# Nuclear Energy Powering Ontario's Growth

Community Advisory Council

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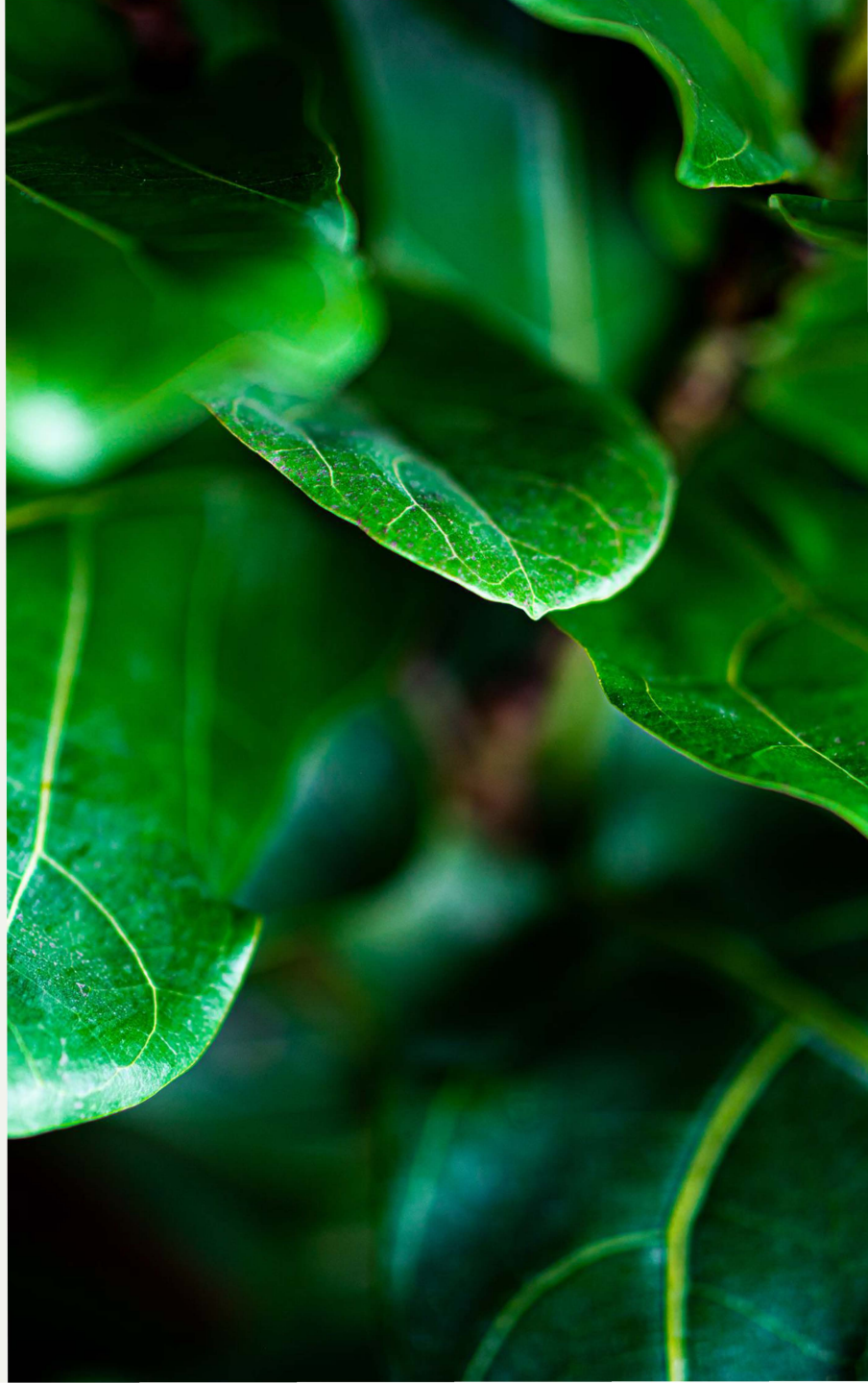
# Agenda

1. Ontario’s Energy Needs
2. Nuclear Energy’s Role
3. OPG’s Contribution to Power Ontario’s Growth



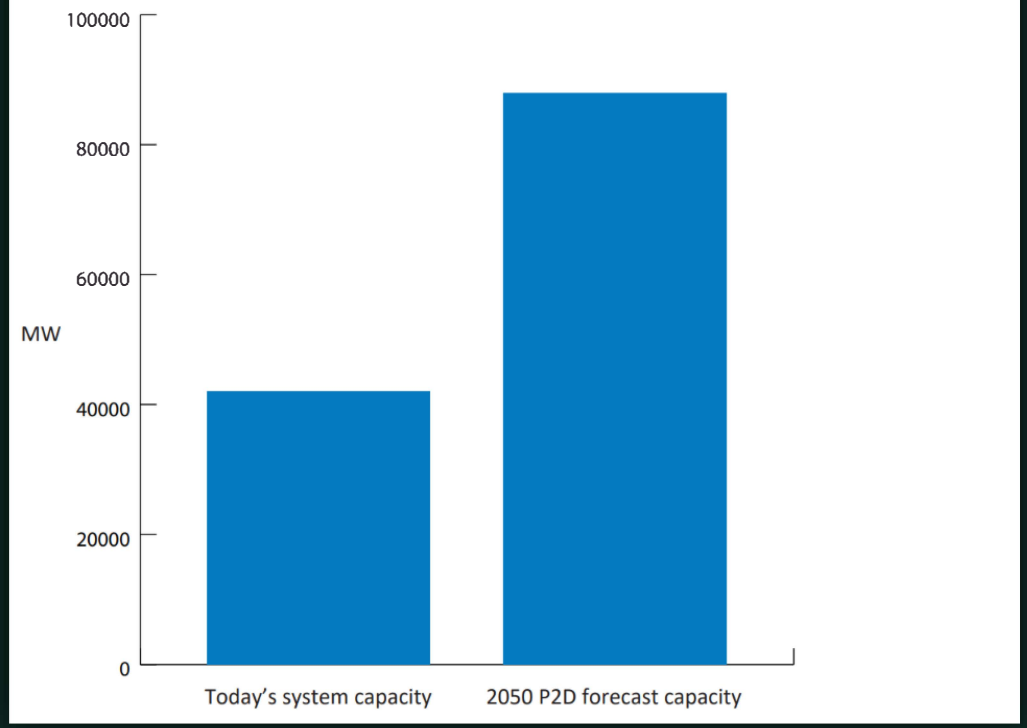
# Ontario's Energy Needs

# Demand for Electricity is Increasing in Ontario

## In 30 years, demand will double

- From 42,000 MW today
- To 88,000 MW in 2050
- Up to 20,000 MW in capacity may be needed just to replace generation that will come to end of life or phased out over the next three decades

**Figure 0.1: Ontario Electricity System Capacity: Historic vs P2D 2050 Pathways Forecast**

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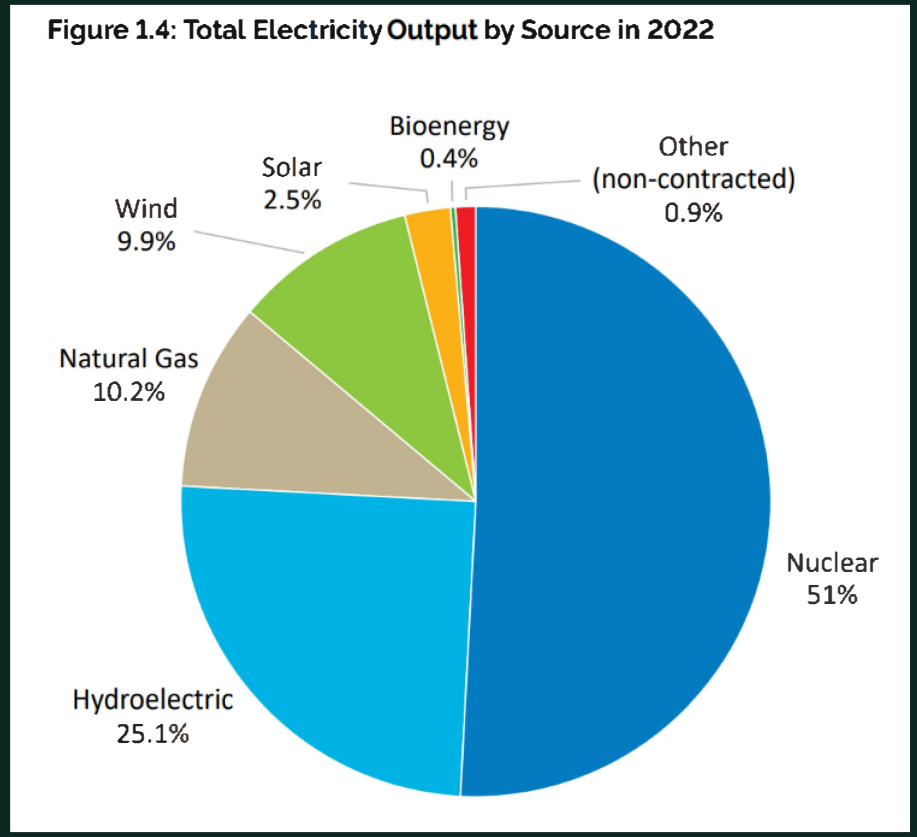
# Ontario grid is low emission

## Our Clean Advantage

- Over 90% of Ontario's electricity come from non-emitting sources
- Compared to our neighbours, Ontario's greenhouse gas production:
  - 7 times less than New York
  - 17 times less than Michigan
  - 26 times less than Indiana
- Access to clean energy attract investments, creating new jobs



# Nuclear Energy's Role

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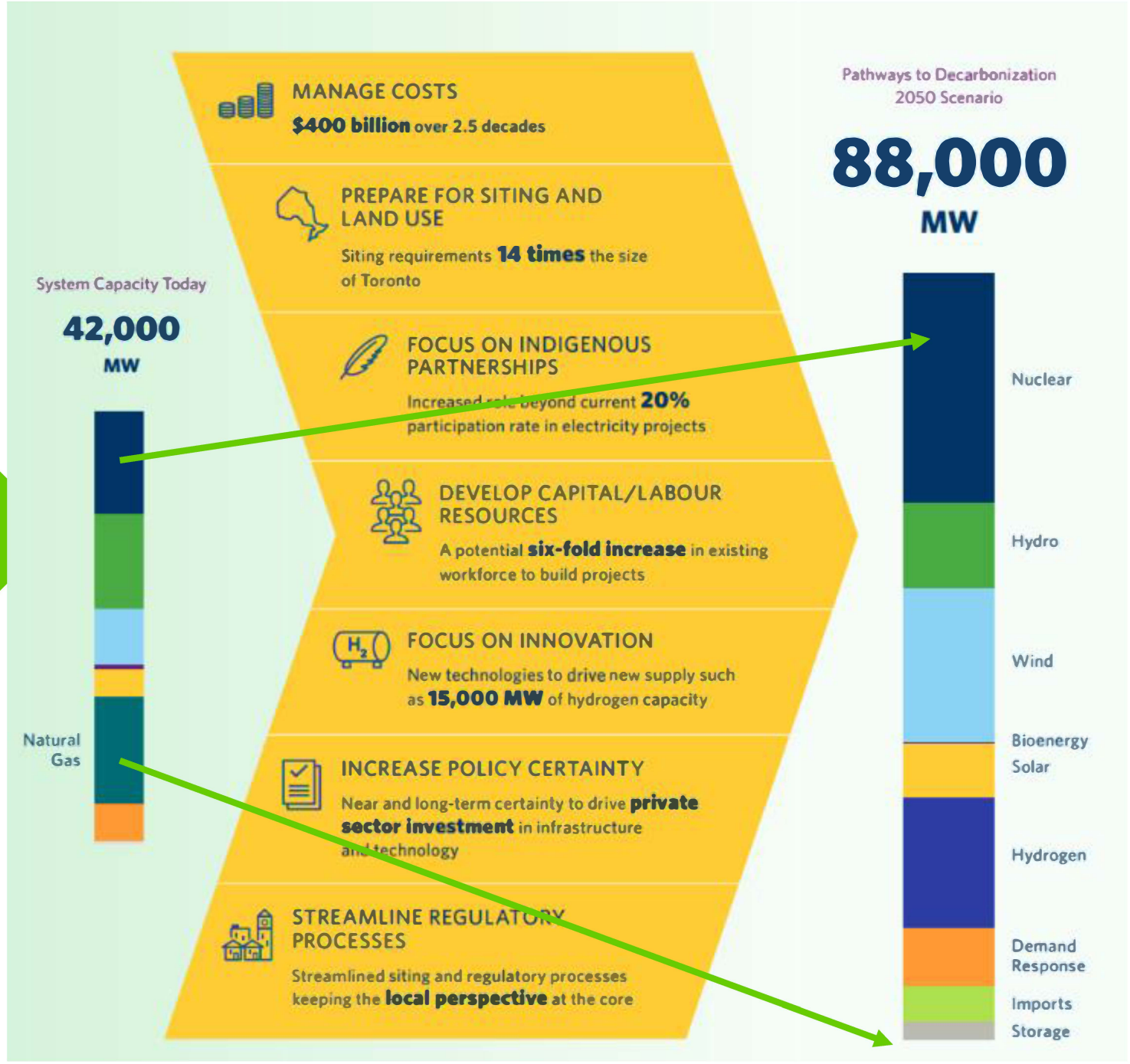
# Pathways to Decarbonization Report (Dec 2022)



# Planning for Nuclear Is Now


## Nuclear Generation Planning

- **Refurbishment of Existing Assets**
  - Safe extension of existing plants with existing infrastructure
  - Faster “Time to market”
- **New Nuclear plants**
  - Adopt latest technologies for higher efficiency and reliability
  - Technology/engineering development time
  - Long environmental and licensing approval process
  - Opportunities: Modulization, Industrialization

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# OPG's Contribution to Power Ontario's Growth

# Powering Ontario's Growth

In July 2023, the Province of Ontario released the Powering Ontario's Growth report to outline the plan to meet expected electrify demand in the decades to come.

## How is OPG helping to power Ontario's growth?

01

### Advancing new nuclear

Nuclear is the backbone of Ontario's electricity system powering homes and businesses with carbon-free electricity 24/7/365.

From small modular reactors to nuclear refurbishments, OPG is leading the way to a net-zero economy.

02

### Maximizing hydroelectric power

From investments in our existing fleet of hydro stations to exploring new hydro opportunities in the North, we're working to ensure this timeless, reliable, and renewable energy source continues to power Ontario for generations to come.

03

### Exploring energy storage

To support grid reliability, we are exploring energy storage solutions, including pumped storage, which stores water and dispatches it during times of peak demand.

DN

## Continued Operations

Darlington Refurbishment


# OPG Demonstrates Mega Project Execution Capability

- On-time and on-budget
- A 20-year project:
  - 10 years of planning and 10 years of execution:
  - Unit 2 completed safely during pandemic.
  - Unit 3 returned to service over 180 days ahead of schedule
  - Unit 1 & 4 progressing well at the same time.
- A $12.8B investment
  - 14,000+ jobs
  - $89.9B boost to Ontario's GDP
  - 30 more years of reliable, safe, low-cost power for Ontario.

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PN

**Continued Operations**

Potential Pickering Refurbishment

## Refurbishment for Pickering Units 5 to 8 Requested for Approval

- Ministry of Energy requested a study the economic and technical feasibility of the refurbishment of Pickering Units 5 to 8
- Lessons learned from Darlington and Bruce Power have been incorporated
- Decision to be made by the government
- Keep 2200 MW of safe, clean and reliable energy on Ontario's grid.

SMR

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Small Modular Reactors BWRX-300 (4 x 300 MW)

## SMR Leader in North America

- Darlington is the only site in Canada licensed for new nuclear build with an accepted environmental assessment.
- First unit targeted for commercial operation in 2029
- Subjected to approvals, SMR Units 2-4 will be online between 2034 and 2036.
- Building additional SMRs at Darlington would provide more opportunities for Ontario companies (e.g. suppliers of nuclear equipment, components, and services)

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# Industrial Applications of Small/Micro Modular Reactors

## Small Modular Reactors




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New Nuclear Growth Feasibility Study

# We need 18 GW of New Nuclear

- Ministry of Energy has requested that OPG, Bruce Power and IESO jointly evaluate the strategy to deploy new nuclear generation to the province of Ontario
  - Large Nuclear: Higher Energy Density
  - Small Nuclear: Flexible, relative easier to deploy
- OPG is currently evaluating different sites that are potentially suitable for large nuclear plants
- CANDU technology is preferred; but other commercially available options such as AP1000, EPR and ABWR are also being evaluated.

# Electrifying life

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