

November 25, 2010

The Honourable Brad Duguid
Minister of Energy
4th Floor, Hearst Block
900 Bay Street
Toronto, Ontario
M7A 2E1

Dear Minister Duguid:

OPG's Strategy to Meet 2011 CO₂ Emission Target

In response to the requirements of Section 4 of the Resolution of the Sole Shareholder, dated May 16, 2008, *Addressing Carbon Dioxide Emissions Arising from the Use of Coal at Its Coal-Fired Generating Stations*, OPG is filing the attached Implementation Strategy for 2011, to meet the CO₂ requirements specified in Paragraph 2 of the resolution. The 2011 Strategy replaces the 2010 Strategy posted on OPG's website at this time last year.

The 2011 Implementation Strategy is similar to the 2010 Strategy except in 2011 no adjustment to operating strategy is expected with the shutdown of 4 coal fired units. The strategy has been reviewed by staff at the Ministry of Energy, the Ministry of Finance and the IESO; any comments have been incorporated.

OPG will post this Implementation Strategy on its website as soon you have had an opportunity to communicate your concurrence with it to me. Please let me know if you require any further information.

Tom Mitchell
President & CEO

cc. Dwight Duncan, Minister of Finance
Paul Murphy, Independent Electricity System Operator

Attachment

OPG's Strategy to Meet on a Forecast Basis the 2011 CO₂ Emission Target

The 2011 CO₂ Emission Target

The Ontario Government's Shareholder Resolution dated May 20, 2010 directs OPG to develop an Implementation Strategy (the "Strategy") to meet on a forecast basis CO₂ emissions, arising from the use of coal at its coal-fired generating stations, for the calendar 2011 year of not more than 11.5 million metric tonnes' (the "Target"). The Strategy will be filed with the Minister of Energy by November 30, 2010. This document describes the measures OPG will take to meet the Target on a forecast basis.

OPG's Strategy to Meet the 2011 Target on a Forecast Basis

OPG's Strategy to meet on a forecast basis the emission target for 2011 is derived from procedures used in operating an energy-limited resource. There are four major elements to OPG's Strategy.

- **Planned Outage Strategy:** determining the duration and timing of the planned outages required by the coal fleet.
- **Operating Strategy:** determining the number of available units from the coal-fired fleet that will be offered into the IESO-administered market at any point in time while managing fleet reliability and emission rates.
- **Offer Strategy:** applying a uniform emission adder to the offers made for all units in all hours of the emission-limited period, calendar year 2011.
- **Fuel Strategy:** purchasing coal on contract to meet the emission target on a forecast basis, and on the spot market if needed to adjust production capability should requirements exceed forecast.

Outage Plans to Accommodate the CO₂ Initiative

OPG's planned outages for its coal units will be submitted to the IESO for approval following standard procedures. These outages will be designed to reduce maintenance and repair costs. CO₂ Outages, as defined in the Implementation Strategy for 2009, will not be used in 2011, but could be reintroduced in later years if necessary.

Operating Strategy for the Coal Fleet in 2011

Operating costs for a coal-fired unit increase, and fleet reliability decreases, with the number of starts each unit makes per year. To reduce the thermal stresses on each unit, it is also desirable to avoid short operating cycles.

OPG continues to have an incentive to reduce wear and tear on its remaining coal-fired units. The components of the units that are unique to coal-fired generation need to be reliable until the units no longer burn coal. The

Implementation Strategy for 2011

remainder of the plant needs to be maintained in good condition as there is value in converting some or all of these units to natural gas (with the possibility of co-firing on biomass) after the use of coal ends in 2014.

In its strategy for meeting the 2009 CO₂ emission target, OPG introduced the concept of NOBA (Not Offered But Available) units to address the need to preserve coal fleet reliability. NOBA units are units that are Not Offered into the market, But are Available on short notice if needed by the IESO for reliability purposes. These units could be offered into the market as per market rules with IESO approval and started if an operating coal-fired unit is forced out of service, or if the IESO directs a NOBA unit to operate for system reliability purposes.

In its 2010 CO₂ emission reduction strategy, OPG replaced the use of NOBA units with a procedure for offering coal units into the market so that they would only be dispatched if the market was relatively tight in real-time. This allowed these units to be available to the market while maintaining the capability to manage fleet reliability. If these units were required to run in real time, OPG would have offered these units at their normal prices.

For 2011, with the shutdown of 4 coal units in the south-west, OPG does not anticipate the need to employ either of these strategies to assist in reducing the wear and tear on its coal-fired units. However, as 2011 progresses, should OPG need to manage coal-fleet reliability through its offer strategy, it retains the option to do so. If required, OPG will provide sufficient notice of its specific change in offer strategy to the IESO so that the IESO may incorporate this information in its planned outage approval and reliability assessment processes.

Offer Strategy for the Emission-limited Coal Fleet in 2011

When a group of units is energy-limited, it is standard practice to apply a uniform adder (\$/MWh) to the offers for the energy limited resources in order to price these resources out of the market enough of the time so that their total production does not exceed the desired target. The uniform adder approach results in the energy-limited resources running in the hours which are most valuable to the market.

Given the Shareholder Resolution, the coal-fired fleet is emission-limited, but the way to achieve the emission limit may be analyzed in a similar manner. The distinction is that the emission adder is expressed in \$/tonne. To determine the size of the emission adder required to achieve the target on a forecast basis, OPG runs its interconnected market simulation model, progressively increasing the offer adder on the coal-fired units until it finds the uniform adder that will yield the desired emission target. In each hour, the emission adder in \$/tonne is translated into the appropriate \$/MWh adder on the simulated offer using the CO₂ emission rate curve for each of the coal-fired units. (The CO₂ emission rate curve gives the emission rate of the unit at any level of its output. For instance, a 500 MW unit operating at the 100 MW output level is less efficient and therefore produces more CO₂ per MWh than when it operates at the 400 MW level.)

Given the operating strategy and shutdown decisions noted above, and the market assumptions OPG has used in developing its 2011 Corporate Business Plan, OPG estimates that no CO₂ emission adder will be needed to meet the 2011 target on a forecast basis.

Fuel Strategy for the Coal Fleet in 2011

Given the downturn in the North American economy and the associated weak level of power market demands, OPG has sufficient quantities of fuel under contract and in storage to permit production of the coal-fired energy associated with the target emissions of 11.5 Mt of CO₂ (approximately equivalent to 11.5 TWh), as well as to meet additional production requirements should circumstances warrant.

Adjusting the Implementation Strategy as Year-end Forecasts Change

Risks to Meeting the 2011 Target

The estimate of the CO₂ emission adder required to limit the coal-fired fleet to the targeted emissions on a forecast basis is subject to a high degree of uncertainty. In particular, it depends on the demand for power in Ontario and the demand for power exports from Ontario to its interconnected markets. The competitiveness of OPG's coal-fired fleet in export markets is driven by the spread between Western and Eastern coal prices and the spread between these coal prices and the natural gas price. The levels of demand and fuel prices are always uncertain. In addition, the underlying demand for energy from the coal fleet depends on the output of the baseload generators in Ontario: nuclear, hydro and wind.

Apart from issues with the forecasts of the market drivers and the baseload production assumptions used in the simulation model, the model and its market information may prove not to be precise in simulating the impact of any adder applied on coal-fired emissions. This is something that can only be learned by experience.

Monitoring Actual Emissions vs. the Forecast Profile for 2011

OPG will provide periodic emission tracking reports on its progress toward achieving the target. Preliminary CO₂ emission measurements from the coal-fired stations will be available within one month following a month's end, and final emission results will be available within two months following a month's end. OPG will provide the year-to-date actuals and updated forecasts of year-end emissions to the Ministry each month starting in March 2011.

OPG will establish a range around the target that recognizes the volatility of the marketplace. OPG will endeavour to manage its CO₂ emissions within this range. Should the updated year-end CO₂ emission forecast move outside the range, OPG will adjust its implementation strategy.

Adjusting the 2011 Implementation Strategy

In conditions where OPG has a positive adder in place to achieve the target range and a forecast update indicates that emissions will fall outside the target range, OPG will adjust its Implementation Strategy so that the forecast for year-end CO₂ emissions meets the target. OPG will adjust the CO₂ emission adder. Any revisions to the CO₂ emission adder will be posted publicly and will take effect with one week's notice.

If the operating strategy described above restricts OPG from managing the reliability of its coal fleet, OPG may need to adapt its offer strategy during 2011. OPG will update this Implementation Strategy and the IESO of any change to its operating strategy.