating initiatives to re-train and employ laid off workers, and encouraging and supporting government efforts to invest and revitalize local and regional economies impacted by the energy transition to ensure social and economic protections for affected community members.

Case Studies

Boost economic growth in emerging markets: East Africa[145]

Kenyan solar companies Solinc East Africa and M-KOPA manufactured and sold more than 100,000 solar PV panels in 2016 and 2017. Solinc's PV module factory began operations in 2011 and currently distributes to markets in Kenya, Uganda, and Tanzania. The company employs 130 Kenyans and has been predominantly Kenyan-owned since 2015. M-KOPA aims to source all its panels from Kenya and plans to buy over 500,000 more panels over the next two years. By purchasing panels locally, M-KOPA improves quality control, shortens supply chains, and provides jobs to local citizens. Solinc, in turn, plans to hire an additional 30 engineers to meet M-KOPA's demand.

Employee owned solar: United States[146]

Namasté solar is an employee owned cooperative in Colorado that shares the profits from solar installations among its more than 100 worker-owners. Upon completing a one-year candidacy period, employees are eligible to purchase a share of the company and become voting members of the cooperative. The company's model is people-centered, choosing co-ownership over hierarchy, democratic decision-making over centralized leadership, and collaboration over competition. At the end of each financial year, profits are divided among the worker-owners.

Sustainable local procurement: United Kingdom[147]

In the UK, the Brigg Renewable Energy Plant burns 250,000 tons of straw from 40 local farms to provide electricity to for 70,000 households annually. In doing so, the Briggs Renewable Plant helps to support local economic growth and reduce dependence on fossil fuels.

Additional Resources

Benjamin O. Alli. 2008. "Fundamental Principles of Occupational Health and Safety" International Labour Organization. https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_093550.pdf

International Labour Organization. 2010. "ILO Declaration on Fundamental Principles and Rights at Work and its Follow Up" https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_467653.pdf

Jan-Christoph Kuntze and Tom Moerenhout. 2013. "Local Content Requirements and the Renewable Energy Industry - A Good Match?" International Centre for Trade and Sustainable Development (ICTSD). 5 https://www.ictsd.org/sites/default/files/research/2013/06/local-content-requirements-and-the-renewable-energy-industry-a-good-match.pdf.

Just Transition Centre and The B Team. May 2018. "Just Transition: A Business Guide" http://www.bteam.org/announcements/just-transition-a-business-guide/.

UK Energy Research Centre. 2014. "Low Carbon Jobs: The Evidence for Net Job Creation from Policy Support for Energy Efficiency and Renewable Energy" http://www.ukerc.ac.uk/publications/low-carbon-jobs-the-evidence-for-net-job-creation-from-policy-support-for-energy-efficiency-and-renewable-energy.html.

United Nations Development Programme. "Goal 8: Decent Work and Economic Growth" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-8-decent-work-and-economic-growth.html.

References

128. United Nations Economic and Social Council. 2017. "Progress Towards the Sustainable Development Goals" 10. http://www.un.org/ga/search/view_doc.asp?symbol=E/2017/66&Lang=E Accessed 23 August 2018.

129. OECD. 2017. "How's Life? 2017: Measuring Well-Being" 19. https://read.oecd-ilibrary.org/economics/how-s-life-2017_how_life-2017-en#page21 Accessed 23 August 2018.

130. International Labour Organization. "Unemployment, Total (% of Total Labor Force) (Modeled ILO Estimate)" The World Bank. https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS Accessed 23 August 2018.

131. Ibid.

132. International Labour Organization. 2018. "World Employment Social Outlook; Trends 2018" 1. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_615594.pdf. Accessed 23 August 2018.

133. United Nations Economic and Social Council. 2017. "Progress Towards the Sustainable Development Goals" 10. http://www.un.org/ga/search/view_doc.asp?symbol=E/2017/66&Lang=E Accessed 23 August 2018.

134. The Business & Human Rights Resource Centre. September 2018. “Renewable Energy: Risking Rights & Returns” https://www.business-humanrights.org/sites/default/files/Solar%2C%20Bioenergy%2C%20Geothermal%20Briefing%20-%20Final_0.pdf Accessed 5 September 2018.

135. International Renewable Energy Agency. 2018. “Renewable Power Generation Costs 2017” 17 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf Accessed 24 August 2018.

136. See International Labour Organization. 2010. “ILO Declaration on Fundamental Principles and Rights at Work and its Follow Up” https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_467653.pdf Accessed 16 May 2019; Benjamin O. Alli. 2008. “Fundamental Principles of Occupational Health and Safety” International Labour Organization. https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_093550.pdf Accessed 16 May 2019.

137. Just Transition Centre and The B Team. May 2018. “Just Transition: A Business Guide” https://issuu.com/the-bteam/docs/just_transition_-_a_business_guide?e=15214291/61113478 Accessed 5 September 2018.

138. SOMO. 2017. “SOMO Annual Report 2017” Centre for Research on Multinational Corporations https://www.somo.nl/wp-content/uploads/2018/05/SOMO-Annual-Report-2017.pdf Accessed 21 August 2018.

139. GRI. “Global Reporting Initiative” www.globalreporting.org/Pages/default.aspx Accessed 21 August 2018.

140. Actionaid, U.K. March 2015. “Responsible Tax Practice by Companies” 4. https://www.actionaid.org.uk/sites/default/files/publications/responsible_tax_practice.pdf Accessed 21 August 2018.

141. Jan-Christoph Kuntze and Tom Moerenhout. 2013. “Local Content Requirements and the Renewable Energy Industry - A Good Match?” International Centre for Trade and Sustainable Development (ICTSD). 5. https://www.ictsd.org/sites/default/files/research/2013/06/local-content-requirements-and-the-renewable-energy-industry-a-good-match.pdf Accessed 29 August 2018.

142. International Labour Organization. 2016. “A Cooperative Way for Empowering Indigenous Peoples” Cooperatives and World of Work Series No. 5 https://www.ilo.org/global/topics/cooperatives/publications/WCMS_496599/lang--en/index.htm Accessed 5 November 2018.

143. International Labour Organization. 2016. “At Work Together: The Cooperative Advantage for People with Disabilities” Cooperatives and World of Work Series No. 3 https://www.ilo.org/empent/units/cooperatives/WCMS_378237/lang--en/index.htm Accessed 5 November 2018.

144. United States Department of Energy. “U.S. Energy and Employment Report.” January 2017. https://www.energy.gov/sites/prod/files/2017/01/f34/2017%20US%20Energy%20and%20Jobs%20Report_0.pdf Accessed 23 August 2018.

145. International Renewable Energy Agency. 2018. “Renewable Energy and Jobs; Annual Review 2018” 23 http://irena.org/-/media/Files/IRENA/Agency/Publication/2018/May/IRENA_RE_Jobs_Annual_Review_2018.pdf Accessed 23 August 2018.

146. Namasté Solar. “Employee-Ownership.” https://www.namastesolar.com/about-us/employee-ownership/

147. BWSC North Line Ltd. BRIGG Renewable Energy Plant: Power for a Greener Future https://www.briggbiomass.com/ Accessed 15 November 2018.

SDG 9: Industry, Innovation and Infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

The processes of industrialization, innovation, and infrastructure development are inextricably intertwined. Sound and sustainable infrastructure is necessary to kick start industrialization, while innovation ensures the constant updating of technology and skills necessary to sustain industrialization processes. In identifying the ongoing need to build resilient infrastructure, promote industrialization, and foster innovation, SDG 9 recognizes that countries continue to underinvest in public infrastructure projects and struggle to integrate the goals of infrastructure development, industrialization, and innovation into their respective growth strategies. For example, more work needs to be done in many countries to build the necessary infrastructure to provide electricity to rural citizens. According to the UN, as of 2014 only 44.8% of those living in Least Developed Countries (LDCs) had access to electricity, compared to the global average rate of 87.4%.[148]

As the costs of renewable technologies like solar and wind continue to drop, emerging and frontier economies have increasingly turned to renewable energies to accelerate electrification, especially in rural communities. Nonetheless, market penetration of "modern renewables" like hydroelectric, solar, wind, and geothermal is still relatively low, comprising only 9.3% of Total Final Energy Consumption (TFEC) in LDCs (in contrast, solid biofuels comprise 56.5% of TFEC).[149] While renewables can provide cheaper solutions to fill infrastructure gaps than traditional centralized electrical grids, widespread deployment nevertheless requires new and substantial capital investments. Renewable companies can hasten infrastructure development through both innovative technical solutions like off-grid or microgrid electrification, as well as innovative financial models like Property Assessed Clean Energy financing or public private partnerships like green banks. Companies can further hasten deployment by taking advantage of existing de-risking mechanisms to develop and finance projects that advance universal energy access in the LDCs. This access is undoubtedly necessary for the facilitation of other aspects of SDG 9 including industrialization and innovation processes.

Key Indicators Related to SDG 9 and Renewables

9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.

9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.

9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.

9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SDG 9 RECOMMENDATIONS

Integrate into Core Business

- Invest in clean energy research and explore development models to decrease costs, improve efficiency, and overcome intermittency challenges
- Support industrialization through local hiring, procurement, and training and skills development
- Support advanced industrialization by providing zero greenhouse gas and non-polluting clean electricity
- Leverage economies of scale to hasten development of generation and transmission infrastructure
- Conduct transparent and meaningful consultations for every project and respect rights to free, prior, and informed consent

Collaborate and Leverage

- Partner with government, industrial firms, and communities to power new industrial development through renewable targets
- Advocate for local government policy to increase access and deployment
- Collaborate with governments and other sectors to create renewable innovation spillovers and share knowledge
- Use convening power to create business clusters
- Explore potential collaborations with domestic research and development initiatives

Integrate SDG 9 Into Core Business

Invest in clean energy research and explore development models to decrease costs, improve efficiency, and overcome intermittency challenges

As for SDGs 7 and 8, investment in clean energy research and development is essential to companies' contributions to SDG 9. R&D has driven incredible innovation in the clean energy sector, decreasing costs precipitously over the last decade. While these advancements have already made renewables cost-competitive with traditional energy sources in many cases, further efficiencies will only hasten deployment of renewables. In addition, new technologies will be needed as renewable energy grows as a proportion of the energy mix, especially to overcome intermittency challenges. Companies should continue to support these initiatives by investing in research, supporting academic institutions, and partnering with researchers to pilot new technologies and innovative models to hasten market penetration.

Support industrialization through local procurement and skills development

As for SDGs 1, 4, and 8, renewable companies can contribute to local industrialization through local procurement of goods and labor. In addition to helping meet companies' employment needs, capacity development, job training, and employment can induce further economic development insofar as skills gained through renewable employment are transferrable to other businesses post-project development. For more information on local procurement and employment, see SDGs 8 and 4.

Leverage economies of scale to hasten development of generation and transmission infrastructure

Renewable projects are by their nature infrastructure projects. In addition to development of project-related infrastructure, renewable energy companies should look for opportunities to leverage economies of scale to hasten the development of generation and transmission infrastructure. This might include offering to procure extra solar panels and sell them to neighboring communities at bulk rates. Or, if there are opportunities to share transmission infrastructure from developments (specifically where short-range transmission infrastructure is being used or can be easily connected), companies could coordinate with local governments and utility companies to connect nearby communities. For off-grid projects, companies could use project developments to anchor microgrids, and allow other community stakeholders to connect, or increase the size of developments for greater electrification. This is especially true for indigenous communities, which comprise a disproportionate number of the world's rural and energy poor.[150]

Collaborate and Leverage

Partner with government, industrial firms, and communities to power new industrial development through renewable targets

Renewable energy companies should encourage industrial firms and national, regional, and local governments to adopt renewable energy transition plans. Such plans would include assessments of: local renewable resources and potential competitive advantages; existing facilities and labor forces; and investment, training and supporting institutional needs. These strategic plans should be adjustable and allow for adaptation to new information and future uncertainty. For governments, these plans should include renewable uptake targets as well as planning and zoning requirements in advance of industrial development.

Advocate for local government policy to increase access and deployment

Some US states and municipalities have helped consumers to finance renewable projects through Property Assessed Clean Energy (PACE) programs. PACE legislation allows private lenders to finance renewable energy and energy-efficiency upgrades on residential and commercial buildings via a special assessment on property records. Since the loans are repaid as part of property tax bills, lenders are able to offer long-term, fixed-rate financing that can often be paid off using the energy savings provided by the financed upgrades. Twenty states and the District of Columbia currently have programs that enable PACE financing.[151] Renewable energy companies and property owners can encourage governments to start such initiatives.

Collaborate with governments and other sectors to create renewable innovation spillovers and share knowledge

While renewable companies have economic incentives to build capacity and sponsor innovation within the renewables sector, incentives to support cross-sectoral linkages and spillovers in other sectors may be less direct. Nevertheless, renewable companies should collaborate with governments and other businesses to promote research and development to adapt renewable innovations for use in other sectors.

Use convening power to create business clusters

Business clusters can drive growth through knowledge sharing, transaction cost reductions, and innovative collaboration. Clusters among renewable energy companies of different source or business development stage can allow for partnerships, low-cost consultation, and best practice dissemination. Business clusters can also be valuable for cross-sectoral collaboration, as renewable companies depend on several other types of businesses to operate and thrive, and other businesses may be able to install renewable energy systems for cost savings. Renewable companies can approach governments to help plan helpful business clusters.

Explore potential collaborations with domestic research and development initiatives

Renewable energy companies can promote innovation by working with research and development initiatives to test new programs and technology. In the United States, the National Renewable Energy Laboratory (NREL) partners with 29 utilities and energy companies on pilots, for example on the use of smart inverters to increase grid stability.[152] In China, the Energy Research Institute (ERI) of the National Development and Reform Commission (NDRC) works to model emission reduction strategies to improve air quality and mitigate climate change.[153]

Case Studies

Providing financing for solar energy to off-grid consumers: Emerging Markets[154]

Greenlight Planet markets solar home energy systems for off-grid consumers. Through its off-grid Sun King program, Greenlight Planet has provided nearly 600,000 solar home systems to remote communities in over 60 countries across Africa and Asia. Greenlight Planet is the "world's largest direct-to-consumer, pay-as-you-go (PAYG) solar product distribution business." Their "Easy Buy" PAYG service allows customers to finance installations without large upfront costs by paying off solar installations over time through mobile-phone payments. Customers can choose between 10- and 12-week payment plans for as little as $0.25 per day with no upfront cost. After six to eight months of payments, customers can fully pay off their systems.

Conversion of mine to renewable power plant: France[155]

The municipality of Fontoy is converting a former iron mine in Lorraine, France for use as part of a geothermal system. Water that has collected in the mine over time will be used as a working fluid in a geothermal heat pump that will heat municipal buildings. This network should reduce municipal gas consumption by 348 MWh annually and avoid 87 tons of carbon dioxide emissions. The heating network also supplements geothermal heating with biomass, the first such combination in France.

Additional Resources

Chris Bataille et al. 2018. "A Review of Technology and Policy Deep Decarbonization Pathway Options for Making Energy Intensive Industry Production Consistent with the Paris Agreement" Journal of Cleaner Production. 187.

International Renewable Energy Agency. June 2015. "Renewable Energy Target Setting" http://www.irena.org/documentdownloads/publications/irena_re_target_setting_2015.pdf.

International Renewable Energy Agency. 2018. "Renewable Energy and Jobs; Annual Review 2018" http://irena.org/-/media/Files/IRENA/Agency/Publication/2018/May/IRENA_RE_Jobs_Annual_Review_2018.pdf.

The Lab. 2018. "Impacts and Lessons Learned, 2014-2017" https://www.climatefinancelab.org/wp-content/uploads/2018/04/Lab-Impact-Report-2018.pdf

United Nations Development Programme. "Goal 9: Industrial Innovation and Infrastructure" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-9-industry-innovation-and-infrastructure.html

United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. 2017. "Promoting Investment for Energy Access in Least Developed Countries" http://unohrlls.org/custom-content/uploads/2017/10/Promo-Energy_10_10_2017_FINAL_LowResF.pdf.

The World Bank. 2018. "2017 Private Participation in Infrastructure (PPI) Annual Report" http://documents.worldbank.org/curated/en/658451524561003915/pdf/125640-AR-PPI-2017-AnnualReport-PUBLIC.pdf.

World Economic Forum. "Renewable Infrastructure Investment Handbook: A Guide for Institutional Investors" http://www3.weforum.org/docs/WEF_Renewable_Infrastructure_Investment_Handbook.pdf.

References

148. UN Committee for Development Policy. April 2018. "Energy Access and Main Challenges in the LDCs" https://www.un.org/ldcportal/energy-access-and-main-challenges-in-the-ldcs/ Accessed 23 August 2018.

149. UN Office of the High Representative for Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States. October 2017. "Promoting Investment for Energy Access in Least Developed Countries" 19 http://unohrlls.org/custom-content/uploads/2017/10/Promo-Energy_10_10_2017_FINAL_LowResF.pdf Accessed 23 August 2018.

150. Indigenous Peoples Major Group for Sustainable Development. "The Right Energy Partnership with Indigenous Peoples." https://indigenouspeoples-sdg.org/index.php/english/who-we-are/right-energy-partnership-members Accessed 23 August 2018.

151. Pace Nation. "PACE Programs Near You" http://pacenation.us/pace-programs/ Accessed 6 September 2018.

152. US Department of Energy National Renewable Energy Lab. "Building a Clean Future for Power Production" https://www.nrel.gov/workingwithus/power.html Accessed 6 September 2018.

153. Integrated Energy and Environment Assessment Model for China. http://www.ipac-model.org/index.htm Accessed 6 September 2018.

154. Enhanced Online News. December 2017. "Greenlight Planet Raises $60 MM for Off-Grid Solar Financing Business, led by Apis Partners" https://www.greenlightplanet.com/presss/greenlight-planet-raises-60-mm-for-off-grid-solar-financing-business-led-by-apis-partners/ Accessed 23 August 2018.

155. Vinci Energies. "Renewable Energy: Geothermal Energy and Biomass Combined for an Innovative Heating Network" https://www.vinci-energies.com/en/our-news/newscenter/renewable-energy-geothermal-energy-and-biomass-combined-for-an-innovative-heating-network/ Accessed 16 October 2018.

SDG 10: Reduced Inequalities

Reduce inequality within and among countries

Structural inequality and discrimination on the basis of race, ethnicity, religion, gender, nationality, socioeconomic status, age, and sexual orientation, critically impede achievement of sustainable development for all. Globally, the wealthiest 10% of adults own 88% of global assets while the poorest half of adults collectively own less than 1% of total wealth.[156] Moreover, after declining for much of the first decade of the 21st century, the share of wealth owned by the richest 1% of adults has grown in the wake of the 2008 Financial Crisis, from 43% of all assets in 2008 to half of all household wealth in 2017.[157] Of course, vast inequalities also exist geographically: North America and Europe, which together account for 17% of global adult population, hold 64% of total household wealth, while Africa and India, together accounting for near 30% of global adult population, collectively hold less than 5% of household wealth.[158] Energy poverty also reflects other global inequalities: 84% of the those who lacked electricity access in 2017 lived in rural areas,[159] a disproportionate number of whom are indigenous people and the world's extremely poor.[160] Energy poverty in turn places the heaviest burden on women and girls, who often spend long hours collecting fuel for cooking and inhaling indoor air pollution.[161]

Insofar as renewable energy can increase wellbeing for those with the least, it can help to bridge these inequalities. Those living in poverty and other marginalized peoples can benefit from renewable energy projects through increased energy access and rents derived from project co-ownership. Renewable projects may also provide economic development benefits in the form of employment, or through potential cost savings for governments, businesses, and households freeing up public and private resources for other purposes. Furthermore, renewable energy can contribute to the achievement of SDG 10 by helping to avoid inequality-exacerbating impacts of fossil fuel combustion. According to the UN and the WHO, climate change and air pollution are already widening productivity and health outcome gaps between low- and middle-income countries and their high-income peers.[162]

However, these potential benefits are not inherent to renewable development, instead depending upon government and company policies that encourage shared opportunities to benefit from the energy transition. In order to promote inclusive development, renewable companies should conduct inclusive community consultations and human rights due diligence, champion inclusivity, and collaborate with government and civil society to ensure that renewable energy benefits reach those with the least access to energy and resources.

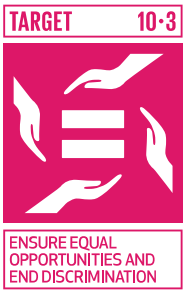
Key Indicators Related to SDG 10 and Renewables

10.1 By 2030, progressively achieve and sustain income growth of the bottom 40% of the population at a rate higher than the national average.

10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality.

10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.

10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes.



10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard.

SDG 10 RECOMMENDATIONS

Integrate into Core Business

- Conduct human rights due diligence and provide access to remedy
  - › Assess and mitigate human rights risks and impacts
  - › Track responses and communicate about how impacts are addressed
  - › Provide effective access to remedy for abuses that occur
- Champion inclusivity
  - › Train, recruit, and employ marginalized populations
  - › Include marginalized groups in local procurement and supply chains
  - › Explore alternative financing and ownership models to promote access to benefits for low-income households
- Anticipate inequality-related risks
  - › Be sensitive to local wage disparities
  - › Establish baseline welfare statistics before project development
- Promote worker, consumer, and community ownership of companies and projects

Collaborate and Leverage

- Support community ownership of renewable energy projects
- Support marginalized peoples through social investment
- Encourage participatory budgeting in local communities

Integrate SDG 10 Into Core Business

Conduct human rights due diligence and provide access to remedy

To avoid exacerbating inequality, companies must respect human rights throughout their operations and supply chains. All companies have the responsibility to identify and address actual and potential human rights risks, track responses, communicate about how impacts are addressed, and provide for or cooperate in the remediation of negative impacts.

One of the most salient human rights risks for the renewable energy sector is displacement. As has been discussed in relation to other SDGs, companies must respect community tenure rights, including when those rights are not formally documented or legally recognized. This will require companies to begin land access planning early in projects and complete inclusive and participatory community consultations. Where indigenous communities are involved, international law provides for indigenous

peoples' right to free, prior, and informed consent before developing projects.[163] In cases where resettlement is necessary, companies must fully restore and adequately compensate communities for displacement. Failure to do so violates human rights and risks serious harm to livelihoods.

Champion inclusivity

The benefits of renewable energy do not inherently contribute to reducing income inequality. Other chapters have discussed practices to stimulate local economic development through local procurement of goods and services (SDG 8) and investment in local skills development (SDG 4). In addition, renewable companies should look for opportunities to ensure that economic benefits of renewables are shared by all members of society by championing inclusivity.

This might include efforts to promote workforce diversity and low-income or community ownership of renewable deployments. In the US, for example, women account for only 28% of employees in the renewable energy sector.[164] Furthermore, only slightly more than a quarter of solar employers in the US formally track workforce demographic statistics. Many organizations like Green for All,[165] the NAACP,[166] and the Solar Energy Industries Association (SEIA)[167] are working to promote and improve workforce diversity in the renewable energy sector.

Meanwhile, some have argued that because rooftop solar and other household-owned renewable energy installments require substantial upfront capital investments and land ownership, they are only available to the wealthy. Renewable energy companies can counter these assertions by pursuing alternative finance and ownership models, including community ownership, community shared solar (which allows ratepayers to own solar arrays not necessarily installed on their own land), and Power Purchase Agreements (which allow households to install solar with low upfront cost, paid off instead through cost savings over the installation's lifespan).[168]

Anticipate inequality-related risks

In addition to human right risk assessments, companies should assess inequality-related risks prior to project development, and plan to manage these risks. For example, companies should establish baseline welfare statistics before projects begin to understand communities' level of development and how the project's distributional impacts may either alleviate or entrench local inequalities. This includes consideration of the impact of wage disparities between external and local workers, and between local employees and other community members. Anticipating inequality-related risks also involves consideration and mitigation of project impacts that could harm community members, especially those already marginalized, including indigenous peoples and ethnic minorities. Efforts to manage inequalities can help companies to prevent conflict and contribute to economic and social inclusion, therefore also contributing to SDG 16.

Promote worker, consumer, and community ownership of companies and projects

Cooperative ownership of companies and projects can help to ensure that benefits are shared by affected stakeholders. Worker owned cooperatives combat inequality by sharing profits among employees. For more information on worker owned cooperatives, see SDG 8.

Collaborate and Leverage

Support community ownership of renewable energy projects

Communities are the best authorities on their own energy needs. Companies can help meet those needs by facilitating processes for communities to organize collective ownership models. Potential models for community ownership include renewable energy cooperatives (like those supported by the European Foundation of Renewable Energy Cooperatives),[169] democratically managed municipally owned installations, and "solar community gardens," where owner-members purchase shares at fixed rates lower than typical electrical bills. This expands access to solar energy to renters, who would otherwise not be able enjoy cost-savings from solar.

Support marginalized peoples through social investment

Companies should consider targeting social investments to benefit those marginalized in communities. This can include efforts to support women and girls (as discussed in SDG 5), racial and ethnic minorities, those living in poverty, or youth. Companies hoping to support marginalized peoples with social investment should first consult with these populations about their own needs, rather than imposing programs based on the companies' own perceptions about what is needed.

Encourage participatory budgeting in local communities

Where companies create substantial new revenues for communities through rent and taxes, they can encourage community leadership to engage in participatory budget planning to manage expenditures. Participatory budgeting can help raise awareness about the contributions that projects make in communities and increase the likelihood that revenues will be used to address real community needs. While companies can use their convening power to support participatory budgeting, the companies themselves should not attempt to plan end use for these revenues.

Case Studies

Solar for refugees: Jordan[170]

In late 2017, Jordan launched the world's largest solar plant inside a refugee camp. The 12.9 MW solar plant at Zaatari refugee camp was funded by the German government and will provide electricity to 80,000 Syrian refugees. According to United Nations High Commissioner for Refugees (UNHCR), in addition to reducing carbon emissions by over 13,000 tons per year, the 40,000 solar panels will save the agency $5.5 million annually. Savings will be invested back into the camp. Solar and other renewable companies can work with development and aid organizations to deliver clean energy and cost savings to marginalized communities to reduce inequalities.

Manungurra Aboriginal Corporation: Australia[171]

The Manungurra Aboriginal Corporation has partnered with Indigenous Business Australia (IBA) to provide electricity to the Aboriginal communities of Ngurrara and Kurnturlpara. IBA provided $240,000 in project financing, enough to purchase a 36 kW solar array and 67 kWh gel battery storage system. The project was installed by Aboriginal-owned Allgrid. The Manungurra Aboriginal Corporation and residents share lease repayments, which are less than half of the previous cost of diesel generation. Many families have returned to their ancestral lands and re-establish agricultural livelihoods since the project's installation because of these reduced power costs, and because they no longer need to drive long distances to refuel;[172] the community has grown from two permanent adults to 30-40 adults and children.

Additional Resources

International Renewable Energy Agency. 2018. "Renewable Energy and Jobs: Annual Review."

Noah S. Diffenbaugh and Marshall Burke. 2019. "Global Warming Has Already Increased Inequality" Proceedings of the National Academy of Sciences of the United States of America https://www.pnas.org/content/early/2019/04/16/1816020116

Solar Energy Industries Association. November 2016. "Diversity Best Practice Guide for the Solar Industry" https://www.seia.org/sites/default/files/resources/SEIA%20Diversity%20Best%20Practices%20Guide_nocrops_0.pdf.

United Nations Development Programme. "Goal 10: Reduced Inequalities" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-10-reduced-inequalities.html.

United Nations Development Programme. 2017. "Gender and Sustainable Energy."

US Environmental Protection Agency (EPA). 2017. "Energy Efficiency and Renewable Energy in Low-Income Communities: A Guide to EPA Programs" https://www.epa.gov/sites/production/files/2017-06/documents/epa_low_income_program_guide_508_2-29-16.pdf.

References

156. Credit Suisse Research. November 2017. "Global Wealth Report 2017" 9 http://publications.credit-suisse.com/tasks/render/file/index.cfm?fileid=12DFFD63-07D1-EC63-A3D5F67356880EF3. Accessed 29 August 2018.

157. Ibid.

158. Id., 6.

159. International Energy Agency and the Organisation for Economic Co-Operation and Development. 2017. "Energy Access Outlook 2017: From Poverty to Prosperity" 40 https://www.iea.org/publications/freepublications/publication/WEO2017SpecialReport_EnergyAccessOutlook.pdf Accessed 13 September 2018.

160. Indigenous Peoples Major Group for Sustainable Development. February 2018. "Doing it Right! Sustainable Energy and Indigenous Peoples" 1. http://www.tebtebba.org/files/ipmg/IPMG_briefer_v6p2_20180220.pdf Accessed 13 September 2018.

161 International Energy Agency and the Organisation for Economic Co-Operation and Development. 2017. "Energy Access Outlook 2017: From Poverty to Prosperity" 26 https://www.iea.org/publications/freepublications/publication/WEO2017SpecialReport_EnergyAccessOutlook.pdf Accessed 13 September 2018.

162. Noah S. Diffenbaugh and Marshall Burke. 2019. "Global Warming Has Already Increased Inequality" Proceedings of the National Academy of Sciences of the United States of America https://www.pnas.org/content/early/2019/04/16/1816020116 Accessed 24 April 2019; World Health Organization. 2018. "WHO Global Ambient Air Quality Database (2018 Update)" https://www.who.int/airpollution/data/cities/en/ Accessed 24 April 2019.

163. See International Labour Organization. 1989. "Indigenous and Tribal Peoples Convention (No. 169)" Art. 16. https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C169 Accessed 11 September 2018.

164. The Solar Foundation. 2017. "2017 U.S. Solar Industry Diversity Study" https://www.thesolarfoundation.org/diversity/#wow-modal-id-2 Accessed 24 August 2018.

165. Green for All. https://www.greenforall.org Accessed 24 August 2018.

166. NAACP. "Power to the People: Fueling the Revolution for Energy Justice." https://www.naacp.org/power-to-the-people/ Accessed 24 August 2018.

167. Solar Energy Industries Association. November 2016. "Diversity Best Practice Guide for the Solar Industry." https://www.seia.org/sites/default/files/resources/SEIA%20Diversity%20Best%20Practices%20Guide_nocrops_0.pdf Accessed 24 August 2018

168. Basav Sen. April 2017. "How States Can Boost Renewables, with Benefits for All: Renewable Portfolio Standards and Distributed Solar Access for Low-Income Households" Institute for Policy Studies https://ips-dc.org/wp-content/uploads/2017/04/RPS-Report.pdf Accessed 24 August 2018.

169. REScoop.EU https://www.rescoop.eu/ Accessed 5 November 2018.

170. Reuters. "Jordan Switches on World's Largest Solar Plant in Refugee Camp" https://www.reuters.com/article/us-jordan-solar-zaatari/jordan-switches-on-worlds-largest-solar-plant-in-refugee-camp-idUSKBN1DD22N Accessed 16 October 2018.

171. Indigenous Business Australia. "Case Study - Manungurra Aboriginal Corporation" http://www.iba.gov.au/investments/case-studies/case-study-manungurra-aboriginal-corporation/ Accessed 23 August 2018.

172. Indigenous Peoples Major Group for Sustainable Development. February 2018. "Doing It Right! Sustainable Energy Access and Indigenous Peoples" https://www.indigenouspeoples-sdg.org/index.php/english/all-resources/ipmg-position-papers-and-publications/ipmg-submission-interventions/83-doing-it-right-sustainable-energy-and-indigenous-peoples/file Accessed 10 September 2018.

11 SUSTAINABLE CITIES AND COMMUNITIES

SDG 11: Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient and sustainable

Urbanization is one of the most significant phenomena of the past century and will continue to shape the world in the century to come. By 2050, the UN expects the proportion of the global population living in urban areas to grow to 68%, up from 55% in 2018 and just 30% in 1950.[173] Urbanization can be a critical force for sustainable development: for example, population density has been linked to economic dynamism[174] and more efficient use of resources.[175] However, the rapid growth of cities has strained existing infrastructure; new investments are needed to promote cities that are environmentally sustainable and resilient, socially inclusive, safe, and economically prosperous. The achievement of SDG 11 will require planning and investment to ensure universal access to housing, transportation, safe and efficient waste management systems, and disaster resilience.

Renewable energy will be an important part of the future's sustainable cities; in fact, more than 100 cities around the world already meet more than 70% of power needs from renewables,[176] and 70 more in the US alone have committed to transition to 100% renewable energy.[177] Such a transition will improve air quality in cities, especially if renewable-powered electric vehicles come to replace many internal combustion engine vehicles currently on the road. Renewable energy integrated into microgrids can also provide for improved grid resilience and reliability. Municipal buildings can also likely be retrofitted with onsite PV that can feed power back to the grid when supply exceeds demand. Companies can contribute to SDG 11 through careful land use planning and looking for opportunities to collaborate with governments and utilities to deploy renewables in cities.

Key Indicators Related to SDG 11 and Renewables

11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels.

11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

SDG 11 RECOMMENDATIONS

Integrate into Core Business

- Deploy renewable energies to provide disaster resilience for vulnerable and coastal populations
- Pursue energy system models tailored to urban communities

Collaborate and Leverage

- Share workforce requirements and planned operations early so local authorities can assess adequacy of local services
- Collaborate with local authorities to develop and increase green space
- Collaborate for increased resilience through participation in microgrids connected by well planned, increasingly webbed and resilient utility transmission that allows access to remote renewable generation sources

Integrate SDG 11 Into Core Business

Deploy renewable energies to provide disaster resilience for vulnerable and coastal populations

Renewables can contribute to the achievement of SDG 11 by helping to increase disaster resilience and relief, especially in hurricane- and flooding-vulnerable coastal communities. As noted in SDG 3, renewable energy's potential for modularity and flexibility, and its ability to integrate into microgrids, makes it well positioned to increase electricity resilience and reliability in the event of natural disasters by buffering disruptions. Smart grids are particularly well suited for renewable integration because the potential for demand response can help grid operators to manage challenges from renewable intermittency. As climate change-exacerbated natural disasters increase in frequency and intensity, renewable companies should work with governments to integrate renewable deployments into adaptation plans.

Likewise, companies must also integrate disaster resilience into project design. Disaster resilient project design includes conducting climate modeling and scenario planning to ensure continued generation capacity during and after extreme weather events, especially in areas vulnerable to hurricanes. It could also include pairing generation technologies with microgrids or storage systems to allow for continued use in the event that grid service is disrupted. When planning for disaster resilience, all stakeholders should consider the durability of renewable energy equipment under

extreme conditions. Salt water in particular can have a corrosive effect on metal, which should be accounted for when retrofitting energy infrastructure in coastal communities.

Pursue ownership models tailored to urban areas

Renewable installation ownership models that may work well in areas with ample space may not be suited for more densely populated cities. That said, cities still provide opportunities for renewable companies to develop projects and should not be ignored. Renewables can further break into urban electricity markets by using alternative business models for projects that allow for installations to be distributed over several properties while still enjoying economies of scale, like community shared solar or community aggregation.

For example, where net metering legislation exists, companies should explore opportunities for "remote net metering," where solar panels are installed near, but not on, the site of the electrical demand. The consumer is then credited for the power produced at the remote site. This model is helpful in cities where some buildings' electricity demand far outstrips roof space. In this case, a high-rise building located near a warehouse with a large roof and relatively lower demand could install a solar energy system on the larger roof and send the credit to inhabitants of the high-rise. Companies can encourage policymakers to allow for remote net metering, and pitch installations where opportunities exist.

Collaborate and Leverage

Share renewable project workforce requirements and planned operations early so local authorities can assess adequacy of local services

To maximize direct and induced economic impacts from renewable projects, companies should share workforce requirements and project plans with local officials early, so that they can assess opportunities for local supply and employment. This information may also be helpful to assess potential infrastructure gaps and make plans for them to be filled.

Collaborate with local authorities to develop green space

Renewable companies can participate in local and regional planning efforts. While it is important for companies to share their plans with governments to allow for adequate responsive planning, companies can also work with governments to provide for shared-use of infrastructure and to promote development of needed housing, transportation options, and green space.

Case Studies

Utilizing solar and storage technologies for disaster resilience: Puerto Rico[178]

Sonnen is a German start-up that develops residential solar and storage systems. Since Hurricane Maria caused massive disruptions in grid service in the fall of 2017, the company has worked on several projects to restore the island's electricity system. These projects have included installation of an off-grid capable solar and storage microgrid connected to a remote school in Orocovis.[179] The company, alongside its Puerto Rican partner Pura Energía, was also commissioned in April 2018 to install another microgrid at a healthcare facility in Utuado, Puerto Rico. These microgrids are contributing to Puerto Rico's restoration while also increasing resilience to future hurricanes.

Additional Resources

CDP Worldwide. "The World's Renewable Energy Cities" https://www.cdp.net/en/cities/world-renewable-energy-cities.

International Renewable Energy Agency. 2016. "Renewable Energy in Cities" http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_Renewable_Energy_in_Cities_2016.pdf.

REN21. 2019. "Renewable Energy in Cities Global Status Report" www.ren21.net. United Nations. 2018. "World Urbanization Prospects: 2018 Revision" https://population.un.org/wup/Publications/Files/WUP2018-KeyFacts.pdf.

United Nations Development Programme. "Goal 11: Sustainable Cities and Communities" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-11-sustainable-cities-and-communities.html.

United Nations Environment Programme. 2017. "Renewable Energy and Energy Efficiency in Developing Countries: Contributions to Reducing Global Emissions" https://www.unenvironment.org/resources/report/renewable-energy-and-energy-efficiency-developing-countries-contributions-0.

References

173. United Nations. 2018. "World Urbanization Prospects: The 2018 Revision" https://esa.un.org/unpd/wup/publications/Files/WUP2018-KeyFacts.pdf Accessed 29 August 2018.

174. UN Habitat. 2016. "Urbanization and Development: Emerging Futures" World Cities Report. 31. http://wcr.unhabitat.org/wp-content/uploads/sites/16/2016/05/WCR-%20Full-Report-2016.pdf Accessed 29 August 2018.

175. Id., 34.

176. CDP Worldwide. "The World's Renewable Energy Cities" https://www.cdp.net/en/cities/world-renewable-energy-cities Accessed 24 August 2018.

177. Sierra Club. "100% Commitments in Cities, Counties, and States" https://www.sierraclub.org/ready-for-100/commitments Accessed 24 August 2018.

178. Sonnen. 17 April 2018. "Sonnen Brings Solar + Storage to Clinic in Puerto Rico to Provide Urgent Healthcare Services to Remote Community" PR Newswire https://www.prnewswire.com/news-releases/sonnen-microgrid-brings-power-shelter-and-relief-to-a-farming-community-in-puerto-rico-300630992.html Accessed 16 October 2018.

179. Ibid.

SDG 12: Responsible Consumption and Production

Ensure sustainable consumption and production patterns

The current trajectory of human consumption and production is deeply unsustainable. According to the World Wildlife Fund, we consume resources more than 50% faster than they are replenished by the earth.[180] Unsustainable consumption and production practices are made worse by widespread resource waste and inefficiency. For instance, in the US in 2015, 61% of all energy produced was lost in transmission or transformation.[181]

Renewable energy improves the sustainability of production and consumption, primarily by replacing the combustion of non-renewable fossil fuel resources with energy generation from renewable resources. Furthermore, the modularity of renewable energy can allow for its generation closer to consumption centers, potentially increasing efficiency by decreasing transmission losses. However, manufacturing the technologies to produce renewable energy also relies on use of non-renewable materials. In addition, the renewable energy sector's reliance on minerals, such as copper, nickel, and cobalt, sourced from countries with poor governance and human rights records and conflict-affected areas can threaten the rights of workers and communities. Renewable developers and operators should encourage responsible sourcing of materials in supply chains and establish technology recycling programs. They should also assess the sustainability of business operations and look for opportunities to improve efficiency.

Key Indicators Related to SDG 12 and Renewables

12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.

12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

SDG 12 RECOMMENDATIONS

Integrate into Core Business

- Minimize inputs and waste
- Source materials and products from manufacturers with adequate labor standards, small carbon footprints, and records of responsible practice
- Plan for technology recycling from early stages of project development, especially for solar panels and batteries

Collaborate and Leverage

- Partner with other renewable companies to encourage adoption of governmental and sectoral recycling programs
- Work with mining companies to improve sustainability of minerals in clean energy technology production

Integrate SDG 12 Into Core Business

Minimize inputs and waste

Renewable energy companies crucially contribute to SDG 12 by replacing or supplanting use of non-renewable fuels in our energy system. That said, the generation of renewable energy still relies on consumption of non-renewable inputs, including land and water in project operation and minerals and energy in manufacturing. Companies should assess project needs with respect to energy, water, land, and materials, and create management plans to reduce project footprints to the extent possible (see, for example, SDGs 2 and 6).

Source materials and products from manufacturers with adequate labor standards, small carbon footprints, and records of responsible practice

In addition to minimizing non-renewable resource consumption, renewable energy companies should adopt responsible sourcing policies and integrate environmental and social considerations and requirements into procurement processes. Among other things, companies should prioritize procurement from manufacturers with adequate labor standards, safe toxic waste disposal policies, and small carbon footprints. This may involve performing due diligence on suppliers, establishing social and environmental performance criteria, and including sustainability clauses in supplier contracts and business partner agreements.

Plan for technology recycling from early stages of project development, especially for solar panels and batteries

Solar panels and wind turbines have a projected useful life of roughly 20 – 30 years. Project developers and operators can improve renewable efficiency and sustainability by considering their footprint throughout the lifecycle of a renewable installment and planning to minimize project waste after retirement. As the number of installed wind farms, solar arrays, and other renewable installations climb in the coming years, the question of how to dispose of these technologies once taken out of service will become ever more pressing: the International Renewable Energy Agency (IRENA) projects that annual solar PV waste will grow at least 2100% by mid-century, from 43,500 – 250,000 metric tons in 2016 to 5.5 – 6 million metric tons in 2050.[182] At present, if panels are recycled at all, they are typically processed in general glass recycling facilities where only glass and aluminum are recovered.[183] Companies should research renewable specific recycling options and provide for technology recycling after retirement, especially to create a market and economy of scale for recycling companies. Some promising models to date include designing products to facilitate modular reuse of parts in keeping with "design for disassembly" and other circular economy principles and providing for take-back of panels at the end of projected useful life thereby shifting responsibility for recycling and responsible waste management back to companies.

Collaborate and Leverage

Partner with other renewable companies to encourage adoption of governmental and sectoral recycling programs

Renewable recycling requires policy frameworks and infrastructure planning to reach scale and economic viability. As of 2016, the European Union was the only government entity that required solar manufacturers to finance end-of-life PV waste.[184] Companies should coordinate with peer companies to organize recycling initiatives and encourage governments to adopt renewable recycling initiatives and programs. Companies can also work with industry organizations to create or strengthen existing recycling programs, as the Solar Energies Industry Association (SEIA) has done in the United States.[185] SEIA "aggregates the services offered by recycling vendors and PV manufacturers" and evaluates vendors to connect members with Preferred Recycling Partners.[186] Companies should also adhere to voluntary standards on renewable energy sustainability, like the American National Standards Institute's NSF/ANSI 457-2017: Sustainability Leadership Standard for Photovoltaic Modules.[187] The standard evaluates product and company sustainability based on seven performance categories: "management of substances, preferable materials use, life cycle assessment, energy efficiency & water use, end-of-life management & design for recycling, product packaging, and corporate responsibility," and awards participating companies bronze, silver, or gold medals depending on adherence to mandatory and optional criteria.[188]

Case Studies

PV recycling: Malaysia, Germany, and the United States[189]

First Solar is a solar module manufacturer that claims to have spearheaded the "first global and comprehensive module recycling program in the PV industry."[190] The company operates recycling facilities near manufacturing sites in Malaysia, Germany, and the United States. The facilities produce laminate material, clean glass cullet, tellurium, and cadmium products from recycled panels. The company boasts high recovery rates, with 95% of semiconductor material from its modules and 90% of glass material reusable for new products and modules.

Additional Resources

International Renewable Energy Agency. June 2016. "End-of-Life Management: Solar Voltaic Panels" http://www.irena.org/documentdownloads/publications/irena_ieapvps_end-of-life_solar_pv_panels_2016.pdf.

RE100. 2018. "Approaching a Tipping Point: How Corporate Users are Redefining Global Electricity Markets" https://www.sustainablebrands.com/digital_learning/tool/cleantech/re100_progress_insights_report_january_2018.

RES4Africa. 2017. "Renewable Energy Solutions for Africa" https://pdfs.semanticscholar.org/presentation/440b/cb35c4288e809def84258d85b-1808c3e55e1.pdf.

SOMO. 2018. "Human Rights in Wind Turbine Supply Chains: Towards a Truly Sustainable Energy Transition" ActionAid https://www.somo.nl/human-rights-wind-turbine-supply-chains/.

United Nations Development Programme. "Goal 12: Responsible Consumption and Production" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-12-responsible-consumption-and-production.html.

References

180. World Wildlife Fund for Nature. "Living Planet Report 2016: Risk and Resilience in a New Era" WWF International. 13 https://www.footprintnetwork.org/content/documents/2016_Living_Planet_Report_Lo.pdf Accessed 24 August 2018.

181. Lisa Swartz et al. "Electricity End Uses, Energy Efficiency, and Distributed Energy Resources Baseline" Lawrence Berkeley National Laboratory. 18. https://www.energy.gov/sites/prod/files/2017/01/f34/Electricity%20End%20Uses,%20Energy%20Efficiency,%20and%20Distributed%20Energy%20Resources.pdf Accessed 24 August 2018.

182. International Renewable Energy Agency. June 2016. "End-of-Life Management: Solar Voltaic Panels." 11. http://www.irena.org/documentdownloads/publications/irena_ieapvps_end-of-life_solar_pv_panels_2016.pdf Accessed 24 August 2018.

183. Geert De Clercq. 25 June 2018. "Europe's First Solar Panel Recycling Plant Opens in France" Reuters. https://www.reuters.com/article/us-solar-recycling/europes-first-solar-panel-recycling-plant-opens-in-france-idUSKBN1JL28Z Accessed 24 August 2018.

184. International Renewable Energy Agency. June 2016. "End-of-Life Management" 13.

185. Solar Energy Industry Association. "PV Recycling" https://www.seia.org/initiatives/pv-recycling Accessed 24 August 2018.

186. Solar Energy Industry Association. "SEIA National PV Recycling Program" https://www.seia.org/initiatives/seia-national-pv-recycling-program Accessed 24 August 2018.

187. Brad Kelechava. 5 February 2018. "Solar Voltaic Modules: Sustainable Leadership Objectives" American National Standards Institute https://blog.ansi.org/2018/02/solar-photovoltaic-sustainability-leadership-ansi/#gref Accessed 5 November 2018.

188. Ibid.

189. First Solar. 2017. "The Recycling Advantage" http://www.firstsolar.com/-/media/First-Solar/Sustainability-Documents/Recycling/First-Solar-Recycling-Brochure.ashx Accessed 29 August 2018.

190. Ibid.

SDG 13: Climate Action

Take urgent action to combat climate change and its impacts

United Nations Secretary General Antonio Guterres has called climate change the world's "most systemic threat to humankind."[191] Global CO_2 levels have risen by nearly 50% since the Industrial Revolution, averaging 406.5 parts per million (ppm) in 2017.[192] While the 2015 Paris Climate Agreement is already facilitating critical international coordination on climate change mitigation, current commitments are insufficient to hold warming to 2 °C above pre-industrial levels, let alone the 1.5 °C target.[193] On the contrary, the Intergovernmental Panel on Climate Change (IPCC) reported in fall 2018 that holding warming to 1.5 °C "would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems... unprecedented in terms of scale."[194] Urgent action is therefore needed to prevent catastrophic climate distortion; massive deployment of renewable energies will be central to any such effort.[195]

Renewable energy companies' main contribution to SDG 13, and perhaps to the Sustainable Development Agenda more generally, will be to displace fossil fuels in global energy supply. The IPCC projects that, in order to hold warming to 1.5 °C, renewable energy will need to grow to supply between 70 – 85% of electricity generation by 2050.[196] This will involve the installation of at least an additional 14,000 GW of renewable energy capacity[197] on top of the 2,179 GW installed through 2017.[198] Such a transition, paired with aggressive gains in energy efficiency, would avoid a cumulative 470 gigatons of CO_2 emissions through 2050.[199]

The installation of renewable generation capacity does not itself displace fossil fuel consumption; deep decarbonization of energy systems relies on planning and integration by governments, utilities, and grid operators. Renewable energy companies should therefore partner with these external stakeholders to maximize the fossil fuel displacement impacts of renewable projects, advance research and development to make renewable energy technologies cheaper, more productive, and more reliable, and overall hasten the transition to a low carbon society.

Importantly, renewable energy companies can also work with suppliers to manage climate change-exacerbating practices in their supply chains and adapt investments to make projects—and their host communities—climate resilient.

Key Indicators Related to SDG 13 and Renewables

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

13 CLIMATE ACTION

SDG 13 RECOMMENDATIONS

Integrate into Core Business

- Deploy renewable projects to decarbonize energy systems
- Reduce operating and supply chain emissions
- Audit input and avoided emissions associated with projects
- Account for climate change in planning and investment
  - › Use scenario planning and climate modeling to inform views on climate and energy risks and opportunities
  - › Use climate projections in design and placement of operations and infrastructure
  - › Adopt corporate climate change, carbon management, and disclosure policies
- Prioritize project siting in locations with greatest emissions reduction potential
- Deploy renewable energies to increase climate resilience in host communities

Collaborate and Leverage

- Work with governments to mitigate climate change
- Participate in climate-related research and development and pilots
- Engage in intra- and cross-industry climate dialogues

Integrate SDG 13 Into Core Business

Deploy renewable projects to decarbonize energy systems

Renewable energy companies' most important contribution to the achievement of SDG 13 will be to install and deploy the renewable projects needed to hold warming to 1.5 °C. For companies like those in the renewables sector for which products themselves inherently contribute to the achievement of the SDGs, efforts to increase availability and deployment without undermining other SDGs and human rights are essential. Renewable companies are encouraged to continue developing new projects to integrate into electrical grids and replace diesel generation off grid. They should also continue to pursue technological and business model innovations to keep driving down installation and operation costs, especially relative to fossil fuels generation and infrastructure.

Reduce operating and supply chain emissions

While renewable energies are essential to reduce reliance on fossil fuels and thereby combat climate change, renewable energy technologies like solar and hydro have been associated with significant GHG emissions in manufacturing and operations, respectively.[200] Companies should therefore prioritize sourcing from companies that have taken steps to shrink their carbon footprints, such as by prioritizing recycling, reuse, and clean energy use, and should otherwise write emissions reduction targets or requirements into procurement contracts. Renewable energy companies should also incorporate emissions and energy management practices throughout their operations to maximize efficiency. Companies can increase climate impact and save money by installing energy-efficient technologies in lighting, transportation, water use, and heating, ventilation, and air conditioning (HVAC) systems.

Audit input and avoided emissions associated with projects

Renewable companies should publicly and transparently audit both project emissions throughout supply chains as well as the avoided emissions associated with projects. Understanding these figures will help companies both to reduce impacts, in accordance with the previous recommendation, as well as to better make the case for the social and environmental value of projects. The World Business Council for Sustainable Development and World Resources Institute have published guides on GHG accounting and reporting.[201]

Account for climate change in planning and investment

Given the likelihood and magnitude of climate-related impacts on infrastructure, companies should account for climate change in project installation and operations design. This involves incorporating climate resilience into project design to improve performance during and after extreme weather events. It could also include pairing generation technologies with microgrids or storage capacity to allow for continued use in the event that grid service is disrupted.

Prioritize project siting in locations with greatest emissions reduction potential

While developers may need to work with governments and utilities to reduce reliance on fossil fuels (see Collaborate and Leverage section), developers can maximize climate impact by prioritizing projects on sites with greatest GHG emissions reduction potential, for example near loads (to avoid heat loss inefficiencies in transmission), on-grid nodes that are heavily reliant on coal, or in off-grid applications where customers currently rely on diesel.

Deploy renewable energies to increase climate resilience in host communities

As climate-related disasters become more frequent and intense, renewable energy can crucially support electricity grid resilience. As noted under SDGs 3 and 11, renewable energy's potential for modularity and flexibility, and its ability to integrate into microgrids, makes it well positioned to increase grid resilience and reliability in the event of natural disasters by buffering against disruptions. Smart grids are particularly well suited for renewable integration because the potential for demand response can help grid operators to manage challenges from renewable intermittency.

Collaborate and Leverage

Work with governments to mitigate climate change

Renewable energy is a critical tool in the fight against climate change. Nevertheless, effective climate mitigation ultimately also relies upon decisive action by governments. Renewable energy companies should support governments to develop decarbonization pathways and regionally integrated energy plans that are consistent with the 1.5 °C target. These pathways and plans may include the adoption of policies that (1) promote the rapid deployment of renewable energy, (2) reduce fossil fuel dependence by electrifying transportation and building infrastructure and supporting utilities to dispatch renewable energies to their fullest extent, and (3) strengthen energy efficiency measures.

Participate in clean energy research and development and pilots

According to IRENA, the cost of photovoltaic panels has decreased by 72% since the end of 2009, while the cost of onshore and offshore wind have dropped by 25% and 18% respectively.[202] Such declines were driven in large part by massive advances in technology research and development, and have enabled renewable energy to be cost competitive with other generation sources in many contexts. Companies can partner with researchers to develop and pilot new technologies and innovative models to hasten market penetration.

Case Studies

Improve energy efficiency of renewable energy: Global[203]

Iberdrola is a publicly-listed multinational utility that owns the largest renewable energy asset base in the world. In addition to Iberdrola's leadership in installing renewable generation capacity, the company has adopted a three-pronged strategy to improve energy efficiency. First, Iberdrola has implemented a program to improve its own operating efficiency, including by retrofitting its office buildings. Second, the company has worked with clients and customers to provide information, education, and training on ways to improve their own energy efficiency and shrink their footprint. Finally, Iberdrola is working with manufacturers to decrease project lifecycle emissions, including by sourcing 80% of products locally to cut transportation emissions.

Kiashke Zaaging Anishinaabek integrated solar microgrid: Canada[204]

Kiashke Zaaging Anishinaabek (KZA)/Gull Bay First Nation, a community in northern Ontario, is home to Canada's first fully-integrated microgrid in a remote community, which uses a combination of battery energy storage and solar panels to replace diesel generation. More than 1,000 ground-mounted solar panels, wired to a central microgrid controller and battery energy storage system, will provide energy to a population of as many as 800 people depending on the season. According to Chief Wilfred N. King, "The KZA Solar Microgrid project reflects our peoples' connection with the land and our responsibility as caretakers on behalf of all living things for seven generations... Through KZA's ownership of the microgrid, we shall replace thousands of litres of dirty diesel fuel with clean solar power." The project may also support economic development in the form of new social enterprises and new revenue. The KZA Solar Micro Grid is a collaboration between Gull Bay First Nation, Ontario Power Generation, and the Independent Electricity System Operator (IESO), which helped to fund the project.

Additional Resources

Christopher Burgess and Joseph Goodman. 2018. "Solar Under Storm: Select Best Practices for Resilient Ground-Mount PV Systems with Hurricane Exposure" Rocky Mountain Institute https://www.rmi.org/wp-content/uploads/2018/06/Islands_SolarUnderStorm_Report_digitalJune122018.pdf.

International Renewable Energy Agency. 2017. "Synergies Between Renewable Energy and Energy Efficiency" Working Paper http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Aug/IRENA_REmap_Synergies_REEE_2017.pdf.

International Renewable Energy Agency. 2018 "Global Energy Transformation; A Roadmap to 2050" https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf.

Tiffany Finley and Ryan Schuchard. 2011. "Adapting to Climate Change: A Guide for the Energy and Utility Industry" Business for Social Responsibility https://www.bsr.org/reports/BSR_Climate_Adaptation_Issue_Brief_Energy_Utilities.pdf.

United Nations Development Programme. "Goal 13: Climate Action" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-13-climate-action.html.

References

191. Somini Segupta. March 2018. "Biggest Threat to Humanity? Climate Change, U.N. Chief Says" The New York Times https://www.nytimes.com/2018/03/29/climate/united-nations-climate-change.html Accessed 29 August 2018.

192. American Meteorological Society. August 2018. "State of the Climate in 2017" 46. https://www.ametsoc.net/sotc2017/StateoftheClimate2017_lowres.pdf Accessed 29 August 2018.

193. Joeri Rogeli et al. June 2016. "Paris Agreement Climate Proposals Need A Boost to Keep Warming Well Below 2 °C" Nature. 7609 http://pure.iiasa.ac.at/id/eprint/13307/1/nature18307_proof1.pdf Accessed 29 August 2018.

194. Intergovernmental Panel on Climate Change. 2018. "Global Warming of 1.5 °C: Summary for Policymakers" 17 https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf Accessed 13 May 2019.

195. See, e.g., Jeffrey D Sachs, Guido Schmidt-Traub, and Jim Williams. 2016. "Pathways to Zero Emission" Nature Geoscience https://www.researchgate.net/publication/309229959_Pathways_to_zero_emissions Accessed 29 August 2018; Sustainable Development Solutions Network – Institute for Sustainable Development and International Relations. 2015. "Pathways to Deep Decarbonization: 2015 Report" http://deepdecarbonization.org/wp-content/uploads/2015/12/DDPP_2015_REPORT.pdf Accessed 29 August 2018.

196. Intergovernmental Panel on Climate Change. 2018. "Global Warming of 1.5 °C: Summary for Policymakers" 17 https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf Accessed 13 May 2019. For other projections, see also The International Renewable Energy Agency, which projects that renewables will need to supply 85% of electricity generation and 67% of global primary energy supply by 2050 to hold warming to 2° C, and the International Energy Agency, which projects that low carbon sources will supply 94% of electricity generation but only 44% of total final energy consumption by 2050 to have a 66% of holding warming to 2° C. International Renewable Energy Agency. 2018. "Global Energy Transformation; A Roadmap to 2050" 9-10 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf Accessed 29 August 2018; International Energy Agency and International Renewable Energy Agency. 2017. "Perspectives for the Energy Transition: Investment Needs for a Low Carbon Energy System" 85 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Mar/Perspectives_for_the_Energy_Transition_2017.pdf?la=en&hash=56436956B74DBD22A9C6309ED76E3924A879D0C7 Accessed 11 October 2018.

197. International Renewable Energy Agency. 2018. "Global Energy Transformation; A Roadmap to 2050" 24 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf Accessed 29 August 2018.

198. International Renewable Energy Agency. 2018. "Renewable Capacity Statistics 2018" 2 http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Mar/IRENA_RE_Capacity_Statistics_2018.pdf Accessed 29 August 2018.

199. International Renewable Energy Agency. 2018. "Global Energy Transformation; A Roadmap to 2050" 21 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf Accessed 29 August 2018.

200. See, i.e., Scott Cramer. 25 May 2018. "The Carbon Footprint of Solar Panel Manufacture" TriplePundit https://www.triplepundit.com/2018/05/carbon-footprint-solar-panels-manufacturing/ Accessed 5 November 2018; Matt Weiser. 6 November 2016. "The Hydropower Paradox: Is This Energy as Clean as it Seems?" The Guardian https://www.theguardian.com/sustainable-business/2016/nov/06/hydropower-hydroelectricity-methane-clean-climate-change-study Accessed 6 November 2018.

201. See World Business Council for Sustainable Development and World Resources Institute. 2004. "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard" https://www.ghgprotocol.org/sites/default/files/ghgp/standards/ghg-protocol-revised.pdf Accessed 15 May 2019; World Business Council for Sustainable Development and World Resources Institute. 2007. "Measuring to Manage: A Guide to Designing GHG Accounting and Reporting Programs" http://pdf.wri.org/measuring-to-manage.pdf Accessed 13 May 2019.

202 International Renewable Energy Agency. 2018. "Renewable Power Generation Costs 2017" 17 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf Accessed 24 August 2018.

203. Iberdrola SE. 2016. "Energy Saving and Efficiency" https://www.iberdrola.com/sustainability/environment/energy-efficiency Accessed 29 August 2018.

204. Ontario Independent Electricity System Operator. 20 June 2018. "Fully Integrated Microgrid at Gull Bay First Nation First of its Kind in Canada." http://www.ieso.ca/en/Powering-Tomorrow/Efficiency/Fully-integrated-microgrid-at-Gull-Bay-First-Nation-first-of-its-kind-in-Canada Accessed 10 April 2019.

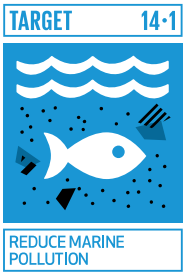
SDG 14: Life Below Water

Conserve and sustainably use the oceans, seas and marine resources for sustainable development

The United Nations Development Programme (UNDP) reports that more than 3 billion people rely on both marine and coastal biodiversity for their livelihoods.[205] The sustainable preservation of marine ecosystems is thus central to protecting and securing these livelihoods. Pollution, habitat destruction, and over-fishing pose significant threats to marine health. By some measures, human activity has impacted as much as 40% of the ocean's area.[206] Improved regulations and processes are needed for sound ocean management to address these impacts and prevent further harm.

Various types of renewable energy, especially offshore wind and hydro, can have substantial impacts on aquatic ecosystems. Renewable energy companies must ensure that their projects do not undermine marine sustainability by identifying marine-related impacts and mitigation strategies and supporting the fishery sector to avoid electricity generation-driven displacement. Companies can also partner with other stakeholders to develop multi-stakeholder coastal management plans and with local authorities to establish conservation areas and marine reserves. Finally, as increasing demand for clean energy technology drives growth of deep-sea mining, companies should work to ensure supply chain sustainability.

Key Indicators Related to SDG 14 and Renewables



14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.

14.5 By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.

14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.

14.b Provide access for small-scale artisanal fishers to marine resources and markets.

SDG 14 RECOMMENDATIONS

Integrate into Core Business

- Incorporate life under water into impact assessments and mitigate habitat destruction
  - › Map breeding grounds and migration routes of underwater species
  - › Minimize sound pollution for marine species that navigate using SONAR
  - › Include fish ladders or similar mechanisms in dams to ensure ability of local species to breed
  - › Avoid impacts on aquatic ecosystems when sourcing minerals for solar panels, especially from deep sea mining
- Incorporate effects on coastal communities and livelihoods into impact assessments and related management plans
  - › Assess environmental and social impacts on fishing- and marine-based livelihoods

Collaborate and Leverage

- Develop multi-stakeholder coastal zone management plans
- Collaborate with local authorities to establish conservation areas and marine reserves

Integrate SDG 14 Into Core Business

Incorporate life under water into impact assessments and mitigate habitat destruction

Renewable companies' environmental impact assessments should consider both direct and indirect impacts on aquatic ecosystems throughout project lifecycles. For sources like offshore wind, hydro, and tidal, these assessments should examine direct impacts including underwater sound pollution,[207] disruption to migration routes,[208] or microplastic discharge.[209] In addition, all projects should also consider the potential for indirect impacts on ecosystems, including from material sourcing, especially for minerals mined from the sea floor.[210] These assessments should inform impact mitigation plans, including with respect to project siting and supply chain sourcing decisions.

Incorporate effects on coastal communities and livelihoods into impact assessments and related management plans

In addition to assessing marine impacts of project development, companies should account for project impacts on communities, especially those that rely on fishing for subsistence or livelihood. Like companies developing or operating projects near communities on land, project developers should conduct inclusive and participatory consultations with fishing communities whose livelihoods may be affected by offshore or upstream operations.[211] Project siting and management plans should both mitigate impacts and include compensation and remediation if negative impacts do occur.

Collaborate and Leverage

Develop multi-stakeholder coastal zone management plans

Companies can leverage their resources and networks to convene local governments and fishing communities to ensure the sustainable management of coastal ecosystems. This may include establishing conservation areas or marine reserves to ensure that project development and operations, as well as community fishing and other marine activity, do not strain aquatic habitats excessively.

Case Studies

Pioneering gravity-support structures to reduce noise pollution: UK[212]

The 100 MW Blyth Offshore Wind Farm is a first-of-its-kind project, developed by EDF Energy Renewables. Unlike other offshore wind farms that require disruptive pile driving to install, the Blyth Wind Farm is equipped with Gravity Based Foundations (GBF), which are held in place through extreme weight. Most notably, this technique eliminates the need for loud underwater hammering during installation, which can be disruptive especially for marine animals that navigate and communicate using SONAR.

Compensation for impacts on fisheries: Taiwan[213]

Swancor Formosa is Taiwan's first offshore wind farm. During the planning stages of the project, Swancor Renewable developers met often with the Nanlong District Fishermen's Association to negotiate the Swancor Offshore Wind Farm Project's Fishery Economy Memorandum of Cooperation, which included "specific and practicable action items such as revisions to environment protection initiatives to meet conformity with current regulations, the will of the fishermen's association and fishermen, and the feasibility of monitoring progress."[214] The Memorandum of Cooperation provided for the company to share weather data and hire association members, among other efforts to manage impact. The two parties also negotiated a legally binding agreement for Swancor to compensate for impacts on fishery rights.

Additional Resources

Bureau of Ocean Energy Management and National Oceanic and Atmospheric Administration. "An Ocean of Information" https://marinecadastre.gov

Organisation for Economic Co-operation and Development. 2016. "The Ocean Economy in 2030" https://www.oecd.org/sti/ind/Session%201_b%20-%20Claire%20Jolly%20-%20Web.pdf

United Nations Development Programme. "Goal 14: Life Below Water" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-14-life-below-water.html

World Energy Council. 2016. "World Energy Resources: Marine Energy" https://www.worldenergy.org/wp-content/uploads/2017/03/WEResources_Marine_2016.pdf

World Wildlife Federation. 2014. "Environmental Impacts of Offshore Wind Power Production in the North Sea: A Literature Overview" https://vdocuments.mx/environmental-impacts-of-offshore-wind-power-impacts-of-offshore-horns-rev.html

References

205. United Nations Development Programme. 2018. "Goal 14: Life Below Water" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-14-life-below-water.html Accessed 29 August 2018.

206. United Nations Development Programme. June 2017. "A Healthy Ocean Critical to Fighting Poverty and Achieving the SDGs: UNDP at the First Ever Ocean Conference" http://www.undp.org/content/undp/en/home/presscenter/pressreleases/2017/06/04/a-healthy-ocean-critical-to-fighting-poverty-and-achieving-the-sdgs-undp-at-the-first-ever-ocean-conference-0.html Accessed 29 August 2018.

207. Building wind farms involves pile driving in order to fasten turbine foundations to the seafloor. This process is loud, and can disrupt local ecosystems, especially for animals that rely on SONAR for navigation. Companies can reduce this pollution by erecting turbines with drilling or gravity base foundations. See Helen Bailey, Kate L. Brookes, and Paul M. Thompson. September 2014. "Assessing Environmental Impacts of Offshore Wind Farms: Lessons Learned and Recommendations for the Future" Aquatic Biosystems https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4172316/ Accessed 29 August 2018.

208. Anadromous fish populations are born in freshwater but migrate to the ocean to mature, before returning to rivers to spawn. Without accommodation, dams can cut off anadromous fish from their spawning grounds, potentially disrupting their reproductive cycles.

209. Teng Wang et al. March 2018. "Microplastics in a Wind Farm Area: A Case Study at the Rudong Offshore Wind Farm, Yellow Sea, China" Science Direct https://www.sciencedirect.com/science/article/pii/S0025326X18300614 Accessed 29 August 2018.

210. Damina Carrington. 4 June 2017. "Is Deep Sea Mining Vital for a Greener Future – Even If it Destroys Ecosystems?" The Guardian https://www.theguardian.com/environment/2017/jun/04/is-deep-sea-mining-vital-for-greener-future-even-if-it-means-destroying-precious-ecosystems Accessed 1 October 2018.

211. Jiska de Groot et al. 2014. "Investigating the Co-Existence of Fisheries and Offshore Renewable Energy in the UK: Identification of a Mitigation Agenda for Fishing Effort Displacement" Ocean and Coastal Management.

212. WEAMEC. "Blyth Offshore Demonstrator Wind Farm Project". https://www.weamec.fr/en/blog/record_synthesis/blyth-offshore-demonstrator-wind-farm-project/ Accessed 29 August 2018.

213. Yu-Che Tseng, Yuh-Minh Lee, and Shih-Jung Lioa. August 2017. "An Integrated Assessment Framework of Offshore Wind Power Projects Applying Equator Principles and Social Life Cycle Assessment" Sustainability www.mdpi.com/2071-1050/9/10/1822/pdf Accessed 10 September 2018

214. Id., 10.

SDG 15: Life on Land

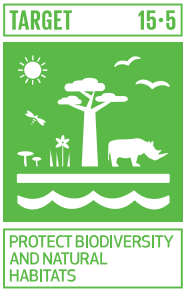
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

The United Nations estimates that 1.6 billion people depend on terrestrial ecosystems for subsistence or livelihood.[215] Forests provide food, water, shelter, medicine, fuel, and income. UN initiatives and agreements on deforestation,[216] desertification,[217] and biodiversity loss[218] have slowed but not reversed the trend of ecosystem degradation. The health of terrestrial ecosystems is essential to species preservation, climate mitigation through carbon sequestration, and human prosperity.

Renewable energy companies' primary responsibility related to SDG 15 is to ensure that project development and operations do not threaten local ecosystems. This involves adopting environmentally safe practices and considering environmental impacts in project siting decisions. Renewable energy companies can also work with other stakeholders to manage land responsibly and preserve ecosystems.

Key Indicators Related to SDG 15 and Renewables

15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.



15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.

15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.

15.3 By 2020, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation-neutral world.

15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.

SDG 15 RECOMMENDATIONS

Integrate into Core Business

- Conduct environmental impact assessments and prioritize project siting on brownfields or previously-developed land to minimize impact on or displacement of existing ecosystems
- Preserve ecosystems and achieve net positive or no net loss impact
  - › Apply mitigation hierarchies to minimize impact
  - › Recognize dynamic nature of habitats
  - › Conduct comprehensive baseline and follow-up environmental impact assessments

Collaborate and Leverage

- Support projects that link communities and biodiversity
- Contribute to research initiatives
- Encourage and participate in landscape-level planning
- Restore historic habitats and engage in reforestation and anti-poaching efforts

Integrate SDG 15 Into Core Business

Conduct environmental impact assessments and prioritize project siting on brownfields or previously-developed land to minimize impact on or displacement of existing ecosystems

Renewable energy companies should conduct comprehensive environmental and human rights impact assessments and account for ecosystem interdependence prior to project implementation. Companies should always consult with communities that rely on animal husbandry, local crops, or forest products to ensure that the project will not adversely affect livelihoods or the ability to perform cultural practices.[219] Often, impact-sensitive project siting will lead to project development away from fragile and valuable diverse ecosystems. In order to make such responsible siting decisions, companies should map ecological sensitivity of prospective project sites before selection, and when possible, plan projects on brownfields, former industrial sites, retired mining sites, pastures, or other sites that will not require land or forest clearing.[220] Companies should always conduct inclusive community consultations and respect indigenous communities' right to free, prior, and informed consent before beginning project development, including not proceeding with the project if communities do not consent. Reducing environmental impact will also help companies to build trust and maintain their social licenses to operate, as land clearance has caused conflicts with communities in several cases.[221] Without building this trust, companies risk project delays and legal and reputational costs.

Preserve ecosystems and achieve net positive or no net loss impact

In addition to considering environmental impact in project siting, renewable companies should incorporate other best practices and technologies to mitigate environmental impact in project operations.[222] For example, to reduce the risk of harm to low-flying bird and bat species, wind companies can increase the visibility of turbine blades, align turbine configuration to flight paths, or not operate turbines during critical migration times. For bioenergy companies that risk causing biodiversity loss, landscape change, and soil degradation, companies can help to protect ecosystems and combat desertification through the creation of habitat corridors and by preserving conservation areas with native vegetation.

Collaborate and Leverage

Support projects that link communities and biodiversity

Where renewable companies develop or operate projects near communities that rely on ecosystem services for subsistence or livelihood, companies can support initiatives to ensure the sustainable management of natural resources. This can include measuring and sharing biodiversity data, supporting reforestation efforts, or working with local authorities to promote compliance with environmental regulations and anti-poaching efforts.

Contribute to research initiatives

In many areas, there may already be substantial efforts to research and protect biodiversity and ecosystem resilience. Companies can partner with local NGOs, governments, and academic institutions to support this research and pilot innovative solutions to environmental problems. This support can include company funding of research in addition to partnerships on research initiatives or data sharing.

Case Studies

Mapping the environmental value of renewable projects: Canada[223]

In 2016, WWF-Canada developed a tool to simultaneously map the economic opportunities and environmental value that renewable energies can provide. The interactive digital tool, Renewables for Nature, encourage companies to consider habitat protection early in project development so that potential disruption to wildlife can be prevented. Renewable companies can use it to better understand the degree to which projects may conflict with conservation and community needs. While this tool is not a replacement for environmental assessments and impact monitoring, the tool helps developers to better project risks before investments are made. The tool was piloted in New Brunswick and the neighboring Bay of Fundy in Canada. It incorporated 75,000 individual data points on more than 700 at-risk species, including 35 datasets covering environmental attributes and related community uses, and overlaid it all with potential for onshore wind, offshore wind, solar, tidal, hydro, and biomass. Renewables for Nature is still in early deployment stages, but can help companies minimize their effects on life on land if adopted.

Offsetting environmental impact through reforestation: Brazil[224]

Rio Energy, supported by energy-focused private equity firm Denham Capital, is a developer, owner, and operator of renewable energy projects in Brazil. In Serra da Babilônia, where Rio Energy has developed a 223 MW wind project, Rio Energy has partnered with researchers from the Federal University of Rio Grande do Norte to offset potential environmental impacts by establishing a tree nursery. The nursery is the first environmental management program of its kind in the region, home to one of the more vulnerable biomes in Brazil. The project registers local plant species, stores seeds, and produces saplings that will later be used for reforestation. The project currently produces 50,000 saplings per year from 20 species. In June 2018, saplings from the nursery have been used to reforest 20 hectares of land in the area. The nursery also

employs members of the local community, generating income and teaching people about sustainable agriculture. Community members are trained to manage the nursery as a cooperative, so that after the company's wind project is completed, the saplings can be sold to businesses that have the environmental obligations related to reforestation. The nursery runs on solar energy and uses collected rainwater and filtered ground water for irrigation.

Additional Resources

Andrea Santangeli et al. 2016. "Synergies and Trade-Offs Between Renewable Energy Expansion and Biodiversity Conservation: A Cross-National Multifactor Analysis" Global Change Biology https://onlinelibrary.wiley.com/doi/epdf/10.1111/gcbb.12337

Natural Resources Defense Council. 2015. "Shifting the Way We Develop Renewable Energy on Public Lands" https://defenders.org/sites/default/files/publications/a-brighter-future-shifting-the-way-we-develop-renewable-energy-on-public-lands.pdf

Union of Concerned Scientists. "Environmental Impacts of Renewable Energy Technologies" https://www.ucsusa.org/clean-energy/renewable-energy/environmental-impacts#.W479hn4nbBI Accessed 4 September 2018.

Union of Concerned Scientists. September 2009. "Land Conservation and Renewable Energy Development: Finding a Balance in the Warming World" https://www.ucsusa.org/sites/default/files/legacy/assets/documents/clean_energy/conservation-renewables-fact-sheet.pdf

United Nations Development Programme. "Goal 15: Life On Land" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-15-life-on-land.html

References

215. United Nations. "United Nations Strategic Plan for Forests, 2017 - 2030" http://www.un.org/esa/forests/wp-content/uploads/2016/12/UNSPF_AdvUnedited.pdf Accessed 4 September 2018.

216. See United Nations. 2014. "New York Declaration on Forests" http://www.un.org/climatechange/summit/wp-content/uploads/sites/2/2014/07/New-York-Declaration-on-Forest-%E2%80%93-Action-Statement-and-Action-Plan.pdf Accessed 4 September 2018.

217. See United Nations. "Convention to Combat Desertification" https://www.unccd.int/ Accessed 4 September 2018.

218. See United Nations. 1992. "Convention on Biological Diversity" https://www.cbd.int/doc/legal/cbd-en.pdf Accessed 4 September 2018.

219. Jannie Staffansson. Saami Community Representative. 6 April 2018. Author Interview.

220. James Lea-Cox, Sarah Ruck, and Sam Walker. EBRD Representatives. 5 March 2018. Author Interview: referencing the presence of solar projects in Jordan where there is not a high level of biodiversity.

221. See, e.g., Danielle Kennedy. April 2018. "Plans for Highly-Contested Solar Project in North Kingstown Delayed." NBC http://turnto10.com/news/local/plans-for-proposed-solar-project-in-north-kingstown-delayed Accessed 29 August 2018; Yucatan Expat Life. November 2017. "Villagers Delay Construction of Solar Park in Ticul" https://yucatanexpatlife.com/villagers-delay-construction-of-solar-park-in-ticul/ Accessed 29 August 2018.

222. James Lea-Cox, Sarah Ruck, and Sam Walker. EBRD Representatives. 5 March 2018. Author Interview.

223. World Wildlife Fund. "Renewables for Nature: Home" https://renewables4nature.wwf.ca/en-CA Accessed 16 October 2018.

224. Sabine Chalopin. ESG Manager, Denham Capital. 22 January 2019. Author Correspondence.

SDG 16: Peace, Justice and Strong Institutions

Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels

Peaceful and just societies, along with accountable institutions, are critical for sustainable development. SDG 16 aims to promote peace and justice for all through the strengthening of institutions and good governance norms in order to protect human rights, promote rule of law and access to justice, and reduce violence and lawlessness (including state violence and corruption).

Renewable energy companies can contribute to SDG 16 by preempting and addressing project-related grievances and conflict, and by promoting a culture of accountability both within the company and in the broader societies in which they operate. This includes conducting inclusive and participatory community consultations, respecting communities' rights to tenure security and free, prior, and informed consent, and establishing formal and accessible grievance mechanisms. Contributing to SDG 16 also requires companies to ensure that employees respect human rights, implement best practices regarding responsible business conduct, and promote accountability for project-related harms. To contribute to inclusive and transparent decision-making around renewable energy projects, and to discourage corruption, companies should publicly disclose information regarding the project, including project-related payments and contracts.

Key Indicators Related to SDG 16 and Renewables

16.1 Significantly reduce all forms of violence and related death rates everywhere.

16.6 Develop effective, accountable and transparent institutions at all levels.

16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all.

16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels.

16.4 By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime.

16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements.

16.5 Substantially reduce corruption and bribery in all their forms.

SDG 16 RECOMMENDATIONS

Integrate into Core Business

- Respect communities' land tenure and human rights, including indigenous peoples' collective rights to lands, territories, and resources
  - › Conduct human rights due diligence
  - › Conduct inclusive and participatory community consultations before commencement of detailed project planning
  - › Develop human rights policies and ensure adherence throughout supply chains
- Preempt and address grievances and conflict
  - › Include local communities in pre-project planning in a way that allows for meaningful participation
  - › Incorporate both regulatory requirements and local community objectives and priorities into decisions
  - › Listen and respond early to stakeholder concerns
  - › Establish formal and accessible complaint and grievance mechanisms
  - › Require security contractors and other subcontractors to comply with relevant domestic and international laws
  - › Promote a company culture of accountability among employees
- Comply with regulations and disclose information regarding the project, including project-related payments and contracts, to decrease corruption risk
- Conduct transfer pricing of intra-company transactions via arm's-length rule
- Foster safe work environments and good community relationships

Integrate SDG 16 Into Core Business

Respect communities' land tenure and human rights, including indigenous peoples' collective rights to lands, territories, and resources

Before project development, companies should conduct consultative human rights impact assessments (HRIAs) and develop policies to ensure respect for international humanitarian and human rights law throughout project implementation. As is true for many of the SDGs (see, e.g., SDGs 1, 2, 5, and 10) SDG 16 requires renewable energy companies to respect indigenous peoples' collective rights to lands, territories, and resources. Respecting indigenous peoples' rights to free, prior, and informed consent requires acceptance of the possibility that communities may decide not to sell, lease, or otherwise provide access to their land. Finally, companies should perform human rights due diligence throughout both their operations and supply chains, and should introduce human rights clauses in supplier contracts and business partner agreements, including to ensure the responsible sourcing of minerals.

Preempt and address conflict

Companies should take preventative measures to ensure that project impacts do not seed conflict. Participatory consultations are essential to help companies to understand community needs and build project buy-in. Facilitating participatory consultations requires effective engagement with marginalized groups in communities, including women, youth, and ethnic and religious minorities, to ensure that their interests are represented in discussions that affect project decision-making, as well as any resulting agreements, benefit-sharing, and/or compensation. Achieving this representation may further require companies to conduct separate, group-specific meetings, such as women-only meetings, so that underrepresented people feel comfortable expressing themselves candidly. In consultations, companies should work with community members to establish formal, accessible, and effective complaint and grievance mechanisms. Company decisions should honor these consultations and incorporate local community objectives and priorities into plans and operations.

Companies must also require employees, security contractors, and other subcontractors to comply with relevant domestic and international laws and take responsibility for any adverse impacts that a company's presence in a community may have. In addition to minimizing impact on communities, efforts to prevent and preempt conflict can also help businesses to avoid potential costs associated with conflict, including high insurance premiums, legal fees, reputational damage, damages incurred to site infrastructure during disputes, and corresponding losses in share value.[225]

Comply with regulations and disclose information regarding the project, including project-related payments and contracts, to decrease corruption risk

Companies can encourage good governance by complying with local regulations, anti-corruption rules, and tax requirements. They should also promote transparency by publicly disclosing information regarding the project, including project-related payments and contracts, and screen for corruption risks. As transparency initiatives are more advanced in the extractives sector, renewable energy companies can learn important lessons from those initiatives (such as the Extractive Industries Transparency Initiative) and can implement best practices developed on the basis of experience in the extractives sector to date. By promoting good governance, companies can build better relationships with host countries and communities. In addition, responsible companies benefit from the stability provided by respect for the rule of law. For more information, see the UN Global Compact's guide on how to promote the rule of law through core business, advocacy, and partnerships.[226]

Case Studies

Solar for Peace: Eldoret, Kenya[227]

The Solar for Peace Initiative has piloted a project in Eldoret, Kenya, the site of past inter-ethnic violence, to promote reconciliation through a solar lamp distribution project. Solar for Peace partnered with the solar company Greenlight Planet and local community members, bringing communities together to improve energy access. Collective project planning has reduced divisions among different ethnic and religious groups and promoted social, educational, and economic development. The communities are now working together to finance the purchase of more solar lamps. The model piloted in Eldoret is being used by other communities throughout Kenya and beyond; nearly 900 families in 16 counties participated in 2016. The project has also expanded to facilitate education opportunities for residents, which similarly aim to strengthen relationships across ethnic groups.

Additional Resources

Business & Human Rights Resource Centre. April 2017. "Investor Briefing: Renewable Energy Impacts on Communities" https://www.business-humanrights.org/sites/default/files/Investor%20briefing%20-%20Renewable%20energy%20-%20Apr%202017.pdf.

David Mozersky and Dan Kammen. 2018. "South Sudan's Renewable Energy Potential: A Building Block for Peace" United States Institute of Peace https://www.usip.org/sites/default/files/2018-01/sr418-south-sudans-renewable-energy-potential-a-building-block-for-peace.pdf. Extractive Industries Transparency Initiative https://eiti.org/.

International Alert. March 2005. "Conflict-Sensitive Business Practice: Guidance for Extractive Industries" https://www.international-alert.org/sites/default/files/Economy_2005_CSBPGuidanceForExtractives_All_EN_v2013.pdf.

International Code of Conduct for Private Security Providers. https://www.icoca.ch/

Justin Guay et. al. 2017. "Can Renewable Energy Pay a Peace Dividend?" Huffington Post https://www.huffingtonpost.com/entry/can-renewable-energy-pay-a-peace-dividend_us_59c51a8fe4b0b7022a6469cf.

Organisation for Economic Co-operation and Development. 2016. "OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Addition" http://www.oecd.org/daf/inv/mne/OECD-Due-Diligence-Guidance-Minerals-Edition3.pdf.

United Nations Development Programme. "Goal 16: Peace, Justice, and Strong Institutions" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-16-peace-justice-and-strong-institutions.html.

United Nations Global Compact. "Business for Peace" https://www.unglobalcompact.org/take-action/action/peace.

United Nations Global Compact. June 2015. "Business for the Rule of Law Framework" https://www.unglobalcompact.org/docs/issues_doc/rule_of_law/B4ROL_Framework.pdf.

UN Special Representative on Business and Human Rights. 2011. "Guiding Principles on Business and Human Rights: Implementing the United Nations 'Protect, Respect and Remedy' Framework" https://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf.

Voluntary Principles on Security and Human Rights. http://www.voluntaryprinciples.org/.

World Resources Institute. "Electricity Governance Initiative, Toolkits" http://www.wri.org/node/41938#project-tabs.

References

225. Natalie Ralph. March 2018. “Ensuring Renewable Energy Doesn’t Fuel Conflict” Australian Institute of International Affairs. http://www.internationalaffairs.org.au/australianoutlook/potential-renewable-energy-fuel-conflict/ Accessed 30 August 2018.

226. United Nations Global Compact. June 2015. “Business for the Rule of Law Framework” https://www.unglobalcompact.org/docs/issues_doc/rule_of_law/B4ROL_Framework.pdf Accessed 28 August 2018.

227. Solar Aid. 12 November 2015. “Guest Blog: The Solar for Peace Initiative” https://solar-aid.org/guest-blog-solar-peace-initiative/ Accessed 16 October 2018.

SDG 17: Partnerships for the Goals

Strengthen the means of implementation and revitalize the global partnership for sustainable development

More than most sectors, renewable energy companies contribute to the SDGs through their core business activity. This Atlas has provided a number of recommendations to help renewable energy companies to maximize direct contributions through provision of electricity, displacement of fossil fuel combustion, and payment of wages, rent, and taxes, all while respecting human rights.

However, the realization of the SDGs depends on strong partnerships. Whether on-grid or off, renewable developments require companies to build strong relationships with communities to safeguard human rights and earn a social license to operate. Displacing fossil fuels requires collaboration with governments, utilities, and grid operators. The ability to maximize economic development impacts depends on the presence of strong schools and workforce training and agreements with local businesses. The future growth prospects for the renewable energy industry itself will depend on government policies and partnerships, private and international development finance, and the ability of technological advances to continue to drive down renewable costs. Without multi-stakeholder collaboration, the renewable industry's contribution to the SDGs will be less than its potential.

Key Indicators Related to SDG 17 and Renewables

17.3 Mobilize additional financial resources for developing countries from multiple sources.

17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation.

17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism.

17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technologies, and financial resources.

17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed.

17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships.

17 PARTNERSHIPS FOR THE GOALS

SDG 17 RECOMMENDATIONS

Integrate into Core Business

- Work with industry groups to advance the SDGS and the collective goals of the sector
- Mobilize financial resources and technology
  - › Make project bid processes, company-government agreements, and data on payments to governments transparent
  - › Build data collection and statistical analysis capacity
  - › Transfer technologies to host countries
  - › Engage in responsible public-private partnerships and civil society-private partnerships
- Support development of other industries and infrastructure needed to grow the renewable sector
- Incorporate the SDGs into company policies and apply SDG indicators

Collaborate and Leverage

- Engage in dialogue with governments, civil society, and development partners
- Strengthen coordination among initiatives
- Join with bottom-up grassroots movements and top-down leadership initiatives

Integrate SDG 17 Into Core Business

Work with industry groups to advance the SDGs and the collective goals of the sector

Industry associations and other corporate partnerships can facilitate peer-to-peer learning, produce guidance for the sector, coordinate cross-sector collaboration, conduct research, and provide coordinated input into global energy and climate discussions. Organizations like the Global Wind Energy Council, the Solar Energy Industry Association, and the World Bioenergy Association can function as platforms for companies to share knowledge and best practice, not least of which around aligning practice to sustainable development.

Mobilize financial resources and technology

While rapid technological advances and economies of scale have allowed for drastic reduction in the price of renewables, more work needs to be done to allow for a full transition to a clean energy economy. Companies should work with governments, development organizations, civil society, and financiers to mobilize resources for the urgent installation of renewable energy capacity. This can include innovative finance models previously discussed, including Property Assessed Clean Energy (PACE) loans, Power Purchase Agreements, community shared solar, or public-private or civil society-private partnerships.[228] Companies should share data related to technological innovation to promote sector growth.

Support development of other industries and infrastructure needed to grow the renewable sector

The inter-connected nature of the needs and opportunities in developing economies requires parallel investment in generation, transmission, distribution, and productive use. Investments in other fields will not precede the availability of reliable power and renewable energy companies cannot invest in the absence of firm demand and delivery infrastructure. Renewable energy companies will therefore increasingly need to either lead or participate in multi-thematic partnerships and consortiums that develop the electricity transportation and load to grow renewable demand.

Collaborate and Leverage

Each previous SDG chapter has presented a number of opportunities and recommendations for companies to partner with external stakeholders—including governments, communities, civil society, and other companies—to contribute to the achievement of the Sustainable Development Agenda. Below are some strategies to find further opportunities to collaborate and leverage resources for the SDGs.

- Share information, data, and analysis, for instance on tax and royalty payments, landscapes, ecosystems, watershed, health challenges, and safety statistics, among others;
- Require SDG-alignment and respect for human rights in supply chains and other business partnership contract;
- Help to implement initiatives by mobilizing resources through social investment programs; and
- Partner with governments and civil society to maximize impact.

Case Studies

The Right Energy Partnership with Indigenous Peoples: Global[229]

In 2018, the Indigenous Peoples Major Group for Sustainable Development launched a multi-stakeholder initiative to ensure that renewable energy projects hosted on indigenous land respect human rights, and to facilitate the provision of renewable energy to 50 million energy-poor indigenous people by 2030. Partners who agree to work towards these goals must commit to shared principles, including equitable benefit sharing and the full inclusion and empowerment of indigenous women. The Right Energy Partnership seeks to fill a gap in existing energy partnerships that do not adequately address indigenous peoples' needs and aspirations. Joan Carling of the Indigenous Peoples Major Group explains: "As the international community calls for leaving no one behind in achieving the [Sustainable Development Goals], renewable energy companies and investors have the opportunity to partner with indigenous peoples under a rights-based framework through the Right Energy Partnership initiative led by indigenous peoples. This initiative can lead to transformational contributions, not only in combating climate change but also in reducing poverty, hunger, and achieving rural development wherein indigenous peoples are regarded as key development actors and equal partners."

Multi-stakeholder collaboration for shared economic and social benefits: Denmark[230]

In the 1970s, Denmark relied heavily on coal as a source of power. In an effort to diversify their economy, the government facilitated social dialogue between Danish employees, unions, and government officials to produce a strong industrial and policy climate that led to energy independence and the transition of the power sector from coal to wind. Today, Denmark's wind industry includes Vestas, the world's second largest wind turbine manufacturer, and Ørsted, the world's largest offshore wind company, employing 31,251 people and delivering 42% of Denmark's total electricity. Companies can collaborate with the governments and workers to increase market penetration and uptake.

Additional Resources

The Cross-Sector Partnership Project. 2008. "Emerging Opportunities for NGO-Business Partnerships."

International Energy Agency. 2011. "Joint Public-Private Approaches for Energy Efficiency Finance."

LEDS Energy Working Group. 2015. "LEDS GP Energy Working Group Session Annual Event - October 2015" http://ledsgp.org/wp-content/uploads/2015/10/Renewable-energy-grid-integration.pdf.

United Nations Development Programme. "Goal 17: Partnerships for the Goals" http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-17-partnerships-for-the-goals.html.

United Nations Environmental Programme. 2017. "Green Foreign Direct Investment in Developing Countries."

The World Bank. 2018. "Progress on Global Energy Goals Slow, but Strong Gains in Countries Show Promise" https://www.worldbank.org/en/news/press-release/2018/05/02/sustainable-development-goal-sdg-7-global-progress-report.

References

228. While public-private partnerships (PPPs) are often characterized as a panacea for, among other things, addressing the gap in financing required for achieving the SDGs, this model is far from risk-free. PPPs, much like other types of models for large-scale investments, require effective regulation, and careful consideration should be given as to the appropriateness of this form of finance to the relevant context. See e.g., Brooke Guven and Lise Johnson. 24 May 2018. "PPPs and ISDS: A Risky Combination" UNCTAD Investment Policy Hub Blog http://investmentpolicyhub.unctad.org/Blog/Index/65 Accessed 16 October 2018; United Nations Office of the High Commissioner for Human Rights. 6 July 2017. "Baseline Study on the Human Rights Impacts and Implications of Mega-Infrastructure Investment" https://www.ohchr.org/Documents/Issues/Development/DFI/MappingStudyontheHRRiskImplications_MegaInfrastructureInvestment.pdf Accessed 16 October 2018.

229. Indigenous Peoples Major Group for Sustainable Development. "The Right Energy Partnership with Indigenous Peoples" https://indigenouspeoples-sdg.org/index.php/english/who-we-are/right-energy-partnership-members Accessed 23 August 2018.

230. Just Transition Centre and The B Team. May 2018. "Just Transition: A Business Guide" https://issuu.com/the-bteam/docs/just_transition_-_a_business_guide?e=15214291/61113478 Accessed 10 September 2018.

Conclusion

As the case studies illustrate, some of the recommendations included in this Atlas are already being implemented by renewable energy companies. Company expertise and capacity can readily be leveraged (and is already being leveraged) to support the achievement of the Sustainable Development Goals. By further aligning company policies and practices to the Sustainable Development Agenda and the UN Guiding Principles on Business and Human Rights, companies can amplify positive contributions to the SDGs and ensure that contributions to some SDGs do not come at the expense of others.

As countries and companies continue to chart a path forward on sustainable development, companies should share best practices, participate in cross-sectoral and multi-stakeholder dialogues on the SDGs, and encourage peer companies and suppliers to adopt responsible business practices.

Renewable energy is a linchpin of the Sustainable Development Agenda. This Atlas has enumerated concrete steps that renewable energy companies can take to maintain a social license to operate, build political support for pro-renewable energy policies, and promote corporate citizenship. Responsible business conduct is crucial to the renewable energy industry's long-term success and to ensuring both a fast and fair transition to a low-carbon economy.

Acknowledgements

Core Atlas Team:

Nathan Lobel, Lead Author, Special Assistant to the Director, Columbia Center on Sustainable Investment

Ryan Ballard, Contributing Author, Research Assistant, Columbia Center on Sustainable Investment

Christen Dobson, Project Partner and Contributor, Senior Project Lead and Researcher, Business & Human Rights Resource Centre

Soledad Mills, Project Partner and Contributor, Chief Executive Officer, Equitable Origin

Lisa Sachs, Project Partner and Editor, Director, Columbia Center on Sustainable Investment

Laura Waldman, Reviewer and Contributor, Research Assistant, Business & Human Rights Resource Centre

Eniko Horvath, Reviewer and Contributor, Senior Researcher, Business & Human Rights Resource Centre

Marti Flacks, Reviewer and Contributor, Deputy Director & Head of North America Office, Business & Human Rights Resource Centre

Jesse Coleman, Reviewer and Contributor, Legal Researcher, Columbia Center on Sustainable Investment

Kaitlin Cordes, Reviewer and Contributor, Head: Land and Agriculture; Lead: Human Rights and Investment, Columbia Center on Sustainable Investment

Lauren Barredo, Reviewer, Head of Partnerships, Sustainable Development Solutions Network

Samuel Malin, Reviewer and Contributor, MBA Candidate, Columbia Business School

Rosanna Carver, Contributor, Research Assistant, Equitable Origin

Shameera Khalid Angullia, Contributor, Research Assistant, Columbia Center on Sustainable Investment

Special Contributors and Reviewers:

Chris Bataille, Associate Researcher, IDDRI

Karol Boudreaux, Chief Program Officer, Landesa

Joan Carling, Focal Person/Convener, Indigenous Peoples Major Group for Sustainable Development

Sophie Hollin, Research Assistant, Columbia Center on Sustainable Investment

Bernardo Lazo, Director, Partnerships and Business Development, Gold Standard

Andrew Morton, Post Conflict and Disaster Management Energy and Engineering Programme Manager, United Nations Environment Programme

Dave Mozersky, Co-Founder, Energy Peace Partners

Miquel Muñoz Cabre, Senior Climate Change & Clean Energy Program Manager and Policy Analyst

Hannah Murdock, Project Manager & Analyst, REN21

Eric O'Shaughnessy, Researcher II-Market Research Analysis, National Renewable Energy Laboratory

Gaya Sriskanthan, Independent Specialist in Climate and Communities