OSPE Formal Energy Policy Reports

OSPE energy policy reports can be downloaded from the OSPE website by doing a web search for the title. For convenience the links are listed below. In case of difficulty you can request a copy from: Paul Acchione, OSPE Volunteer, email: paulacchione@gmail.com

Energy Policy Report List:

R-1: Ontario Electrical Grid and Project Requirements for Nuclear Plants (Mar 2011) - discusses the power system related technical requirements for nuclear plants installed into the Ontario power system. The report was written to advise the provincial government after an inadequate specification was used to seek bids for a new nuclear plant that did not contain the unique Ontario system requirements.

https://www.ospe.on.ca/public/documents/advocacy/submissions/2011-nuclear-plants.pdf

R-2: Wind and the Electrical Grid – Mitigating the Rise in Electricity Rates and Greenhouse Gas Emissions (Mar 2012) - discusses the limitations of Ontario's power system to incorporate large amounts of intermittent wind generation. The report was written to advise the provincial government after the 2010 Long Term Energy Plan was issued and proposed far more wind generation than the Ontario power system was capable of integrating effectively.

https://www.ospe.on.ca/public/documents/advocacy/2012-wind-electrical-grid.pdf

R-3: Engineering a Cleaner Economy – Examining Ontario's Carbon Pricing Program and the Role of Innovation (Sep 2015) – examines carbon tax programs and a cap-and-trade programs and the benefits of having a well-designed program that puts a price on carbon emissions. The report was written to advise the provincial government of the engineering community's views on carbon pricing programs and innovation opportunities for the economy.

https://www.ospe.on.ca/public/documents/advocacy/2015-engineering-cleaner-economy.pdf

R-4: Ontario's Energy Dilemma – Reducing Emissions at an Affordable Cost (Mar 2016) – examines various technologies that can help Ontario reduce emissions in the heating and transportation section now that electricity emissions are already 90% below 19990 levels. The report also describes Ontario's experiences with reducing emissions in the electrical sector and the lessons that were learned. The report was written to advise the provincial government that emission reductions in the heating and transportation sectors will be more difficult and expensive than the electricity sector unless we are creative and leverage the clean electrical sector effectively.

https://www.ospe.on.ca/public/documents/advocacy/2016-ontario-energy-dilemma.pdf

R-5: Retail Electricity Rate Reform – Path to Lower Energy Bills and Economy-Wide CO_2 Emission Reduction (Apr 2019) – examines the benefits of reforming Ontario's retail electricity rate plans on a voluntary basis so consumers can affordably use surplus clean electricity to displace some of their fossil fuel use. The report was written to advise the provincial government that innovation in rate design is a less costly way to reduce greenhouse gas emissions.

https://ospe.on.ca/wp-content/uploads/2019/11/FINAL_FULL_REPORT_Retail_Electricity_Price_Reform_April_2019.pdf

OSPE Energy Policy Seminar Outlines

Most seminars are formatted for a 1-hour presentation unless otherwise noted. OSPE energy policy reports can be downloaded from the OSPE website by doing a web search for the title. In case of difficulty you can request a copy from: Paul Acchione, OSPE Volunteer, email: paulacchione@gmail.com

Energy Policy Seminar List:

E-1: Limits to Renewable Energy Penetration (Dec 2013) - discusses the technical limits to how much wind and solar can be installed on the electrical grid. The presentation includes:

- Benefits and challenges of wind and solar generation
- Present electrical grid constraints and their impact on wind and solar generation
- Cost impact of dispatching generation (load following)
- Wind and solar production profiles compared with actual electrical demand
- Why dispatching down (constraining output) of wind and solar generation has become necessary
- Limits to how much wind and solar can be installed on the grid

E-2: Electrical Energy Storage Options (Oct 2015) - discusses the benefits of storage and the costs involved. The presentation includes:

- Ontario's electrical demand profile
- Cost impact of dispatching generation (load following)
- Benefits and challenges of storage
- Alternatives if we don't use storage
- How much storage is needed to effectively integrate renewables
- Storage technology options and their costs

E-3: Wind and the Electrical Grid (updated Jun 2019) - discusses the challenges posed by wind generation to ensure dependable electrical supply. The presentation includes:

- Why Ontario wind generation is out of step with electrical demand
- Why wind generation is difficult to integrate into Ontario's electrical grid
- Why electricity market prices collapse and even go negative in Ontario
- Why Quebec's hydroelectric storage capacity is not available to Ontario
- Why wind generation results in higher GHG emissions in Ontario's grid
- Why nuclear generation is needed if low GHG emissions is a requirement

E-4: The Real Cost of Electrical Energy (Nov 2014) - discusses the comparative cost of electricity and the carbon dioxide emissions that would result from a wind, solar, nuclear or natural gas generation grid. The presentation includes:

- Why the demand profile is critical to understanding the real cost of production
- Price confusion - the different prices for electricity
- The cost impact of load following (dispatching)
- Solar production profiles and how that impacts generation & storage capacity
- Wind production profiles and how that impacts generation & storage capacity
- The total delivered energy cost of solar, wind, nuclear and natural gas

E-5: Productive Use of Nuclear Spent Fuel (May 2016) - discusses how we can consume our used fuel waste in new Generation IV fast neutron reactors to make energy. The presentation includes:

- The CANDU and PWR (open) fuel cycles in Canada and USA
- Spent fuel properties of current CANDU and PWR reactors
- Usable components of used fuel and how they can be extracted
- The difference between thermal and fast neutron reactors
- Difference between thorium and uranium fast neutron reactors
- Reducing life time and radio-toxicity of used fuel
- Advantages of reprocessing used fuel to generate energy

E-6: has been replaced by E-17

E-7: Challenges Facing Nuclear Energy After Fukushima (Jan 2015) - discusses the problems nuclear needs to overcome to gain public acceptance. The presentation includes:

- Natural gas prices and their impact on nuclear
- Interest rates and their impact on nuclear
- Growing fleet of wind turbines and their impact on nuclear
- Load following requirements and the impact on nuclear
- Public safety concerns - used fuel repository, reactor accidents
- Cost and schedule over-run experience on recent projects
- Large capital requirements and corporate risk

E-8: Straight Talk on Energy Challenges – Canada, USA, World (Jan 2017) - discusses energy policy challenges and the lessons learned from Ontario's experience. The presentation includes:

- Some inconvenient energy facts
- Policy challenges
- Current energy demand – Canada, Ontario, USA, World
- Current electricity demand - Canada, Ontario, USA, World
- Cost of various generation technologies in Ontario
- Case study – Ontario's grid
- Lessons learned from Ontario's experience

E-9: Ontario's Electricity Dilemma (Apr 2015) - discusses Ontario's challenges and policy changes needed to achieve low emissions at reasonable electricity rates. The presentation includes:

- Original Goals for Electricity System Transformation
- Technology Limitations
- Unexpected Surprises
- Ontario's Electricity Demand
- The Cost Impact of Curtailing Generation Output
- Why Are Electricity Prices Rising So Fast in Ontario ?
- Why Will Emissions Double as We Add Wind and Solar Plants ?
- What Can We Do to Mitigate Increases in Rates and Emissions ?
- What Are the Enabling Policies and Technologies That We Need ?

E-10: has been replaced by E17.

E-11: The Electrical Grid (Sep 2015) – this is a 4 part educational series of 2 hour seminars each covering how the grid works, how greenhouse gas emissions can be reduced, current challenges the grid is facing and potential solutions to those challenges. (8 hours total time). Shorter presentations of 40 to 60 minutes on a portion of the contents can also be provided upon request.

- Part 1 – How It Works (2 hour presentation with Q/A)

    - Historical Perspective - T. Edison, N. Tesla, Sir Adam Beck
    - The Electrical Grid
    - Consumer Load Demand – daily, weekly, annual
    - Generation Technologies
    - Storage
    - Load, Frequency and Voltage Control
    - Wholesale Auction Market
    - Retail Electricity Prices
    - Stranded Debt

- Part 2 – Achieving Low Greenhouse Gas Emissions (2 hour presentation with Q/A)
    - Greenhouse Gas (GHG) Emissions from Each Technology
    - Consumer Load Demand – Weekly and Annual
    - Generation Production Profiles
    - Using Storage Economically
    - Integrated Generation Solutions
    - Minimizing Greenhouse Gas Emissions
    - Reducing Greenhouse Gas Emissions in Other Sectors
    - Using Electricity to Facilitate Carbon Reduction in Other Sectors

- Part 3 – Current Challenges (2 hour presentation with Q/A)
    - Government Energy Policy Goals
    - Challenges and Their Impacts
        - Rising Greenhouse Gas Emissions
        - Rising Electricity Prices
        - Ineffective Retail Price Plans
        - Low Power System Load Factors
        - Curtailment (Waste) of Carbon-Free Energy
        - Conservation Program Creates Surplus Carbon-Free Energy
        - Adding Capacity During a Period of Flat Demand

- Part 4 – Potential Solutions (2 hour presentation with Q/A)
    - What Problems Do We Need to Solve ?
    - Reducing Electricity Rates
    - OSPE's Voluntary Smart Price Plan
    - Reducing Greenhouse Gas Emissions

E12 – The Electrical Grid and the Wholesale Electricity Market (May 2016) – discusses the components in the electrical grid and a basic description of how the wholesale market works in Ontario. The presentation includes:

- Historical Perspective - T. Edison, N. Tesla, Sir Adam Beck.
- The Electrical Grid
- Consumer Load Demand – daily, weekly, annual
- Generation Technologies
- Storage
- Load, Frequency and Voltage Control
- Wholesale Electricity Market
- Grid Scale Storage and the Wholesale Market

E13 – Electricity – Displacing Fossil Fuels in Other Sectors (Sep 2016) – discusses which combination of electricity prices and carbon prices are needed to enable electricity to displace fossil fuels in the transportation and building sectors. The presentation includes:

- Greenhouse Gas (GHG) Emissions from Ontario's Electricity Sector
- Electricity versus Natural Gas for Home Heating/AC
- Electricity versus Gasoline for Transportation
- Ontario's Surplus Carbon-Free Electricity
- Potential for Fossil Fuel Displacement by Electricity
- Energy Policy Implications

E14 – The Marriage of Nuclear with Natural Gas: Low Emission Affordable Electricity (May 2016) – discusses how nuclear units for base-load capacity and natural gas units for peak load and reserve capacity can be combined to provide an electrical grid that meets the international goal of an 80% reduction in greenhouse gases at an affordable price. The presentation includes:

- Natural Gas Is Key to a Low Emission Affordable Future
- Carbon Dioxide Emissions from Ontario's Power System
- Creating a Low Emission Affordable Future
- The Electrical Demand Profile
- The Optimum Roles for NG, Nuclear and Renewables
- Generation Costs
- Energy Policy Implications

E15 – Ontario's Energy Dilemma: Reducing Emissions at an Affordable Cost (Apr 2017) – discusses the challenges we face to reduce emissions across the economy and the opportunities to leverage a low emission electrical system to facilitate carbon emission reductions in other sectors like transportation, buildings and industry. The presentation includes:

- Power System Carbon Dioxide Emissions
- Power System Supply and Demand
- Marginal Cost of Zero Emission Electricity
- Availability of Surplus Zero Emission Electricity
- Case Studies
- Policy Barriers to Productive Use of Surplus Zero Emission Electricity

E16 – Ontario's Electricity Rates: What Went Wrong? (Jul 2017) – discusses what caused Ontario's electricity rates to rise almost 2x faster than the rest of North American between 2009 and 2016. The presentation includes:

- Constructive Policies
- Power System Carbon Dioxide Emissions
- Unexpected Economic Turmoil
- Ontario's Excess Capacity
- Sub-Optimal Policies that Drive Rates Higher
- The Government's Fair Hydro Plan
- Where Do We Go From Here?

E17 – Retail Electricity Rate Reform – a Zero Cost Way to Reduce Emissions (Mar 2019) – discusses Ontario's growing surplus of emission-free electricity and how we can use it to displace fossil fuels for our heating needs. The presentation includes:

- Major Energy Systems
- Why Do We Have Surplus Emission-Free Electricity?
- Deficiencies of Current Retail Electricity Price Plans
- Attributes of Smart Retail Electricity Price Plans
- OSPE's Smart Price Plans

- Implications for Energy Policy

E18 – Small Modular Reactors – Innovation in the Nuclear Industry (May 2019) – discusses the design features of the new SMRs and the advantages over current large water-cooled thermal reactors.

- Challenges with the Current Generation III+ Large Nuclear Reactors
- Advantages of Small Modular Reactors
- Small Modular Reactor Technologies
- Role of SMRs in Climate Change Mitigation
- SMR Development in Canada
- Policy Implications for Canadian and Provincial Governments

E19 – Energy Strategies for Ontario and the Planet (Sep 2018) – discusses strategies for a low-emission, affordable, economy-wide energy system. The presentation will draw on experiences to date on the transformation of energy systems. The presentation includes:

- Ontario's electrical sector supply mix and emissions
- Ontario's GHG economy-wide emissions
- Benefits of integrating the electrical and natural gas systems
- Benefits of natural gas, thermal and electrical storage
- Economy-wide integrated energy strategies
- Opportunities and challenges for northern off-grid First Nation and mining communities
- Export potential for Ontario's energy expertise
- Policy implications