



Professional Engineers
Ontario

sorting through the • noise

[A Unique Decision-Making Approach for a Secure Energy Future]



CLEAR VISION NEEDED

When it comes to charting our energy future, there is no shortage of draftspeople. Just two months ago, Enbridge Inc. President Patrick Daniel called for speedy approvals of proposed natural gas and crude oil projects to meet short-term needs. About the same time, Ontario Clean Air Alliance Chair Jack Gibbons urged the province to establish a goal of a 100 per cent renewable electricity system. A few weeks ago, Stephen Snyder, the president of TransAlta Corp., told a select group of Toronto businesspeople that his company would return to the Ontario market only when the province establishes a clear energy vision for the future. “We need public policy decisions; we need them now and we need faith that they’ll be consistently implemented in the years ahead,” Snyder said. “The time for study is over—this industry has been studied to death.”

Today, we in Ontario face a potential paralysis in the energy sector because we lack a transparent and dynamic process for making tough choices.

PEO ENTERS DEBATE

Professional Engineers Ontario (PEO) enters this debate over the province’s appropriate future energy supply mix with clean hands, with no axe to grind. We represent neither energy producers nor energy consumers. In that sense, we do not care whether the province decides to build more nuclear plants or more windmills, whether it orders more gas-fired plants or encourages more solar panels.

We support the province’s leadership to protect the public energy interest. We have seen the results of inaction in the brownouts of last summer and the blackout of three summers ago. We face a threatening supply/demand chasm, but equally frightening is the lack of a trusted mechanism for effective energy decision making that inspires public trust. Today, we in Ontario face a potential paralysis in the energy sector because we lack a transparent and dynamic process for making tough choices.

It is too easy to call for immediate government action in the face of warnings that electrical demand is dangerously outpacing supply. Everyone says the province should do something, usually what suits their vested interest—and PEO will not be part of that chorus. The real issue is: How is the government to decide among competing interests, almost all with a legitimate point of view? How, for example, should the government balance the pro-nuclear lobby with a public that remains skeptical of expert assertions that nuclear waste can be controlled safely and economically? How to balance its commitment to shut down coal-fired plants by 2009 with the Ontario Association of Major Power Consumers’ warnings that such a policy may challenge certain sectors of the province’s economy?

BREAKING THE LOGJAM

To call simply for a government decision without providing a decision-making framework is irresponsible. That is why we are today proposing a groundbreaking PEO-government program based on a unique method for evaluating how best to supply Ontario’s future energy needs. We are proposing a way to reconcile the apparently irreconcilable, a way to break the logjam of vested interests. This problem-solving technique will have broad appeal because it integrates engineering principles with public policy in the broadest sense, including health and environmental concerns.

The current government has demonstrated decisiveness in the energy file, a recent example being the minister's go ahead for the Portlands power plant to prevent future blackouts in Toronto. However, many people feel such decisions are made on an ad hoc basis, only when a crisis point is reached, as opposed to being part of a planned approach that assures supply stability in our future. The government is on the right track, but is the energy policy train moving quickly enough?

PEO also recognizes what is abundantly clear to policy makers today. Expert opinion is no longer good enough. To buy into potential solutions, the public needs to accept that the solution was reached through a process that is open, fair and comprehensive.

Next month marks the 100th anniversary of the beginning of Ontario's modern power era. On June 6, 1906, the legislature created the Hydro-electric Power Commission, whose principal role was to build public transmission lines for power generated by private companies at Niagara Falls. Most of those 100 years have been characterized by a "we know best" attitude when it came to power supply—and for most of that century, this approach served Ontario well.

But in our Internet age, knowledge is accessible to all. There exists a proliferation of interest groups, some even funded by the governments they oppose, that have well-founded and well-articulated positions. Today, the public is properly part of the energy supply policy debate. Its questions and concerns must be taken seriously—and they must be addressed.

A NEW APPROACH

Our approach, known as Value Analysis or Value Engineering, acknowledges this 21st century reality. This well-tested method can effectively analyze competing inputs to reach sound and

broadly acceptable conclusions. It offers a dynamic technique that should leave all stakeholders feeling their views have been properly acknowledged.

A purple rectangular graphic with a faint, glowing network pattern in the background. The text is white and reads: "Our approach, known as Value Analysis or Value Engineering... can effectively analyze competing inputs to reach sound and broadly acceptable conclusions." The word "Our" is significantly larger than the other words.

Our approach, known as
Value Analysis or Value
Engineering... can effectively
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conclusions.

Value Analysis produces results of the highest *value*, as opposed to simply the lowest cost. It brings together differing viewpoints to focus on the *function* of a material, process, or service in providing value to the end user. Seeking out alternative solutions based on functional analysis is a hallmark of this approach. The term "value" embraces quality, performance and social values, as well as cost. Value Analysis also implies respect for all legitimate points of view, even those that seem to be in opposition.

When Value Analysis is applied to examining our energy supply future, it might well begin by asking some fundamental questions. Can conservation alone fill the energy gap? Is the public, for the good of the environment, prepared to pay up to 10 times more for electricity produced from solar panels? Are we prepared to flood pristine parts of our province to create hydroelectric power? Is the public interest best served by the myriad agencies that concern themselves with producing, distributing and regulating electrical power?

VALUE ANALYSIS TESTED

Recently, PEO sponsored a day-and-a-half workshop to test the application of Value Analysis to the energy supply sector. We brought together some 25 experts from various energy fields, including electrical power generation, transmission and distribution, power system planning and operation, policy and conservation. Expert facilitators in Value Analysis led the discussions, from which emerged many original ideas and proposals.

The PEO value model, by its very nature, acknowledges the important social needs of health, safety, reliability and affordability.

Reflecting the province's overall objective, the group began by developing a model goal for assessing value in relation to our future energy supply.

“To grow the province’s economy and sustain the environment through a dynamic, transparent and timely decision-making process reflecting societal desires and risk tolerance in electricity supply and conservation.”

This energy policy mission statement goes beyond the critical question of how to fill the supply/demand gap. It provides a rationale—to grow the economy; a value-based limit to the growth—to sustain the environment; and, equally important, the means—a timely and transparent decision-making process reflecting societal desires and risk tolerance.

PUBLIC SUPPORT KEY

PEO believes strongly that only such a comprehensive Value Analysis approach will produce the needed public support to allow the government to move forward expeditiously. It is grounded on the principles of objectivity, transparency, fairness, accountability, consistency and effectiveness. Furthermore, the PEO value model, by its very nature, acknowledges the important social needs of health, safety, reliability and affordability.

The energy policy debate today stems from last December's *Supply Mix Report* prepared by the Ontario Power Authority (OPA). In this thorough and technically sound analysis, the Power Authority made a tremendous contribution to addressing the challenges faced by decision makers and the public.

However, a Value Analysis approach might have led to an even better understanding of the rationale for the report's recommendations. On what basis was one form of replacement power chosen over another? What factors were used to measure environmental impact? To measure cost? Reliability? Timeliness? Longevity? A clear understanding of how such decisions are reached is necessary to win over a public who is prone to believe that the energy policy makers are travelling down the same path that led us to the current apparent demand/supply crisis.

OPPORTUNITIES IDENTIFIED

In contrast, as can be seen from the opportunities identified by the PEO workshop, below, the Value Analysis model provides an integrated framework for both assessing and making decisions. These suggestions are not presented as solutions per se, but as proposals that might stimulate solutions.

- ◆ Achieve energy conservation through the efficient use of the electrical grid. The current rate structure system supports inefficiencies instead of conservation.

- ◆ Establish an integrated community-based energy planning requirement as a component of a municipality's official plan. (The province's Bill 51, *Amendments to the Planning Act*, is a step in this direction.)
- ◆ Capitalize on the opportunity to use energy tariffs to drive the desired conservation behaviours.
- ◆ Create a dynamic model capable of assessing all societal desires and risk tolerance to replace time-period-specific planning.
- ◆ Streamline government and regulatory processes related to reviews and approvals to eliminate unnecessary delays.
- ◆ Encourage reduced reliance on fossil fuels used for transportation and home heating in favour of those fuels that can be safely converted to electricity with acceptable emission standards.
- ◆ Encourage engineering schools to develop specialties in Power Engineering to address the growing complexity of electrical power systems.

PEO does not claim any magic answers for the multitude of questions surrounding our energy supply situation. But PEO can be helpful in two important ways: One, by providing through Value Analysis a dynamic and transparent means of better resolving tricky energy conflicts in a way that will help restore confidence with the public and in the marketplace. Secondly, PEO provides a wealth of expertise among its 68,000 members throughout the province.

JOINT PROJECT PROPOSED

Specifically, as a first step, PEO is prepared to partner with the province to jointly sponsor a Value Analysis project on the energy conservation challenge, perhaps the most critical aspect of our energy supply future. This combined effort would examine conservation in its broadest scope.

Naturally, the province's chief energy conservation officer would be part of the project team. Using PEO facilitators, the exercise should take no longer than 10 weeks.

From the consumer perspective, the project would consider not only ways of using less power, but more efficient energy use and the timing of such use, all to address peak demand concerns without measurably reducing the current quality of life enjoyed in Ontario. As well, more efficiency in the delivery of power must be part of the discussion.

This exercise could be a springboard for technical innovation and investment in energy conservation. In this way, PEO and the province could make a tangible contribution to the building of an energy conservation culture.

The project results would be audited and evaluated to assess the potential for future similar studies, for example on nuclear power, and to resolve the questions asked earlier in this paper. In any event, PEO promises to mobilize its 68,000 members in 38 provincial chapters to promote public awareness of the conservation project conclusions.

“When innovation is truly valued, by expanding boundaries and fostering out-of-the-box approaches, the opportunity to produce high quality results is leveraged and magnified.”

Pat Quinn, P.Eng., 2006–2007 President, PEO

PEO COMMITTED

In addition, PEO's governing Council has urged the Ontario Professional Engineers Awards Selection Committee to consider creating a new energy conservation and demand management category for its Engineering Medal, one of the premiere awards of its annual program. This would recognize our licence holders who are making significant contributions to conserving energy and demonstrate PEO's commitment to energy conservation.

As a leading regulator, PEO can play an important role in educating both the profession and the public. PEO has among its licence holders engineers working for power generators, energy service companies, regulators, major users, leading developers of new technology, operators and government. Engineers are creative, action-oriented and solution-driven. But they are much more than creators and builders. They are

expected to demonstrate knowledge of social, environmental and global issues as they impact on engineering practice.

PEO encourages engineers to play a meaningful role in society—and they do, more and more so all the time. In the words of PEO's 2006–2007 President, Pat Quinn, P.Eng., "This energy file is so important that we have an *obligation* to be involved." Quinn adds: "When innovation is truly valued, by expanding boundaries and fostering out-of-the-box approaches, the opportunity to produce high quality results is leveraged and magnified. This is the environment from which PEO's proposal flows and, with the positive partnership of your government, in which it will be consummated."

In the area of energy decision making, PEO believes this is a unique opportunity that can be grasped with confidence.



APPENDIX A

Complete List of PEO Workshop Suggestions

Infrastructure Effectiveness

- ◆ Treat transmission facilities as the enabler of additional generation capacity rather than an answer to meeting local shortages.
- ◆ Reconsider burning waste, rather than burying it, to create energy. (Seek broad public input to better understand the controllable risks.)
- ◆ Develop new ways to convert effectively waste heat from generation for productive use in power supply planning.
- ◆ Ensure full transparency of the cost of nuclear plant refurbishing to enable updating of the plan as needed.

Investment

- ◆ Facilitate a competitive electricity climate by allowing market forces to determine appropriate pricing.
- ◆ Ensure a stable and sustainable investment climate to promote energy conservation and supply options.
- ◆ Require the Ontario Energy Board (OEB) to use performance-based regulation as a means to provide strong incentives for utilities to continue to improve their efficiency, resulting in lower rates for customers and potentially higher profits for shareholders.
- ◆ Eliminate the transfer tax on the sale of municipal utilities to create a level playing field among all distribution utilities, thereby encouraging private sector involvement and competitive practices.
- ◆ Amend current OEB policies to provide incentives for more efficient practices.

Policy, Planning and Approvals

- ◆ Consider energy conservation as driving the demand line down instead of being an option that competes with supply.
- ◆ Achieve energy conservation through the efficient use of the electrical grid. The current rate structure system supports inefficiencies instead of conservation.
- ◆ Establish an integrated community-based energy planning requirement as a component of a municipality's official plan. (The province's Bill 51, *Amendments to the Planning Act*, is a step in this direction.)
- ◆ Aggressively promote and plan cogeneration and energy-sharing strategies and infrastructure investment (for example, district heating systems) through tax incentives.
- ◆ Promote land use policies (such as Smart Growth) that increase housing densities and use of public transit to better achieve economies of scale for energy sharing strategies.
- ◆ Capitalize on the opportunity to use energy tariffs to drive the desired conservation behaviours.
- ◆ Create a dynamic model capable of assessing all societal desires and risk tolerance to replace time-period-specific planning.
- ◆ Streamline government and regulatory processes related to reviews and approvals to eliminate unnecessary delays.
- ◆ Encourage reduced reliance on fossil fuels (i.e. oil and natural gas) that are used for transportation and home heating in favour of those fuels (i.e. nuclear, coal, waste, peat, etc.) that can be safely converted to electricity with acceptable emission standards.

PEO Workshop Suggestions (continued)

- ◆ Encourage engineering schools to develop specialties in Power Engineering to address the growing complexity of electrical power systems.
- ◆ Ask what we can learn from Quebec's James Bay hydroelectric experience.
- ◆ Integrate risk analysis with the Value Analysis approach. Risk-based decision analysis methods can assess each alternative (e.g. nuclear versus coal generation) separately with respect to the uncertainties associated with specific activities required to implement a project plan, whether the project plan is delivery of a new power plant or changing regulations and conservation incentives. For each identified uncertainty, explicit values are assigned to criteria such as consequential costs and time to completion delay/acceleration and the probability that the identified uncertainty might occur. All of the variables are evaluated simultaneously in an integrated time-value model. The alternatives can then be compared in a larger dynamic model, specifically developed for portfolio management, so that the right blend of the alternatives can be chosen.
- ◆ Determine and disclose the full costs to decommission nuclear plants.
- ◆ Require OEB to publish full customer interruption costs to determine the willingness to pay for improved reliability.
- ◆ Further the unbundling of rates into distribution and commodity components, and further simplify the procedure to unbundle existing rates and improve their accuracy.
- ◆ Create true incentive-based regulation, where the utilities with good performance are rewarded when further improving their performance.
- ◆ Require well-articulated, risk-based decision analysis assessments with a full and balanced view of alternatives in support of all energy conservation and supply projects.

Stakeholder Engagement

Accountability

- ◆ Enhance confidence with key stakeholders that energy supply plans, processes and costs will not put the province's economy or the health of its citizens at risk.
- ◆ Encourage the reduction of fossil fuel use to achieve Kyoto commitments.
- ◆ Review the complementary mandates of the Ontario Power Authority, (OPA), Ontario Energy Board (OEB), Independent Electric System Operator (IESO), Ontario Power Generation (OPG), Ontario Electricity Financial Corporation (OEF) and Hydro One to facilitate nimble, timely and effective decision making.
- ◆ Facilitate a true understanding of energy conservation and supply options by users. Educate consumers to understand the "true" cost of all alternatives (environmental, generation, health, etc.) and the results of trade-offs.
- ◆ Enhance public education and understanding of energy conservation and its relationship to power supply.
- ◆ Make the use of high energy-wasting devices like the incandescent light bulb as socially unacceptable as smoking.
- ◆ Accelerate the implementation of time-of-use rates to reduce peak loads.
- ◆ Use fully transparent "smart taxation" to build public support for conservation measures.
- ◆ Engage in a massive public and community relations campaign to better assess public resistance to nuclear power and nuclear waste management.

APPENDIX B

Why is PEO Wading into the Energy Supply/Demand Debate?

Professional Engineers Ontario is the body responsible for granting licences to practise professional engineering and for setting and maintaining standards of qualification, practice and ethics for the province's 68,000 professional engineers. But PEO has a broader mandate, a mandate to act in the public interest where engineering is concerned. This mandate of licensed practitioners to hold the public interest paramount is spelled out in the professional engineer's Code of Ethics, which is enshrined in section 77 of Regulation 941/90 under the *Professional Engineers Act*.

Specifically, the Code of Ethics says:

"It is the duty of a practitioner to the public... to act at all times with... fidelity to public needs..."

Further on, the Code clearly underlines the importance of this public duty:

"A practitioner shall... regard the... duty to public welfare as paramount..."

In the sense that a professional is recognized by the willingness to walk the extra mile of service, engineers embrace this high calling in their contributions beyond technical analysis, through their involvement in assessing and reconciling the overall situation where policy, value, and societal and political realities must be understood and respected. The extra mile in this case is the duty to the broader public good.



APPENDIX C

Workshop Participants

Special thanks to our presenters, contributors and workshop participants, including those who requested that their names not be published.

Presentation, April 11, 2006

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