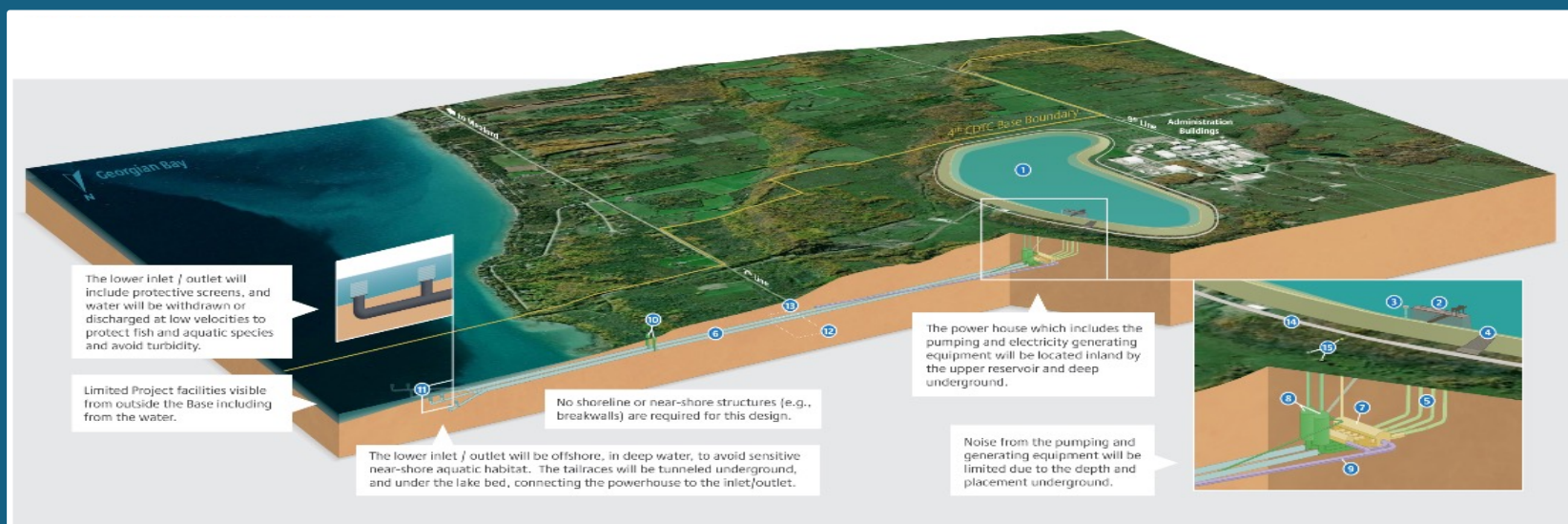




Save Georgian Bay
is a grassroots organization committed to
stopping TC Energy's proposal for a
pumped storage energy plant which will
cause irreparable harm to the Niagara
Escarpment and pose significant risks to
the ecosystem and waters of Georgian Bay.

Awarded Ontario Nature's 2024 Corporate Award for Conservation

Open Loop!



The massive size of this open-loop pumped storage plant raises serious concerns about the potential environmental impact on water, land, wildlife, and humans.



TRI-COLORED

BAT



BUTTERNUT TREE



WESTERN CHORUS FROG

PERMANENT DESTRUCTION OF 500 ACRES OF THE NIAGARA ESCARPMENT
An important geological formation that is home to 30 Species At Risk
Worth protecting!

Some environmental risks can be lessened,
but they can not be eliminated.

- ✓ Fast implementation
within a few years of approval
- ✓ Location is flexible
close to the grid/far from toxins
- ✓ 90% efficient
(vs 70% for pumped hydro)
- ✓ Preserves the Escarpment
- ✓ Saves Georgian Bay
- ✓ Economical
least 40% less expensive
- ✓ Scalable and upgradeable
- ✓ Recyclable

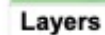
A better solution!





**Inevitable spread of
forever chemicals into
the air, land and water**

Area: Grey, Lake Huron **Content:** 0 Federal Property, 0 Federal Building, 36 Federal Contaminated Sites



-    Contaminated Sites from active query
  Federal Properties
  Federal Buildings
   Federal Contaminated Sites



Treasury Board of Canada Secretariat

Home > FCSI > Site 00025148

Site 00025148 - Meaford Main Impact Area (MIA)

[Previous Site](#)

[Return to Query Results](#)

Status	Historical review completed. Initial testing underway.
Site Status	Suspected
Classification	

Site Details

Reporting Organization	National Defence
Reason for Involvement	Federal Real Property
Property Type	Federal (DFRP Property Number 10992)

Site Location

[Locate this site on map](#)

Latitude, Longitude	44.695323, -80.676651
Municipality	Meaford, ON
Federal Electoral District	Bruce--Grey--Owen Sound

Site Management Strategy

- Care and Maintenance

Contaminant Details

Contamination Estimate

The following contaminated media may exist on the site:

Contaminant Type	Medium Type
Metal, metalloid, and organometallic	Groundwater
Metal, metalloid, and organometallic	Soil
Energetics	Groundwater
Energetics	Soil

Population


This table contains the population estimates at distances around the site.

Radius	Population
1 km	20
5 km	736
10 km	3,994
25 km	65,920
50 km	282,194

Financial/Annual Information

2023-2024	
2023-2024	
Reporting Organization	National Defence
Internal Identifier	0280-C022
Highest Step Completed	02 Historical Review
Total Assessment Expenditure	\$0.00
Total Remediation Expenditure	\$0.00
Total Monitoring Expenditure	\$0.00
FCSAP Assessment Expenditure	\$0.00
FCSAP Remediation Expenditure	\$0.00
FCSAP Monitoring Expenditure	\$0.00
Actual Cubic Meters Remediated	0 m ³
Actual Hectares Remediated	0 ha
Actual Tons Remediated	0 t
Closed	No

Treasury Board of Canada
Secrétariat



Search

Departmental ActivitiesPolicy and OversightFederal Public Service

Home > FCSI > Site 10992006

Federal Contaminated Sites
Inventory

Introduction

Official Contacts

Search By

Keyword(s)

Identifier

Federal Site Identifier

DFRP Property Number

Organization

Reporting Organization

Geography

Location

Map Navigator

Site Attribute

Classification

Contaminants or Media

Highest Step Completed

Reason For Federal Involvement

Site Status

Reports

Financial Summaries

Open Data

Site 10992006 - Refuelling Facility 2

Status

Remediation / risk management completed. No further action required.

Site Status

Closed

Classification

Medium Priority for Action

Site Details

Reporting Organization

[National Defence](#)


Reason for Involvement

Federal Real Property

Property Type

Federal (DFRP Property Number [10992](#))

Site Location



Latitude, Longitude

44.6683, -80.6469

Municipality

Meaford, ON

Federal Electoral District

Bruce--Grey--Owen Sound

Site Management Strategy

Other

Risk Management

Contaminant Details

Contamination Estimate

Cubic Meters

7,568

The following contaminated media was identified on the site:

Contaminant Type	Medium Type
PHCs (petroleum hydrocarbons)	Groundwater
PHCs (petroleum hydrocarbons)	Soil
BTEXs (benzene, toluene, ethylbenzene, and xylene)	Soil
Other organics	Groundwater

Population

This table contains the population estimates at distances around the site.

Radius	Population
1 km	91
5 km	1,527
10 km	10,864
25 km	64,692
50 km	302,529

Summary of Annually Reported Data

Total Expenditures

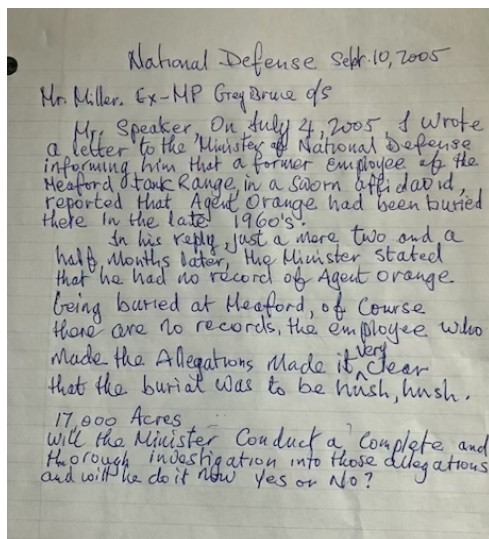
Assessment	\$182,720.00
Remediation	\$562,227.36

FCSAP Expenditures

Assessment	\$161,330.00
Remediation	\$491,513.25

Financial/Annual Information

2019-2020	
2019-2020	
Reporting Organization	National Defence
Internal Identifier	0280-C005
Highest Step Completed	08 Implement Remediation/Risk Management Strategy
Total Assessment Expenditure	\$0.00
Total Remediation Expenditure	\$0.00
Total Monitoring Expenditure	\$0.00
FCSAP Assessment Expenditure	\$0.00
FCSAP Remediation Expenditure	\$0.00
FCSAP Monitoring Expenditure	\$0.00
Actual Cubic Meters Remediated	0 m ³
Actual Hectares Remediated	0 ha
Actual Tons Remediated	0 t
Closed	Yes



HOUSE PUBLICATIONS

The **Debates** are the report—transcribed, edited, and corrected—of what is said in the House. The **Journals** are the official record of the decisions and other transactions of the House. The **Order Paper and Notice Paper** contains the listing of all items that may be brought forward on a particular sitting day, and notices for upcoming items.

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[<](#) [September 30, 2005](#) [>](#)

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[PDF](#)

38TH PARLIAMENT, 1ST SESSION

EDITED HANSARD • NUMBER 129

CONTENTS

Friday, September 30, 2005

National Defence



Mr. Larry Miller (Bruce—Grey—Owen Sound, CPC): Mr. Speaker, on July 4 I wrote a letter to the Minister of National Defence informing him that a former employee of the Meaford tank range, in a sworn affidavit, reported that agent orange had been buried there in the late 1960s.

In his reply, just a mere two and a half months later, the minister stated that he had no record of agent orange being buried at Meaford. Of course there are no records. The employee who made the allegations made it very clear that the burial was to be hush-hush.

Will the minister conduct a complete and thorough investigation into these allegations and will he do it now, yes or no?



Hon. Bill Graham (Minister of National Defence, Lib.): Mr. Speaker, I thank the hon. member for his letter. As I said to him in my response, our investigation internally did not indicate any records showing any such event. I am now looking at ways in which we could work with the individual who made the comments in question to see whether we could get any further information.

I assure the hon. member that I have this matter still under hand and I will continue the investigation. I do not want anything to go possibly where we could not find out the existence of any substance that is difficult for us to deal with on our bases. I will continue all efforts and work with the hon. member and the person to whom he spoke to find that out.

* * *

So What is on 4CDTC??

- Metal, metalloids, organometallic in Groundwater
- Metal, metalloids, organometallic in Soil
- Energetics in Groundwater
- Energetics in Soil
- PHCs in Groundwater
- PHCs in Soil
- BTEXs (benzene, toluene, ethylbenzene, toluene) in Soil
- White Phosphorus
- Asbestos
- PFAS
- Lead
- Arsenic
-
-

“According to the National Energy Board, 17 of the 39 major pipeline accidents in Canada (from 1992 to 2014) were on pipelines owned by TransCanada or its subsidiary NGTL.”

Source: *The Polaris Institute Profile of TransCanada Energy*

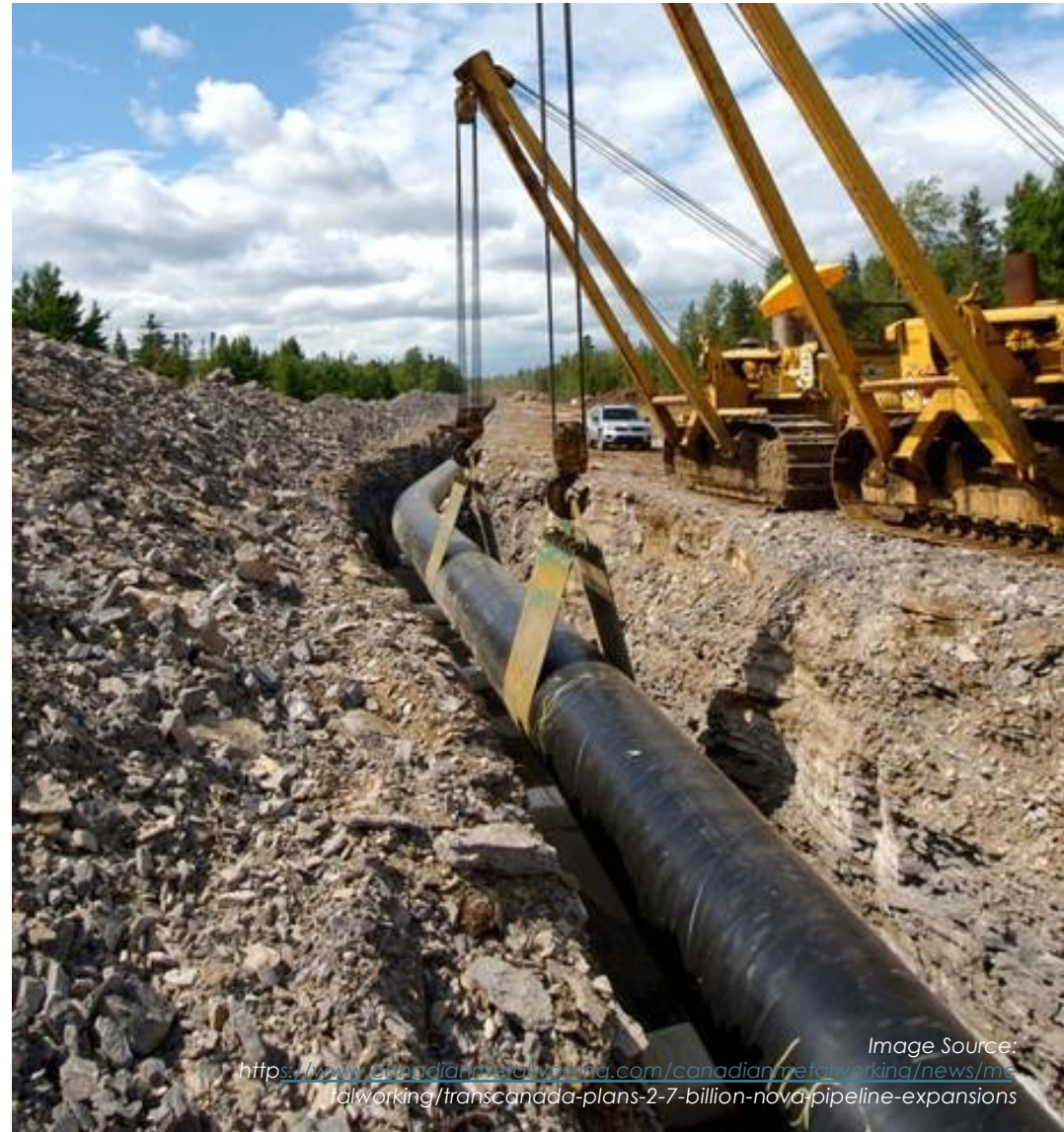


Image Source:
<https://www.canadianmetalworking.com/canadianmetalworking/news/metalworking/transcanada-plans-2-7-billion-nova-pipeline-expansions>



**Unavoidable and irreversible destruction
of a large part of the Escarpment**

Concerned Environmentalists speak out!

"Georgian Bay Association is concerned about the risks posed by this proposed project to water quality throughout Georgian Bay, aquatic biota, and the habitat of species-at-risk - plus the irreversible harm to the Niagara Escarpment.

- Rupert Kindersley, Executive Director, Georgian Bay Association



"TC Energy's proposed pumped storage operation is a monster of an idea. It could destroy the entire aquatic ecosystem of Georgian Bay and threaten the sanctity of a UNESCO World Biosphere. This dangerous plan puts a huge body of water at risk. It must be stopped!"

- Maude Barlow, Author and co-founder of the Council of Canadians and the Blue Planet Project

"Instead of negotiating a sweetheart backroom deal with TC Energy, Todd Smith should be paying EV owners to send power back to the grid when it is needed."

- Jack Gibbons, Chair, Ontario Clean Air Alliance and Former Toronto Hydro Commissioner





*Thank
you!*



A Review of TC Energy's Open-Loop Pumped Storage Proposal:

Why Take the Risk?



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EXECUTIVE SUMMARY

Save Georgian Bay is a grassroots organization committed to stopping TC Energy's proposal for a pumped storage plant in Meaford, Ontario, which could cause irreparable harm both to the Niagara Escarpment and to the waters of Georgian Bay.

The dedicated Save Georgian Bay volunteers – made up of environmentalists, engineers, and concerned citizens – have been studying the project for 5 years. Our investigation has included:

- completion of an 80-page environmental strategic assessment;
- the review of over 2,000 pages of material from the Department of National Defense, Ontario's Independent Electricity System Operator (IESO), and the Municipality of Meaford received through the Access to Information Process (ATIP);
- the commissioning of a "Survey for Endangered Bats: Meaford Ontario" an acoustic survey of the local bat community on and around the military training base;
- consulting with environmentalists, engineers, scientists, lawyers, and other experts;
- liaising with municipal, provincial, and federal leaders; and
- engaging with concerned citizens.

Save Georgian Bay supports efforts to combat the climate change crisis with renewable energy sources and electricity storage solutions. However, our investigation has led us to the conclusion that TC Energy's proposed Pumped Storage Project in Meaford is not the best way to decarbonize the grid and that Ontario should pursue the *best, least environmentally damaging, and most cost-effective* energy storage solutions.

In this review *TC Energy's Open-Loop Pumped Storage Proposal: Why Take the Risk?* Save Georgian Bay will show that TC Energy's proposal would not effectively support Ontario's transition to renewable energy sources because it would:

1. **Take too long to build, and may not even be needed by the time construction is completed.** The need for energy storage will steadily reduce over time (and may not even be a permanent requirement). TC Energy's open-loop pumped storage project, which would not be online for about a decade, may not even be needed by then.
2. **Be built too far from energy demand centers and the grid,** therefore requiring new transmission lines.
3. **Waste more energy than alternative energy storage solutions.** Batteries are 90% efficient, while pumped storage is 70% efficient. The TC Energy proposed pumped storage plant would use 1,400 megawatts of energy created by hydro, nuclear, wind, and solar, and turn it into 1,000 megawatts while dumping 400,000 kilowatts of heat energy (the majority of which goes into Georgian Bay) every day for the lifetime of the project (currently estimated to be 50 to 100 years).



Of grave concern to Save Georgian Bay is the many environmental issues associated with TC Energy's open-loop pumped storage project. While some environmental risks can be reduced or lessened, they can not be eliminated. One major threat to the environment can not be mitigated at all: the permanent destruction of 500 acres of the Niagara Escarpment.

1. **The massive construction project would permanently destroy 500 acres of the Niagara Escarpment.** The flora and fauna of the Escarpment area that would be destroyed is habitat for 30 Species at Risk.
2. **The project poses a high risk of spreading the toxic chemicals that litter the project site.** Defence Department documents note that the waters of Georgian Bay would be threatened by the risk of run-off from the tank range when toxin-contaminated soils are disturbed during construction. The Federal Contaminated Sites registry shows lead, methyl mercury, selenium, polycyclic aromatic hydrocarbons (PAHs) and organo-metallic compounds containing arsenic and zinc - all threats to soil, water, marine life and human health - to be present on the site. The high risk of spreading toxins, including "forever chemicals" into the air, land, and water, poses, in our opinion, an unacceptable project risk - an opinion that is widely shared.
3. **The proposed project would actually increase, not decrease, CO2 emissions.** TC Energy's claims that their pumped storage proposal offers a "green" solution, and their repeated reference to "net-zero," are inappropriate and misleading. The analysis upon which they base their claims of CO2 reduction fails to consider the diversion of lost energy exports to U.S. jurisdictions.

It is important to note that we have reached out to TC Energy many times with questions and concerns. Unfortunately, we have not received answers. The lack of transparency and cooperation has created challenges, yet we remain committed to a diligent and objective review of the proposed project. On behalf of the members of Save Georgian Bay, over 43,000 people who have signed petitions opposing the project, and a growing chorus of environmental advocates who have spoken out against the proposals, we urge anyone interested in the risks this project poses to the environment to **insist that TC Energy provide proof that their proposed plant would cause "no harm."**

Why would we take these risks, and cause this harm - for a project that's may not even be needed? Especially when long-duration battery storage offers a viable alternative that does not pose these risks?

Long-duration battery storage is a better solution. Battery parks can be built precisely *when* storage is needed and can be online within a few years of being approved. Battery parks can be built specifically *where* they are needed - close to the demand source and to the grid, eliminating the need for new transmission lines. Long-duration battery storage also benefits from being more efficient, kinder to the Ontario environment, more effective at reducing carbon, and less expensive than the proposed open-loop pumped storage project. Battery technology is also scalable, upgradable, and recyclable - a much better option!

One may also be interested to know these facts about TC Energy's proposed pumped storage project:

- **No decision has been made by SON to participate in the project.** Although TC Energy has touted the proposed project as a "collaboration" with the Saugeen Ojibway Nation, in a March 26, 2024 video posted on the Saugeen Ojibway Nation Environmental Office Facebook, Chief Gregory Nadjiwon (Chippewas of Nawash Unceded First Nation) and Chief Conrad Ritchie (Chippewas of



Saugeen First Nation) share that more discussions with the SON community are required before a decision regarding their participation can be made.

- **Shared economic benefits with indigenous communities can come just as easily from more efficient and sustainable battery storage projects.** This past June the IESO approved 15 long-duration battery storage projects, nine of which boast at least 50% participation from indigenous communities.
- **The project will only provide 20-22 permanent jobs.**
- **Four Georgian Bay municipalities have voted against the proposal** – the Township of the Archipelago, the Town of Blue Mountains, the Township of Georgian Bay, and the Town of Parry Sound.
- **Three renowned and widely respected environmental advocates have denounced the project** – Rupert Kindersley (Executive Director of Georgian Bay Association), Maude Barlow (co-founder of the Council of Canadians and one of the world's leading experts on freshwater issues), and Jack Gibbons (Chair of Ontario Clean Air Alliance and former Toronto Hydro Commissioner).

Long-duration battery storage would cost about half of what the TC Energy pumped storage project would likely cost. The price tag on this risky megaproject has already skyrocketed from \$2.2 billion in 2019 to \$4.5 billion last year, and TC Energy has now agreed to cap it at \$7 billion - however that would work! In comparison, the cost to build a long-duration battery park with the same storage capacity as TC Energy's proposed open-loop pumped storage plant would be \$4B. And because there are fewer unknowns and the time to implement is shorter, those costs are more predictable. If approved, this project would burden Ontario electricity consumers for decades with the cost recovery of an unknown capital cost that is steadily increasing.

Why take the risk?



ENERGY STORAGE IN ONTARIO

Ontario is faced with the challenge of managing the current (but as we will discuss later in this paper, temporary) imbalance between how much energy is demanded during the day vs at night. At the same time, Ontario is transitioning from natural gas generation to other forms of cleaner energy supply, such as wind and solar. These cleaner energy sources are not “on demand” - we can’t control when the sun will shine or when the wind will blow. And although the output from nuclear power plants is consistent and reliable, it is not flexible enough to quickly respond to changes in demand.

Therefore, Ontario needs a way of storing the energy when it’s produced and releasing it when it’s needed. Energy storage helps to balance this demand differential. There are many types of energy storage, including different battery technologies, gravity, and pumped storage among others. Regardless of the method, all storage technologies operate on the same general principle - charging up when electricity demand and costs are low and discharging when demand and prices are high. Where these storage solutions differ is their:

1. speed of implementation;
2. flexibility of location (where they can be built);
3. efficiency (the amount of energy that they use to operate);
4. environmental impact (amount of damage caused during construction and operation); and
5. relative economic burdens on Ontario.

The IESO points to long-duration battery storage parks as the current best and most cost-effective method. The 250 MW Oneida Energy Storage Project, co-owned by the Six Nations of the Grand River, is currently under construction on 10 acres in Ohsweken, Ontario.

In June 2023 the IESO awarded 15 new battery storage contracts, nine of which boast at least 50% participation from indigenous communities, that will deliver more than 880 MW of additional capacity from electricity storage facilities scheduled to be in service no later than 2026, representing a five-fold expansion of Ontario’s current battery storage capacity (*see chart below*).

The IESO plans continued expansion of energy storage capacity in the Province, completing Ontario’s overall procurement of approximately 2,500 MW of storage that will be online/in-service toward the end of the decade. (*Source: Resource Acquisition and Contracts - Long-Term 1 RFP and Expedited Process; <https://www.ieso.ca/en/Sector-Participants/Resource-Acquisition-and-Contracts/Long-Term-RFP-and-Expedited-Process>*)

It is important to note that the TCE pumped storage project would create 1,000 MW over 8 hours (8,000 MW/hr of power), whereas the equivalent size battery storage can only discharge over 4 hours, meaning that 2,000 MW of battery storage capacity would be needed to create 8,000 MW/hr of power.



Expedited Long-Term RFP (E-LT1 RFP) – Final Results

Storage Category Suppliers

Proponent	Qualified Applicant	Project Name	Nameplate Capacity (MW)	Summer Contract Capacity (MW)	Winter Contract Capacity (MW)	Fixed Capacity Payment (\$/MW Business Day)	Indigenous Participation	Zone – Location
Storage Category 1								
Hagersville Battery Storage Inc.	Boralex Inc.	Hagersville Battery Energy Storage Park	300	285	285	\$786.25	50% Six Nations of The Grand River	Southwest – Haldimand County
Napanee BESS Inc.	PORTLANDS ENERGY CENTRE L.P. (At risk capacity)	Napanee Energy Storage	265	250	250	\$896.92	No Indigenous Participation	East – Town of Greater Napanee
Tilbury Battery Storage Inc.	Boralex Inc.	Tilbury Battery Storage	80	76	76	\$774.50	50% Walpole Island and First Nation	West – Municipality of Lakeshore
Walker BESS 4 Limited Partnership	Wahgoshig Solar FITS LP	Walker BESS 4	4,999	4,749	4,749	\$997.00	51% MoCreebec Eeyou	West – City of Windsor
Walker BESS 4 Limited Partnership	Wahgoshig Solar FITS LP	Walker BESS 5	4,999	4,749	4,749	\$998.00	51% MoCreebec Eeyou	West – City of Windsor
Walker BESS 4 Limited Partnership	Wahgoshig Solar FITS LP	Walker BESS 6	4,999	4,749	4,749	\$998.99	51% MoCreebec Eeyou	West – City of Windsor
York (Battery) LP	Capital Power Corporation	York BESS	120	114	114	\$852.50	No Indigenous Participation	Essa – King Township
Storage Category 1 Total			779.997	739.247	739.247			
Storage Category 2								
1000234763 Ontario Inc.	1000234763 Ontario Inc.	SFF 06	4.99	4.74	4.74	\$1,477.00	50% Caldwell First Nation, Mississaugas of Scugog It and First Nation	East – Township of Cramahe
1000234763 Ontario Inc.	1000234763 Ontario Inc.	903	4.99	4.74	4.74	\$1,477.00	50% Caldwell First Nation, Mississaugas of Scugog It and First Nation	Essa – Township of Armour
1000234813 Ontario Inc.	1000234813 Ontario Inc.	OZ-1	4.99	4.74	4.74	\$1,477.00	50% Caldwell First Nation, Mississaugas of Scugog It and First Nation	Bruce – Municipality of Arran-Elderslie
Arien Energy Storage 1 LP	Alectra Convergent Development LP	Arien Energy Storage 1	20	19	19	\$1,224.00	No Indigenous Participation	Southwest – City of Guelph
Goreway (Battery) LP1	Capital Power Corporation	Goreway BESS	50	47.5	47.5	\$1,007.00	No Indigenous Participation	Toronto – City of Brampton
Vaughan 1E Energy Storage 1 LP	Alectra Convergent Development LP	Vaughan 1E Energy Storage 1	20	19	19	\$1,186.00	No Indigenous Participation	Toronto – City of Vaughan
Vaughan 3 Energy Storage 1 LP	Alectra Convergent Development LP	Vaughan 3 Energy Storage 1	40	38	38	\$1,028.00	No Indigenous Participation	Toronto – City of Vaughan
Walker BESS 4 Limited Partnership	Wahgoshig Solar FITS LP	Almonte BESS	4,999	4,749	4,749	\$969.00	51% MoCreebec Eeyou	East – Municipality of Mississippi Mills
Storage Category 2 Total			149.969	142.469	142.469			
Storage Category 2 weighted average price						\$1,111.06		
Storage Total			929.966	881.716	881.716			

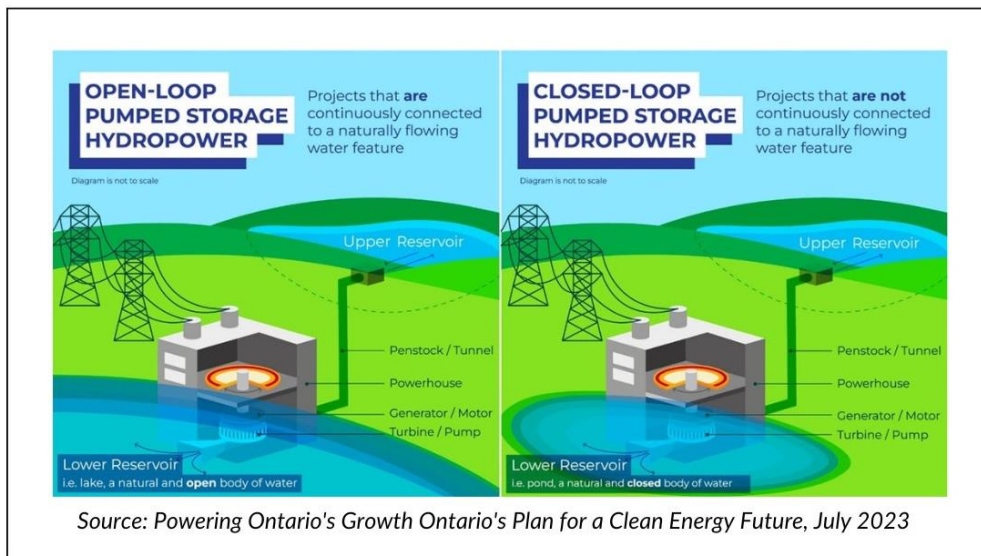
Expedited Long-Term RFP (E-LT1 RFP) – Selected Proponents | September 18, 2023 | Public

2

Source: Expedited Long-Term RFP (E-LT1 RFP) Selected Proponents Final Results

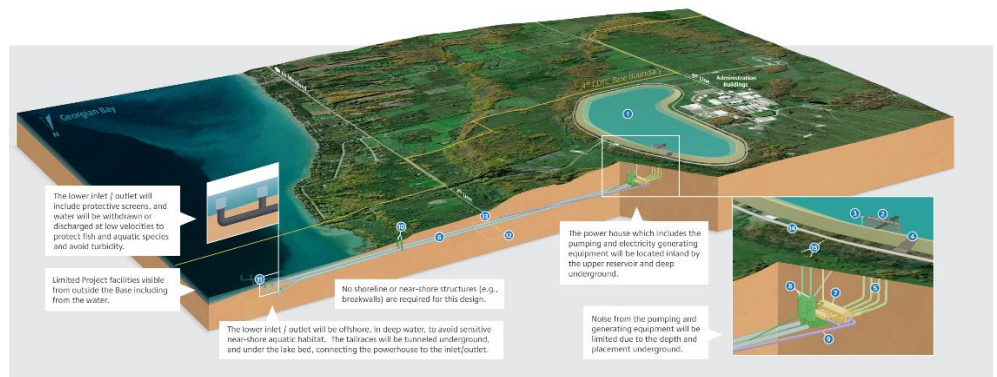


Pumped hydropower storage, an alternative to long-duration batteries, uses the force of gravity to generate electricity using water that has been previously pumped from a lower source to an upper reservoir. The water is pumped to the upper reservoir at times of low demand and low electricity prices. At times of high demand - and higher prices - the water is then released to drive a turbine in a powerhouse and supply electricity to the grid. The energy storage capacity of a pumped hydro facility depends on the size of its reservoir, while the amount of power generated is linked to the size of the turbine.



It is important to note that some pumped storage projects are closed-loop designs, recirculating the same water between a lower and upper reservoir (often former open-pit mines) not connected to a freshwater resource. This is the type of project currently under consideration in Marmora, Ontario, and is widely considered to be less environmentally damaging than open-loop projects.

TC Energy is proposing a 1,000 megawatt hydroelectric **open-loop** pumped storage facility to be built on the existing operational 4th Canadian Division Training Centre, situated north of Meaford, Ontario. Renderings fail to show the 300 homes located below the reservoir in the "impact zone."



Source: ontariopumpedstorage.com

To function, the facility must pump 23 billion litres of water (9,200 Olympic-sized swimming pools) 150 metres up the Escarpment by giant turbines, store it in a 375-acre reservoir (a hole the size of Toronto's High Park carved into the Escarpment), and flush it back down the escarpment and into Georgian Bay every day. The scale of this operation raises serious concerns about the potential environmental impact on water, land, and wildlife, jeopardizing the entire fragile ecosystem of the Georgian Bay basin.



The project has been pitched by TC Energy as “a reliable, powerful climate solution” and a major contribution to greening Ontario’s grid. But that’s not the whole story. By throwing around buzzwords like “green” and “net-zero” TC Energy hopes to distract from the very real shortcomings of their proposal. Open-loop pumped storage is so problematic – technically, environmentally, and economically – that there has not been a new one built in North America since Ludington Pumped Storage in the early 1970’s.

The Ludington Open-loop Pumped Storage Example

TC Energy’s model for their original project design is the continent’s second-largest pumped storage plant in Ludington, Michigan. Opened in 1973, Ludington is classified a “high-hazard dam” whose failure would “cause significant damage to property and loss of life.” According to its emergency action plan, a full breach would flood property half a mile away to a depth of two feet within five minutes.

It took a 12-year lawsuit to stop Ludington’s turbines from killing 150 million fish a year. A 1994 settlement awarded \$5 million to a Great Lakes Fishery Trust and ordered the plant to install a two-kilometre net across its intake pipes to reduce that massive fish kill. Last year, a spokesman told *The Narwhal* that 91 percent of fish bigger than five inches are no longer sucked in, but had no comment on smaller fish.

Ludington’s spokesman also told *The Narwhal* that the reservoir dam suffered from “small leakages,” but claimed local farmers found them “helpful” to water their fields.

Now undergoing a \$500 million upgrade, Ludington’s owners are suing Toshiba for faulty work affecting shaft seals and five turbines.

Given those technical and environmental challenges, no new pumped storage plants have been built in North America since 2010. As one utility spokesman pointed out, “It doesn’t make financial sense.” Ontario’s Independent Electricity System Operator (IESO) agrees, twice ruling that TC Energy’s proposal has no net economic benefit.



Ludington during construction (left) and operational (right)



ALTERNATIVE GRID SCALE ENERGY STORAGE TECHNOLOGIES

Lithium-ion Batteries

- Global grid-scale battery storage currently dominated by lithium-ion
- Declining lithium-ion costs due to technological innovations and improved manufacturing capacity
- 80% - 90%+ round-trip efficiency

Lithium-iron Phosphate (LFP) Batteries

- Don't decompose, heat up or collapse like lithium-ion and environmentally-friendly
- Low cost, longer lifecycle than lithium-ion, handle extreme temperatures, safer and lower toxicity
- Currently used in Tesla Model 3 EV's
- Tesla planning to manufacture LFP batteries in Sparks, Nevada for use in Megapack grid energy storage units
- High energy density with round-trip efficiency as much as 90%

Sodium-ion Batteries

- Sodium cheap and sustainable alternative to lithium-ion
- Lower power density than lithium-ion
- 92% round-trip efficiency

Sodium Solid-state Batteries

- New Huahui New Energy battery is high energy density sodium solid-state battery combined with polymer composites
- Close to energy density of current LFP batteries in Tesla Model 3 cars
- Low fire risk
- Toyota, ProLogium and Samsung commercializing own solid-state batteries by 2027
- Technology could have large future implementation in grid-scale energy storage

Redox Flow Batteries (RFBs)

- Redox flow batteries replace solid electrodes with liquid electrolytic compounds such as vanadium, iron-chromium or zinc-bromine separated by membrane
- Can store large amounts of energy, which make them ideal for grid energy storage
- In 2024, TC Energy completing 81 MW (40 MWh) project in Alberta
- Over 70% round-trip efficiency

Salgenx Saltwater Redox Flow Batteries

- Store grid-scale power and thermal energy (including cogeneration)
- Desalinates seawater and produces exfoliated graphene
- 4-6 hour flow battery charge rate can be discharged at any time
- Stored energy held almost indefinitely and batteries easily recyclable
- Lower energy density than lithium-ion
- 90% round-trip efficiency

Liquid Metal Batteries

- Have minimal degradation and can last over 20 years
- Extremely reliable but also safe as no gases and no possibility of thermal runaway
- Composed of two molten metal alloys separated by an electrolyte
- Simple to manufacture but require high temperatures to keep metals in liquid state
- Sodium sulphur batteries being used for grid storage in Japan and USA
- Ambri battery uses antimony cathode, calcium alloy anode and calcium chloride salt electrolyte
- Over 80% round-trip efficiency

Electric Vehicle (EV) Battery Storage

- Millions of EV's could provide large amount of energy storage
- Most EV's charged up at night during electrical grid off-peak hours
- EV's would then utilize excess energy during peak hours
- For cars unused during peak hours, owners could sell back excess power to grid

Gravity Storage - Lifted Weight Storage (LWS)

- Uses surplus energy to lift solid weights vertically
- When extra energy needed, mass is lowered and pulley turns a generator
- Two projects (168 MWh) deployed since 2023 by Energy Vault in China
- More projects planned
- Up to 86% round-trip efficiency

Gravity Storage - Rail Energy Storage

- Uses excess electrical energy to haul heavy train cars uphill during low energy demand
- Electrical energy released later using regenerative braking as cars roll downhill
- Utility-scale (50 MW) facility by Advanced Rail Energy Storage
- 86% round-trip efficiency

Compressed Air Storage

- In 2019, Hydrostor built first CAES facility in world on deserted mine salt cavern near Goderich
- Uses excess grid electricity to produce compressed air stored in cavern
- Stored air released back to atmosphere through air turbine/generator
- Plant can generate 10 MW for about 5 hours at claimed half cost of similar capacity battery
- Can store energy for weeks and offers lowest levelized cost of storage for large-scale applications
- Round-trip efficiency about 67% and has service life of 50 years

Hydrogen Production

- Excess electricity from grid used to produce "green" hydrogen by electrolysis
- Can be stored and used in fuel cells, engines, or gas turbines/generators
- Several companies working to develop hydrogen-powered cars
- Portable, high energy density fuel
- IESO currently funding hydrogen research

Flywheel Storage

- Accelerates large mass rotor to high speed and maintains power as rotating energy
- Device shaped like cylinder and contains large rotor inside a vacuum
- Advanced designs have composite rotors suspended by magnetic bearings
- Reaches energy capacity more quickly than other forms of storage
- Long lifetime, requires little maintenance and can be placed almost anywhere
- Many flywheels connected together to create multi-MW storage facility
- Stephentown Flywheel Energy Storage Plant in New York has capacity of 20 MW
- Round-trip efficiency as high as 90%

Thermal Storage

- Heat storage system uses liquid or solid medium
- Water, sand, rocks or molten salt heated or cooled to store collected energy
- Nevada Crescent Dunes project uses molten salt to store 1,100 MW of power
- Can store that energy for 40 years without degradation
- Round-trip efficiency of 72% - 80

HOW DO OPEN-LOOP PUMPED STORAGE AND LONG-DURATION BATTERY PARKS COMPARE?

Open-loop Pumped Storage and Long-Duration Battery Park technology both use energy generated by gas, nuclear, wind, or solar to charge up when electricity demand is low and discharge energy back onto the grid when it's needed most. However, they differ on five important factors, and on all five, long-duration battery parks come out ahead of open-loop pumped storage.

	TC Energy's Open Loop Pumped Storage Proposal	Long-Duration Battery Parks
Speed of Implementation	<input type="checkbox"/> <ul style="list-style-type: none"> - Long development and construction process. This project would not be online until between 2032 and 2035. By then energy storage will likely not be needed. 	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> - Can be added quickly when storage is needed the most. Battery parks have a swift 3-5 year implementation as evidenced by the Oneida project.
Flexibility of Location	<input type="checkbox"/> <ul style="list-style-type: none"> - Must be located on a large piece of elevated land adjacent to an open body of water, requiring long transmission lines to connect to the grid. 	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> - Can be built where storage is needed - close to the demand and close to the grid, eliminating the need for new transmission infrastructure.
Efficiency	<input type="checkbox"/> <ul style="list-style-type: none"> - 70% efficient; Energy to power 400,000 homes is wasted, 4 times less efficient than battery storage. 	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> - 90% efficient; Energy to power 100,000 homes is wasted, therefore saving Ontarians the energy to power 300,000 homes.
Environmental Impact	<input type="checkbox"/> <ul style="list-style-type: none"> - Unavoidable and permanent destruction of 500 acres of the Niagara Escarpment a UNESCO World Biosphere Reserve. - Inevitable spread of "forever" chemicals - many of which have no remediation solution - into the air, land, and water. - Destroy the flora and fauna of the Escarpment that are habitat for 30 Species at Risk. - Threaten the Bay's fish and the entire aquatic ecosystem on which residents depend. 	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> - Lithium-ion batteries have virtually no local environmental impact (although there are mining and disposal concerns). - Other battery technologies that are in use today don't post the environmental issues that lithium batteries do.
Economic Burden	<input type="checkbox"/> <ul style="list-style-type: none"> - Massive price tag (capped at \$7 billion), will burden Ontario electricity consumers for decades. - Bi-lateral deal made behind closed doors; no competitive process - Twice rejected by the IESO because the proposed project fails to deliver any net economic benefit to provincial ratepayers. 	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> - Batteries are also a more cost-effective solution and could also offer the opportunity for "shared benefits" with Saugeen Ojibway Nation.



1. Speed of Implementation

Ontario is transitioning from natural gas generation to other forms of cleaner energy supply, such as wind and solar. Because these cleaner energy sources are not “on demand” - we can’t control when the sun will shine or when the wind will blow - Ontario is investing in battery park energy storage to capture power at night when demand is low and releasing it during the day when demand is high. Although they are among the fastest energy storage technologies to implement, battery park projects still take some time to develop. In the meantime, Ontario is building more gas plants that are intended to keep the system reliable during the transition and is also. So, the faster we can bring energy storage online, the less reliant we will be on gas plants during Ontario’s transition to non-emitting alternatives.

During this transition, Ontario faces the added challenge of managing the imbalance between how much energy is demanded during the day vs at night. TC Energy is promoting its pumped storage proposal as a solution to this storage need. If approved, TC Energy’s plant would not be online until 2032 (or perhaps even 2035 as recently mentioned by TC Energy’s John Mikkelsen). What will Ontario’s demand profile look like then?

Although the need for storage to balance high and low demand is a real issue today, the need for storage will steadily reduce over time and it may not be a permanent requirement. TC Energy’s pumped storage project, which would deliver storage about a decade from now, is therefore likely not needed. So, it makes no sense to build any very long-term project, especially one that is so inefficient, poses such major threats to the environment, and is an economic burden on Ontarians. Alternatively, a new battery park can be online within only a few years of being approved. This solution can deliver storage quickly when storage is needed the most.

Figure 4 and Figure 5 illustrate the forecasted changes in hourly energy demand in a typical mid-winter and mid-summer business day over the planning horizon.

Figure 4 | Mid-Summer Business Day: Hourly Profile

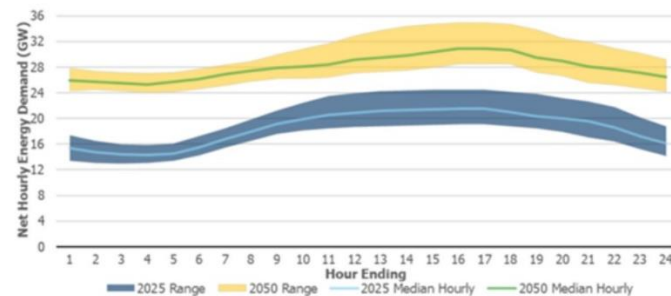
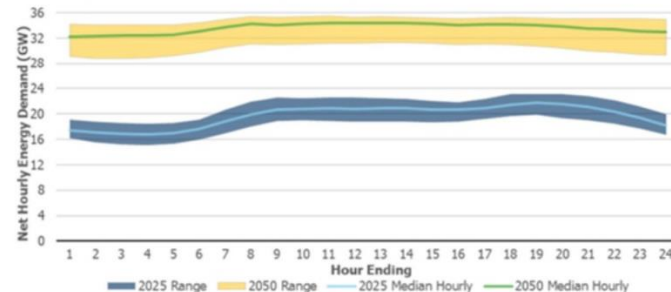


Figure 5 | Mid-Winter Business Day: Hourly Profile



Ontario’s regulator predicts that increased nighttime energy use (for example EV battery charging) and the long-duration battery parks that are currently in development will lower the grid’s demand imbalance between peak and off-peak hours.

Source: IESO’s Annual Planning Outlook - Ontario’s electricity system needs: 2025-2050, March 2024



2. Flexibility of Location

An open-loop pumped storage plant must be located on a large piece of elevated land (in this case the Niagara Escarpment) adjacent to an open body of water (in this case Georgian Bay). TC Energy has proposed its open-loop Pumped Storage Project on Defence Department lands straddling the Niagara Escarpment precisely because the site offers unfettered access to the public waters of Georgian Bay. This location also requires long transmission lines to connect to the grid. TC Energy's pumped storage proposal requires a huge amount of land – about 500 acres for the reservoir, intakes, etc.

Eight battery storage stations – which would deliver the same energy storage capacity as TC Energy's proposal - would require only about 100 acres of land. And they can be built *virtually anywhere* allowing them to be close to centres of high energy demand and close to the grid, eliminating the need for new transmission lines.

3. Efficiency

Batteries are more energy efficient than pumped storage. Batteries are 90% efficient, vs pumped storage at 70% efficient. That is a huge difference over 10, 20 or 50 years. *(Note: These efficiency calculations measure what is delivered to the grid vs power used after all factors, including AC/DC etc. conversions and transmission losses, are accounted for).* The TC Energy proposed pumped storage plant would use 1,400 megawatts of energy created by hydro, nuclear, wind, and solar, and turn it into 1,000 megawatts while dumping 400,000 kilowatts of heat energy (the majority of which goes into Georgian Bay) every day for the lifetime of the project (currently estimated to be 50 to 100 years).

Efficiency Example:

TC Energy reports the open-loop pumped storage plant would be able to power 1,000,000 homes for 8 hours. The energy to fill the reservoir with water so that it could produce that electricity would be enough to power 1,400,000 homes. This means the energy to power 400,000 homes is wasted.

IESO has contracted for 8 mega battery stations starting with the Oneida Battery Station. 8 of these stations equal the energy of the pumped storage plant proposed by TCE. They can power 1,000,000 homes for 8 hours. The energy to fill the batteries so that they can produce that electricity would be enough to power 1,100,000 homes. This means the energy to power 100,000 homes is wasted in this storage alternative.

In comparison to long-duration battery storage, the pumped storage plant would “waste” the energy to power 400,000 homes and the batteries would “waste” the energy to power 100,000 homes. Batteries therefore save Ontario the energy to power 300,000 homes. Therefore, if battery storage was used instead of open-loop pumped storage, utility costs to Ontarians would be lower.

	Open Loop Pumped Storage	8 Long-Duration Battery Parks
Energy output for 8 hours	1,000,000 homes	1,000,000 homes
Energy used to charge/fill	1,400,000 homes	1,100,000 homes
Energy “wasted”	400,000 homes	100,000 homes



4. Environmental Impact

Save Georgian Bay's dedicated volunteers have been studying the project for 5 years. Our investigation has included:

- the review of over 2,000 pages of material from the Department of National Defense, Ontario's Independent Electricity System Operator (IESO), and the Municipality of Meaford received through the Access to Information Process (ATIP);
- the commissioning of a study of the bat species on the military training base;
- consulting with environmentalists, engineers, scientists, lawyers, and other experts;
- liaising with municipal, provincial, and federal leaders; and
- engaging with concerned citizens.

It is important to note that TC Energy has not provided their most recent plant designs for review or any proof of their claims that the project will do "no harm." The lack of transparency is alarming.

Species at Risk:

Through our work, we have learned that there are 30 Species at Risk (SAR) including chorus frogs and butternut trees, as well as endangered bats, that have habitats on the base. Experts warn that the construction and operation of the proposed plant could cause the loss and degradation of habitat with resulting detrimental effects such as disruption to migration and foraging habits.

Department of National Defence internal documents, obtained through a federal Access to Information Process (ATIP), reveal that there are up to 30 species at risk on the 4th Canadian Division Training Centre property, and up to 20 species at risk within the proposed project location. The department cautions that "the proposed project is estimated to devastate approximately 10% of the 4th Canadian Division Training Centre wildlife with direct effects alone."

TC Energy has not provided any proof for how the devastation of 500 acres of the Niagara Escarpment, a UNESCO World Biosphere Reserve, would not cause harm to these Species at Risk or to their habitat.



Tri-coloured Bat (Endangered)



Butternut (At Risk)



Western Chorus Frog (At Risk)



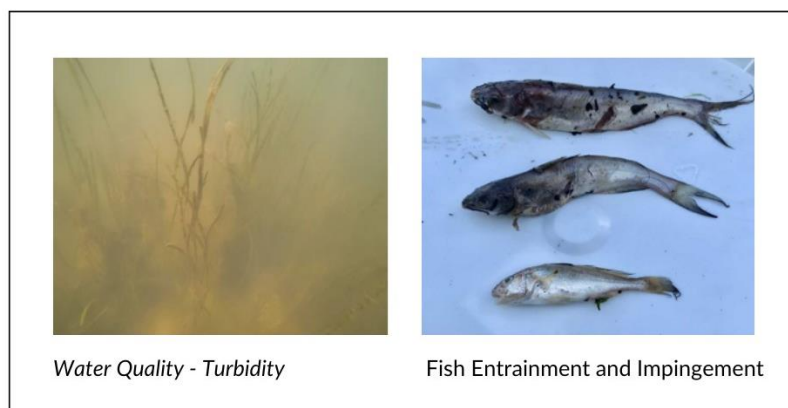
Risk to Fish and Aquatic Habitat:

Our analysis of the project indicates that the operation of the plant could cause turbidity and impact the water quality of Georgian Bay.

If water becomes too turbid, it loses the ability to support aquatic plants and animals. Specifically, turbidity leads to: clogging of fish gills causing labored breathing or death, degradation of fish habitats such as spawning beds, decreased resistance to fish diseases, modification of natural fish movement and migrations, reduction in fish growth and successful development, and reduction in the amount of food and oxygen available. It also affects the efficiency of methods to catch fish. (Source: Atlas Scientific (<https://atlas-scientific.com/blog/why-is-turbidity-important/>)).

Experts consulted by Save Georgian Bay warn that it is not possible to suck up and release that amount of water daily and not cause damaging turbidity. TC Energy has not shown any conclusive proof otherwise.

Our studies have also revealed that the operation of the plant could cause fish entrainment – fish being sucked into the turbines and injured or killed. TC Energy's original model for the Meaford project was the continent's second-largest pumped storage plant in Ludington, Michigan it took a 12-year lawsuit to stop the turbines from killing 150 million fish a year. A 1994 settlement awarded \$5 million to a Great Lakes Fishery Trust and ordered the plant to install a two-kilometre net across its intake pipes to reduce that massive fish kill. Last year, a spokesman told The Narwhal that 91 percent of fish bigger than five inches are no longer sucked in, but had no comment on smaller fish. TC Energy has not provided any conclusive proof about how they will protect fish - or how many fish and of what size will still get through their redesigned intake/outtake structures.





Dam Failure:

TC Energy's renderings of the project fail to show the approximately 300 existing homes, farms, and cottages that are below the Defence Department base on the Niagara Escarpment where TC Energy plans to excavate a 375-acre reservoir. The project has been inaccurately described as being located in a remote area. On the contrary, a failure of the dam would deluge those in the "impact zone" risking their lives and property. Some insurers have indicated to owners that their properties would not be eligible for flood insurance should the project be built.



Image: Ludington Pumped Storage Reservoir

Note: Ludington is far more remote than the proposed TC Energy plant, which would be situated above approximately 300 existing homes, farms, and cottages that would be within the "impact zone" of a dam failure.

TC Energy's original model for the Meaford project was the continent's second-largest pumped storage plant in Ludington, Michigan. Opened in 1973, Ludington is classified as a "high-hazard dam" whose failure would "cause significant damage to property and loss of life." According to its emergency action plan, a full breach would flood property half a mile away to a depth of two feet within five minutes.



Permanent Destruction of 500 Acres of the Niagara Escarpment:

There is no getting around the fact that the construction of this project necessitates the permanent destruction of 500 acres this UNESCO World Biosphere Reserve. TC Energy has not provided any plans to lessen this environmental damage – and in fact there is no possible way to do so. This environmental harm is inevitable and irrefutable. No design changes, risk management, or environmental stewardship can change this.



*Unavoidable and irreversible destruction
of a approximately 500 acres the Niagara Escarpment*



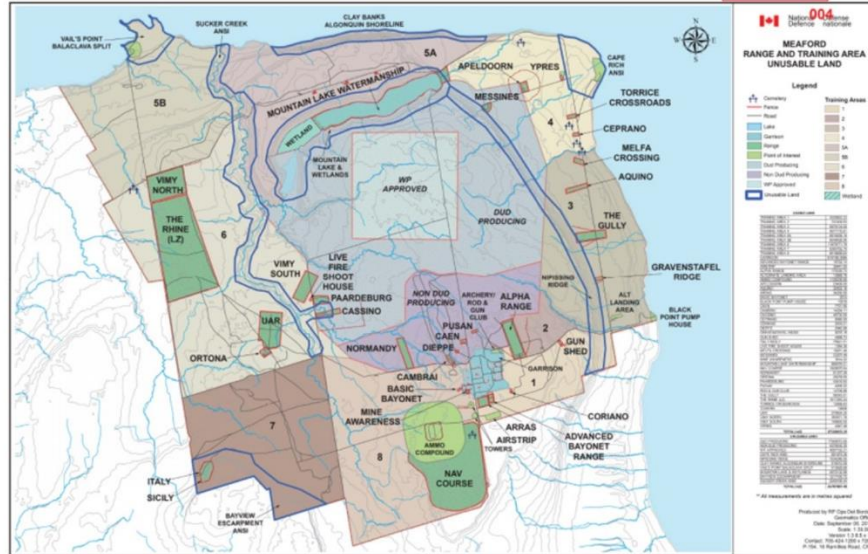
High Risk of the Spread of Toxins, Including “Forever Chemicals” Into the Air, Land, and Water:

As the Department of National Defence has documented, vast tracts of the 19,000-acre base are littered with unexploded ordnance (UXOs) and toxic chemicals from weapons training over more than 80 years. The dangers of those contaminants are clear, both to members of the military and police forces currently training there, as well as to the surrounding civilian population.

On a Defence Department map of the range provided to Meaford's council in 2021, three sites are considered so contaminated that they are off-limits to military personnel today. One is labeled “White Phosphorous” - a highly toxic substance used in smoke grenades, tracer shells, and mortars that ignites on contact with oxygen and can cause severe burns and total organ failure.

Three areas of the Defence Department base on the Niagara Escarpment where TC Energy plans to build the plant are considered so contaminated that they are off-limits to military personnel today.

The Defence Department base on the Niagara Escarpment where TC Energy plans to build the plant are shown on the Federal Contaminated Sites Inventory. Among the other chemicals of concern listed on a Treasury Board Review of Federal Contaminated Sites: methyl mercury, nitrogen oxides, Poly-cyclic Aromatic Hydrocarbons (PAHs) and organo-metallic compounds containing lead and arsenic – all threats to human health, aquatic life, soil and water.



Source: Defence Department map of the range provided to Meaford's council "Update - 4th Canadian Division Training Centre Payment In Lieu of Taxes Appeal" dated May 31, 2021



Source: Snapshot of the Treasury Board of Canada Federal Contaminated Sites Inventory provided to Meaford's council "Update - 4th Canadian Division Training Centre Payment In Lieu of Taxes Appeal" dated May 31, 2021



There may be many other toxins as well. A chemical solvent called trichloroethylene (TCE) was commonly used as a degreasing agent until the 1990s on military bases across North America. More recent outcries have been raised by firefighters exposed to the potential carcinogens of Polyfluoroalkyl Substances (PFAS), also known as 'forever chemicals' because they don't break down in the environment or human bodies. The military is considered one of the largest users of PFAS, commonly found in firefighting foam during training exercises and emergencies.

The existence of those toxins on the base is worrisome enough, but scientists warn that they would become all the more dangerous if and when the soil is disturbed by TC Energy's massive construction plans—specifically the excavation of its proposed 375-acre reservoir. Thanks to the many watercourses clearly visible on maps of the base, those toxins—once disturbed—risk draining into the aquifers and wells of the 300 homes, farms and cottages situated below the reservoir and even directly into Georgian Bay itself, the source of drinking water to thousands for miles around.

<p style="text-align: center;">Environmental Concerns</p> <ul style="list-style-type: none">• Contaminated soils – Disturbing the soil may release heavy metals and toxins into the environment.• Species at Risk(special interest to endangered) & Migratory Birds.• Dept of Fisheries and Oceans (DFO) – possible affects on fish bearing streams and other aquatic life in Georgian Bay. Analysis required.• Natural drainage from the impact area will be changed, increasing flow in other streams and increasing erosion affecting local community. <p style="text-align: right;">22</p> <p style="text-align: center;">ENVIRONMENTAL CONSIDERATIONS</p> <p>1. Environmental Concerns. The following are a list of environment considerations that have been identified are requiring further study given they have a direct impact to TCE's project.</p> <p>a. Contaminated Soils. Over the years, the impact area has been heavily used for various types of fires. The expended rounds have caused various types of contamination from heavy metals to other toxins. Disturbing the soil would expose more of these elements to the surrounding area (air, land and water) and if the soil were used as part of the reservoir walls, then the heavy metals and toxins could cause increased contamination of the water. Pollution of the water creates large concerns for marine animals' health and for any person drawing water from the bay for personal use.</p> <p>Source: Department of National Defense, received through the Access to Information Process (ATIP)</p>	<p>The Defence Department's own documents, obtained through an Access to Information Process (ATIP), indicate that "disturbing the soil may release heavy metals and toxins into the environment" and express concern for "marine animals' health and for any person drawing water from the bay for personal use."</p>
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No Harm?

TC Energy claims it has redesigned the project to mitigate some environmental effects, but they have not provided those designs for review or offered any details as to how these risks will be lessened.

Experts agree that the construction and operation of TC Energy's pumped storage plant would cause irreversible harm to the Niagara Escarpment, a UN-designated World Biosphere Reserve, and threaten the water quality of Georgian Bay. Yet TC Energy continues to say the project will do "no harm."



Save Georgian Bay acknowledges that some environmental risks can be reduced or lessened with a thoroughly risk-managed construction process and thoughtful plant design. But these risks can only be reduced, not eliminated. Plus, one major threat to the environment can not be mitigated at all: the permanent destruction of 500 acres of the Niagara Escarpment. Further, the high risk of spreading toxins, including “forever chemicals” into the air, land, and water, poses, in our opinion, an unacceptable project risk - an opinion that is widely shared.

Why would we take these risks, and cause this harm – for a project that’s not even needed? - especially when there is a viable alternative that does not pose these risks? Save Georgian Bay urges anyone interested in the risks the project would cause to the environment to demand that TC Energy provide proof that their proposed plant would cause “no harm.”

5. Economic Burden

Against the Advice of the Independent Electricity System Operator (IESO):

According to the Independent Electricity System Operator’s website, “The IESO oversees and evolves Ontario’s electricity markets, driving competition to maintain affordability.” The IESO:

- Reviews and accepts bids from electricity suppliers, starting with the lowest-cost options, until Ontario’s energy needs are met;
- Sets and enforces rules that govern participation in Ontario’s electricity markets; and
- Fosters an open, dynamic, and sustainable marketplace that encourages new opportunities for emerging resources.”

After reviewing TC Energy’s unsolicited bid, the IESO concluded that “Based on the project’s long development timeline, it is not expected to contribute to meeting short or medium term needs.” (Source: *Letter from Minister of Energy to President and Chief Executive Officer Independent Electricity System Operator dated November 10, 2021 received through ATIP*)

Despite the IESO’s conclusion, Minister Smith persists in advancing the project through the evaluation process. The Minister of Energy writes to IESO, “I am asking the IESO to move these three PS projects to the second stage (i.e.: Gate 2) of the Unsolicited Project Proposals framework. I am aware, based on the analysis provided by the IESO, that the three PS projects are not forecast to provide sufficient value to Ontario’s electricity consumers.” (Source: *Letter from Minister of Energy to President and Chief Executive Officer Independent Electricity System Operator dated November 10, 2021*)

Why would this be pushed through against the IESO’s advice? Why would the Minister not favour meeting long-term needs through a competitive mechanism, rather than the sole-sourced approach? The perception here is that the IESO is being politically overridden to favour big business over value to taxpayers.



Capital Costs:

The project's price tag is another cause for concern. As evidenced above, despite findings from Ontario's Independent Electricity System Operator (IESO) that the project does not economically compare favorably to existing non-emitting resources, Energy Minister Todd Smith is determined to push it forward, burdening Ontarians with significant financial and environmental costs. The price tag on this risky megaproject has already skyrocketed from \$2.2 billion in 2019 to \$4.5 billion last year, and TC Energy has now agreed to cap it at \$7 billion - however that would work!

There are so many complex and variable elements of this project – dealing with unexploded ordinance and toxic chemicals, construction of a large dam, etc. - that no one knows what this project would ultimately cost Ontarians.

A University of Oxford study showed that construction costs of large dams are on average +90% higher than their budgets at the time of approval, in real terms (without including the effects of inflation and debt servicing). (Source: “Should We Build Large Dams?” University of Oxford, March 2014).

Department of National Defence documents obtained through an Access to Information Process (ATIP) reveal the department's concerns that TC Energy “has limited to no experience working in an area with UXOs. Their current estimate states three years of consultation and planning and four years of construction. They have not factored in the UXO problem... UXO clearance could add years to construction.”

- TransCanada has limited to no experience working in an area with UXOs. Their current estimate sees three years of consultation and planning and four years of construction. They have not factored in the UXO problem. ADM(IE) pers around the table stated that UXO clearance could add years to construction.
 - TransCanada states that they want to ensure their work doesn't impact training. This may change as the full scope of the UXO problem becomes known. This could be a

Source:

Department of National Defense, received through the Access to Information Process (ATIP)

SDP - Planning Assumptions

- The TCE proposed PSP will not adversely impact 4 CDTCT training and site operations. Construction of replacement infrastructure will be in advance of the decommissioning of impacted buildings, facilities or infrastructure
- If required, TCE will cover the costs of relocating any training or courses impacted during construction
- The siting of infrastructure in the SDP focuses on potential infrastructure impacted by the PSP. Current COA's provided by TCE are very early working versions
- The TCE site survey and preliminary studies will confirm all impacted infrastructure and may result in a change to the inclusion of the Maintenance and Supply facilities
- The SDP sets the direction for future development at 4CDTCT and will require endorsement from stakeholders and will be signed by DGPR
- The SDP may be amended in the future depending on changes resulting from the TCE PSP site assessment

Source:

Department of National Defense, received through the Access to Information Process (ATIP)

Adding to the project costs is the need to rebuild all 4th Canadian Division Training Centre infrastructure, estimated to be approximately 41 pieces of infrastructure. Why would Ontario ratepayers and tax-payers foot the bill for the rebuilding of federal defence department infrastructure?



Pumped Storage infrastructure is massive and complex; when things go wrong, the costs are astronomical. One example is the Snowy 2.0 project in Australia with chemical leaks, sinkholes, toxic gases, a stuck boring machine, and a skyrocketing budget from \$2b to \$12b (plus \$8b for the transmission lines). (Source: "A sinkhole, toxic gas and the \$2 billion mistake behind Snowy 2.0's blowout", ABC Australia, October 2023 and "Pushing water uphill: Snowy 2.0 was a bad idea from the start. Let's not make the same mistake again" The Conversation, October 2023)

TC Energy's Coastal Gas Link project is now expected to cost \$14.5 billion (up 134 percent from the original price in 2018 of \$6.2 billion). (Source: "Estimated cost of Coastal GasLink pipeline surges to \$14.5-billion" The Globe and Mail, February 2023) With no experience with pumped storage, why would TC Energy be expected to be able to come in on budget for this project?

When Save Georgian Bay met with Energy Minister Todd Smith in the fall of 2023, he reported that he did not know what the final cost of TC Energy's open-loop pumped storage project would be. If the Ontario government hands the company the long-term electricity contract it seeks, all provincial electricity ratepayers will be on the hook for underwriting the costs of this possible white elephant for years to come. Meanwhile, the IESO points out a more cost-effective alternative to TC Energy's proposal: long-duration battery storage parks such as the Oneida Energy Storage Project currently under construction on 10 acres in Ohsweken, Ontario, and co-owned by the neighboring Six Nations of the Grand River.

Development Costs:

In a January 9, 2024 letter to IESO president Lesley Gallinger, Minister Smith asked the agency to re-assess the proposal for at least the third time. The IESO has reiterated that the project lacks economic value for Ontario's electricity ratepayers. Despite this, the Minister has actively challenged the regulator's recommendations, tasking the agency with a request for yet another review. In an unusual move, he also set in motion a process for his government to reimburse TC Energy's pre-construction costs. This has led to growing concerns that Ontario taxpayers might end up shouldering the development costs for a proposal that was initiated by TC Energy, an Alberta-based company, and has never been subject to a public competition. (Source: Letter from Minister of Energy to President and Chief Executive Officer Independent Electricity System Operator dated January 9, 2024)

A Bi-lateral Closed-Door Deal:

TC Energy approached the Independent Electricity System Operator (IESO) and the Department of National Defence with an unsolicited proposal for this project. The proposal is being evaluated under the IESO's Unsolicited Proposal Process (UPP). This three-gate process was developed by the IESO to evaluate Unsolicited Proposals and evaluates a project *independently*, as opposed to *in relation to* other bids. This amounts to a non-competitive sole-sourced contract for energy. If approved, TC Energy would be *given* the project vs *winning* the project by competing with it on the open market.



The IESO has since abandoned the UPP in favour of a more typical RFP process for energy storage that seeks bids from the market. In a letter to the IESO dated July 10, 2023, the Minister of Energy writes, “The UPP was developed by ENERGY and IESO at a time when IESO’s Resource Adequacy Framework (RAF) was still under development, and there needed to be an alternative process to evaluate the costs and system benefits of the multiple large-scale energy projects that were being proposed at the time... Considering the success of the RAF, I believe that the UPP is no longer a necessary mechanism to evaluate energy project proposals...” (Source: Letter from Minister of Energy to President and CEO of IESO, July 10, 2023)

The IESO recommends that the province’s long-term energy storage needs be procured in an open competitive process. In a November 20, 2021 letter to the IESO, Minister Smith acknowledges that “Over the long-term, Ontario does have an enduring need for new incremental capacity resources, and the project could contribute to meeting this need; however, the IESO currently plans to address it through a competitive mechanism.” (Source: Letter from Minister of Energy to President and Chief Executive Officer Independent Electricity System Operator dated November 10, 2021 received through ATIP)

By advancing this project, the Minister of Energy is pushing a single source mega project that the IESO experts advise would be better addressed under a competitive RFP process. If approved, the project would essentially be a directed contract, bypassing competitive tendering.

Opportunity for Shared Economic Benefits:

TC Energy has touted its Meaford project as a “collaboration” with the Saugeen Ojibway Nation, which will bring “shared benefits.” “Shared benefits” are used by TC Energy as a way to promote their open-loop pumped storage project as a part of Ontario’s reconciliation with indigenous communities. But those shared economic benefits *can come just as easily* from more efficient and sustainable battery storage projects. This past June the IESO approved 15 long-duration battery storage projects, nine of which boast at least 50% participation from indigenous communities therefore also offering the opportunity for “shared benefits” that TC Energy is promising without inflicting such damage on the land and waters for generations to come. (Source: Expedited Long-Term RFP (E-LTD RFP) – Final Results)

Carbon Credit Transfer

Department of National Defence documents, obtained through a federal Access to Information Process request, show that TC Energy “have claimed that they have been willing to give DND the Greenhouse Gas Credits that will come with this project” and that “TCE has made the claim that [4th Canadian Division Training Centre] will be able to benefit directly from this project by drawing power directly from the site, which could be done at a reduced cost.”

At \$170 per tonne, 490,000 tonnes in credits is worth \$83.3 million annually throughout the project’s expected 50-year lifespan, which would amount to \$4.165 billion. It would appear that, if this transfer of carbon credits is made, Ontario would be giving away carbon credits worth over \$4b to the federal government – a benefit should stay in Ontario.



Federal Infrastructure Replacement Costs

Department of National Defence documents, obtained through a federal Access to Information Process request, show that TC Energy has “agreed to replace (at their cost) all affected infrastructure on and off-site” and that TC Energy will be “responsible for covering all costs” including “any costs incurred from clearing unexploded ordinance” from the land and water. Costs include building (or re-building) up to 43 new pieces of infrastructure.

This is a massive federal military base upgrade, estimated to cost approximately \$250 million, ultimately paid for by Ontario taxpayers. Ontarians would essentially be footing the bill for replacing federal military infrastructure.

Upon consideration of all of these factors – capital costs, cost uncertainties, taxpayers on the hook for TC Energy’s project development costs, IESO’s rejection of the project, carbon credit transfer, federal infrastructure replacement, and TC Energy’s unsolicited approach to the Ontario government – it is clear that TC Energy’s open-loop pumped storage proposal is not in the best interests of Ontario’s taxpayers or rate payers.

In addition to being a better choice from an environmental and efficiency perspective, long-duration battery storage is also more cost-effective - *and* could also offer the opportunity for “shared benefits” with Saugeen Ojibway Nation.

The cost to build a long-duration battery park with the same storage capacity as TC Energy’s proposed open-loop pumped storage plant would be \$4B. And because there are fewer unknowns and the time to implement is shorter, those costs are more predictable. TC Energy’s proposed open-loop pumped storage plant would take at least 10 years to develop and build, and is likely to cost more than the current \$7 billion currently advised by TC Energy (probably closer to 15 years and over \$10 billion, given the historic cost and time overruns for projects of this size).

From all perspectives, it is clear that TC Energy’s proposed open-loop pumped storage plant would cost more to develop, build, refurbish, maintain, and decommission than long-duration battery storage. Why would Energy Minister Todd Smith push ahead with an environmentally damaging project that the IESO says offers no net economic benefit to ratepayers when more efficient and less expensive technologies are available?

Save Georgian Bay questions the project’s political drivers, noting close ties between TC Energy’s lobbyists and Ontario’s political leaders. Rubicon Strategy is headed by Kory Teneycke who served as Premier Doug Ford’s Campaign Manager. Minister Smith’s Chief of Staff, David Donovan, came to the Minister’s office from Sussex Strategy whose executives, Chris Benedetti and Paul Pellegrini have close ties to both the Minister and the Premier.



GREENWASHING

TC Energy attempts to greenwash the project by touting the production of emission-free power capacity and the reduction of the province's reliance on natural gas power production. All storage alternatives would have the same climate change impact TC Energy is claiming for their proposal: "Canada's Largest Climate Change Initiative." Their project is not unique in this respect.

But claims that their pumped storage proposal offers a "green" solution, and their repeated reference to "net-zero," is inappropriate and misleading. Save Georgian Bay's experts find that TC Energy's pumped storage project would increase CO2 emissions and that, comparatively, long-duration battery storage would add less CO2 into the atmosphere. TC Energy's commissioned "Economic Analysis of a Proposed Hydroelectric Pumped Storage Project in Ontario" Navigant dated January 2020) is incomplete, as it does not analyze the effect of these lost exports (over 4.3 million MW/hrs per year) to US states that currently produce a majority of their energy using coal and gas. TCE's conclusion that the operation of the proposed pumped storage plant would result in a reduction of CO2, relies on an incomplete analysis. When the diversion of lost energy exports to U.S. jurisdictions, and other factors identified by Save Georgian Bay, are considered, the pumped storage project will increase CO2 emissions. Currently, excess energy from the Bruce Nuclear Plant is exported to the United States. If some of this excess energy is diverted away from export to operate the pumped storage facility, these states would turn on their gas and coal plants, adding carbon to the environment. These emissions, and the 490,000 tonnes of carbon that would be introduced into the environment to construct the facility, undermine its purported environmental benefits. *(Source: Section 8.0 of the Strategic Environment Assessment prepared for DND by SGB offers a detailed analysis of how TC Energy's pumped storage project would increase CO2 emissions.)*

It is important to note that excess energy is currently diverted to the US to power up long-duration batteries, but the carbon emissions would be much less than pumped storage because batteries are approx. 1/3 more efficient than pumped storage. *All storage solutions provide carbon savings and of course, those that are easier to build and are more efficient do a better job leveraging the carbon reduction - Batteries would do a better job at carbon reduction.*

One also must consider the environmental concerns about this project beyond Carbon – adverse impacts to 30 Species at Risk, increased turbidity, fish entrainment, devastation to 500 acres of the Niagara Escarpment, and the spread of "forever chemicals," toxins and carcinogens into the environment – *"Green" isn't just about carbon!*

Strategic partnerships with high-profile conservation groups have allowed TransCanada to greenwash its image, providing a "green" veneer to an otherwise fundamentally dirty corporation. For example, in 2009, TransCanada committed up to \$11.4 million to the Nature Conservancy of Canada (NCC), making the NCC the recipient of the company's largest-ever community investment. The company has also partnered with Ducks Unlimited (DU) for over 15 years, and in 2013 contributed \$1 million to DU projects in Louisiana and Saskatchewan.



TC ENERGY'S TRACK RECORD

TransCanada Pipelines Leak:

TransCanada's gas and oil pipelines leak. TransCanada Pipelines has one of the worst safety records of any North American pipeline company. It's not a question of if the pipelines will leak, but rather when, where and how much the pipelines will leak. Since 2010, when TransCanada's first oil pipeline came into service, the company has reported 152 oil spills. According to the National Energy Board (NEB), 17 of the 39 major pipeline (gas and oil combined) accidents that have happened in Canada (between 1992 and 2014) occurred on pipelines owned by TransCanada and its subsidiary NOVA Gas Transmission Ltd. (NGTL). This is most likely a conservative number, as the NEB only discloses 'reportable' breaches and many pipeline incidents never even come to public attention.

In December 2022, its Keystone Pipeline spilled 13,000 barrels of tar sands crude into a Kansas creek, with clean-up costs of \$480 million (US). Investigators found the company had increased pressure in the pipeline above normally allowed stress rates, but TC Energy blamed the leak on shifting land and faulty construction.

TC Energy's proposed open-loop pumped storage project is especially risky since they have never built one. TC Energy's core competence is pipeline construction. If they can't build leakproof crude oil pipelines, after decades of experience, what expectation can we have that they have the ability to build a pumped storage plant safely?

Bad-Faith Engagement with First Nations:

The following two cases illustrate TransCanada's bad-faith engagement with First Nations. The first example is related to how TransCanada consistently ignored requests for information and the concerns of the Lubicon Cree in the lead-up and during the construction of its North Central Corridor Pipeline in Alberta. The company claimed that "no objections were raised in extensive consultation with native communities." The Lubicon nation maintained that their concerns were not taken seriously and that their rights had been violated, while the government and TransCanada said that they had been adequately consulted. James Anaya, the former UN Special Rapporteur on the Rights of Indigenous Peoples, investigated this case and his report makes clear that from the perspective of the Lubicon Cree, their fundamental rights were violated.

The second example is related to TransCanada's Grand Rapids Pipeline and the Athabasca Chipewyan First Nation (ACFN). In July 2014, the Athabasca Chipewyan First Nation (ACFN) formally pulled out of the Alberta Energy Regulator (AER) hearings for the pipeline. Citing industry prejudice and impossible timelines, Chief Adam explained that the AER had refused to give them enough time to study new documents submitted by TransCanada. Previously, the company had submitted incomplete environmental, safety, spill contingency, and caribou protection plans. The Chief of the ACFN, Allan Adam, accused TransCanada of dealing with his community in bad faith, saying that instead of taking aboriginal concerns seriously, it was more focused on what it would cost to "buy us off."



Aggressive Public Relations Strategies:

In 2014, leaked PR strategy documents revealed that TransCanada had hired the world's largest PR firm, Edelman, to prepare its Energy East Campaign, including the use of controversial strategies to damage the reputation of opponents and adding "layers of difficulty for opponents, distracting them from their mission and causing them to redirect their resources." One example of these strategies includes a \$5 million (USD) Strategic Lawsuit Against Public Participation (SLAPP) against 19 activists and several environmental groups. The defendants, threatened with losing their homes and life's savings, agreed in 2013 to cease opposition to the Keystone XL pipeline.

Sources: All information related to TC Energy's Track Record is sourced from the Polaris Institute's corporate profile of the TransCanada Corporation "Unplugging the Dirty Energy Economy" dated 2015.



OUR SUPPORTERS SPEAK OUT

Save Georgian Bay has shared our concerns about the proposed project with concerned citizens, media, and political leaders. We are heartened that we're not alone in our concerns, as evidenced by over 40,000 online / 3,300+ paper petition signatures opposing the project.

Rupert Kindersley, Executive Director of the Georgian Bay Association, is concerned about the environmental risks and why the project is still proceeding after being rejected twice by the IESO.

"Georgian Bay Association is concerned about the risks posed by this proposed project to water quality throughout Georgian Bay, aquatic biota, and the habitat of species-at-risk - plus the irreversible harm to the Niagara Escarpment. Given that the project does not have the support of the regulator, the Independent Electricity System Operator (who view it as a bad financial deal for Ontario and question whether it will even be needed by the time it is finished), and given the far less costly alternatives that can be put in place in 2-3 years rather than a decade, we believe that it is imperative that the Minister of Energy put this long-term energy storage requirement out to a public, competitive tender."

- Rupert Kindersley, Executive Director, Georgian Bay Association

Maude Barlow, one of the world's leading experts on freshwater issues calls for the project to be stopped.

"TC Energy's proposed pumped storage operation is a monster of an idea. It could destroy the entire aquatic ecosystem of Georgian Bay and threaten the sanctity of a UNESCO World Biosphere. We in Canada have taken our fragile water heritage for granted and not properly cared for it. To provide energy that can more safely be supplied in other ways, this dangerous plan puts a huge body of water at risk. It must be stopped!"

- Maude Barlow, co-founder of the Council of Canadians and author of *Blue Gold, Whose Water Is It Anyway?* and *Still Hopeful: Lessons from a Lifetime of Activism*.

Jack Gibbons, leading the Ontario Clean Alliance's charge to see Ontario move to 100% renewable electricity, has an interesting suggestion for Minister Smith.

"The Ontario Clean Air Alliance is concerned that Ontario's Minister of Energy, Todd Smith, is promoting TC Energy's high-cost Meaford pumped storage project despite the fact that according to the Independent Electricity System Operator we have lower cost alternatives, including battery storage. By 2030 the storage capacity of our electric vehicles' (EVs) batteries will be more than 20 times larger than the proposed Meaford pumped storage project. Instead of negotiating a sweetheart, backroom deal with TC Energy, Minister Smith should direct our electric utilities to pay EV owners to provide power back to the grid when it is needed."

- Jack Gibbons, Chair, Ontario Clean Air Alliance and Former Toronto Hydro Commissioner



Save Georgian Bay is also grateful for the opposition to the project voiced by several municipalities around Georgian Bay. On November 17th, the council of the Township of The Archipelago in Parry Sound District first passed a resolution “vehemently” opposing the project, denounced it as “a bad financial deal for Ontario,” and objected to the proposal based on its threat to the environment and the area’s vital tourism, sport, and commercial fishing industries. Then on December 18th, the Town of Blue Mountains, which includes Thornbury, also passed a similar resolution. The Township of Georgian Bay, and the Town of Parry Sound soon followed.

The support from these municipalities - some on the eastern shore of Georgian Bay nearly 90 kilometres away - refutes TC Energy’s claim that mounting criticism of the project is merely a case of NIMBYism. These resolutions demonstrate that there is widespread concern about this project beyond the immediate area and the opposition to Save Georgian Bay and rightly recognize the waters of Georgian Bay follow no municipal boundaries. The water touches all of us. Because of that, everyone on the Bay should have a say.

The actions of these four advocate municipalities stands in stark contrast to Meaford and Owen Sound, who have “conditionally” supported the project based on the promise of economic benefits. Leading up to Meaford’s October 2022 municipal election, Mayor Ross Kenter campaigned on a platform against TC Energy’s proposed project. Yet, in February 2023 five of Meaford’s seven councillors, including Mayor Kentner, voted to offer conditional support for the project. Mayor Kentner reported meeting with Minister Smith at the January 2023 Rural Ontario Municipal Association (ROMA) conference where the Minister urged approval of the project and warned that Meaford should accept the pumped storage plant to secure potential community benefits. TC Energy’s John Mikkelsen said that the municipality could lose out on an economic bonanza from the Calgary-based pipeline corporation. “Benefits will come to Meaford if—and only if—the council votes for the project to proceed,” Mikkelsen declared at the time.

Yet, as we know, this was a hollow threat. Local municipalities, including Meaford, have the authority to declare their community a “willing host” for a proposed project. If a municipality does not provide this approval, the project cannot proceed. The 2009 Green Energy Act initially bypassed municipal regulations, but the Ford government later reinstated local government input in 2018, requiring new energy projects to seek approval from local city councils. The Green Energy Repeal Act, 2018 gave powers back to municipalities regarding how land use for renewable energy is regulated and approved in Ontario, including restoring municipal siting authority under the Planning Act over new proposed projects.

In March of 2024, Owen Sound also offered its conditional support for the project, largely driven by the promise of economic benefits, including jobs. TC Energy claims its project will create 1,000 well-paying, unionized construction jobs. But those jobs are short-term construction jobs – only 20-22 of them are reported to be permanent jobs. A contractor for the Ludington Pumped Storage (TC Energy’s model for their proposal) says most of its construction workforce was short-term and came from out of town while creating pressure on local housing and schools. Energy Minister Todd Smith is touting TC Energy’s promise to create 1,000 well-paid unionized construction jobs on its pumped storage proposal for Meaford as one of the “societal and economic benefits” that the IESO has not factored in. \$7 billion dollars is a lot of money for 20 full-time jobs!



CONCLUSION

In conclusion, the amalgamation of these issues underscores the questionable nature of this politically motivated project.

Although the need for storage to balance high and low demand is a real issue today, the need for storage will steadily reduce over time and it may not be a permanent requirement. TC Energy's pumped storage project, which would deliver storage in about a decade from now, is therefore likely not needed. So it makes no sense to build any very long-term project, especially one that is so inefficient, poses such major threats to the environment, and is an economic burden on Ontarians. Alternatively, a new battery park can be online within only a few years of being approved. This solution can deliver storage quickly when storage is needed the most.

The environmental case for long-duration battery storage over open-loop pumped storage is clear – and will only get more compelling over time. TC Energy's proposed project poses many environmental risks, some of which can be mitigated. TC Energy says that the Federal Impact Assessment process will address them and that Saugeen Ojibway Nation will ensure that the environment is protected. We would like them to explain how they will do this. There is no getting around the fact that this massive construction project would permanently destroy 500 acres of the Niagara Escarpment. And regardless of any impact assessment or risk mitigation, the high likelihood of spreading PFAS "forever chemicals" and other toxins into the environment is an unacceptable risk. Once the 500 acres of the Niagara Escarpment are destroyed, there is no repairing it. If toxins, many of which are carcinogens with no remediation solution, are spread into the environment they will be there forever. TC Energy says that their project will cause "no harm." We urge you to insist that TC Energy provide proof of this claim.

Long-duration battery storage has other benefits too. They can be built virtually anywhere allowing them to be close to centres of high energy demand and close to the grid, eliminating the need for new transmission lines. And in a head-to-head comparison of energy efficiency, carbon reduction, and costs to ratepayers and taxpayers, long-duration battery storage out-performs open-loop pumped storage.

Save Georgian Bay urges Minister Smith and the Ford Government to prioritize the Niagara Escarpment and Georgian Bay, and the financial interests of Ontario's taxpayers and ratepayers, over the clear corporate and political motivations driving TC Energy's open-loop pumped storage proposal. We ask the Minister of National Defence to protect the health and safety of Ontarians and not allow the disruption of soil at the base to release toxins, including "forever chemicals" into the air, land, and water. We urge every municipality around the Bay to examine the project and consider a resolution in opposition to TC Energy's proposal for an open-loop pumped storage facility due to the irreparable harm both to the Niagara Escarpment and to the waters of Georgian Bay.

Why take the risk?