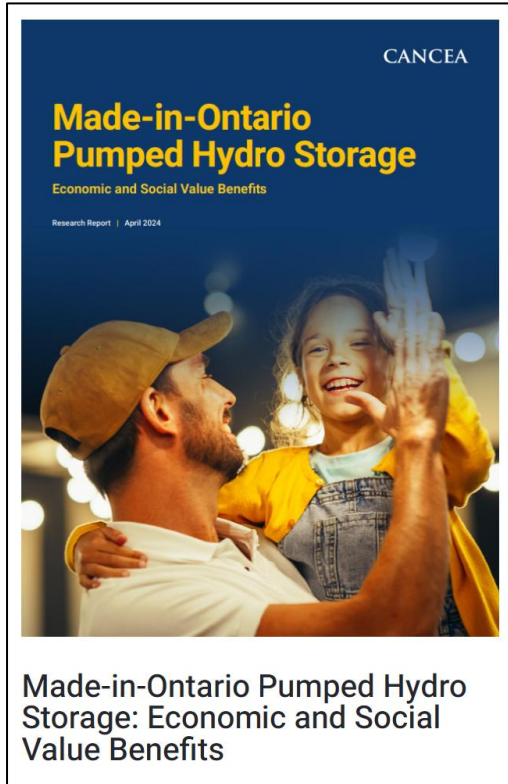


CANCEA REPORT: *A Critical Analysis*



Commissioned by TC Energy, the Canadian Centre for Economic Analysis (CANCEA) was tasked with making the case for the proposed pumped storage project. This "funded research" is carefully crafted to influence its audience, relying on a model that allows for user-defined inputs, making the outcomes easily manipulated. The report presents data in ways that exaggerate the project's benefits, painting a much rosier picture than reality.

CANCEA intentionally overwhelms readers with complex numbers and jargon, creating an illusion of credibility and making it difficult to critically assess the information. Even TC Energy's Clarke Little has admitted to struggling to follow CANCEA's "voodoo math."

However, a closer look reveals the truth: this project will cost Ontario taxpayers far more than it will return, while creating very few meaningful jobs.

CANCEA's analysis neglects to fully explore the range of more economically viable alternatives to their client's proposed project. Moreover, it fails to address the environmental risks tied to open-loop pumped storage.

If CANCEA were to take a broader, more honest view, it would show that there are less expensive, more efficient, and more environmentally friendly solutions to meet Ontario's energy storage needs.

"Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits" Canadian Centre for Economic Analysis (CANCEA)

This critical analysis offers a broader perspective on TC Energy's proposal. We aim to spark a more transparent, informed, and balanced discussion.



CANCEA REPORT: *Research or Storytelling?*



The screenshot shows a webpage with a dark blue header containing a pie chart and the text "Influence via our Specialized Reports" and "Evidence-based ways to achieving your objectives". Below the header, the same title is repeated. The main content area includes a paragraph about government and industry consulting, a sub-section titled "Introduction and application of our four-pillar approach" with a paragraph of text, a photograph of a man in a light blue shirt looking at a document, another sub-section titled "Goal identification and planning" with a paragraph of text, and a final paragraph about data-driven analysis.

Influence via our Specialized Reports

Evidence-based ways to achieving your objectives

Influence via our Specialized Reports

Our government and industry consulting practice will accompany you through a process of influence and change from start to finish. Our team provides a range of services based on your needs.

Introduction and application of our four-pillar approach

We have been very successful in making the case for change, with approximately \$17 billion unlocked in successful government and industry campaigns in Canada since 2002. With this success comes valuable insights as to what works and what doesn't. Our four-pillar approach is a framework derived from these experiences and we will be pleased to share this with you.



Goal identification and planning

Clients tend to have a strong understanding of what they'd like to achieve but are less clear on problem identification and how detailed, data-driven analysis can help them. With our knowledge of the complexity and participants of socio-economic systems, we are able to decompose a client's objectives into a detailed plan of how to make the case with evidence and analysis.

<https://www.cancea.ca/index.php/influence-via-our-specialized-reports/>

The CANCEA report is not independent.

Rather it is an example of “funded research” commissioned by TC Energy and designed to make the case for their proposed project.

On their website, CANCEA says that they help clients set “goals” for research outcomes and develop a “detailed plan of how to make the case.” They describe their reports as designed result in “influence and change.”

CANCEA uses Agent-based Computational Modeling (ABM), which relies on design choices, such as assumptions about behaviors and interactions inside a computer simulation. These choices can introduce subjectivity and impact the simulation’s outcomes. It's important to question the biases in the programming of the model's behavioral rules.

It would be appropriate to engage a truly independent third party to audit CANCEA’s report before relying on it.

CANCEA REPORT: *A Closer Look Tells a Different Story*

As you take a closer look at the CANCEA report, consider this:

- **A BIASED VIEW:** The report is an example of CANCEA's "funded research" service they call "Influence via Our Specialized Reports." They use Agent-based Computational Modeling (ABM), which relies on design choices that can introduce subjectivity and impact the simulation's outcomes. **The report tells a good story and craftily makes the case for their client's proposal, but does not reflect an independent view of the project.**
- **A NET LOSS FOR ONTARIANS:** CANCEA's analysis relies on outdated capital cost assumptions that are off by \$1.2 billion. TC Energy initially estimated the project at \$2.3 billion, but the report raised the cost to \$5.8 billion. TC Energy now estimates \$7 billion, which would be funded with public dollars. Based on CANCEA's estimated Ontario economic benefit of \$6.12 billion, Ontario taxpayers stand to lose \$880 million on this project. Ontario taxpayers have already spent \$285 million to cover TC Energy's "pre-development" costs, a decision announced just before Premier Doug Ford called a snap election. **The only economic benefits go to TC Energy, not to Ontarians.**
- **EXAGGERATED JOB CREATION:** The report grossly overstates job creation. After converting "people-years" to jobs, we see that the project is anticipated to result in 740 jobs in Ontario and just 180 in Grey-Bruce-Simcoe. This includes part-time and temporary jobs as well as direct, indirect, and induced jobs. **And with TC Energy's estimation of 32 permanent jobs, the project is not the job creator they would like you to believe it is.**
- **A FALSE COMPARISON:** The report is based on an unrealistic comparison to a "business-as-usual" economy. If this project doesn't move forward, other energy storage projects would fill the gap, making those alternatives a more appropriate benchmark. Additionally, CANCEA compares the pumped storage project to an unrealistic, "stylized" battery storage model. Further, they fail to compare the project to other feasible energy storage options that could meet the province's needs, while also costing less, offering speedier implementation, delivering better efficiency, and causing less adverse impact to the environment. **CANCEA's selective comparison model is specifically engineered to exaggerate the benefits of their client's proposal.**

CANCEA's report delivers impressive headlines but lacks the rigor and substance one would expect when making a \$7b decision for Ontarians.



CANCEA REPORT: A Look at “Total Net Benefits”

Objectives

This study focuses on the economic and social value of the OPS investment, with social value being the well-being pillar of Environmental, Social and Governance (ESG) investment principles. Together, these components of value combine to measure the total benefits supported by the Project. Additionally, to fully understand the benefits of any infrastructure investment, both the contribution (the overall significance of the Project in the economy and society) and the net benefit (how the Project compares to business-as-usual growth) of an investment must be considered. These key concepts are explained below.

OPS Contributions: The Gross Value Components of OPS



Economic Contributions: The economic contributions quantify the activity in Ontario and the increased capacity of its supply lines that result from OPS investments. This requires an understanding of the jobs and economic activity directly related to OPS construction and operations (direct contributions), the jobs and economic activity generated in the affected supply lines (indirect contributions) and the induced effects from the payment of wages which OPS will directly, or indirectly, support.



Social Value Benefits: The social value benefit quantifies the extent to which OPS will change the well-being of Ontarians. This captures all the positive and negative effects on the well-being of individuals against well-being in a business-as-usual baseline that would generate the same number of jobs as OPS would generate directly¹. These changes in well-being are mapped to monetary equivalents using income changes that would result, all else equal, in the same changes in well-being for each unique individual in the analysis. This exercise requires an understanding of the people that OPS will impact through training, upskilling, increased Ontario supply capacity and the higher wages paid to higher-quality jobs.

OPS Net Economic Benefit: The Net Economic Value Components of OPS



Economic Net Benefits: The net economic benefit of the project measures how much more valuable, in terms of the economic metrics analyzed, the OPS investment is over the business-as-usual baseline that would generate the same number of jobs as OPS would generate directly. This net benefit corresponds to the difference between OPS's gross economic contribution and the gross economic contribution of the baseline.

1 The motivation for this baseline scenario is that if an alternative investment were to have the same direct jobs impact, but the direct jobs reflected the general economy (rather than the specific jobs required for OPS) there will be differences in the overall economic contribution. In particular, when following the indirect and induced aspects in the 'business as usual' case, there might be different jobs required in the supply chain, and variation in the overall economic capacity of the province. The net result will reveal that even when starting with the same number of direct jobs, the effects of OPS on the supply chain and induced activity could be different to the 'business as usual' case.

2 Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits

The report looks at “total net benefits” supported by the project which include “economic contributions” and “social value benefits” *combined and then compare it to “business-as-usual.”*

Economic contributions (jobs and economic activity) are defined very broadly and include assumed benefits *well beyond the direct influence of the project.*

Social Value Benefits attempts to monetarily quantify the project’s impact on the well-being of Ontarians. They do that by estimating the change in individual income, all else being equal, that would result in the same change in well-being *and then include these values when calculating the project’s “contributions.”*

This approach deliberately presents the project as more favorable than it truly is.

“Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits” Canadian Centre for Economic Analysis (CANCEA)



CANCEA REPORT: *Compared to Business-as-Usual?*

Net Value of Ontario Pumped Hydro Storage to Ontario

To better understand the significance of OPS in the Ontario economy and society, it is useful to compare the effect of OPS relative to a business-as-usual baseline that would generate the same number of jobs as OPS would generate directly. In this case, the economic contribution of OPS was found to be 1.7 times higher than the contribution generated from Ontario's business-as-usual activity. That is, OPS is 1.7 times more beneficial than general investment in the Ontario economy. In addition, it benefits 20% more Ontarians.

Overall, OPS is expected to generate a total net value of \$3.4 billion over the next 50 years, which arises from a net economic contribution of \$2.9 billion relative to the general economy plus the social value contribution of \$450 million.

OPS is 1.7 times more beneficial than an alternative investment in the Ontario economy



5 Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits

CANCEA

“Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits” Canadian Centre for Economic Analysis (CANCEA)

The “net value” contributions of the proposed project are compared to “business-as-usual” or *not having any energy storage project*.

This is, of course, a false narrative. Ontario needs energy storage to support the transition to renewable energy sources. Should this project not go forward other energy storage projects would, *so the appropriate comparison should be to those alternatives*.

Because TC Energy submitted this project to the province as an unsolicited bid, *it has not gone through a transparent, competitive RFP process to prove its value relative to other options*.

The IESO has twice rejected TC Energy’s proposed project based on lack of value to Ontarians relative to other energy storage options.

If considered in an open, transparent competitive process, other energy storage projects may prove to be more valuable to Ontarians than TC Energy’s unsolicited proposal.



CANCEA REPORT: *A Bad Deal For Ontarians*

1.4 Ontario Pumped Hydro Storage Investments and Operations

This report analyzes capital and operational investments proposed by TC Energy from 2024 to 2072. Capital investments, related to the preconstruction and construction phases of the project, span the 2024-2032 period. In total, the estimated capital investments amount to \$5.8 billion¹⁰, with 83% of this spending remaining in Canada. The majority of these investments occur during the construction phase from 2027 to 2032, as shown in Figure 1.

Figure 1 Estimated Capital expenditures (2023 dollars)



10 Given ongoing refinements to the project, the final project costs could differ from the estimates used for this analysis.

“Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits” Canadian Centre for Economic Analysis (CANCEA)

CANCEA is using a capital cost assumption of \$5.8 billion, which is *out-of-date by \$1.2 billion*. TC Energy’s current capital cost estimate is \$7 billion – *that’s up from \$2.3 billion when it was first proposed*. How high will it ultimately be? Our experts think it could be as much as \$10 billion or more. Ontario taxpayers have already spent \$285 million to cover TC Energy’s “pre-development” costs.

If one follows the math through, the only net benefit goes to TC Energy, not to Ontarians.

Using the potentially problematic agent-based modeling, CANCEA determined that the project would contribute \$6.8 billion to the Canadian economy, with only 90% of that benefit staying in Ontario. The remaining 10% (\$680m) would essentially be a subsidy arrangement from Ontario to other provinces, leaving only \$6.12 billion into the Ontario economy.

With \$7 billion in capital costs funded with public dollars, and only \$6.12 billion returning into the Ontario economy, Ontario taxpayers are left facing a *loss of \$880 million*.

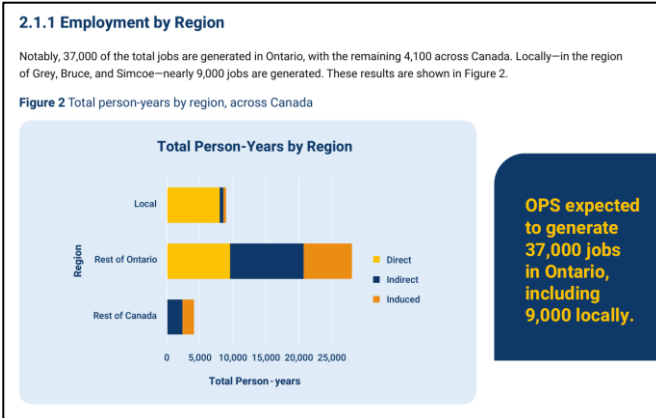
CANCEA REPORT: *Misleading Job Numbers!*

Category	Total	Direct Components	Indirect Components	Induced Components
Economic Contribution (GDP, 2023 dollars)	\$6.8 billion	\$3.4 billion	\$2.0 billion	\$1.4 billion
Gross operating surplus* (2023 dollars)	\$2.9 billion	\$1.5 billion	\$0.8 billion	\$0.7 billion
Private investment (2023 dollars)	\$1.4 billion	\$0.7 billion	\$0.5 billion	\$0.2 billion
Jobs (people-years)	41,200	17,600	14,100	9,400
Labour income (2023 dollars)	\$3.9 billion	\$2.0 billion	\$1.3 billion	\$0.6 billion

* Gross operating surpluses are approximately equal to business profits.

The majority of potential jobs from TC Energy’s project would be temporary. The company acknowledges there will only be **32 permanent positions**, most based in Toronto or Calgary.

CANCEA compares the project’s potential jobs to a “business-as-usual” scenario. However, if this pumped storage project did not proceed, other energy storage projects would, and they may create even more local jobs. **Without an open RFP process, we can’t know how really know how TC Energy’s proposal would compare to other proposals.**



CANCEA misleads by calculating jobs in “people-years,” which doesn’t reflect actual full-time job creation. **People-years are NOT jobs as is commonly understood.**

“Jobs are measured in people-years, which correspond to the number of full-time employment equivalents over one year.”

- CANCEA

CANCEA REPORT: *People-Years Are Not Jobs!*

The “people-year” numbers provided must be divided by the 50 years of the project lifespan to get a sense of actual potential job creation.

A “people-year” of employment can represent the work of one person for a full year, or multiple people working for a shorter period of time.

All of these examples are counted as “people-years” of employment in CANCEA’s report:

- *One person working full-time for a full year.*
- *Four people working for three months.*
- *Four people working 10 hours per week for a year.*

Category	Total	Direct Components	Indirect Components	Induced Components
Economic Contribution (GDP, 2023 dollars)	\$6.8 billion	\$3.4 billion	\$2.0 billion	\$1.4 billion
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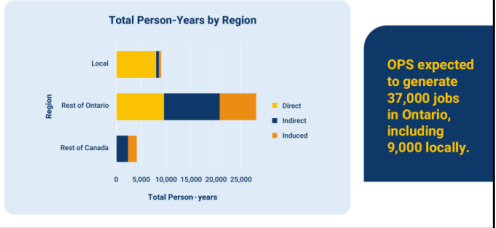


Total	Direct Jobs	Indirect Jobs	Induced Jobs
825	352	282	188

2.1.1 Employment by Region

Notably, 37,000 of the total jobs are generated in Ontario, with the remaining 4,100 across Canada. Locally—in the region of Grey, Bruce, and Simcoe—nearly 9,000 jobs are generated. These results are shown in Figure 2.

Figure 2 Total person-years by region, across Canada



Only 740 jobs in Ontario
(180 in Grey-Bruce-Simcoe, including part-time and temporary jobs)

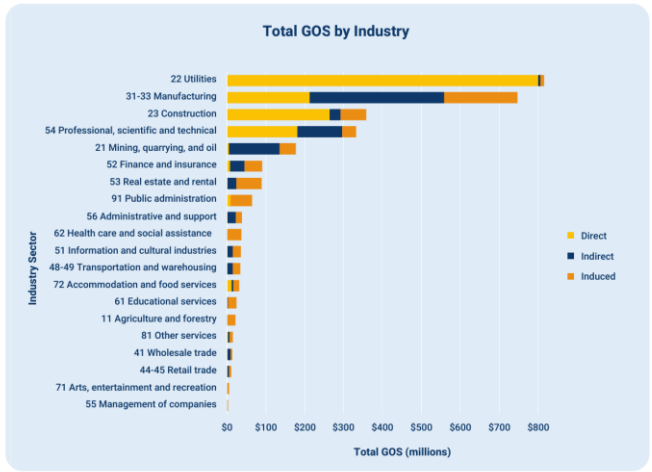
“Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits” Canadian Centre for Economic Analysis (CANCEA)



CANCEA'S REPORT: *Misleading Utility Sector Benefits*

The results by industry are depicted in Figure 12. The bulk of benefits are concentrated in the utilities and manufacturing sectors, followed by construction and professional, scientific and technical services. The size of benefits received by the utilities sector is expected, given that this sector directly benefits from the added flexibility and reliability that pumped storage provides, and includes the operation of OPS itself. Moreover, OPS can lead to significant cost savings for utilities in terms of reduced need for peaking power plants, which are typically more expensive to run. By providing a more cost-effective way to manage peak loads, the utility sector can improve its overall efficiency and profitability.

Figure 12 Total Gross Operating Surplus by industry (2023 dollars)



“Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits” Canadian Centre for Economic Analysis (CANCEA)

CANCEA is showing the largest industry benefits going to the Utility sector and is described as that sector’s direct benefits from “the added flexibility and reliability that pumped storage provides” and the resulting “significant cost savings for utilities” due to reduced need for peak power plants.

CANCEA compares the project impact on the Utility sector to a “business-as-usual” scenario. However, if this energy storage project did not proceed, other energy storage projects would, and they may create even more improvements for the utility sector. **Without an open RFP process, we can’t know how TC Energy’s proposal would compare to other proposals.**

These benefits are not unique to pumped storage and would be true for any energy storage projects.



CANCEA'S REPORT: *Misleading Comparison to BESS*

Comparison of Ontario Pumped Hydro Storage to Battery Energy Storage System

A primary alternative to pumped hydro storage is battery energy storage. While these technologies can provide similar utility to the electricity system, they can differ widely in their economic and social benefits. With this in mind, the economic and social benefits of the first 20 years of construction and operations of OPS are contrasted with those of a 20-year battery energy storage system (BESS) alternative. The exercise adopts a stylized BESS example that is of similar capacity and location to OPS. The total capital investment for this BESS example would be similar to OPS.

The net benefit of OPS relative to such a battery energy storage system is \$3.5 billion, encompassing \$3.2 billion and \$190 million, respectively, in net economic and social value contributions over the next 20 years. In terms of GDP and social value, the OPS contributions are 2.5 and 2.1 times higher than those of BESS, respectively.

OPS is 2.5 times more economically beneficial than battery alternatives.

OPS is 2.1 times more beneficial to the well-being of Ontarians than battery alternatives.

Pumped Hydro Storage Relative to Battery Energy Storage System

Relative to the first 20 years of OPS, an investment in the equivalent capacity battery storage system would result in:

- Fewer jobs for Ontarians:** While OPS generates 34,700 jobs for Ontarians, BESS generates only 10,500. This means that OPS generates 3.3 times more jobs than BESS.
- Greater reliance on foreign supply chains:** While 83% of the direct spending from OPS would remain in Canada, that figure is only 20% for BESS. This reliance on foreign, as opposed to local, supply chains, is reflected in the significantly lower economic and social benefits generated for Ontarians by BESS.
- Less economic value:** OPS generates 2.5 times more GDP than BESS over the 20 years analyzed. Similar differences are observed for all metrics analyzed, including GDP in rural regions, gross operating surpluses, private investments, and jobs.
- Less social value:** OPS generates 2.1 times more social value than BESS over the 20 years analyzed. Across all social metrics analyzed, including the number of affected Ontarians, households, and full-time jobs, OPS generates at least 3.2 times as many benefits as BESS.

OPS generates more spending in Ontario, building important construction & manufacturing capacity.

9 Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits CANCEA

CANCEA has compared the proposed TC Energy pumped storage proposal to one “stylized” battery storage alternative.

CANCEA do not explain what assumptions they have made in their “stylized” example, making it unclear whether their example is relevant and opening the question of whether it was purposefully designed to result in the desired outcome.

The Independent Electricity System Operator (IESO), a truly independent expert, has rejected TC Energy’s proposal at least twice, citing a lack of value and net economic benefit to Ontario energy consumers.

It is widely known that the cost of pumped hydro energy storage is remaining relatively stable or even increasing over time, while the costs of battery storage is rapidly declining due to technological advancements and economies of scale. And advancements in battery storage are also making them more appropriate than ever for providing long-duration energy storage.

“Made-in-Ontario Pumped Hydro Storage: Economic and Social Value Benefits” Canadian Centre for Economic Analysis (CANCEA)

Open-loop pumped storage is exorbitantly expensive compared to alternative energy storage technologies.



CANCEA'S REPORT: *Taking a Broader Perspective*

CANCEA fails to acknowledge that long-duration battery parks fair better than TC Energy's open-loop pumped storage proposal in other important ways too:

- **Speed of Implementation:** TC Energy's open-loop project would take a decade to develop, much slower than alternative technologies, which are advancing rapidly.
- **Environmental Impact:** TC Energy's project requires an open body of water and significant elevation, making the Niagara Escarpment and Georgian Bay ideal, but this would damage the Escarpment and risk the Bay. Alternative technologies can be built on brownfield industrial sites, closer to the grid and energy demand.
- **Efficiency:** Open-loop pumped storage is only 68% efficient, while BESS and other alternatives are closer to 90% efficient. **With the demand for energy projected to increase so steeply, how can we afford to waste so much for so very long?**

PUMPED STORAGE WASTES MORE ENERGY THAN ALTERNATIVES

Pumped Storage:

471 MW per day x 365 days x 50 years = 8,595,750 MW lifetime waste

Alternative Technologies:

111 MW per day x 365 days x 50 years = 2,025,750 MW lifetime waste

CANCEA fails to consider the many alternative technologies available to meet Ontario's energy storage needs.

While Battery Energy Storage Systems (BESS) is *one option*, newer technologies are proving very effective and offer significant advantages over TC Energy's proposed open loop pumped storage proposal. **Among the most promising options are gravity storage and newer battery technologies including redox flow, sodium ion, and liquid metal.**



CANCEA REPORT: *A Closer Look Tells a Different Story*

The Canadian Centre for Economic Analysis (CANCEA) report was purchased by TC Energy to influence project decision-makers. This "funded research" is carefully crafted to overstate the project's benefits, painting a much rosier picture than reality.

By overwhelming readers with complex numbers and jargon, CANCEA creates an illusion of credibility, making it hard to critically assess the findings.

While the report delivers impressive headlines, a closer look at the report's "voodoo math" reveals the truth: **this project will cost Ontario taxpayers far more than it will deliver, while creating very few meaningful jobs.**

- **A BIASED VIEW:** The report tells a good story and craftily makes the case for their client's proposal, but does not reflect an independent view of the project.
- **A NET LOSS FOR ONTARIANS:** The only economic benefits go to TC Energy, not to Ontarians.
- **EXAGGERATED JOB CREATION:** The project is not the job creator they would like you to believe it is.
- **A FALSE COMPARISON:** CANCEA's selective comparison model is specifically engineered to exaggerate the benefits of their client's proposal.

Save Georgian Bay is a non-profit grassroots organization committed to stopping TC Energy's proposal for an open-loop pumped storage plant in Meaford.

info@savegeorgianbay.ca | savegeorgianbay.ca

