ESTIMATES 2016
**DEPUTY MINISTER'S TOP ISSUES**
**LONG-TERM ENERGY PLANNING**

## LTEP 2017 PROCESS AND KEY DATES

- This year, the Ministry of Energy is beginning to develop its next Long-Term Energy Plan (LTEP). The 2017 LTEP will follow the planning process outlined in the *Energy Statute Law Amendment Act, 2016 (*Bill 135*)* which came into force on July 1, 2016.

- The consultations will be supported by an electricity technical report released by the IESO on September 1 2016. The Minister of Energy requested the report on June 10, 2016. The report is titled the Ontario Planning Outlook (OPO).

- The Ministry released a fuels sector technical report in September 2016. The report was prepared by Navigant Consulting.

## ONTARIO PLANNING OUTLOOK

### OPO Demand Outlooks

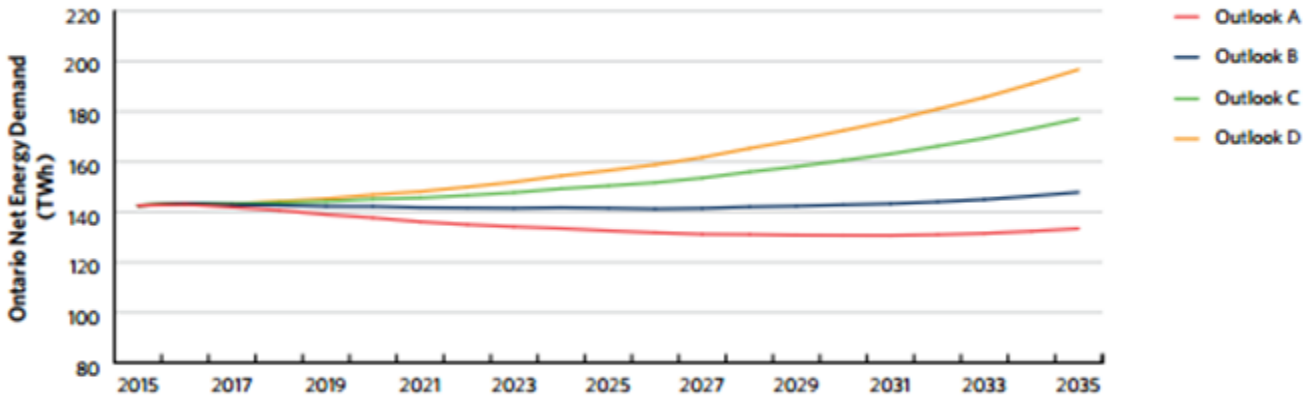
- The Ontario Planning Outlook includes a range of demand outlooks. This range is reflected in four outlooks that all reflect the actions identified in the Climate Change Action Plan.

- The four outlooks for Ontario's electricity demand are:
    - **Outlook A (**or "low demand outlook"), which explores the implications of lower electricity demand;

    - **Outlook B** (or "flat demand outlook"), which explores a level of long-term demand that roughly matches the level of demand that exists today

    - **Outlooks C and D** (or "higher demand outlooks"), which explore higher levels of demand driven by different levels of electrification associated with policy choices on climate change.

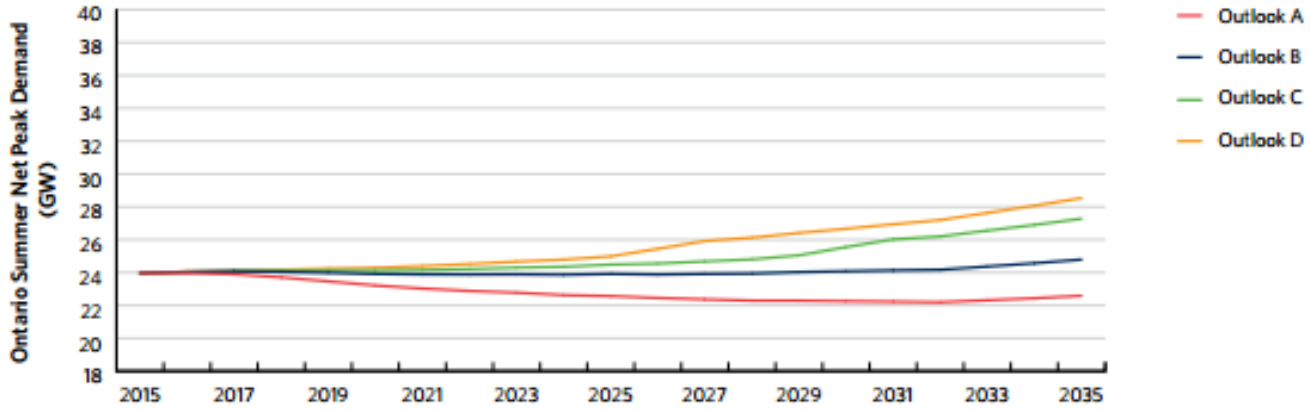
- The four demand Outlooks span a net electricity demand between 133 TWh and 197 TWh by 2035:



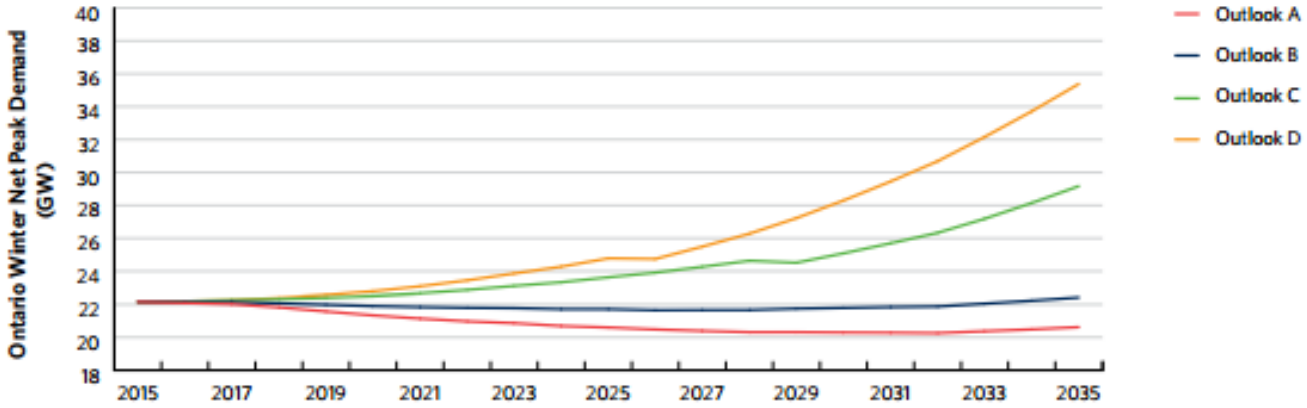
## Demand Outlook Assumptions

| Sector | Outlook A | Outlook B | Outlook C | Outlook D |
|---|---|---|---|---|
| **Residential (52 TWh in 2015)** | 48 TWh in 2035 | 51 TWh in 2035 | Oil heating switches to heat pumps, electric space and water heating gain 25% of gas market share (58 TWh in 2035) | Oil heating switches to heat pumps, electric space and water heating gain 50% of gas market share (64 TWh in 2035) |
| **Commercial (51 TWh in 2015)** | 49 TWh in 2035 | 54 TWh in 2035 | Oil heating switches to heat pumps, electric space and water heating gain 25% of gas market share (63 TWh in 2035) | Oil heating switches to heat pumps, electric space and water heating gain 50% of gas market share (69 TWh in 2035) |
| **Industrial (35 TWh in 2015)** | 29 TWh in 2035 | 35 TWh in 2035 | 5% of 2012 fossil energy switches to electric equivalent (43 TWh in 2035) | 10% of 2012 fossil energy switches to electric equivalent (51 TWh in 2035) |
| **Electric Vehicles (<1 TWh in 2015)** | 2 TWh in 2035 | 3 TWh in 2035 | 2.4 million EVs by 2035 (8 TWh in 2035) | 2.4 million EVs by 2035 (8 TWh in 2035) |
| **Transit (<1 TWh in 2015)** | 1 TWh in 2035 | 1 TWh in 2035 | Planned projects, 2017-2035 (1 TWh in 2035) | Planned projects, 2017-2035 (1 TWh in 2035) |
| **Others (5 TWh in 2015)** | 5 TWh in 2035 | 5 TWh in 2035 | 5 TWh in 2035 | 5 TWh in 2035 |
| **Total (143 TWh in 2015)** | 133 TWh in 2035 | 148 TWh in 2035 | 177 TWh in 2035 | 197 TWh in 2035 |

- The peak demand in the summer differs in the four outlooks, from **22.6 GW to 28.5 GW by 2035**.



- The winter peak ranges from 20.6 GW to 35.4 GW. Outlooks C and D would see Ontario return to a winter-peaking jurisdiction due to an increase in electricity use for space-heating.




**OPO Supply Outlooks**

- The Ontario Planning Outlook identifies the following outlook for installed capacity to 2035:

| **Installed Capacity (MW)** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** |
|---|---|---|---|---|---|---|---|---|---|---|
| Existing Supply | 38,417 | 37,868 | 37,510 | 37,056 | 35,307 | 34,425 | 34,288 | 29,405 | 28,620 | 25,756 |
| Committed, Not Yet Online | 1,078 | 1,678 | 2,655 | 2,811 | 3,194 | 3,194 | 3,230 | 3,229 | 3,244 | 3,244 |
| Directed Procurements | 0 | 125 | 433 | 683 | 683 | 963 | 1,563 | 2,047 | 2,287 | 2,767 |
| Expired Contracts | 32 | 581 | 939 | 1,492 | 1,548 | 1,548 | 1,684 | 3,875 | 4,661 | 4,689 |
| Refurbished Nuclear | 0 | 0 | 0 | 0 | 881 | 881 | 881 | 1,762 | 3,465 | 4,346 |
| **Installed Capacity (MW)** | **2026** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** | **2033** | **2034** | **2035** |
| Existing Supply | 23,903 | 23,789 | 21,440 | 17,599 | 15,155 | 14,254 | 13,471 | 12,443 | 10,401 | 9,345 |
| Committed, Not Yet Online | 3,244 | 3,244 | 3,244 | 3,239 | 3,238 | 3,021 | 3,021 | 2,991 | 2,696 | 2,517 |
| Directed Procurements | 2,855 | 2,855 | 3,033 | 3,033 | 3,033 | 3,033 | 3,033 | 3,033 | 3,033 | 3,033 |
| Expired Contracts | 5,719 | 5,832 | 7,376 | 11,221 | 12,843 | 13,961 | 14,744 | 15,803 | 18,140 | 19,375 |
| Refurbished Nuclear | 5,127 | 5,127 | 5,900 | 6,722 | 6,722 | 7,544 | 7,544 | 8,366 | 8,366 | 8,366 |

- Provided planned resources come into service and existing resources continue to operate, Ontario's existing, committed and directed resources would be sufficient to meet the flat or lower demand outlook. Higher demand could create a need for additional resources in the mid-2020's.

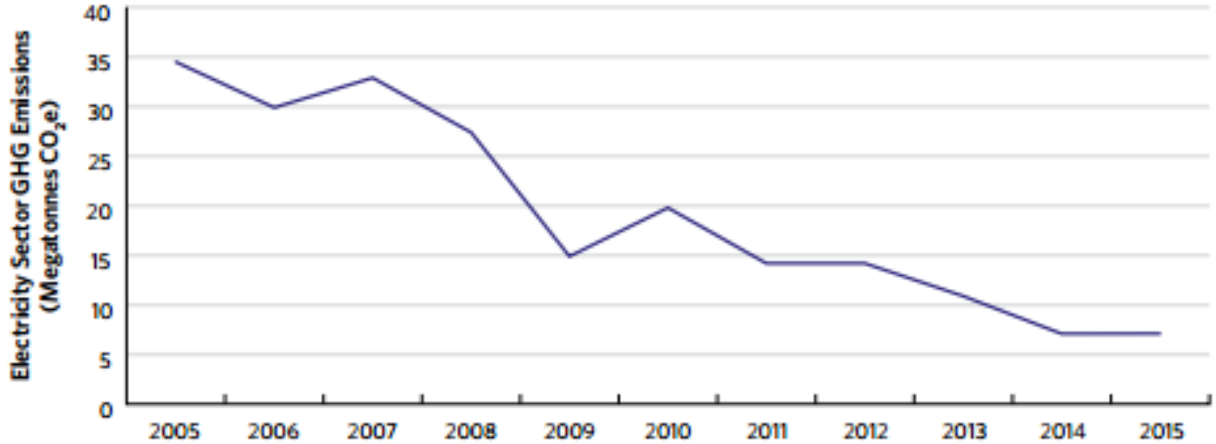
- The following two charts illustrate the available supply at the time of peak demand relative to total resource requirements by the four demand outlooks:



**OPO Emission Outlooks**

- Emissions are expected to continue to decline over the next five years as additional renewable generation enters service. Beyond this period, emissions will depend on demand and amount of generation supplied by natural gas.

- When the cap-and-trade system takes effect in 2017, the electricity sector will see the



cost of carbon reflected in the wholesale electricity price when natural gas-fired resources are on the margin. The carbon price will also be applied to imports.

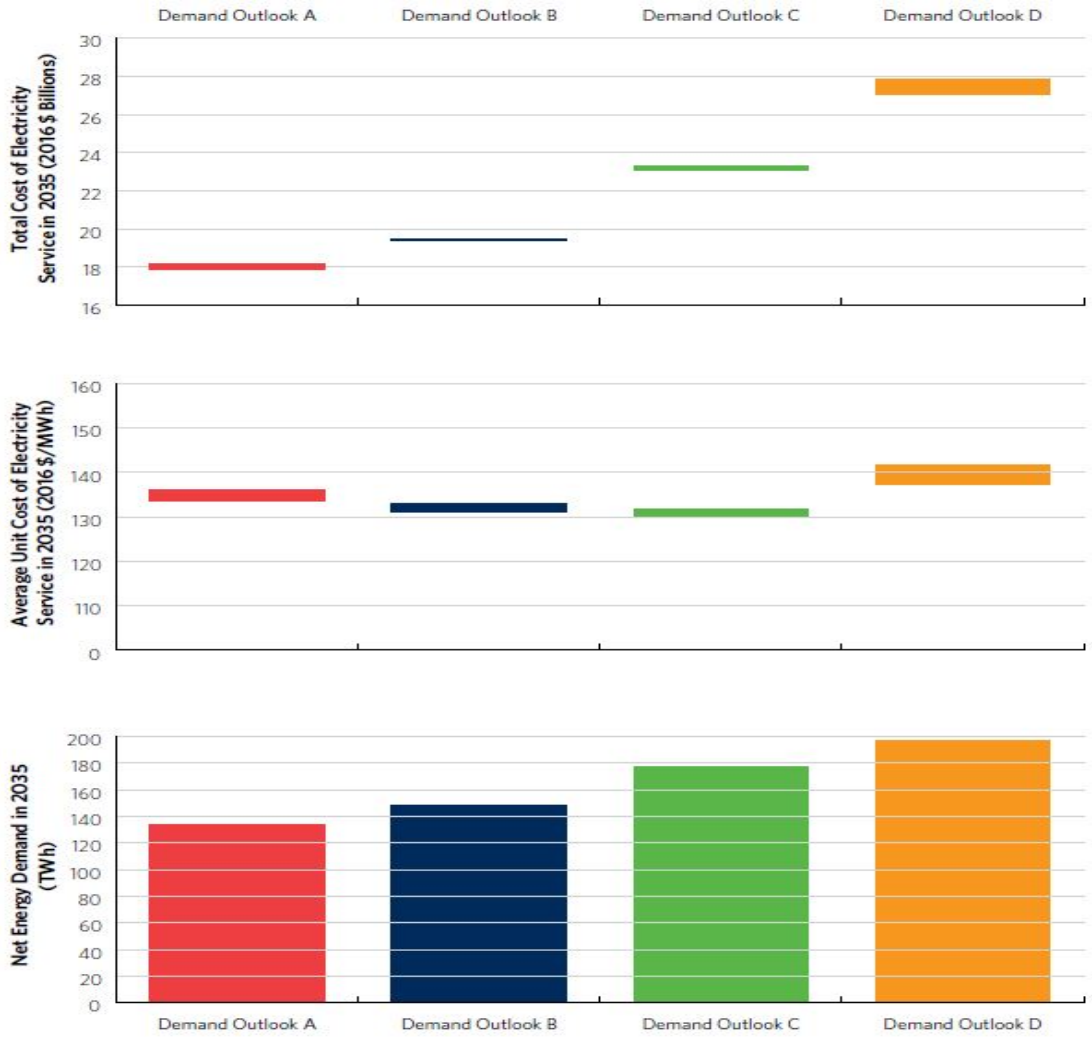
**OPO Cost Outlooks**

- Under flat demand , the total cost of electricity service would average ~$21 billion per year (2016$) over the next 10 years, and decrease to ~$19 billion per year by 2035. The unit cost would decreases by an 0.3 % per year (2016$) over the 20-year period.

- Forecasted cost reductions are due to lower revenue requirements for generators operating after contracts have expired.

- In higher demand outlooks, annual cost of electricity service would rise by approximately $4 billion to $10 billion by 2035 (2016$). Unit costs would be within the same range as the flat demand outlook due to associated consumption increases.

- The following charts summarise the cost of electricity across demand outlooks:



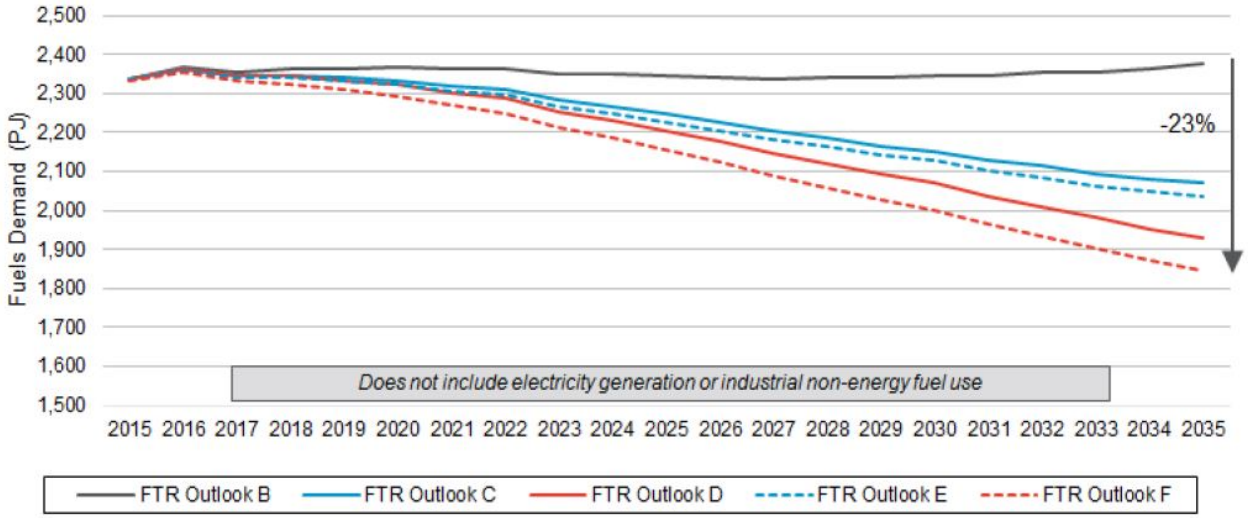
## FUELS TECHNICAL REPORT

### FTR Demand Outlooks

- Navigant considered a range of potential demand outlooks, growing from approximately 2,300 PJ in 2015 to between 1,800 PJ and 2,400 PJ in 2035.

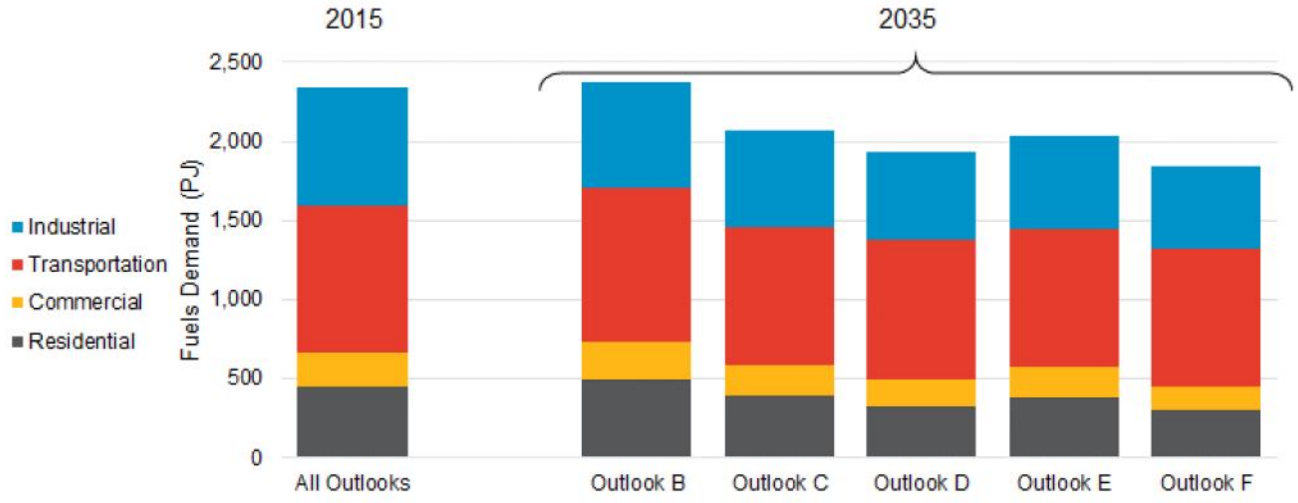
- The range is reflected in five demand outlooks that will be used to inform LTEP consultations and development.

- A snapshot of the five demand outlooks is described below:




*Source: CanESS & Navigant Analysis, 2016*

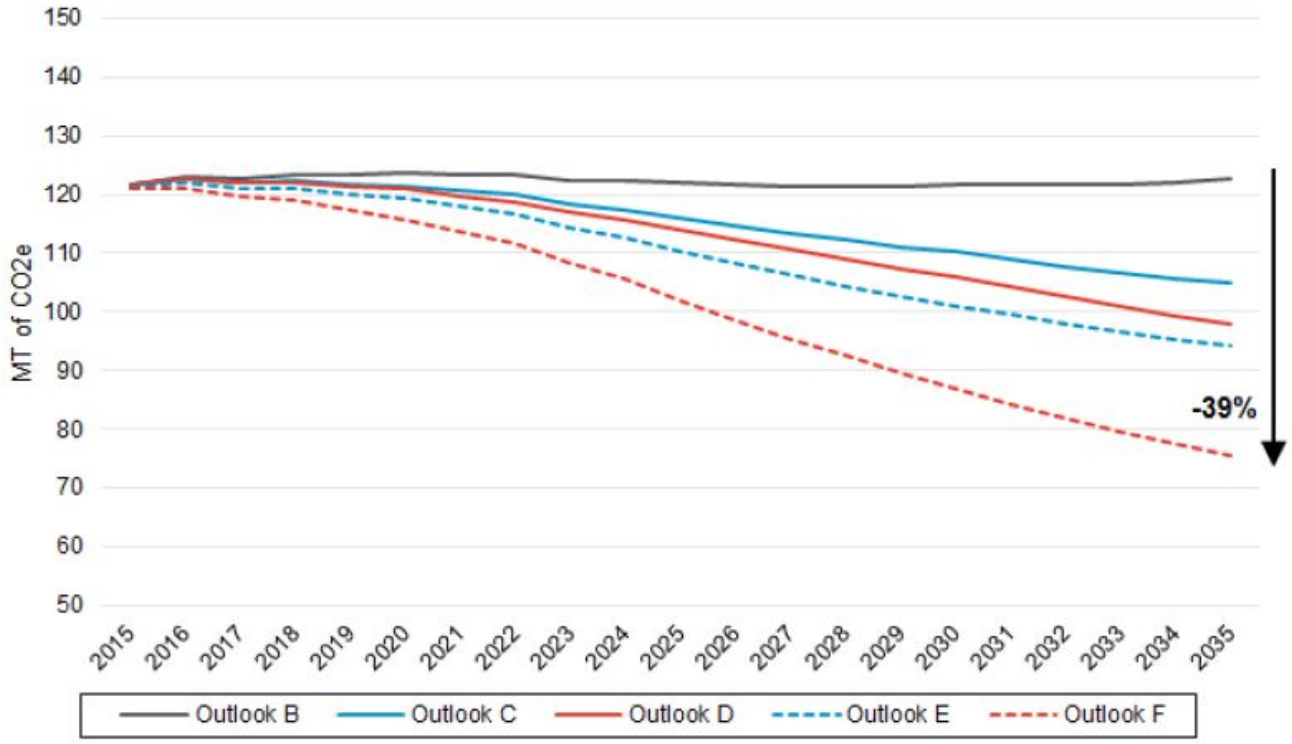
- The 2035 demand, by Outlook, and across the industrial, transportation, commercial, and residential sectors is detailed below:




*Source: CanESS & Navigant Analysis, 2016*

## FTR Emissions Outlooks

- The FTR includes a snapshot of the emissions, by demand outlook, between 2015 and 2035.
- The carbon emissions from Ontario's fuels sector are expected to decline, relative to Outlooks B, under Outlooks C, D, E, and F.
- The emissions reductions in Outlooks C and D are primarily driven by electrification assumed to take place across all sectors; Outlooks E and F include the electrification-driven emissions reductions and include additional reductions due to incremental natural gas DSM.
- The following chart illustrates the emissions reductions from energy-related fuels across the five Outlooks:




*Source: CanESS & Navigant Analysis, 2016*

## FTR Cost Outlooks

- Total fuels energy costs decline significantly in Outlooks C, D, E, and F, primarily due to electrification of space-heating, industrial process, and light-duty transportation.
- The total energy costs and unit energy costs, by Outlook, are described below:

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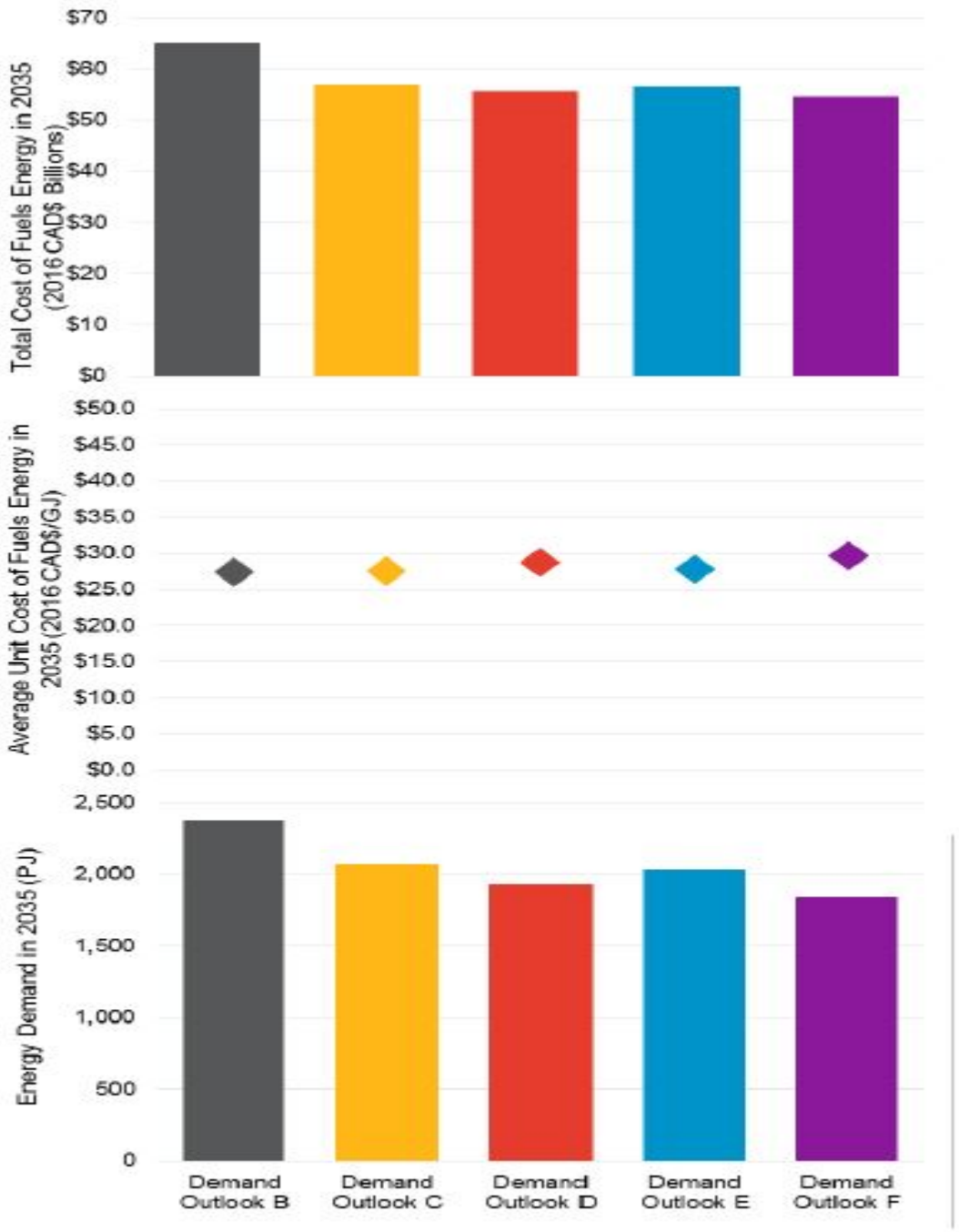


*Source: CanESS & Navigant Analysis, 2016*

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