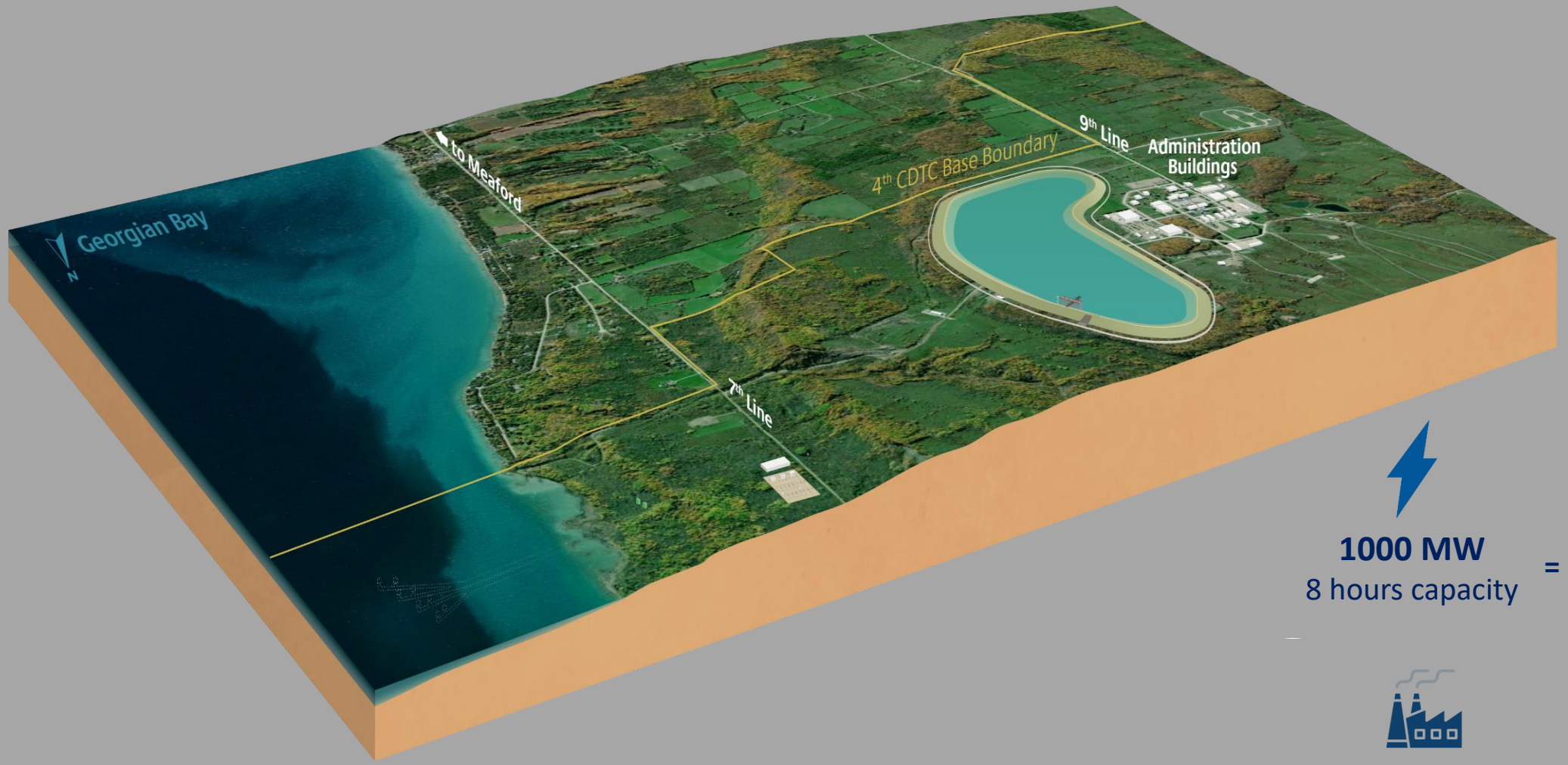
Proposed Pumped Storage Project

October 6, 2020
4th Annual Ivey Workshop on The Economics of Electricity Policy and Markets

TC Energy

Concept: Utilize Ontario's clean energy to meet its future needs



1000 MW
8 hours capacity

=

Electricity needs of
1 million Canadian Homes

490,000 tonnes
per year reduction in greenhouse gas emissions

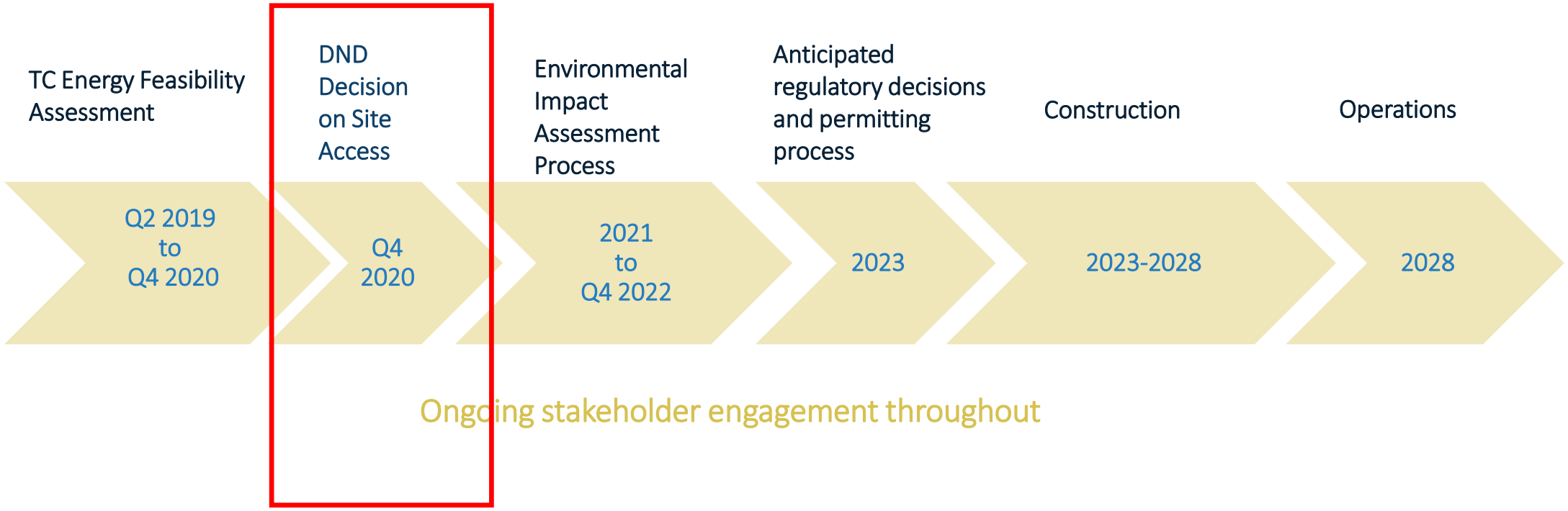
=

150,000 cars
taken off of the road

TC Energy

ILLUSTRATIVE ONLY – SUBJECT TO CHANGE

Anticipated Project Timeline



The Opportunity Drivers in Four Charts

Summer Capacity Surplus/Deficit
with continued availability of existing resources

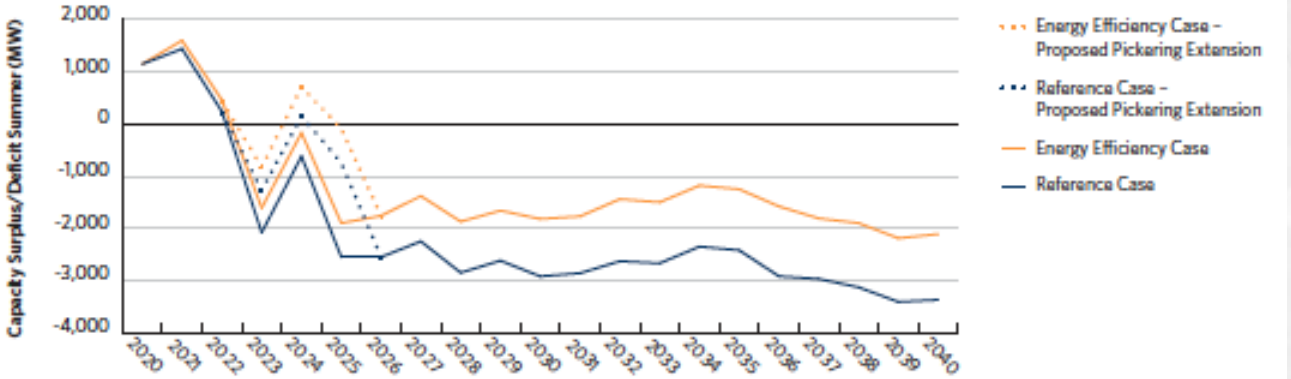


Figure 22: Surplus Baseload Generation, with Continued Availability of Existing Resources

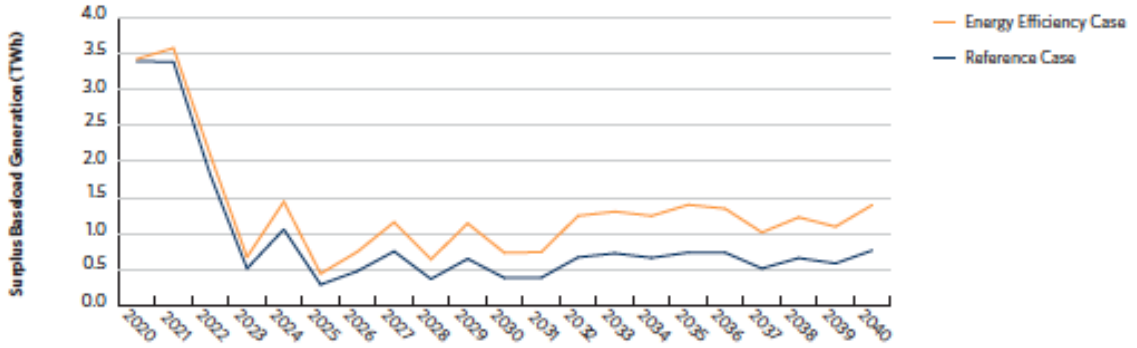


Figure 32: Electricity Sector GHG Emissions, Historical and Forecast

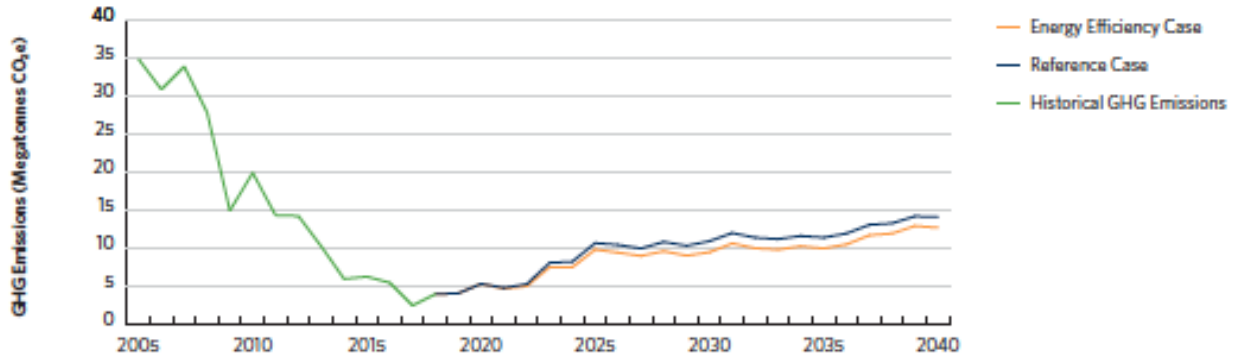
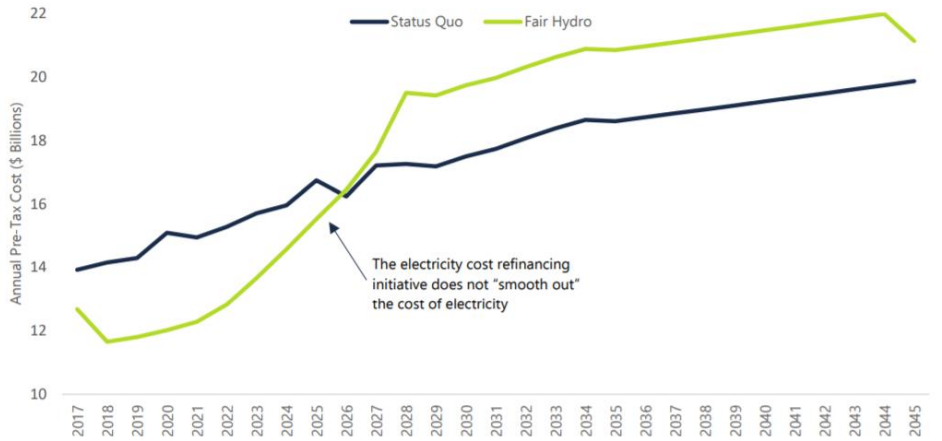
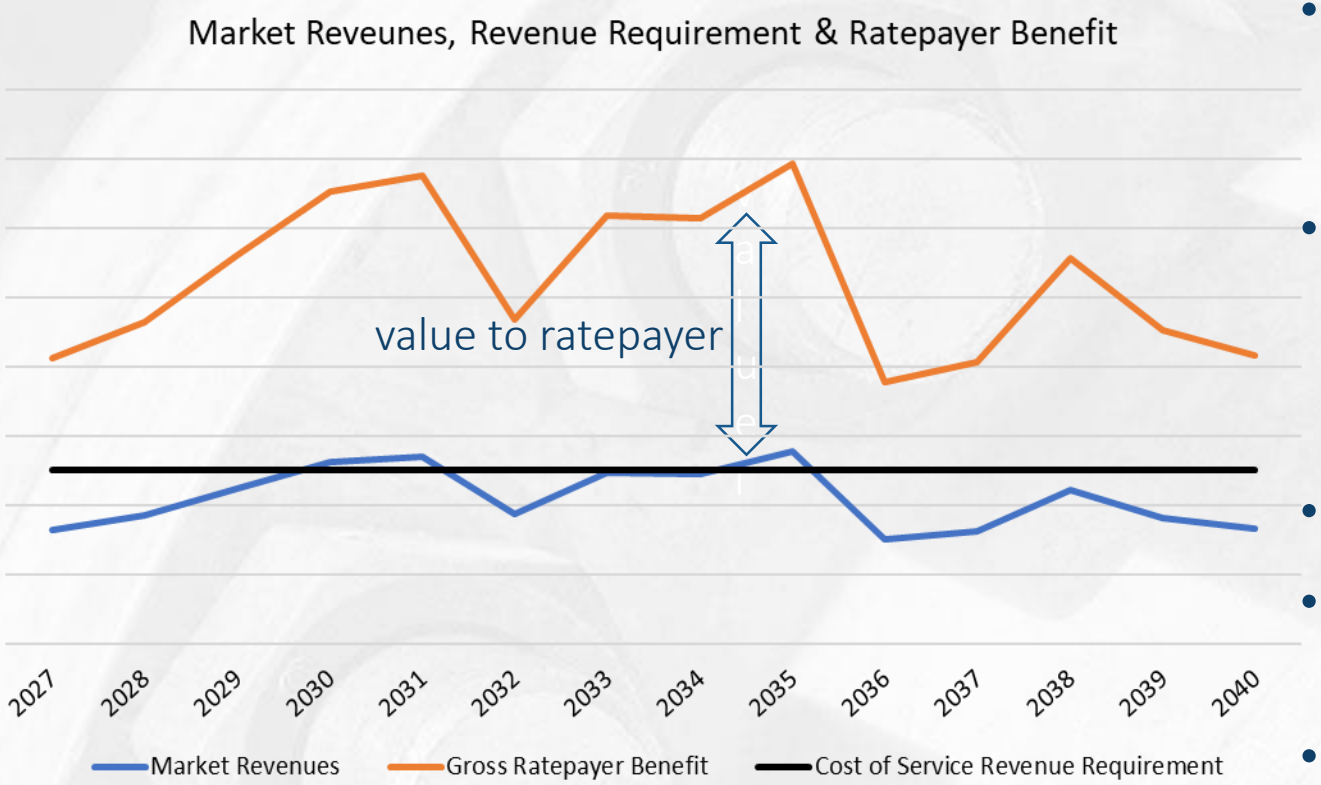


Figure 3-2: FAO's Estimated Impact of Electricity Cost Refinancing on Eligible Ratepayer Electricity Costs



Source: FAO analysis of Provincial information

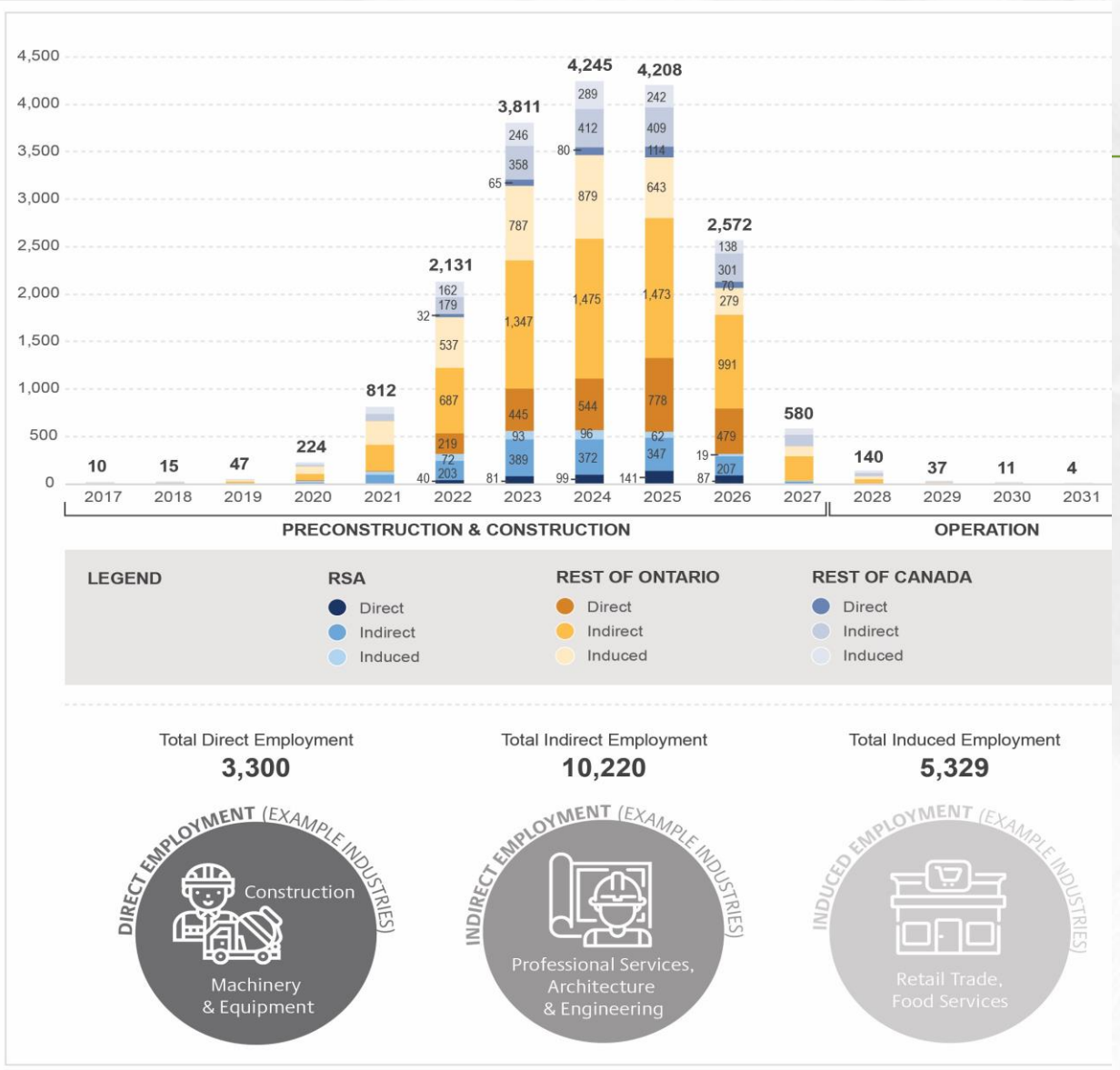
Value Creation



- Market revenues for energy, capacity and ancillary services insufficient and without sufficient certainty to support the revenue requirement.
- Introduction of asset into Ontario market suppresses clearing prices to the benefit of ratepayers but reducing the revenue available to the asset.
- Value to ratepayer exceeds net cost of service.
- Maximum value to ratepayer achieved through continuous optimization as a system asset.
- Long life capital intensive asset best underpinned by cost of service either a long term contract or rate regulation.

Value under range of Future Scenarios

Scenario	Description	CO_2 Reduction (Avg. Tonnes/Year)	Net Ratepayer Benefit ($CAD)
Base Case	Navigant's view of the most likely evolution of the Ontario power system.	490,000	$12.1B
Booming Economy	A strong economy and electrification drive increased load and incremental supply.	410,000	$20.4B
Clean Grid	More aggressive decarbonization efforts drive additional load from increased electrification and higher carbon emissions prices.	800,000	$30.0B
Challenging Supply	The absence of new conservation programs cause peak demand to increase and major disruptions for nuclear refurbishments, resulting in larger supply gaps.	690,000	$19.2B
Low Net Demand	Slow growth and industrial economic restructuring drive a decrease in Ontario's electric peak demand.	630,000	$7.8B
No Market	The absence of a competitive electricity market in Ontario.	490,000	$10.0B



Significant Employment

Pre-construction (2020-2022) (EA and associated preliminary permitting and design work)

- 1000 person-years of employment (200 jobs year 1 and 800 year 2).

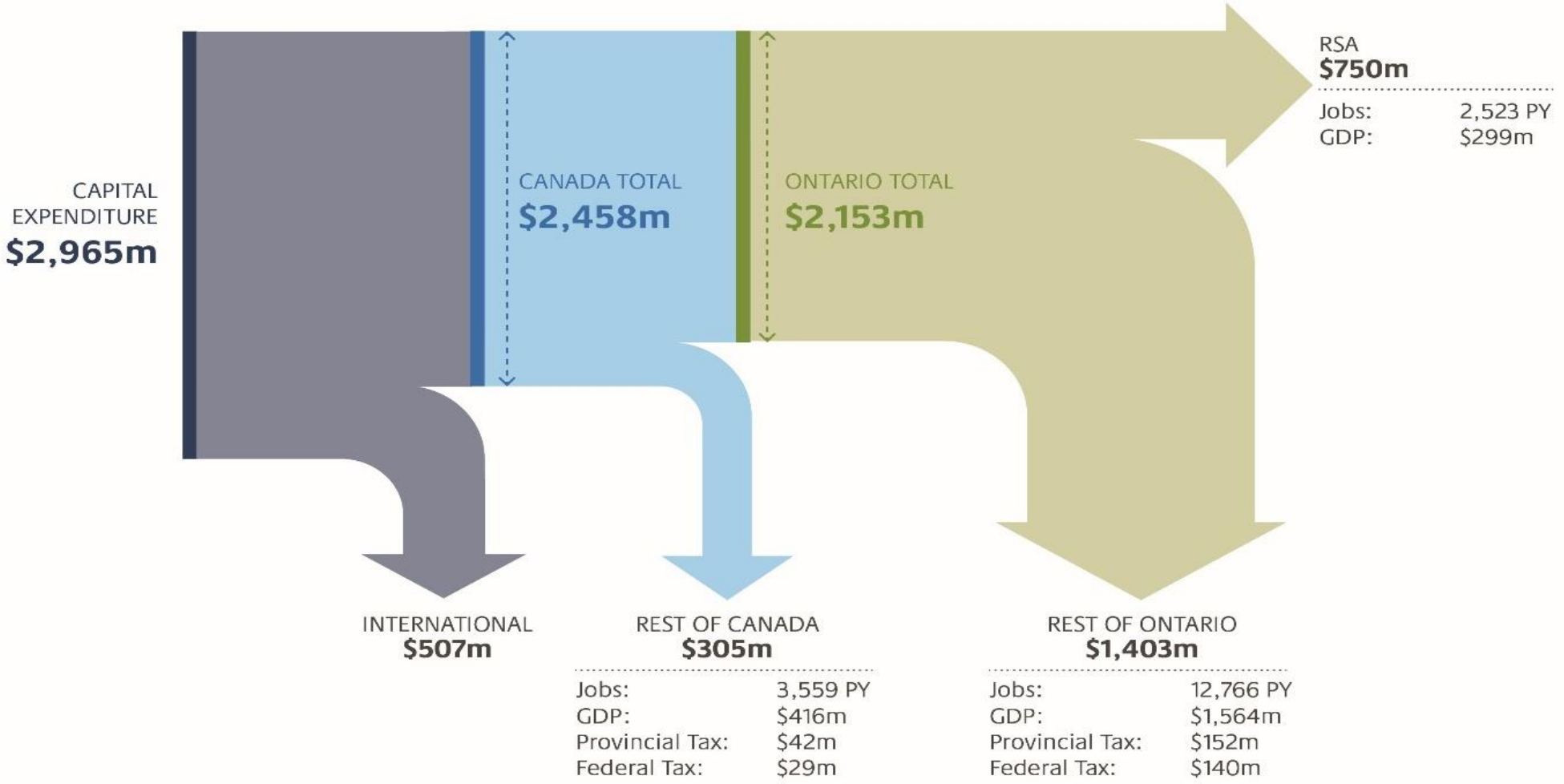
Construction (2023-2027)

- 1,033 direct jobs for 4 years
- 3,536 additional spinoff jobs (indirect and induced) locally, in Ontario and throughout the rest of Canada.
- In total, 18,849 total person-years of employment (direct, indirect, and induced)

Operation (2028-2068)

- 20 new full-time direct on-site jobs and 3 direct off-site jobs.
- 163 additional spinoff job (indirect and induced) locally, in Ontario and throughout the rest of Canada.
- In total, 9,245 person-years of employment over the life of the Project (direct, indirect, and induced)

Significant Economic Injection

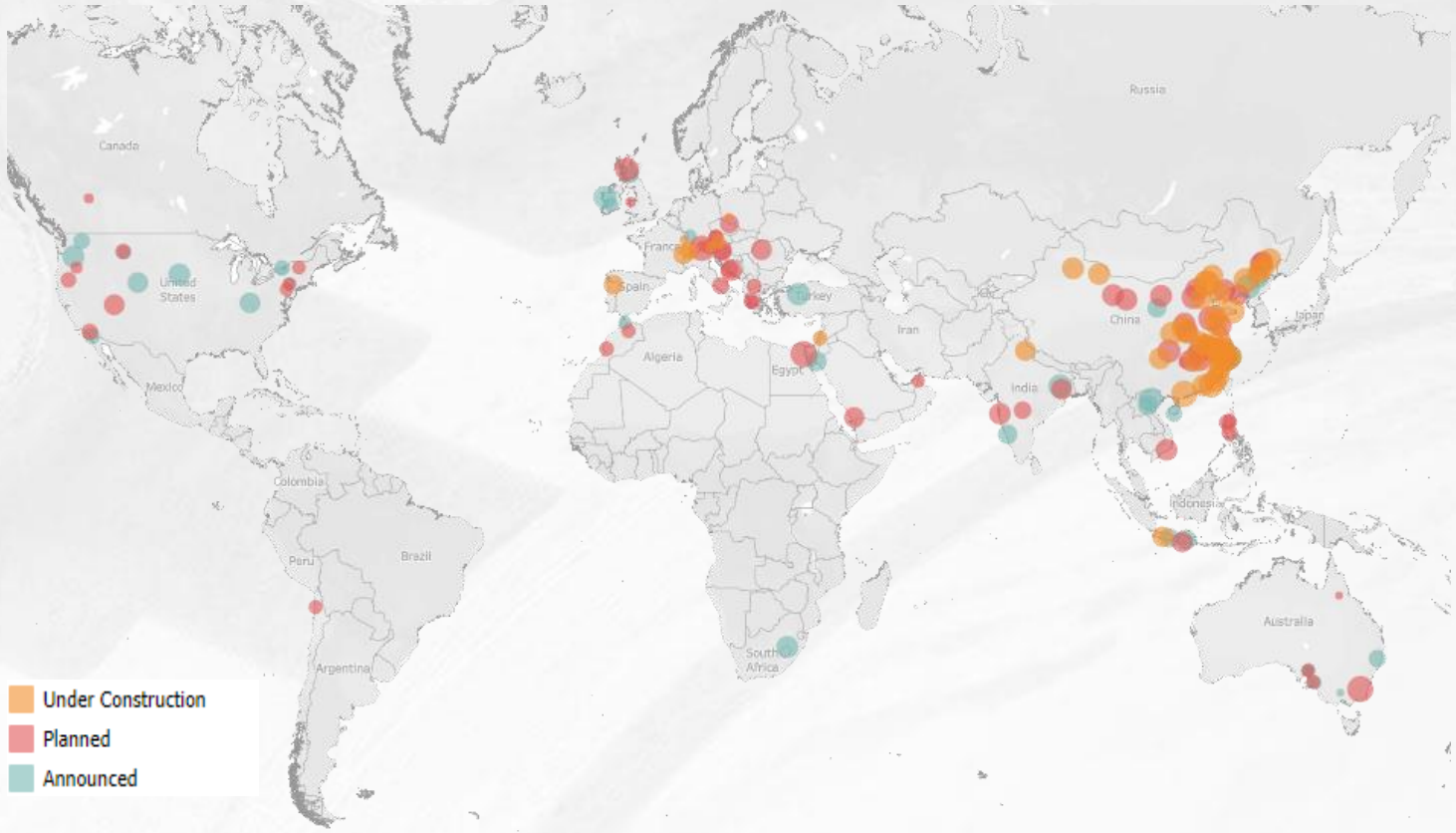


Note: Spending in the RSA also drive some spending in the rest of Ontario and rest of Canada through indirect and induced activities.

Why Pumped Storage

Pumped Storage: A Proven Solution for Decarbonization

- Accounts for over 95% of all energy storage worldwide*
- 160,000 MW in service**
- Over 100 PS projects worldwide announced, planned or under construction (2017)**
- PS projects will add 78,000 megawatts (MW) in clean energy storage capacity by 2030



* United States Department of Energy (US DOE) Global Energy Storage Database (2017).
**International Hydropower Association

Managing Risk

- Setting realistic objectives and expectations at the onset.
- Thorough and transparent assessment of value over range of potential outcomes.
- Designing a delivery model that ensures control, decision-making and accountability at every stage and allocation of project risks to the party best capable of managing it.

Some unique attributes of the Meaford Project

- On the plus side – proximity to a robust transportation system, significant labour pool, manufacturing and supply chain infrastructure.
- Unique challenges requiring special attention – removal of unexploded ordinance, and working around military schedules.