Canada
Associated Gas Utilization Study

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Thanks to Tom Mitro for his thoughtful review

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

Summary of Findings

Fiscal and legal regulation for APG use

- Canada has an extensive, efficient fiscal and legal framework regarding the use of Associated Petroleum Gas (APG) also called 'solution gas' in Canada.

Local level regulatory agencies

- National standards are set on the federal level for gas flaring and again on the local level with agencies like Alberta's Energy Resources Conservation Board (ERCB) to meet local air quality objectives. ERCB also relies on companies to ascertain whether APG use, flaring or venting is more economically viable.

Domestic market for gas

- A robust domestic market for gas exists with full wholesale and retail competition in the gas market allowing gas producers to either sell APG to gas buyers or supply industrial and retail customers in their own right.

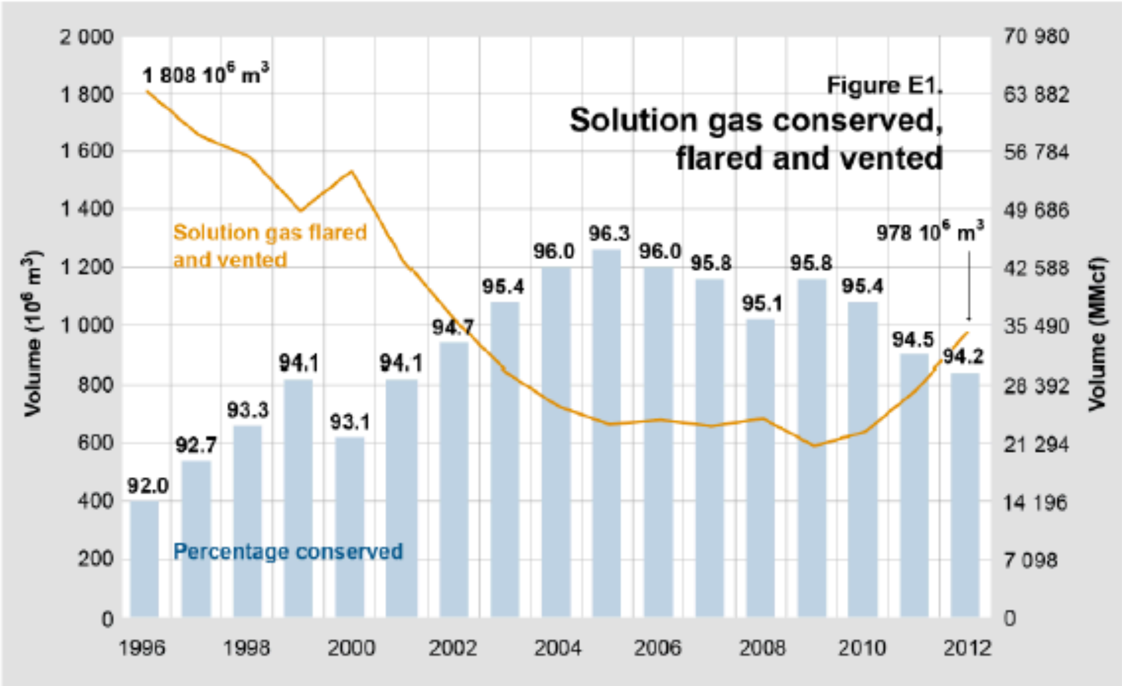
Flaring from oil sands

- Increased gas flaring in recent years, particularly in Alberta, has been attributed to an uptick in heavy oil sands production and low gas prices making APG use uneconomic.

The statistics of APG flaring in Canada: How bad is it?

Statistics on APG flaring

Gas Flaring in Alberta, Canada, 1996-2012



Source: Palanca, Gerald, *Flaring and Venting in Alberta, Canada.* Alberta Energy Regulator. 2014

- About 978 million cubic meters of gas was flared and vented in 2012, an uptick from 2011 levels following an increasing trend in gas flaring since 2009. About 94% of APG produced was used in 2012.

What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

Agencies

Legal framework

Fiscal framework

- **On the federal level**, the function of regulators is to license pipeline and natural gas operations as well as design and collection of royalties only (the Canada Petroleum Resources Act (CPRA) grants the right to the federal government to restrict or halt any operations in case of environmental problems).
- "Environment Canada," a department of the federal government sets the National Ambient Objective (NAO) for different air pollutants, which include those from flaring and venting.
- All other functions are delegated to regulation making authorities **on the province level.** On this level, the agency is responsible for gathering and analyzing of data, reporting requirements for flaring reduction, compliance and enforcement.
- Local air quality objectives are set by individual provinces. Provincial level authorities might require flaring and venting reduction beyond the level required by the NAO.

What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

Agencies

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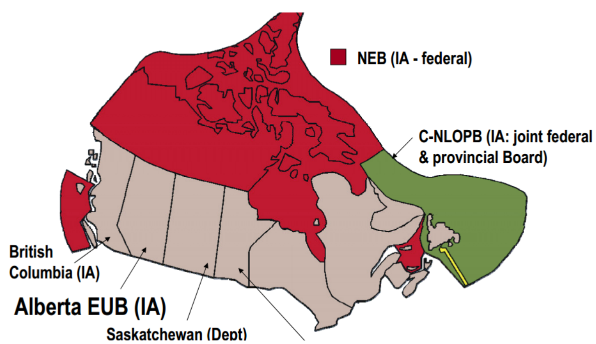
Fiscal framework

Provincial – Level Jurisdiction	Name	Form of Regulatory Authority (Independent Agency or Department of Government)
British Columbia	Oil and Gas Commission	Independent Agency
Alberta	Energy Resources Conservation Board	Independent Agency
Saskatchewan	Saskatchewan Ministry of Energy and Resources	Ministry of the Government
Manitoba	Manitoba Science, Technology, Energy and Mines	Department of the Government
Newfoundland and Labrador (Offshore)	Canada – Newfoundland and Labrador Offshore Petroleum Board	Independent Agency
Newfoundland and Labrador (Onshore)	Newfoundland and Labrador Department of Natural Resources	Department of the Government
Non-Accord Federal Lands	National Energy Board	Independent Agency



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Fiscal Framework for APG use	Description
Otherwise Flared Solution Gas Royalty Waiver Program	• As of 1998, the Minister of Energy announced a program of royalty waivers on otherwise flared associated gas as an additional incentive for associated gas conservation • The waiver is independent of the end use of APG and lasts for 10 years • Companies are exempt from the royalty if gas production becomes uneconomic due to royalties • Also, any gas utilized for on-site power generation is exempt from royalty

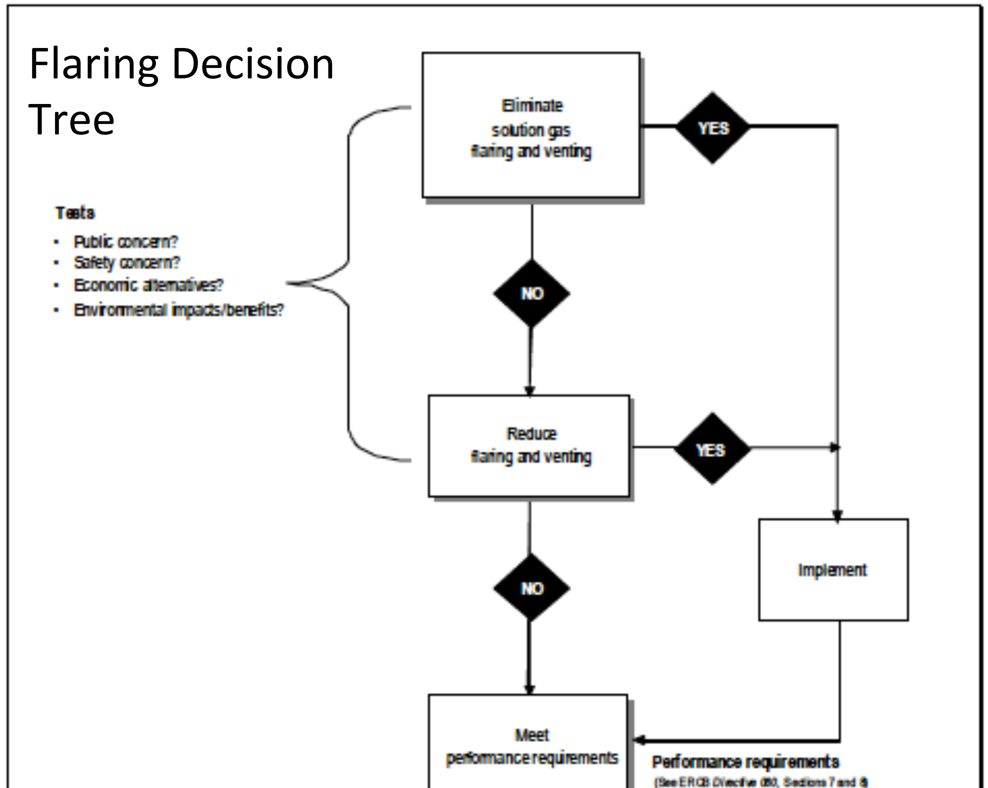
Sources: Griffith, John O., *Improving Economics of Flare and Vent Reduction Projects,* Gaffney, Cline and Associates. 2008; Information Letter (IL) 99-19: Otherwise Flared Solution Gas Royalty Waiver Program, Department of Energy, June 11, 1999.

Focus on Alberta, Canada: tools for regulating flaring

Agencies

Legal framework

Fiscal framework



Source: Alberta Energy Regulator (AER)

- Alberta's Energy Resources Conservation Board regulates flaring and venting in Alberta's upstream petroleum industry with the "Directive 060- Upstream Petroleum Industry Flaring, Incinerating and Venting" found at the Alberta Energy Regulator (AER) website. The Directive requires firms to do an economic analysis, following the structure provided in the above Decision Tree, to ascertain the necessity for flaring where flaring is only permitted (within certain limits) if APG use is deemed uneconomic as a result of the analysis.

Focus on Alberta, Canada: Directive 060 and current flaring

Agencies

Legal framework

Fiscal framework

- The Decision Tree from the Directive adds important structure to the economic analysis performed to determine whether or not gas will be flared as opposed to used for more efficient purposes. Following the Tree, the operator's first mandate is to attempt to completely eliminate gas flaring, considering public and social concerns and any economic alternatives in its flaring calculus. Failing that, it is to attempt to reduce gas flaring following the same calculus and if that is not possible, it should meet the minimum performance requirements for flaring as outlined in Directive 060.

- Directive 060 has been less effective in curbing increased gas flaring in recent years, particularly in Alberta, where flaring is attributed to an uptick in heavy oil sands (or bitumen) production and low/falling gas prices ($4/GJ in 2011 versus $8.89 in 2005 and $8.41/GJ in 2008) coupled with long distances to gathering infrastructure, making APG use uneconomic.

- Alberta's Energy Resources Conservation Board is currently engaged in constructing new frameworks to address the increased flaring issue when APG use is deemed uneconomic in the context of falling gas prices, following the decision tree.

Focus on Alberta, Canada: policies and regulations as compared to Norway

Agencies

Legal framework

Fiscal framework

Regulation/Policies on Gas Flaring/APG use	Alberta, Canada	Norway
Type of Operation	Over 45,00 oil wells of mainly lower productivity. Small number of large oil sands projects, all onshore.	Smaller number of large offshore fields
Regulator?	Independent Agency	Government Department
1- Universal flaring guidelines or regulated case-by-case ? 2- Stakeholder consensus in determining the approach?	1- Universal 2- Yes	1- Case – by – case 2- Yes
Annual national flaring target/limit?	Maximum total industry flaring volume. Individual operations comply with regulations, not individual flaring limits.	No
1- Routine flaring allowed by law? 2 - And permits limiting flaring for each flaring facility?	1- Only if not economic to use and no adverse off-lease impact 2- No. Exceptions are certain specific types of facility (H2S flaring facilities, gas plants…)	1- No, but may secure a waiver in exceptional cases 2- Yes
Field Development Plans require approval?	Only large multi-well projects do but each proposed flaring project must be evaluated and, if economic, utilization is mandatory (except very low volumes). If flaring goes ahead, economic viability must be reassessed annually.	Yes. Approval is given only if an acceptable solution is included for associated gas utilization

Source: World Bank, 2014

Focus on Alberta, Canada: policies and regulations as compared to Norway

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Regulation/ Policies on Gas Flaring/APG use	Alberta, Canada	Norway
Criteria/ parameters for economic evaluation of gas utilization options?	Criteria/parameters/methodology (e.g. discount rate, operating costs) are specified. Approved sources for product price forecasts are also specified	Not relevant. Routine flaring is not normally allowed under any economic conditions.
EIA required?	Only required for large projects. Sour gas flaring permits require modeling that show that health & environmental limits are met. Any EIA is made public.	Yes. The EIA is made public.
Fiscal Incentives	If APG use is not economic, a royalty waiver can be applied for. No other incentives apart from this.	No specific fiscal incentives for associated gas utilization.
Taxes/fines on emission?	None	CO2 tax of $120 per '000m3 gas burnt (including flared) at production facility
Penalty for violation of regulation?	Rising levels of sanctions depending on seriousness of violation including production shut-in and or suspension of normal ability to have applications processed. The ultimate sanction is the suspension of production license for violating facility with possibly the application of other corporate sanctions.	No penalties or ultimate sanction

Source: World Bank, 2014

Note: The regulations for Canadian east coast offshore production are similar to those in Norway except for the CO2 tax. "Annual permissible flaring volumes are specified. Penalties for exceeding flaring permitted volumes include reduction of production volumes." (Source: World Bank, 2014)

What are some current APG use projects that could serve as blueprints for future projects?

Power Generation (IPP)

Reinjection

- Two of the more interesting APG-use projects to come out of Alberta recently have been IPP projects with IPP company Genalta Power in collaboration with Shell Canada and Baytex Energy Group.
- Genalta Power is a particularly interesting case here as the company's business model involves transforming waste energy, including waste gas, to power that is then sold into the distribution grid.

APG-use case study: Genalta Power/Baytex

Power Generation (IPP)

Reinjection

- **Project Participants:**
  - Genalta Power, Baytex Energy Group
- **Project Description and Motivation:**
  - In 2013, Genalta signed a 10-year agreement with the Baytex Energy Group to the effect that most of the solution/associated gas associated with Baytex's Peace River region heavy oil production at the Three Creek site would be transferred to a power generating facility built by Genalta in the same region.
  - The project is expected to generate 12 MW of power, equivalent to daily energy needs for over 14,000 Alberta homes.
  - Baytex would build a pipeline joining its existing integrated gas collection system in Harmon Valley and West Harmon areas to the Genalta facility.
  - Motivators of the project include
    - Producers having volumes of gas high enough to sustain a long-term project
    - Quality of gas was good enough to avoid costly processing
    - Perceived social value of the project from the local community that was complaining about flaring
    - All electricity could be sold to the distribution grid, which is Genalta's source of revenue
- **Project Location:**
  - Gas will be sold from Baytex's Three Creek site near Peace River to Genalta for a neighboring power generating facility
- **Associated Gas Use:**
  - Associated gas from Baytex 's Three Creek site, near its Peace River field

APG-use case study: Genalta Power/Shell

Power Generation (IPP)

Reinjection

- **Project Participants:**
  - Genalta Power, Shell Canada

- **Project Description and Motivation:**
  - In May 2014, Genalta Power reported its decision to increase the generating capacity of its Peace River generation facilities, entering an agreement with Shell to generate an extra 5 MW from Shell's Peace River bitumen APG.
  - The first agreement with Shell was signed in 2012 and permitted Genalta Power to generate 4 MW of electricity from Shell's APG.
  - The 2 new generating facilities are expected to jointly generate enough electricity to provide power for 'the equivalent of over 10,000 homes in Alberta' (CNW, 2014).
  - Motivators of the project are as presented in the previous slide.

- **Project Location:**
  - The Shell Peace River Complex is situated onshore in northern Alberta, some 40 km northeast of Peace River

- **Associated Gas Use:**
  - APG from Shell Canada's Peace River bitumen production facility

APG-use case studies: Genalta Power/Baytex

Location of Peace River Oil Sands and Baytex Leases

Source:http://seekingalpha.com/article/1504532-carbonate-triangles-peace-river-investment-guide-baytex-edition

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