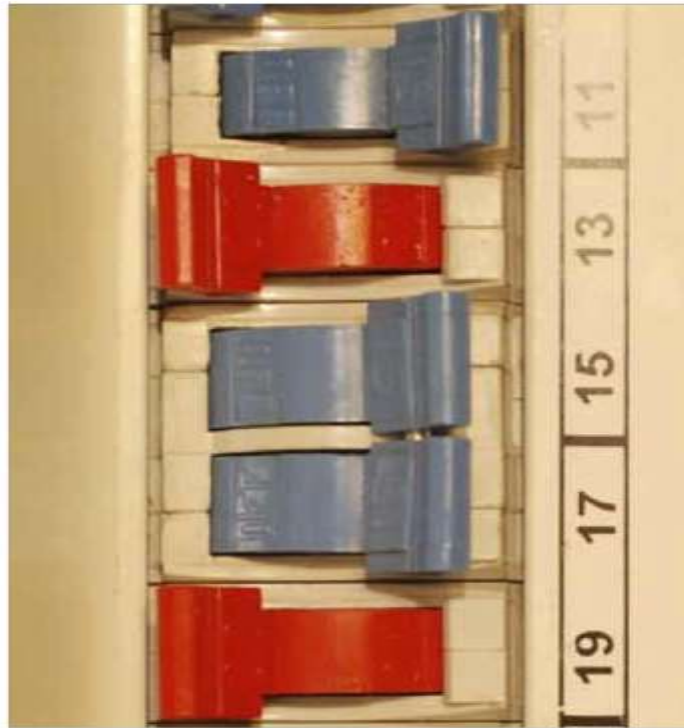
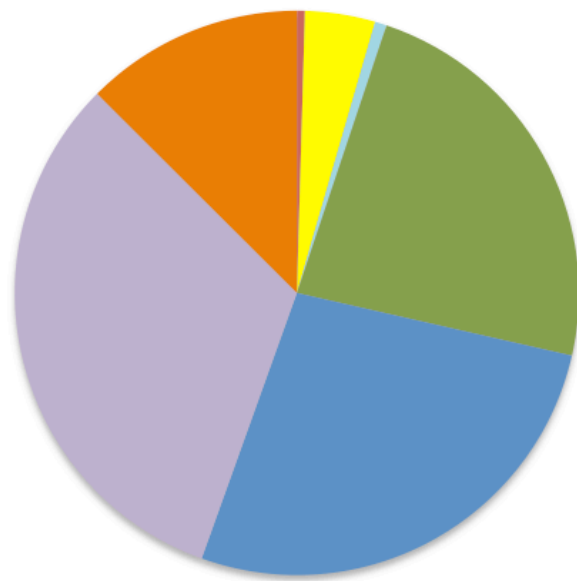


Behind the Switch

PRICING ONTARIO ELECTRICITY OPTIONS

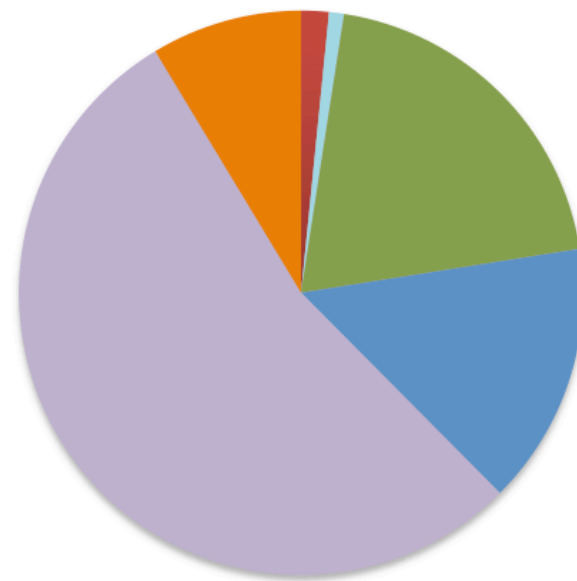


Where does Ontario's power come from today?



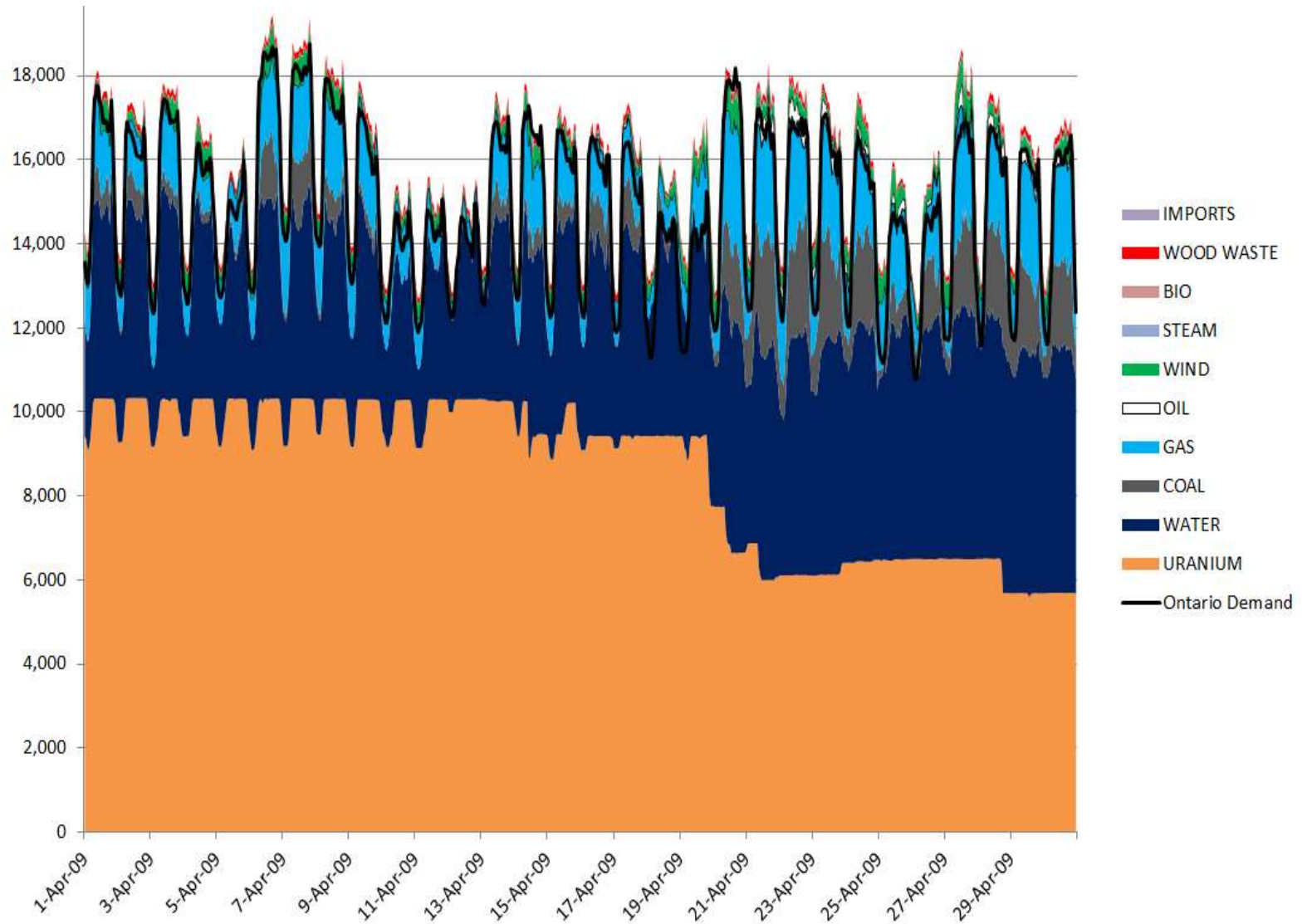
Installed capacity in 2010

- Solar
- Wind
- Bioenergy
- Hydro
- Gas
- Nuclear
- Coal



Generation in 2010

Hourly production, April 2009



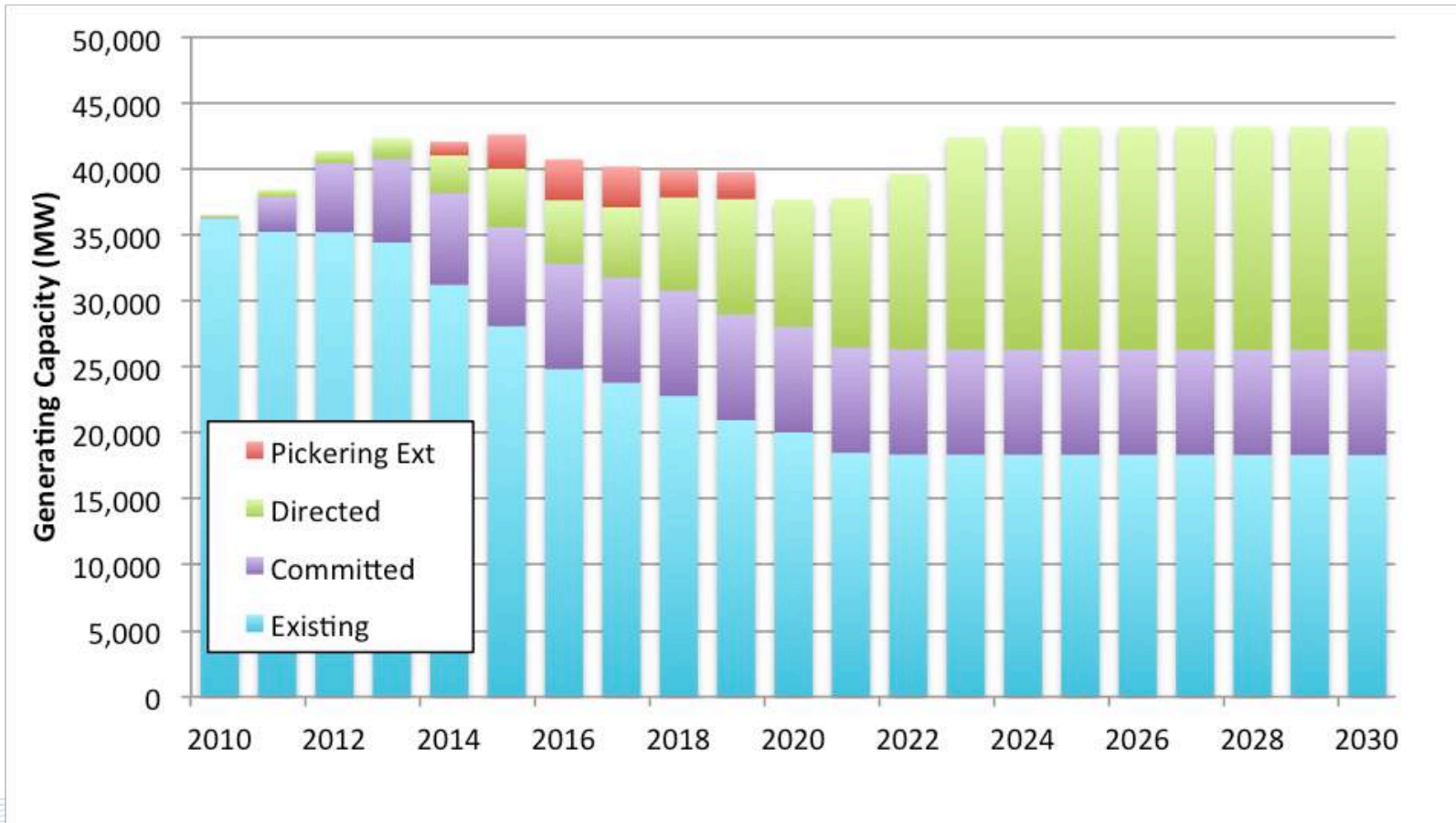
Changes on the way

In the coming years, Ontario's electricity system will undergo significant change

- Phase-out of coal power by end of 2014
- Retirement of Pickering nuclear plant, with likely temporary extension of some units
- Rebuilding/refurbishment of nearly all of Ontario's remaining nuclear reactors
- Expansion of renewable power
- Significant investment in transmission and distribution systems

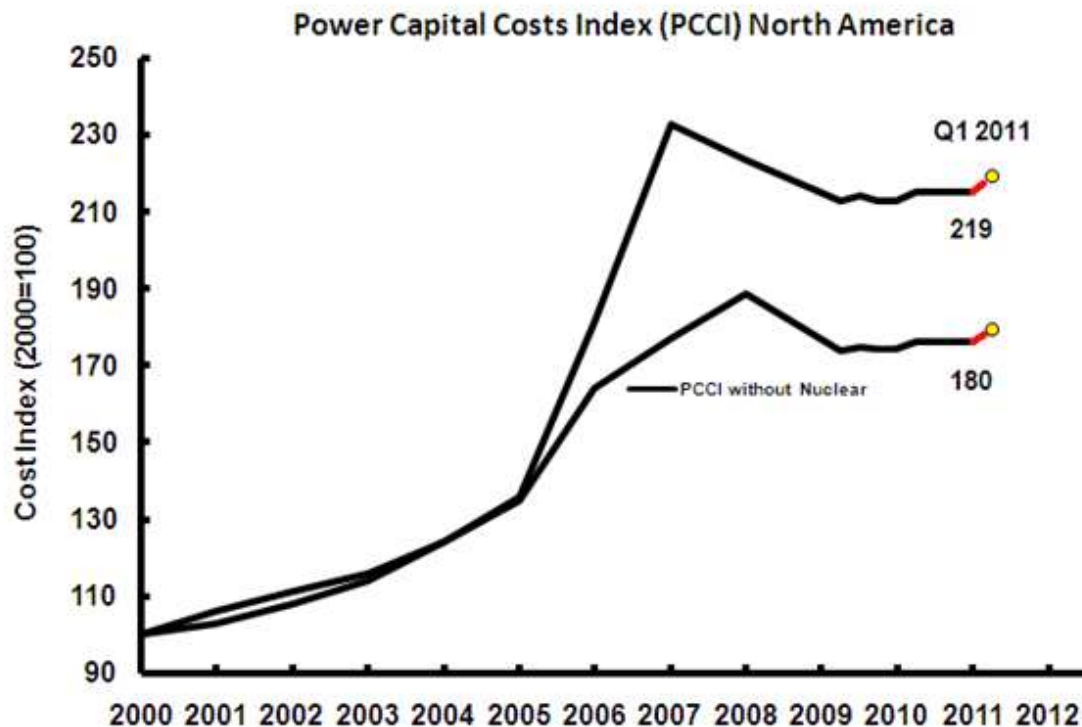
Rebuilding Generation

Half of today's generating capacity will need to be replaced by 2022

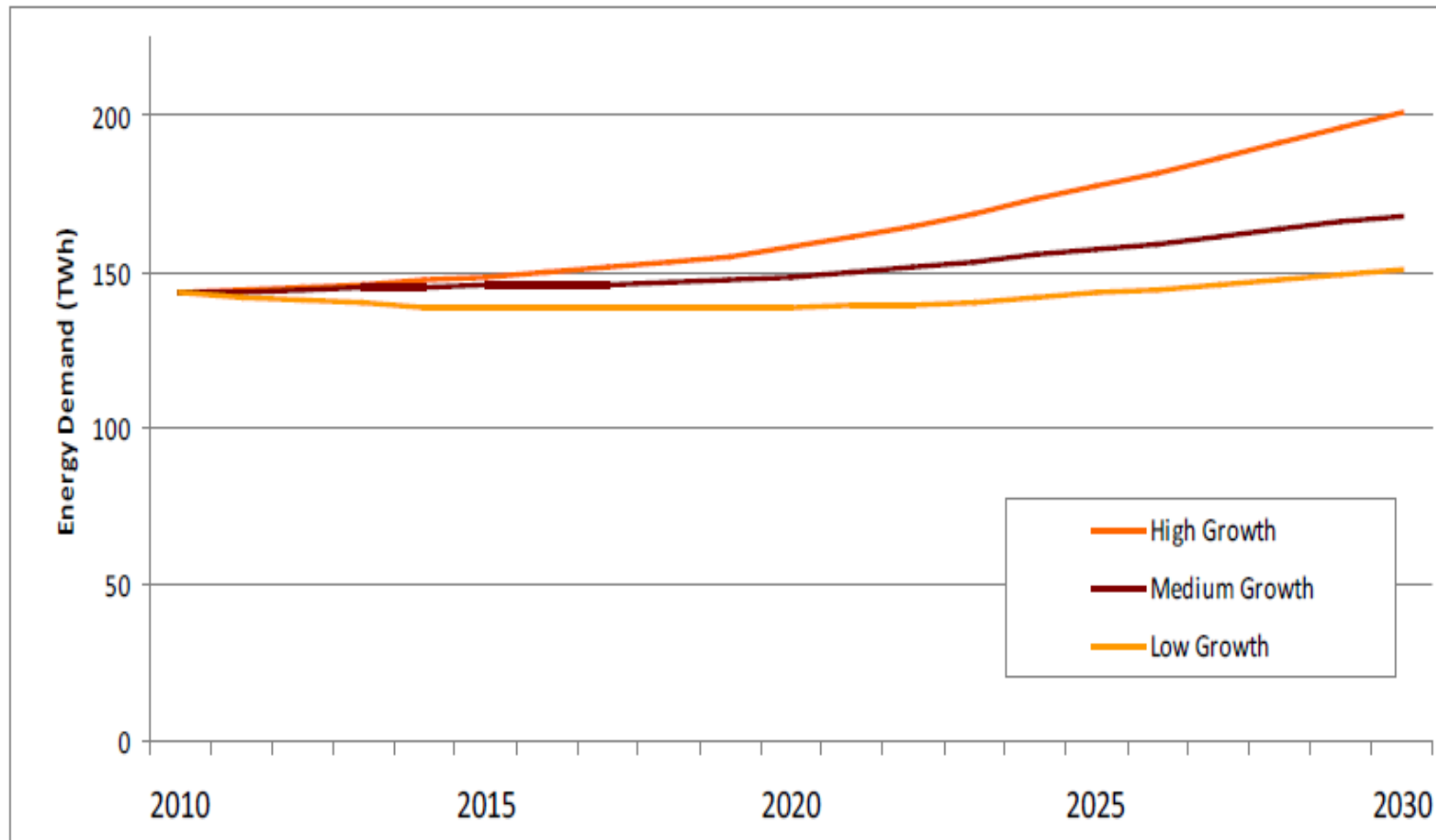


Costs for new power plants have increased

The capital cost of building the average power plant has doubled in the past decade



Demand projected to continue moderate growth



Ontario electricity rates in a Canadian context

Rates vary widely across Canada. Ontario's are competitively placed.

Community	Served by	Avg. Rate
Lloydminster, AB	Atco	139.71
Charlottetown, PE	Maritime Electric	129.05
Calgary, AB	Enmax	98.35
Edmonton, AB	Epcor	95.77
Halifax, NS	N.S. Power	90.45
Saskatoon, SK	City of Saskatoon	86.5
Moncton, NB	N.B. Power	85.33
Toronto, ON	Toronto Hydro	80.86
St. John's, NL	Nfld. Light & Power	80.57
Regina, SK	SaskPower	78.63
Ottawa, ON	Ottawa Hydro	78.03
Thunder Bay, ON	Thunder Bay Hydro	71.68
Montreal, PQ	Hydro-Québec	48.81
Winnipeg, MB	Manitoba Hydro	47.64
Vancouver, BC	B.C. Hydro	44.14

Residential - 675 kWh/month

Jan. 2009 rates, including applicable rate riders and rebates.

Does not include taxes, municipal surcharges or municipal franchise fees.

Source: adapted from SaskPower 2010 rate application, Appendix C.

Prices are rising across the country

- British Columbia
 - Rates forecast to rise 33% from 2010-2013
- Alberta
 - Rates forecast to rise 50% from 2010-2016
- Nova Scotia
 - Electricity rates up 37% between 2002-2010
- Saskatchewan
 - Electricity rates up 36% between 2002-2010

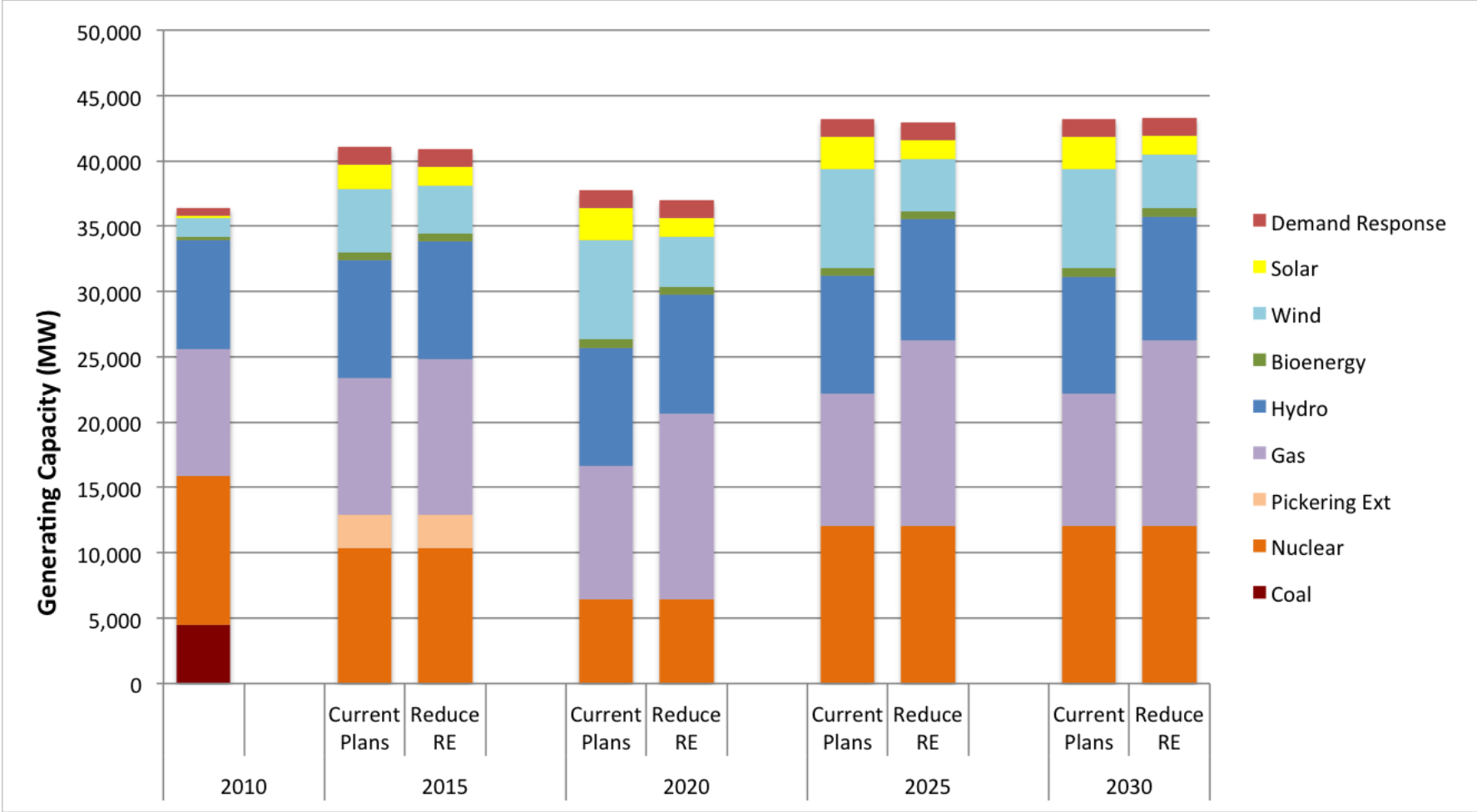
Understanding Ontario's future electricity prices

- To compare cost impacts of Green Energy Act and alternative generation choices, we modelled two scenarios of Ontario's electricity future.
 - **Current Plans**
 - Represents current electricity planning, as represented by the Long-Term Energy Plan and proposed IPSP II
 - **Reduce Renewables**
 - Green Energy Act is removed and mainly replaced by new natural gas plants and some new large hydro.
- Nuclear plans remain the same in both scenarios
- These scenarios were modelled using CanESS to simulate generator dispatch and system costs

Approach

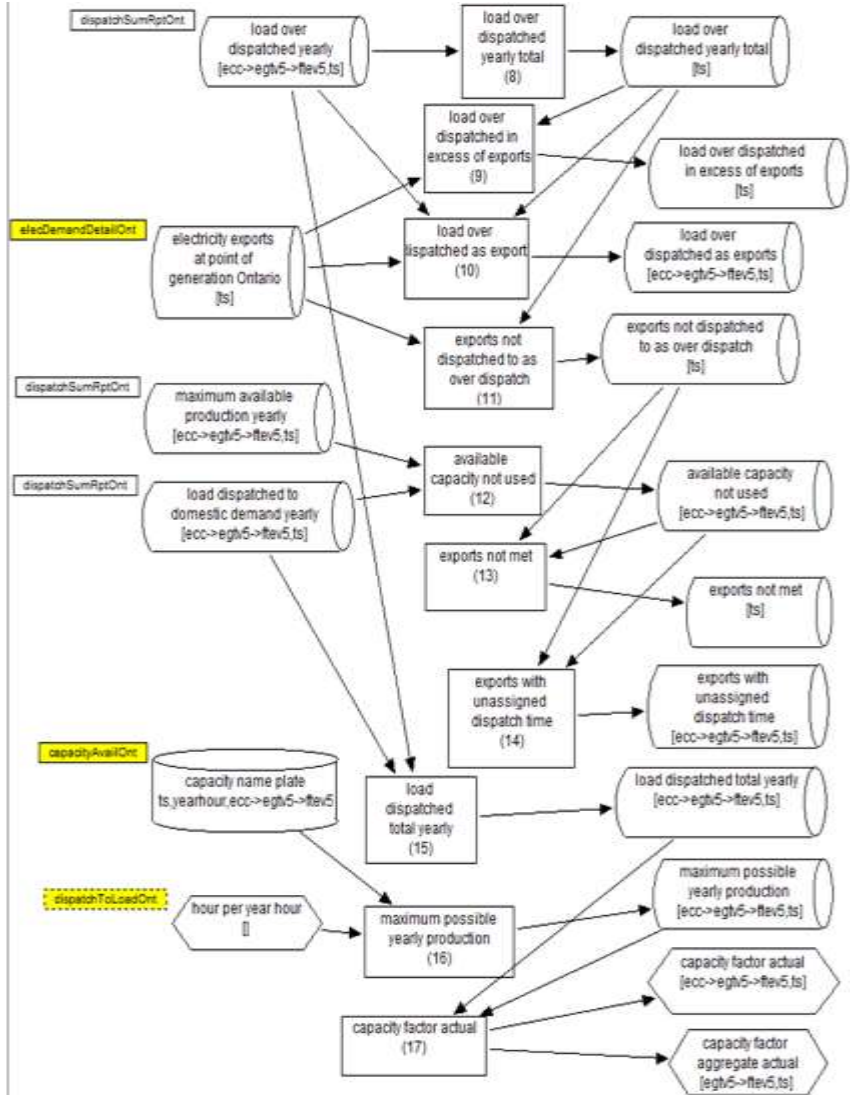
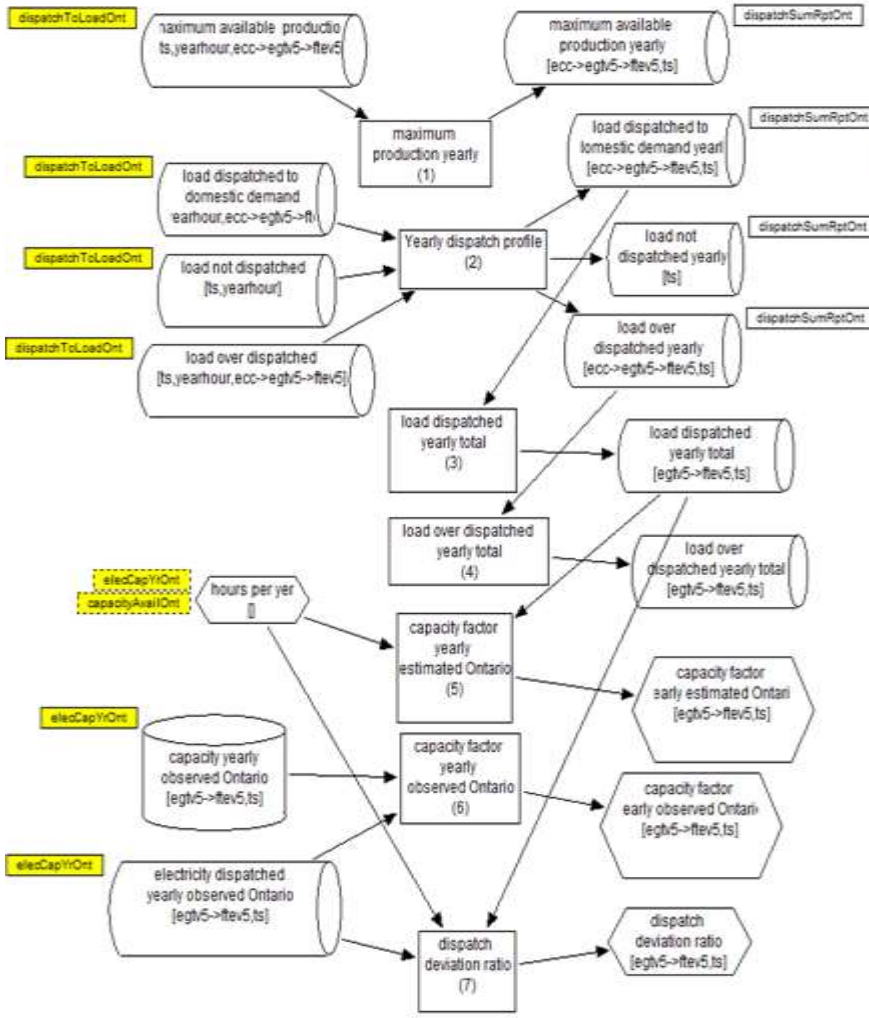
- Key cost assumptions were based on publicly-available third-party data.
 - Primarily U.S. EIA, OPA, IESO, NRCan, U.S. EPA and publicly available reports from Black & Veatch and Navigant Consulting.
- These assumptions are used despite history of cost overruns for certain technologies.
 - Higher nuclear costs and natural gas prices were run as sensitivity cases.
- CanESS provides comprehensive model of how various factors integrate to result in differing potential electricity prices for the scenarios considered.

Generating capacity in the two scenarios

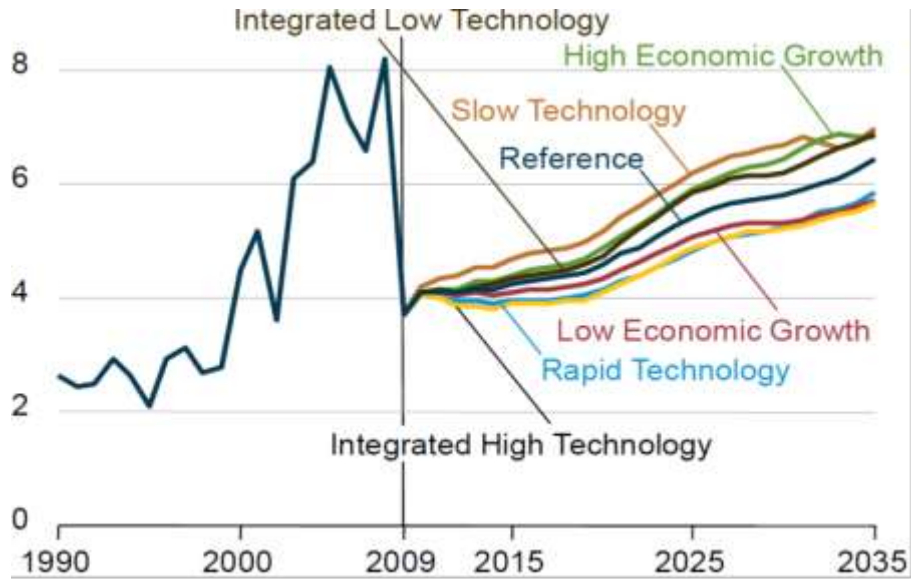


Dispatch in CanESS model

Dispatch Summary Report Ontario



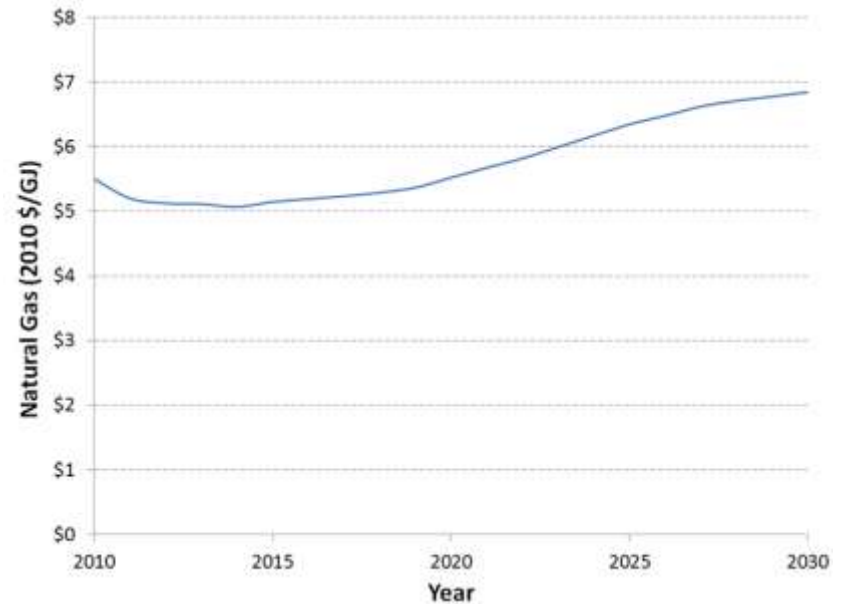
Future natural gas prices



Source: US Department of Energy
(2009 \$US per thousand cubic feet)

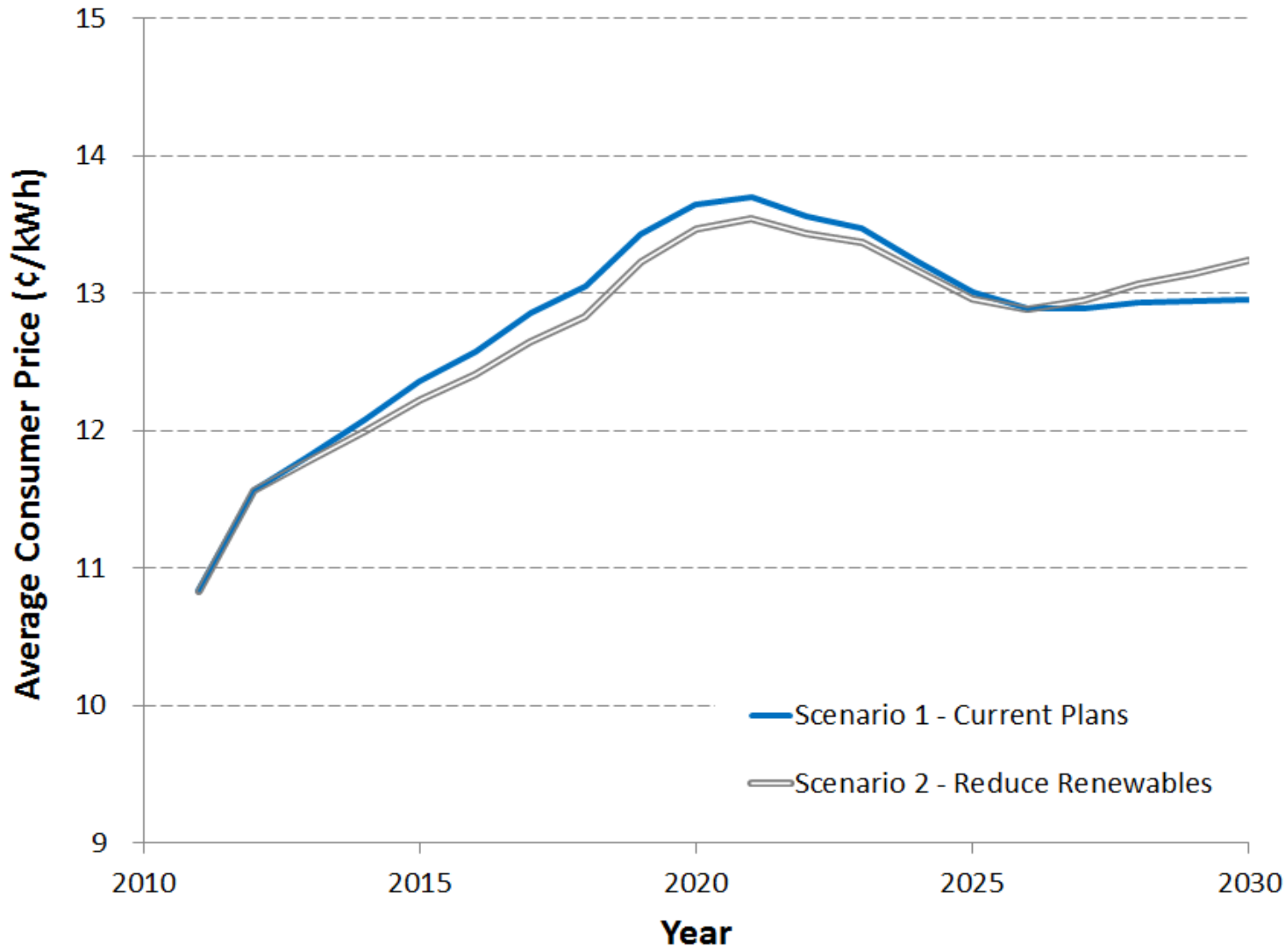
Used in Analysis

Source: Energy Information Agency, 2011 Annual Energy Outlook



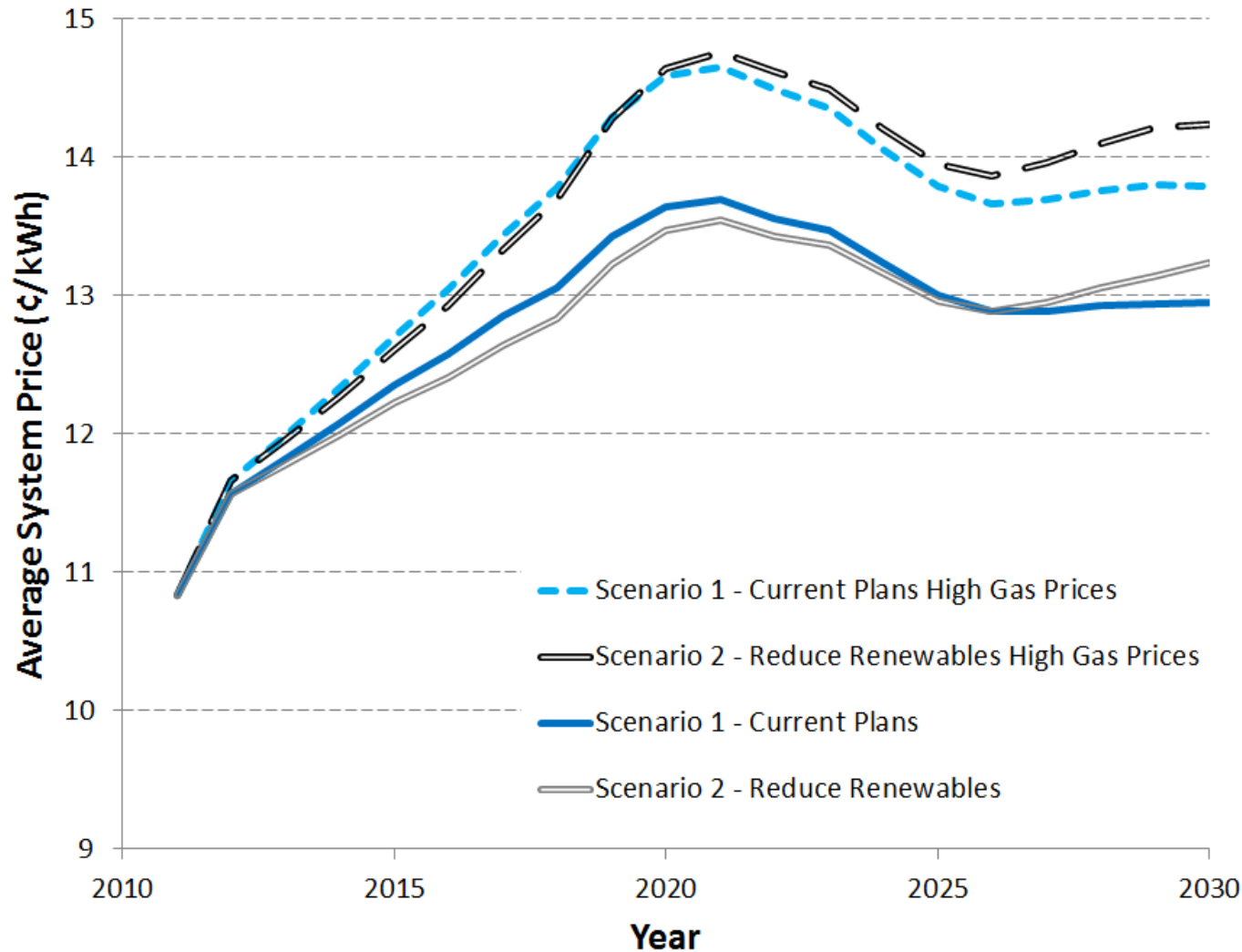
Comparing Price Impacts

Results show prices will increase in both scenarios, with virtually no price difference between them (prices in 2010 \$Cdn).



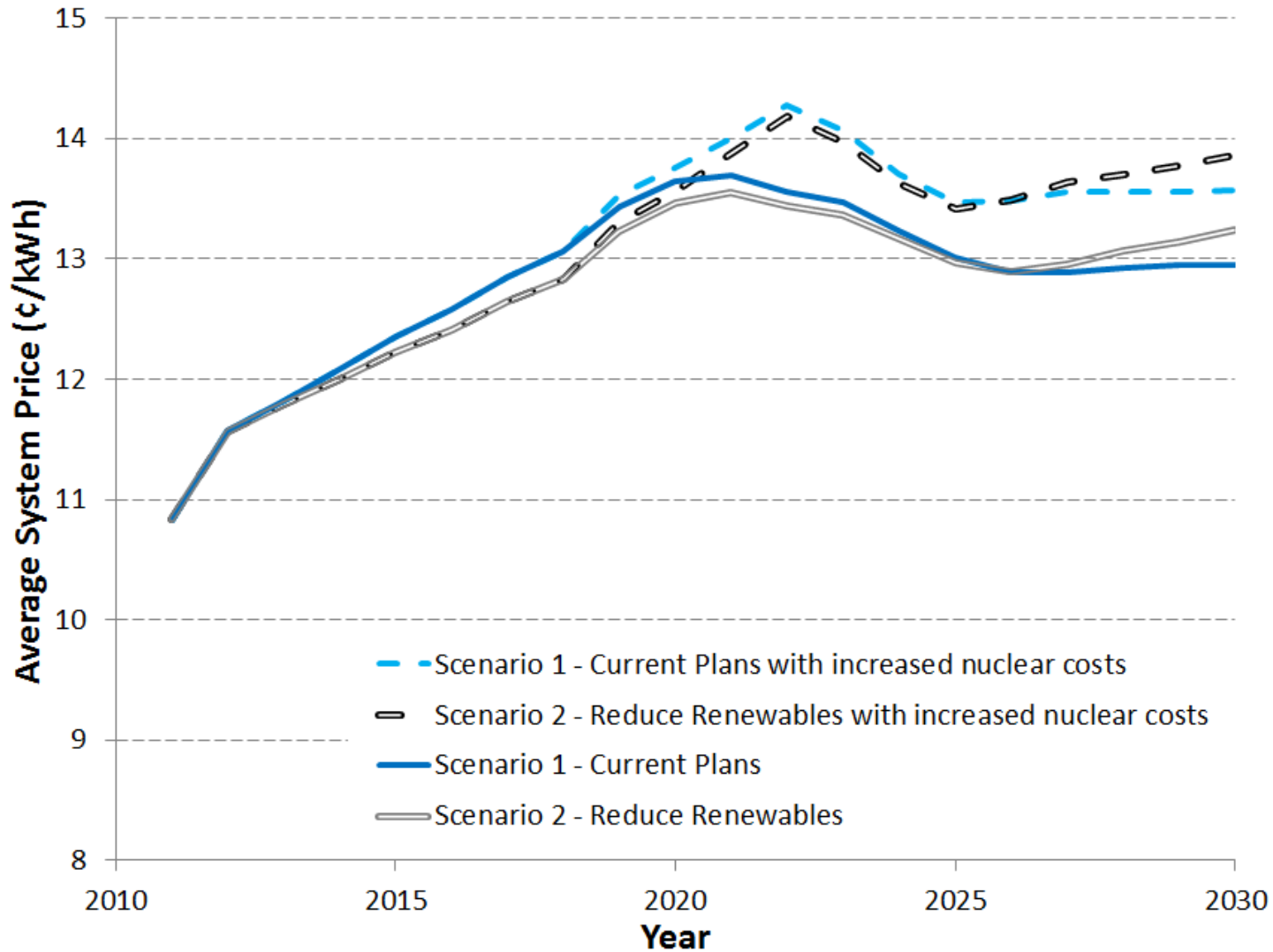
Impact of higher natural gas prices

Sensitivity case with natural gas prices gradually rising to 29% above forecast by 2019 and remaining above forecast levels through 2030 (prices in 2010 \$Cdn).



Impact of increased nuclear costs

Sensitivity case with nuclear costs increasing 25% (prices in 2010 \$Cdn).



Conclusions

- Minimal consumer price benefit to removing Green Energy Act in short term.
- Electricity prices are much more sensitive to future nuclear and gas prices
- Increased reliance on natural gas brings risks:
 - Increased GHGs and air pollution
 - Difficulty siting new gas-fired power plants
 - Upstream impacts of unconventional gas
 - More money leaving province
- Growing renewables brings risks too (notably surplus baseload and integration issues), but can also act as pricing hedge.

Value for Money

- Like the rest of Canada, Ontario's electricity prices are poised to continue increasing in the short term as old infrastructure is updated and replaced, regardless of the choice of electricity generation mix in Ontario. However, the choices facing Ontarians today will have an impact on air quality, greenhouse gas pollution, economic diversity and employment.
- Ontario should be asking which electricity-generation options offer the best value to the province in the long run.

The Pembina Institute

The Pembina Institute is an environmental nonprofit think tank with 50+ staff in eight offices. We work to advance sustainable energy solutions through innovative research, education, consulting and advocacy.



For more information

- www.pembina.org
- www.pembina.org/subscription
 - Pembina eNews
 - Media releases
 - Publication alerts
- Twitter 
- Facebook 