Optimizing the CDM Resources in Ontario:

DIRECT TESTIMONY OF SCUDDER H. PARKER

DRAFT

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I. Qualifications

Q: Please summarize your qualifications

A: I am a Managing Consultant at Vermont Energy Investment Corporation ("VEIC"). I have worked for the Planning and Evaluation Division of VEIC since February, 2008, and just prior to that worked as an independent consultant, partnering with VEIC on a number of projects. In this proceeding I have worked closely with and been assisted by David Hill, Carole Hakstian, and Samuel Dent, all of VEIC.

A summary of my professional experience as well as David Hill's, Carole Hakstian's, and Samuel Dent's resumes are attached with a summary of the VEIC Planning and Evaluation Division's corporate experience as **Appendix 1**.

I have worked on energy policy, energy efficiency and renewable energy development since 1981. I served in the Vermont Senate for eight years in the 1980s, and from 1985-1988 was chair of the Vermont Senate Finance Committee which had jurisdiction over utility policy, tax policy and many other financial and regulatory matters. During my eight years in the Vermont Senate I also served on the Senate Energy and Natural Resources Committee and the Joint Energy Committee, both of which also dealt with energy issues, particularly from resource acquisition and environmental perspectives.

In the summer of 1990 I became the Director of the newly created Energy Efficiency Division of the Vermont Department of Public Service ("DPS"). I served in this role until March of 2003. I was responsible for overseeing development and implementation of energy efficiency ("Demand Side

Management" or "DSM"), programs by Vermont energy utilities. I worked in early collaborative efforts to design DSM programs. I testified in Vermont in many rate cases and Integrated Resource Planning ("IRP") proceedings as well as other related dockets on issues of DSM program design, cost-effectiveness, cost recovery and implementation.

I, and under my direction, the Vermont Department of Public Service Energy Efficiency Division, participated actively in the energy planning activities of the DPS, including the *Vermont 1994 Twenty Year Electric Plan*, the *Vermont 1998 Comprehensive Energy Plan* and in 2002 and early 2003 I was involved in drafting a new Vermont Twenty Year Electric Plan.

I was instrumental in conceptualizing and initiating the Vermont Energy Efficiency Utility ("EEU") (which took place primarily in the context of Vermont Public Service Board Docket No. 5980.) I supervised the writing of "The Power to Save" an analysis of the need and rationale for a new statewide entity to deliver a comprehensive set of energy efficiency programs and a proposal for how such an "Efficiency Utility" could function. I supported that proposal in testimony; in extensive multi-party negotiations with Vermont utilities; in securing the legislative changes that accompanied the negotiation process; and in the transition process, which resulted in selection of an implementation contractor and commencement of EEU operations in March of 2000. I helped design, and oversaw for three years, a program of monitoring and evaluation of the EEU. This included establishing, and verifying compliance with, clearly defined performance goals for the EEU, including aggressive megawatt and MWh savings targets.

From 1994 until 2003, I also spent a significant portion of my time at the Department working on renewable energy policy and program development. I helped secure and administer grants for innovative energy efficiency programs, wind development, farm methane generation, biomass energy development, and a

variety of solar initiatives. I worked with a number of Vermont businesses to support the installation of small-scale combined heat and power ("CHP") installations.

I worked in the legislature on numerous issues for the Department. I led Vermont's effort to design and implement net metering legislation; an innovative residential building energy efficiency code; programs to provide effective efficiency services to low income Vermonters, and adoption by Vermont of certain appliance efficiency standards.

I played a leadership role in Vermont Public Service Board Docket No. 6290, relative to Distributed Utility Planning. This Docket laid the groundwork for Vermont's use of efficiency and distributed generation investments as part of a "least cost" approach to distribution and transmission planning.

As Director of the Energy Efficiency Division, I was the management person primarily responsible for the Department's work as the State of Vermont Energy office, the administrator of U. S. Department of Energy ("DOE") programs in the state.

I negotiated the contract for, and, until my departure from the Department in 2003, supervised the work of Optimal Energy in conducting an assessment of the potential for energy efficiency resources in Vermont. Their work resulted in the study entitled: "Electric and Economic impacts of Maximum Achievable Statewide Efficiency Savings 2003-2012."

In my current work with VEIC, my focus is primarily on issues related to what I call Deep Efficiency Acquisition Systems ("DEAS"). My work in Rhode Island, for instance, focuses on helping that state, which officially recognizes energy efficiency as its first energy resource, work through the efficiency program changes

and the related policy, regulatory and organizational changes required to effect a transition from conducting efficiency programs that acquire a moderate level of energy efficiency resource, to aggressive and sustained efforts that seek to secure all efficiency (and other distributed resources) that are lower cost than traditional supply options.

Q: Have you testified previously before the Ontario Energy Board?

A: I have not.

Q: On whose behalf are you testifying?

A: My testimony is sponsored by The Green Energy Coalition, Pembina Institute and OSEA.

Q: To what portions of the Ontario Power Authority ("OPA") filing do you respond?

A: I address primarily the portions of the OPA filing that deal with Conservation and Demand Management ("CDM") and its integration into the Integrated Power System Plan ("IPSP").

Q: What is the purpose of your testimony?

A: VEIC was asked to review the relevant portions of the OPA filing to determine whether the level of CDM resource acquisition planned by OPA and included in the IPSP was consistent with the Directive Priority as interpreted by OPA, to: "maximize feasible cost effective conservation" as a part of its planning process. VEIC was asked to make this assessment based on its own extensive knowledge and experience with energy efficiency implementation and program design in Vermont; in its consulting work in energy policy and program evaluation in numerous other jurisdictions; and through a survey of the energy efficiency efforts (both existing and planned) in a number of the jurisdictions in North America where a commitment to deep efficiency acquisition strategies are under way.

VEIC was also asked to include in its assessment the effects of acquisition for other components of CDM as the OPA defines it, including distributed renewable energy (primarily customer-sited renewable energy installations), demand response, fuel switching and small-scale combined heat and power applications.

Q: Did VEIC review OPA's assessment of CHP potential for installations exceeding 10 MW in capacity?

A: We did not. I understand that witness Tom Casten addresses this issue.

Q: Did VEIC conduct an independent analysis of energy efficiency potential for Ontario?

A: We did not. It would not be possible to do so in a thorough manner in the time that was available. We reviewed the Jaccard study and the Marbek studies, and the 2005 ICF study of potential done for the OPA. We also relied upon estimates of CDM potential with which VEIC is familiar, including some work in which VEIC has been a participant contractor in other jurisdictions. OPA has acknowledged that there is more potential for cost effective CDM than it includes in the IPSP but express concern about achievability. Accordingly, our focus is on the achievability of CDM (though we do also conclude that OPA also understates the potential, as is common for studies that consider only existing measure opportunities).

Q: Do you make specific recommendations about new program initiatives or proposals for new implementation strategies?

A: In general, I do not. It is my understanding that such proposals would reach a level of detail that is not sought in this proceeding. I do, however, establish that other jurisdictions are both recognizing and demonstrating the opportunity for significantly increased and sustained investment in cost-effective CDM resources. I emphasize the potential for integration and coordination of delivery, the institutional incentives and flexibility required for effective implementation of CDM strategies and the appropriate roles and responsibilities of participants in the

CDM effort. I emphasize the benefits of combined gas and electric efficiency efforts and their coordination with the other components of CDM as defined by OPA.

II. Summary

Q: To what issues posed by the Ontario Energy Board ("OEB" or "the Board") do you testify?

A: I have structured my testimony to assist the OEB in its decision(s) with regard to the Integrated Power System Plan ("IPSP") under the two tests it describes on page 6 of its March 26, 2008 "Decision with Reasons" document. The OEB in that document quotes Subsection 4 of section 25.30 of the Electricity Act:

(4) The Board shall review each integrated power system plan submitted by the OPA to ensure it complies with any directions issued by the Minister and is economically prudent and cost effective.

Specifically, I address the five questions identified on page 18 of the "Decision with Reasons" Document:

1) *Does the IPSP define programs and actions which aim to reduce projected peak demand by 1,350 MW by 2010, and by an additional 3,600 MW by 2025?*
2) *Has the OPA, in developing the IPSP, identified and developed innovative strategies to accelerate the implementation of conservation, energy efficiency and demand management measures?*
3) *Is the mix of conservation types and program types included in the Plan to meet the 2010 and 2025 goals economically prudent and cost effective?*
4) *Would it be more economically prudent and cost effective to seek to exceed the 2010 and 2025 goals?*
5) *Is the implementation schedule for conservation initiatives economically prudent and cost effective?*

Q: Are there other Questions posed by the Board that are addressed by your testimony?

A: There are. The level of CDM investment proposed (and eventually acquired) will have a direct impact on the scale of investment required for other generation

resources, the risks associated with them, and on the environmental impacts they may impose. Thus, for instance, Questions 11 and 12 are directly affected by the projected level of CDM acquisition:

11. What is the base-load requirement after the contribution of existing and committed projects and the planned conservation and renewable supply?
12. Is the IPSP's plan to use nuclear power to meet the remaining baseload requirements economically prudent and cost effective? (p. 25, "Decision with Reasons")

In a similar manner Question 21 is directly affected by the answers to questions 1-5:

"How do existing, committed and planned conservation initiatives, renewable resources and nuclear power contribute to meeting the contribution that coal-fired generation currently provides to meeting Ontario's electricity needs with respect to capacity (6,535MW), energy production (24.7 TWh) and reliability (flexibility, dispatchability, and the ability to respond to unforeseen supply availability)? (p.. 31, "Decision with Reasons.")

Witness Paul Chernick will address these issues in his testimony, basing his analysis in part on the VEIC assessment of what would be an economically prudent and cost-effective level of CDM investment over the life of the IPSP.

With regard to environmental impacts, Questions 31, and 32 (b) are also directly affected by the answers to the first five questions:

31. Has the OPA, in developing the IPSP, ensured that safety, environmental protection and environmental sustainability are considered?
32. Has the OPA, in developing the IPSP, ensured that for each electricity project recommended in the plan that meets the criteria set out in subsection 2(2) of Regulation 424/04, the plan contains a sound rationale including:

…
(b) an analysis of the impact on the environment of a reasonable range of alternatives to the electricity project? (p. 38, "Decision with Reasons")

I understand that the evidence of Professor Robert Gibson *et al* will address these matters.

Q: Did you review other materials from OPA that suggest the standards by which it seeks to conduct its planning and decision-making?

A: I reviewed Exhibit B, Tab 3, Schedule 1, a discussion of "Development of the IPSP". There is extensive discussion in this document about the planning and decision-making processes, including a summary discussion about the requirements of sustainability. Table 1, on page 8 of this Exhibit is a summary of the eight "Requirements for Progress Toward Sustainability" as outlined by Robert Gibson.

I found the discussion interesting and the eight Requirements helpful and insightful. I cannot, however determine from the evidence presented by OPA how these principles influenced its planning process. In particular, I do not understand how the OPA can purport to address the issues of sustainability or the other criteria discussed in this paper without treating CDM as a "first resource" in both planning and implementation.

Q: Please summarize your Testimony

A: I have reached the following conclusions:

- OPA, in its IPSP, has not put forward a plan for securing Conservation and Demand Management ("CDM") resources that incorporates best practices that will "maximize feasible cost effective conservation." The flaws in OPA's planning approach are deep and systemic. OPA has in its early implementation and in its long-term planning ignored numerous lessons gained in the past decade of CDM implementation. This failure makes it very likely that its IPSP will result in unnecessary repetition of many CDM implementation errors that could be avoided. Those errors will result in significant lost savings, but they may also have the additional harmful effect of damaging relationships and creating mistrust with market participants such as engineers, the design community, vendors and installers; with Local Distribution Companies ("LDCs"); with other potential program implementation partners; and with customers, all of whom will be essential to effective sustained CDM resource acquisition.
- While OPA describes its plan as a strategy to meet the Directive goals of a projected peak demand reduction of 1,350 MW by 2010, and by an additional

3,600 MW by 2025, it is my conclusion that, given the approaches OPA has selected, it will have a difficult time meeting the 2010 target. I believe that OPA may be able to meet the low 2025 target, but an integrated and sustained approach with well-designed programs could far exceed the 2025 target.

- While OPA has done and is proposing to do some beneficial things to re-start efficiency efforts in Ontario[1], OPA has not identified and developed innovative strategies to both accelerate and institutionalize the implementation of conservation, energy efficiency and demand management measures. OPA has failed to propose clear goals, a set of well-defined objectives to articulate those goals, and a range of strategic initiatives that can credibly attain such goals and objectives. Despite occasional reference to experience in other jurisdictions, OPA appears to have approached the planning process as though it had been wakened from ten years of deep sleep and commenced its work with the assumption that the world had not changed and no real learning about efficiency investment strategies had taken place during the elapsed decade.
- I am very concerned that while the mix of conservation types and program types included in the Plan to meet the 2010 and 2025 goals may initially pass the TRC test, the programs are not designed to secure all cost effective resources in an innovative and aggressive manner that will be the most cost-effective option for Ontario over time. Simply passing a cost-effectiveness test (which it is relatively easy for most CDM measures and programs to do) does not mean that the higher test of "economically prudent and cost-effective" has been met. In fact, I would suggest that to the extent the approach of OPA has been to get the cheapest conservation resources instead of as much of the cost effective potential as possible its approach is clearly not prudent and cost effective.
- I conclude that from a total resource portfolio perspective it would be far more economically prudent and cost effective to plan to exceed the 2010 and 2025 goals by a substantial margin. In fact, the OPA projects an aggressive ramp-up of

[1] Though it is activity by LDCs under "third tranche" funding, beginning in 2004 that started the restoration of CDM capability in Ontario.

the programs through 2010, and then proposes a dramatic and sustained decline in savings levels over the next fifteen years that purports to meet (but does not exceed) the 2025 target.[2]

- The implementation schedule for conservation initiatives seems to assume that the initial effort to implement resource acquisition programs and build capacity in the market place will result in a "market transformation" that acquires in the out years about a third or less of the annual level of savings that is acquired in the highest years of resource acquisition. This can hardly be considered economically prudent and cost effective. It certainly cannot be called "market transformation." I would describe it as "planned failure," because any market transformation effects should show deeper levels of savings than traditional "resource acquisition" strategies.
- The failure to secure all cost-effective CDM resources will result in higher total costs for the IPSP portfolio, will mean that not all Ontario customers have an equal opportunity to take advantage of CDM measures; will increase risk to customers and the system, and will increase harmful environmental impacts from Ontario's electricity production and use.

Q: Do you propose a level of savings from CDM that you believe represents a more aggressive, but attainable level of resource acquisition?

A: I do. Based on experience to date in other jurisdictions, the plans for savings in other jurisdictions, and the particular opportunity in Ontario to have a deep impact on markets, I propose ramping up by 2011 and sustaining thereafter a savings level of at least 2.5% of annual sales the correlated reduction in peak consumption each year from all forms of CDM implementation.

Q: What is your recommendation regarding the IPSP?

[2] I do not know how this target was set, but it is my assumption that this target in particular was intended to be a minimum, not a maximum.

A: I recommend that the OEB not approve the IPSP, and require the OPA to re-submit he Plan with an integrated proposal to deliver CDM aggressively in a sustained and integrated fashion throughout the planning period. The OPA should be required to propose a plan that targets a savings level from all CDM components of 2.5% and as much as 3% of Ontario system sales and system peak per year after a reasonable ramp-up period. That CDM component should then be incorporated into the overall IPSP. The higher level of CDM savings would provide an instructive sensitivity assessment.

III. OPA's Proposal for CDM Acquisition is Not a Proposal for Least Cost Procurement and is Both Unrealistic and Inadequate

Q: What is OPA's interpretation of the Directive Priority?

A: In its discussion of "The Integrated Power System Plan for the Period 2008-2027" on page 2, the OPA states the following: [3]

In summary, the Directive Priority is as follows:

1. *Maximize feasible cost effective contribution from energy efficiency, demand management, fuel switching, and customer based generation ("Conservation")*
2. *Maximize feasible cost effective contribution from renewable sources:*
3. *Make up baseload requirements remaining after Steps 1 and 2 above with nuclear power:*
4. *Replace coal-fired generation with power from committed and planned resources. Specifically, in order to ensure that existing coal-fired facilities are replaced by 2014, gas-fired generation ("GFG") facilities are planned to be installed in the areas of Northern York Region, Kitchener-Waterloo-Cambridge-Guelph and the Greater Toronto Area ("GTA") by 2014; and*
5. *Restrict contribution of GFG to specific projects as required when additional Conservation and renewable resources are not feasible or cost effective.*

In effect, the OPA states that to the extent Conservation (and renewable resources) can provide cost-effective supply options; they will help defer or avoid nuclear resources and perhaps gas generation (intended to help accelerate the transition away from coal-fired generation by 2014).

[3] EB-2007-0707, Exhibit B-Tab 1-Schedule 1 (Corrected: Oct 19, 2007) (Exhibit B,1,1)

Q: How would you characterize this interpretation of the Directive Priority?

A: This interpretation could be characterized as a "least cost procurement" approach to CDM. This means that a utility or jurisdiction recognizes that it is sound energy, economic and environmental policy to purchase all available CDM resources that are lower cost than traditional supply. Perhaps even more significant is that a jurisdiction then allocates the resources and makes the structural and financial commitments required to secure those resources in a sustained and aggressive manner. Rhode Island, Connecticut and Massachusetts are in various forms taking this approach.

Stated simply "least cost procurement" refers to the decision by a jurisdiction to treat CDM as its "first resource" for meeting electric energy needs and make all other resource decisions based on plans and projections for this resource.[4]

Q: Does this mean that all other resource acquisition is put on hold until the "least cost procurement" has been accomplished?

A: No. It is not possible to secure all least cost resources instantaneously. Planning should include ambitious goals for securing such resources aggressively, but clearly other resources may be required and planned for as part of an IPSP. Periodic performance checks of CDM implementation success (and of the performance and risks of other supply options) should be used to re-evaluate decisions about other resource options.

On the other hand, least cost procurement does not treat CDM as an "optional" or discretionary resource. It makes the up-front commitment to aggressive implementation, and significant changes in energy markets; and it relies upon

[4] See for instance the California Energy Commission Staff Report in 2005, entitled: "Implementing California's Loading Order For electricity Resources, CED-400-2005-043, http://www.energy.ca.gov/2005publications/CEC-400-2005-043/CEC-400-2005-043.PDF

performance from CDM as the fundamental building block to meet its long term goals.

It is this approach to CDM acquisition that is a new and emerging development in a number of North American jurisdictions. While the rhetoric of "least cost planning" has been with us for a long time, the reality is that CDM has been treated as something that may help lower the growth in energy needs, but not as something that could, for instance, turn load growth negative.

Q: Do you disagree with OPA's stated approach to the challenge posed by the Directive Priority?

A: It certainly appears at the outset that the OPA has interpreted the Directive Priority appropriately, and I agree with the approach outlined in its summary. This treatment of efficiency in particular and CDM more generally as a "first resource" is consistent with what other leading jurisdictions are doing in California, Vermont, Massachusetts, Connecticut, Rhode Island, and elsewhere. It is based on the sound economic proposition that if efficiency and other distributed resources are lower cost and provide greater benefits than traditional supply, least cost procurement should be both a planning priority and at the heart of the resource acquisition strategy.

Q: Is what sounds like a solid commitment to Conservation (and renewables) as the "first option" for meeting Ontario's energy needs preserved in the actual supply planning process?

A: It is not. On Page 5 of the document referred to above the OPA starts with what seems like a clear statement about Conservation as a resource:

<u>Directive Priority</u>
Conservation takes priority over supply resources in that the IPSP first applies all economic and feasible Conservation to meeting resource requirements before applying supply resources. Economic Conservation is defined as Conservation that is more cost effective than supply resources as determined by applying a Total Resource Cost ("TRC") Test. Feasible Conservation is Conservation that can be

used for resource planning. ***In other words, the Conservation contribution can make as predictable and reliable a contribution to meeting resource requirements as the alternative supply resource.*** (emphasis added).

It sounds as though the OPA places Conservation on an equal footing with supply. But in the second and third paragraphs the OPA signals its retreat from that commitment…a retreat that is in evidence throughout the IPSP:

The OPA will seek to develop and identify Conservation opportunities that exceed the Directives 2010 and 2025 Conservation goals. ***However, determining whether and how this can be done requires a realistic understanding of the feasibility of achieving Conservation beyond the goals. Such an understanding can only occur as Ontario gains more experience in Conservation and in associated evaluation, measurement and verification ("EM&V") results.*** *In addition the OPA will monitor future policy changes such as codes and standards, price, carbon taxes and land use that underpin the potential estimate to establish the feasibility of exceeding the goal.* (emphasis added)

The IPSP has sufficient flexibility to develop a number of options on both the Conservation and supply side. If experience from the 2008 to 2010 Conservation programs demonstrates that there is feasible Conservation to exceed the Directive goal, that Conservation will be compared to alternative supply resources before any commitment is made.

Q: You describe the second and third paragraphs as a "retreat" from the treatment of Conservation as a viable resource, but isn't it reasonable to "wait and see" how implementation proceeds, and learn from experience over the next few years, revisiting the issue of how much can be secured from Conservation or CDM at a later point?

A. No, not when the current implementation plans are so deeply flawed and when alternative supply commitments are being made (by OPA, government or market participants) in lieu of the CDM. It may well be that the OPA, through inadequate planning, is (perhaps unintentionally) setting itself up to "prove" that the attainable CDM resource out there is as small as or smaller than its Plan suggests.

Q: Does Ontario have a strong base of CDM experience and infrastructure upon which to build?

A: OPA states that it does not. As OPA states in Exhibit C, Tab 7, Schedule 2, page 38:[5] *"CDM programming capabilities in Ontario were substantially eroded in the 1992-2002 period. Since 2004, there has been renewed interest in promoting and delivering electricity conservation. Delivery capability has begun to improve and new activities have been launched."* In effect, Ontario, abandoned DSM programs a decade and a half ago and OPA (and the LDCs) are faced with the challenge of rebuilding both the efficiency planning and evaluation structure and the implementation capability that are critical to acquiring high levels of CDM resources.[6]

Q: Again, doesn't this argue for a "wait and see" attitude?

A: Absolutely not. On the contrary, it suggests that an aggressive planning and capability building effort is urgently needed if Ontario is to acquire its least cost resource in both a timely and sustained manner.

It also suggests that the level of adoption and penetration of efficiency technologies in Ontario has been lower than in other jurisdictions where efficiency programs have been operating continuously over nearly two decades. In other words, it is not unreasonable to assume that the CDM resource potential is even greater in Ontario than it is in other jurisdictions where efficiency investment has been taking place aggressively for years.

[5] "Ontario's Integrated Power System Plan: Discussion Paper 3: Conservation and Demand Management (Revised)

[6] I have not conducted any independent assessment to determine what the resources might be in Ontario to assist in the ramp-up of the CDM effort. Anecdotally I understand that there may be a number of significant pockets of expertise and capability to deliver conservation: Toronto Region Conservation Authority, Toronto Atmospheric Fund, Green Communities, for example. It may be that such entities simply lack financial resources. I understand that the Canada Green Building Council has seen an explosion of industry led development, but I am not aware of whether the OPA has sought to fund these organizations in a sustained fashion. Token support is not what will help build the capability in such organizations. If the OPA RFPs are focused simply on getting the short-term "cheapest" CDM it may well be that real capability building partnership opportunities are being missed.

Q: Aren't the IPSP itself, the creation of the Conservation Bureau, and the availability of $400,000,000 for CDM indications of a dramatic new effort to get CDM deployed promptly and aggressively?

A: Certainly these are actions that have re-ignited interest in CDM, begun to influence markets and to acquire some (apparently significant) efficiency savings.

My concern is that OPA appears to approach CDM acquisition and traditional resource acquisition with what might be described as "asymmetrical optimism". Even as it adopts the language of "least cost planning" OPA, in its projections of savings, in the tentativeness of its language,[7] and in the failures of its planning reflects an uncertainty about Ontario's ability to secure cost-effective CDM over the long term. At the same time it assumes that the construction of new nuclear plants is a strategy that can be relied upon to provide affordable supply (even as the evidence of significantly increased costs is growing). (See the evidence of Mssrs. Chernick, Harding and Thompson.)

"Asymmetrical optimism" describes this mindset of traditional utility planners who are convinced that construction of new facilities is a safe and reliable way to meet need even as regulatory, material, construction and fuel costs are escalating. At the same time (they assume) CDM measures are characterized by significant uncertainties (even though experience shows that they are cheap, effective, reliable, not generally affected by fuel price escalation, can be secured in reasonable increments, and in many cases are subject to declining cost curves.) In short, an unwarranted optimism about supply gets paired in the planning process with an unwarranted pessimism about CDM.[8]

[7] "The CDM resource plan will be adjusted in future IPSPs if circumstances warrant." (Exhibit C-7-2, page 25) This is just one of many such provisional statements. No definition of what the relevant "circumstances" might be is provided.

[8] In a response to a GEC *et al* interrogatory, OPA states: "However, in the absence of experience with program delivery the OPA cannot conclude that there is additional feasible conservation that can displace the need for new generation at this time." See Exhibit GEC-SHP-1, Schedule 1. This language is a perfect demonstration of asymmetrical optimism.

Q: Are you saying that OPA suffers from this "asymmetrical optimism"?

A: I am. While the language about creating a "conservation culture," "building capability," and "market transformation" sounds great, the reality is that OPA's approach simply fails to consider the full potential of CDM as a resource that can make a major difference in Ontario's future. The OPA dances briefly with the concept of least cost procurement but then goes off to dance with other more familiar supply side partners.

Q: Why are you so focused on this point?

A: This failure to adopt a consistent least cost procurement approach is perhaps the most significant and fundamental failure in OPA's IPSP. It will affect all other choices and resource selection. This failure will increase costs, risks and harmful environmental impacts going forward. But there is one aspect of this failure that is even more distressing, namely that Ontario is at risk of missing a remarkable opportunity.

Q: Please explain your point about Ontario's unique opportunity.

A: I am persuaded that the Province of Ontario, through the Ministerial Directives, the creation of the OPA, and the requirement to plan comprehensively for the Provincial energy future has a unique opportunity to become a North American (and perhaps global) leader in moving to an era of growing economic well-being that is characterized by dramatic increases in efficiency and distributed energy resource production that will result in declining energy usage for all consumers, dramatically reduced environmental harm, and the emergence of new industries, new technologies, and new jobs.

Q: Why is Ontario uniquely positioned for this opportunity?

A: Ontario has in place some of the key structural elements that will be essential to creating a coordinated and sustained approach to acquiring CDM. For the purposes of this testimony I will refer to a system that acquires CDM or distributed resources

in this manner as an Aggressive Distributed Resource Acquisition System.[9] These key structural elements are:

- A jurisdiction-wide mandate to treat CDM as the "first resource". I have already discussed OPA's preliminary articulation of this mandate, and my agreement with it. The issue is not the mandate, but its perceived feasibility and OPA's inadequate plan for implementation.
- A responsible body with authority and resources jurisdiction-wide to articulate the goals, define the objectives, take leadership, promote coordination, and provide consistent funding for ADRAS implementation. It seems clear that the OPA *could* play this role if it sought to. This is a remarkable advantage for Ontario, as other jurisdictions struggle with split responsibilities, inadequate funding, lack of coordination, and policy inconsistency in developing and implementing CDM infrastructure, and ultimately, programs.
- No inconsistent goals. There is no built-in disincentive for the OPA to resist efficiency and declining energy sales as there is with traditional utilities.[10] This is a dramatic (potential) advantage over the situation in other jurisdictions.
- A responsible body that can coordinate CDM program implementation with other Provincial policy. Increasingly, aggressive CDM implementation will require partnering with other agencies at the federal and provincial levels and other province-wide organizations. While OPA is not the standard and code-setting entity, for instance, it is well placed to partner with such entities in Ontario in ways that can increase the effectiveness of code implementation and the swiftness of code and standard updates. OPA can also be the advocate for policy changes at the "macro" level that will facilitate CDM acceptance and customer investment.[11]

[9] My definition of "distributed resources" in this context is identical with OPA's definition of CDM.
[10] Such disincentives may apply to LDCs as implementation partners. I discuss this issue in more detail in Section VI.
[11] The Opportunities are numerous and include better pricing and usage signals, favorable tax treatment for CDM investment, including property tax exemptions; direct business and individual tax incentives; removal of current regulatory obstacles and barriers such as standby charges and burdensome interconnection agreements.

- A clear recognition that CDM is made up of all the components that OPA has defined so that integrated delivery strategies can be supported. It is perhaps unique in North America (except, perhaps for the California Energy Commission) that the broad definition of CDM that OPA has articulated can be treated in an integrated and coherent approach. Too often in other jurisdictions energy efficiency services for gas and electric customers are separated; CHP is treated (if at all) through another set of policies: demand response is treated through yet another program(s); and customer-sited generation is subject to several other program approaches. Ontario has a unique opportunity to create CDM services that offer customers a full spectrum of CDM options, and the convenience of "one-stop-shopping" that offers customers from a societal perspective the opportunity to select the mix of energy solutions that will work best for them.
- The flexibility to value CDM savings from whatever source they come. The OPA, in its claims of savings from 2007 efforts, counts savings in peak capacity from Federal Government action, Local Distribution Companies ("LDCs") and the Independent Electric System Operator ("IESO"). Savings from Code and Standard implementation are also included.[12] It is important to have an entity in the leadership of CDM that will recognize and account for the range of efforts under way in the Province to improve efficiency. In some North American jurisdictions great effort is expended to determine what portion of savings is attributable to the effort of what entity…when ultimately the simple fact and size of the savings is what matters. Ultimately this means that the OPA can (and I believe, should) operate in a way that promotes the broadest possible approach to CDM implementation, while actively working to improve the effectiveness of such efforts whether they are acquired through CDM programs it administers or not.
- The benefit of large scale. Even in a small jurisdiction like Vermont, where coordinated delivery is being provided, economies of scale are a significant

[12] See "Taking Action: Annual Report 2007; Supplement: Conservation Results 2005-2007" issued by Conservation Bureau, June 2008

benefit to consumers and to the overall effectiveness and cost-effectiveness of CDM service delivery. In Ontario's case, the potential to create economies of scale are dramatic. Bulk purchasing effects, work with trade allies and upstream vendors could have enormous beneficial impact. OPA, if it designs consistent and sustained programs, will offer enough market volume to have an effect on the design of products and services. It can play a vital role in facilitating the job training and vendor support that will enable CDM to grow into a significant economic growth driver in the economy as well as enabling prompt and sustained implementation.

- An opportunity for a "fresh start". While the previous erosion of CDM infrastructure in Ontario makes for a difficult starting point, the OPA has a remarkable opportunity to create a seamless and integrated approach to developing that infrastructure through its leadership. In other jurisdictions entrenched players can be real obstacles to providing coordinated and integrated market strategies.
- An opportunity for province-wide equity. By adopting an approach that seeks deep and comprehensive acquisition of all CDM resources, the OPA can address the customer equity issue sometimes raised about efficiency programs, namely that the customers who participate benefit more than non-participants. If programs are truly designed to offer services to all customers, the level of participation planned can itself help address the equity issue by ensuring that in addition to the system benefits of CDM (which do flow to all customers), direct participant benefits will be available to all as well.

Q: I thought you were testifying about the CDM resource available in Ontario, and so far you have talked more about implementation structures than the resource itself. Isn't the "how to get it" question a subset of "what is available"?

A: What we are learning from aggressive efficiency implementation is that when we treat CDM as a serious resource on an equal footing with traditional supply the issues of "what is available" and "how do we get it" cannot be separated.

Q: While we debate the cost, reliability and production features of a new nuclear plant in this proceeding we do not spend much time discussing just how a nuclear reactor will be built. Why is CDM so different?

A: The difference is that CDM -- while it can help meet energy and peak requirements at lower cost and just as reliably as traditional supply resources -- requires a different kind of acquisition strategy. If attention is not paid to the critical components of that acquisition strategy, the resource will either not be acquired, or much of less of it than would be economically prudent will be acquired.

Q: Please explain.

A: In general, CDM resources are highly cost-effective. The problem is that failures in the market keep them from being adopted widely by customers. CDM programs are not primarily designed to put concrete in the ground and steel in the air, but to overcome those "failures" or "barriers" in the markets. For CDM programs to be aggressive and cost-effective the 20 years of experience with how such programs work needs to be incorporated (not in detail, but in broad principle) in a plan such as the IPSP.

OPA in its IPSP, fundamentally separates the questions of "what is available" and "how do we get it" and in its implementation approach ignores current lessons about best practice.[13] It resorts to language about what it may learn going forward as a substitute for articulating an aggressive goal and developing an accompanying dynamic approach to aggressive distributed resource acquisition.

[13] I emphasize again that while OPA may or may not have adopted "best practice" approaches for some programs—that level of detail is beyond my testimony. OPA has not explored or adopted "best practices" at the structure and system levels.

Q: Are you suggesting that the OEB should turn this proceeding into a debate about the details of program implementation and (for instance) incentive levels?

A: Absolutely not. In fact, I strongly agree with the sentiment that the details of program design and implementation should *not* be dealt with in this (or, in fact, other) litigated proceedings.[14] My understanding is that the Board is focused on the broad issues of balance, intelligent anticipation of the future, and resiliency in the face of uncertainty. ***My point is that OPA, by failing to recognize and plan for what is required for aggressive distributed resource acquisition, runs the risk of failing to secure the resource with the greatest benefit to Ontario in meeting those broad tests.***

My concern is that the necessarily restricted review process in this proceeding should not allow the OPA to obscure the fact that it has no clearly articulated approach to creating an integrated, aggressive and sustained system for securing CDM, and, in fact, does not even acknowledge that creating such an approach is essential to treating CDM on an equal footing with traditional supply. My references to specific program designs or strategies are intended to illustrate the approach that would be consistent with an aggressive, innovative acquisition strategy.

Q: What are the hallmarks of an appropriately aggressive approach to securing CDM?

A: There are several:

- First, OPA would clearly and consistently articulate the goal of securing all CDM that is lower cost than traditional and projected supply. This goal would serve to

[14] One of the most important lessons I learned as we implemented energy efficiency programs in Vermont was that litigated proceedings to establish the details of program design was perhaps the *worst* imaginable way to proceed. Creating a clear mission and consistency of purpose and funding, establishing clear roles and responsibilities, offering the right economic incentives to implementers, and then permitting intelligence and flexibility in implementation to take over was the best way to proceed. My point is that the OPA is ignoring those precedent conditions.

drive and motivate development of a comprehensive approach to changing Ontario's energy markets. Studies of economic potential would be viewed as part of a dynamic process of learning, through implementation, how to get more CDM faster and at lower cost. Instead, after paying lip service, OPA has used the specific Ministerial Directives as effective caps, not as the baselines they should be.

- Second, OPA would demonstrate a thorough understanding of what other jurisdictions are doing to maximize CDM acquisition. Though OPA mentions California in its filings, there is no serious investigation and discussion in this filing of what is both happening and planned in other cutting-edge efforts in North America. I am not talking just about what programs are run, but also about the structural and incentive mechanisms that support high levels of CDM acquisition. Prudent research and preparation of this sort could overcome much of the uncertainty that the OPA uses to justify its caution.[15]
- Third, OPA would recognize that securing deep levels of CDM resource requires a carefully planned, systemic approach to program funding, building capability, to recruiting and maintaining a motivated and skilled program implementation network, and to building the structural changes that will accelerate CDM acceptance. The broad outlines of that approach would guide the discussion of CDM resource acquisition. Instead, OPA has (whether intentionally or not I do not know) used the regulatory decision-making process to fragment the CDM implementation strategy process and obscure its lack of a real plan.

[15] The OPA filing with all its attachments is indeed massive. Other pertinent materials are abundant. I have tried to read as many relevant materials as possible, and I have found some references to experience in other jurisdictions, such as those in the ICF International June 2007 "Opportunity Analysis for CDM Programs in Ontario 2008-2010" prepared for the Ontario Power Authority. (See, for instance, Table 1, p.7, and extensive discussion of "best practices" in other jurisdictions). What I have *not* found is evidence that OPA has demonstrated in its own filings that it has taken these lessons into its own planning process. The referenced ICF document would serve the OPA well not only for the 2008-2010 implementation period, but in the initial design of programs for the whole planning timeframe.

Q: Are you offering a critique of what OPA has done in program implementation through 2007? If so, isn't that beyond the scope of what the OEB wants to consider in this proceeding?

A: Quite frankly, it is not possible for me, based on the evidence available, to do a critique of OPA performance through 2007. It may well be that OPA has funded some excellent programs and acquired significant savings. The materials I have been able to find simply do not provide the basis for making such a judgment. The supplement to the Conservation Bureau Annual Report for 2007, summarizing conservation Results for 2005-2007, issued by the OPA in June of 2008 summarizes peak savings from all contributing sources on table 3.2 on page 10. It is clear from the report that solid M&V on these estimated savings is either preliminary or non-existent.

But it is not my intent to evaluate program performance to date, and I presume that this is not what the OEB seeks in this proceeding. My point is simply this: If many wonderful things, yielding significant savings are happening as OPA says they are, why is it that OPA projects significantly declining results from these efforts after 2010-11? While it may be that these current initiatives will have a limited duration, would they not be replaced by new initiatives, using new technologies and strategies to address further savings opportunities?

Q: What are the consequences of OPA separating the discussion of "what is available" from the consideration of "how do we get it"?

A: There are four likely consequences:

1. <u>Undervaluing the resource.</u> I have already discussed this effect and the counter-intuitive result that the lowest cost resource is seen as the least reliable resource.
2. <u>Treating CDM as a resource that can be "bought off the shelf" as needed</u>. This is the point at which CDM is relegated to junior status. The mindset that may appropriately plan for the purchase of a new gas unit at a specific site, but tries to do the same for CDM will fail in CDM acquisition. This is because, as I have

discussed, CDM acquisition is about addressing and overcoming market failures. Erratic movement in and out of the market can actually damage vital market relationships significantly. While I do not know this first hand, it is likely that Ontario Hydro's unexpected cessation of conservation programs in January 1993 eroded trust among customers, trade allies, and service providers.

3. Self-fulfilling under-performance. It is precisely the treatment of CDM as an "off the shelf" commodity that will end up providing "evidence" that undervaluing the resource (see #1 above) is warranted, because programs will not be as successful as they would have been if the appropriate customer and market focus was informing the efforts.
4. Unintended customer equity issues. As I have suggested already, if deep acquisition of cost-effective CDM is not pursued, some potentially willing customers will not be offered services, and customer equity issues could be aggravated.

IV. OPA's Projected Savings from CDM Reflect its Flawed Approach.

Q: OPA has presented projected cumulative electrical energy and peak demand savings, and associated annual delivery budgets. Before discussing these projections, are there any comments you want to make about OPA's base assumptions or methodologies?

A: There are. We sought access to the Jaccard model to verify OPA's basic assumptions. OPA indicated that the model was unavailable. We are left with uncertainty as to how Jaccard and OPA treated two related, fundamental methodological issues in the OPA plan:

1. Retirement of measures

The installation of any conservation measure will not provide constant energy savings forever. First, new high efficiency equipment will have a finite operational life, but even this engineered estimate of life may not persist for reasons such as the removal or breakage prior to the end of the normal lifetime, the reduction in

effectiveness due to poor maintenance, controls going out of calibration or being overridden by operators. By the end of the life of a measure, the standard baseline for the replacement may have risen significantly, but it is common practice to factor in some consideration of the retirement and reduction of savings over time.

It is important to note as well, that the end of the useful life of a measure represents *another opportunity to secure additional savings*. For instance, a CFL with a measure life of 7 years may be replaced by a new LED lighting system with better efficiency and longer life. By using measure life appropriately, then, the additional potential represented by that opportunity is better represented in CDM planning. Of course this approach also assumes that there will be an effort in place to promote that new, more efficient technology or measure in the future.

In OPA's proposal there is little discussion about either the retirement or persistence of savings over the twenty year plan.[16] If this indicates an oversight, it could have the effect of leading to an overestimate of cumulative savings in the later years, as measures from the early years would not remain constant indefinitely. If this has been addressed in the underlying forecast of naturally-occurring efficiency (e.g., as measure lives end, they will be replaced by baseline technology of equivalent efficiency), it would be important to explain this and present how such naturally-occurring efficiency has been accounted for in the pre-CDM load forecast.[17]

2. Cost metrics

[16] In response to a Council interrogatory (See Exhibit GEC-SHP-1, Schedule 2)the OPA says that it recognizes the issue of measure life, but indicates that it will address this issue by estimating and verifying "…the persistence of savings from 2008-10 resource acquisition programs based on the effective useful life of measures….as well as persistence of behaviours…" As I interpret this, OPA acknowledges the issue but does not address it in its current projection of savings

[17] It does not appear that this is the case. In response to GEC-Pembina-OSEA Interrogatory 14, a) (Exhibit GEC-SHP-1, Schedule 3) OPA states: "The targets set for 2025 in Table A include Market transformation effects." I interpret this to mean that such effects as codes and standards improvement, and other market transformation effects are included in the CDM savings projections, not in an adjustment to the load forecast.

The plan provides estimates of annual savings and budgets. Using these values one can estimate $/MWh based on annualized savings. However, without factoring in measure life, the true cost of savings cannot be adequately assessed. For example, a measure that costs $1000 and saves 10MWh for one year would be less attractive than a measure that also costs $1000 but would save 10MWh per year for 10 years. Without this incorporation of measure lives into cost projections, these measures all appear equally attractive, both at $100 per annual (first year) MWh. It is recognized best practice, therefore, to present savings projections in terms of the levelized costs of delivering the savings, incorporating both measure lives and appropriate discount rates. I do not see an adequate discussion or projection of this in OPA's portfolio.[18]

Had access and further model runs of CDM been available it might have been possible to evaluate accurately the impact of OPA's treatment of measure retirement. However, as confirmed in I-22-235 (See Exhibit GEC-SHP-1, Schedule 4)[19] the Jaccard CIMS model was not maintained in a state that allows for further runs at this time. Accordingly, I can offer only a rough estimate of the potential impact of OPA's apparent methodological choices without clarification from OPA of its actual methodology.

The effect of these possible oversights is that cumulative savings presented by OPA could be significantly inflated, and that the comparison of costs to benefits may not be a true account of relative worth.

[18] This is not intended as a criticism of how OPA does measure and program screening under the TRC test. I do not offer a critique of OPA screening methodology in detail, but I did review it enough to recognize that estimates of measure lives are part of that screening. This discussion pertains to the presentation of data in the tables I reviewed and the need for a methodology to compare costs with other jurisdictions.
[19] See Interrogatory Response to GEC 22, schedule 235 at: http://www.powerauthority.on.ca/Page.asp?PageID=122&ContentID=6573&SiteNodeID=320&BL_ExpandID

On the other hand I recognize that a sustained CDM program could have the effect of "locking in" savings from many measures beyond their expected lifetimes by continuing to move markets to higher baseline efficiencies. It is true that in most jurisdictions measure life retirement is tracked in part for purposes of "attribution" of program effects and not simply as a methodology for accurately projecting total CDM effects.[20]

This issue of how to treat lifetime effects, then, is a complex one, and it will become more complex as the kind of sustained aggressive support for moving efficiency markets that I advocate moves forward. I would argue that if the OPA adopted the approach to CDM that I am advocating it would be more entitled to assume continued savings from efficiency measures beyond their measure lives. OPA appears to have done so without projecting a CDM approach that would warrant it.

What I have done in this section is to leave OPA's projections as they are, and in the projections of savings I recommend, I have included measure retirements. This represents a significant conservatism in the numbers I have provided to Mr. Chernick for his analysis. I do provide below an illustrative chart that shows what the VEIC savings curves would look like if we did *not* remove measures at the end of their useful lives.

But let me emphasize again, for actual comparison purposes I treat OPA's projections as it has presented them, and I follow with two scenarios for comparison that illustrate savings levels that I believe OPA could and should be planning to attain. *My* projections of what is possible *do include the full retirement of measures* (which is conventional practice). This reflects a significant

[20] In other words, an implementing entity might be allowed to "claim credit" for a measure during its useful lifetime, but not claim savings for a successor measure installed by the customer without implementer involvement.

conservatism when compared with OPA methodology. This difference should be kept in mind when comparisons are made between OPA and VEIC scenarios.

Q: In your analysis of CDM savings, do you break out and treat separately the different components of CDM as the OPA describes them?

A: I do not.

Q: Why do you analyze all the CDM sectors together?

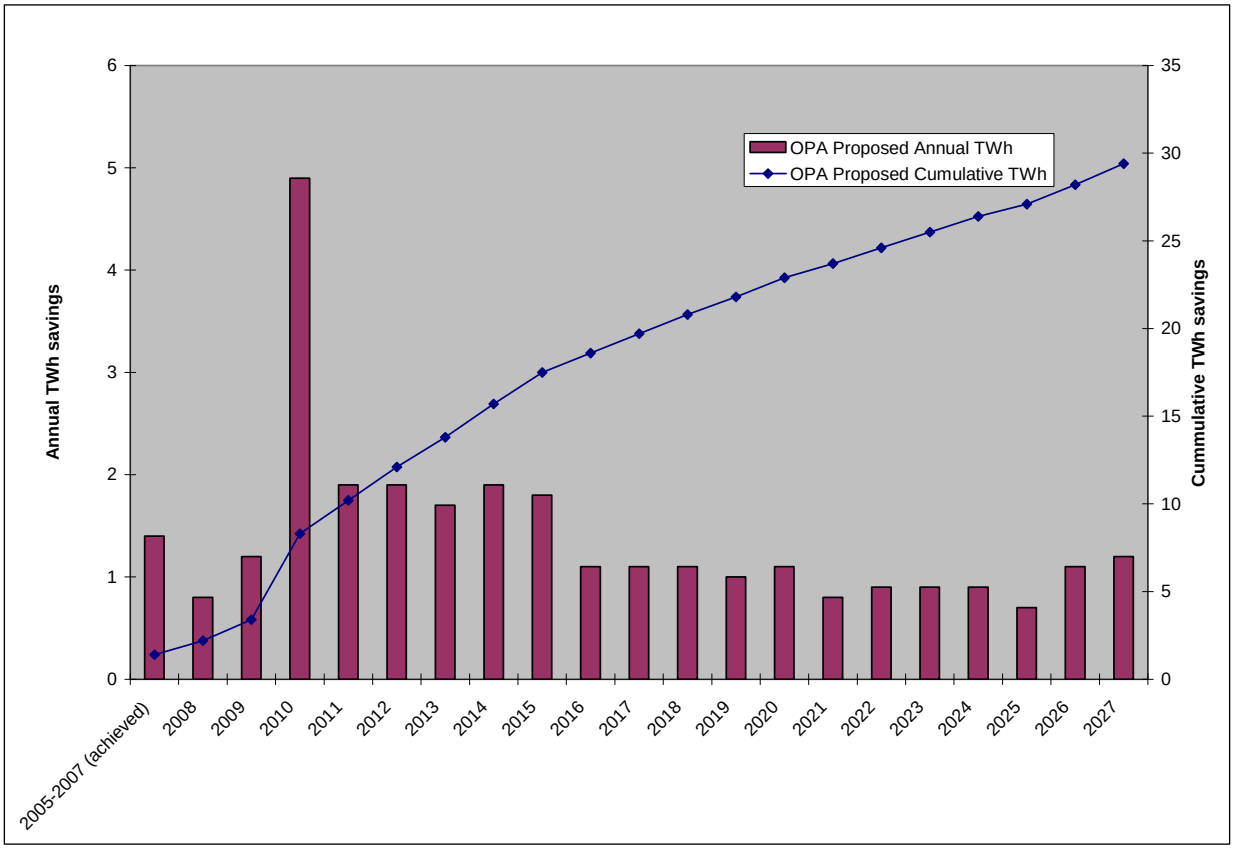
A: I group together all CDM options for four reasons:

- First, for the purposes of this discussion, the focus is on the total quantity of savings realized rather than the question of from which component of CDM they are secured.
- Second, I have already stated that the opportunity for integrated delivery of all forms of CDM is one of the unique advantages available to Ontario. Treatment of the CDM components as a combined resource respects that opportunity.
- Third, for the purposes of estimating peak savings it is simpler to consider all components of CDM together as OPA has done, so there is a fair comparison between what our analysis projects and the methodology OPA has used.
- Finally, in the later years it is not at all clear that the currently projected relative relationships projected for energy savings and peak among the CDM components will prevail. It may be that demand response, CHP or renewable energy grows as a percentage of total CDM savings. OPA has not specified these relationships in the out years, and given time and information constraints we have adopted its approach.

Q: Please describe the level and pattern of projected energy savings achieved from energy efficiency and other components of CDM, as presented by the OPA.

A: Figure 1 below illustrates the level of electrical energy savings achieved by the Ontario utilities in 2005-2007[21], and proposed by OPA in it's IPSP through 2027[22]. Annual incremental savings ramp up to a peak of 4.9TWh in 2010, followed by a marked drop to just under 2TWh for the next five years and fluctuate around 1TWh for the remaining twelve years.

Figure 1: OPA proposed annual and cumulative electrical energy savings.

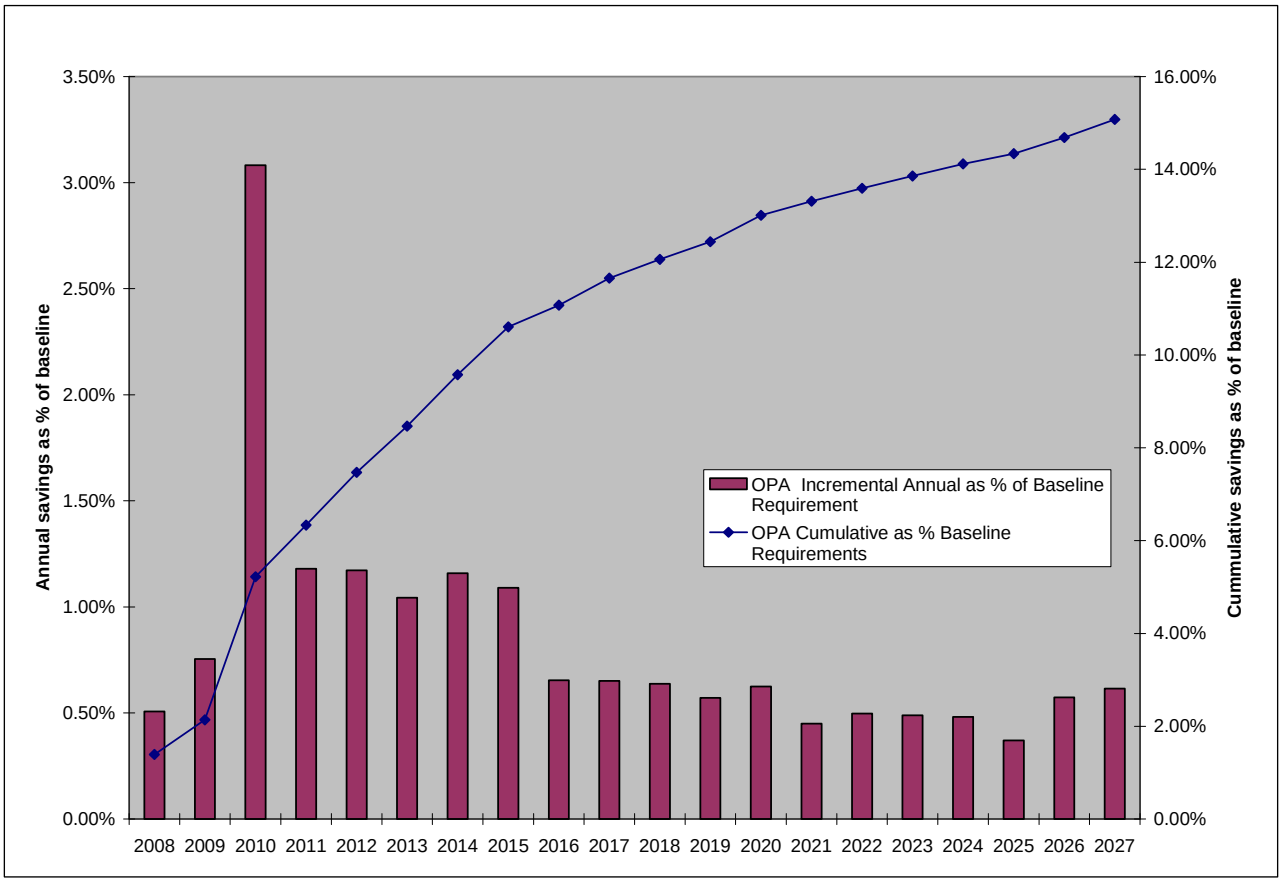


[21] Marbek Resource Consultants Ltd.: *Summary of Electricity Conservation Programs & Initiatives in Ontario from 2005-2007, Excluding OPA Funded Programs and Ontario Government Buildings.* http://www.conservationbureau.on.ca/Storage/19/2451_Summary_of_Non-OPA_Funded_Conservation_Programs_2005_-_2007.pdf

[22] Projected electrical energy savings are provided in Exhibit D-4-1, Attachment 4, Table 4.

Figure 2 illustrates the annual and cumulative electrical energy savings as a percentage of the estimated baseline requirements (based on forecasts of load without CDM efforts as provided in the IPSP).[23] Note again, the peak in 2010 of just over 3.0% of projected system requirements, the decline to around 1.2% for the next five years, and to 0.4 – 0.65% for the remaining years. At the conclusion of the twenty year cycle, OPA projects reaching just over 29TWh of cumulative savings or approximately 15% of baseline requirements.

Figure 2: Annual and cumulative electrical energy savings as percentage of estimated baseline system requirements.

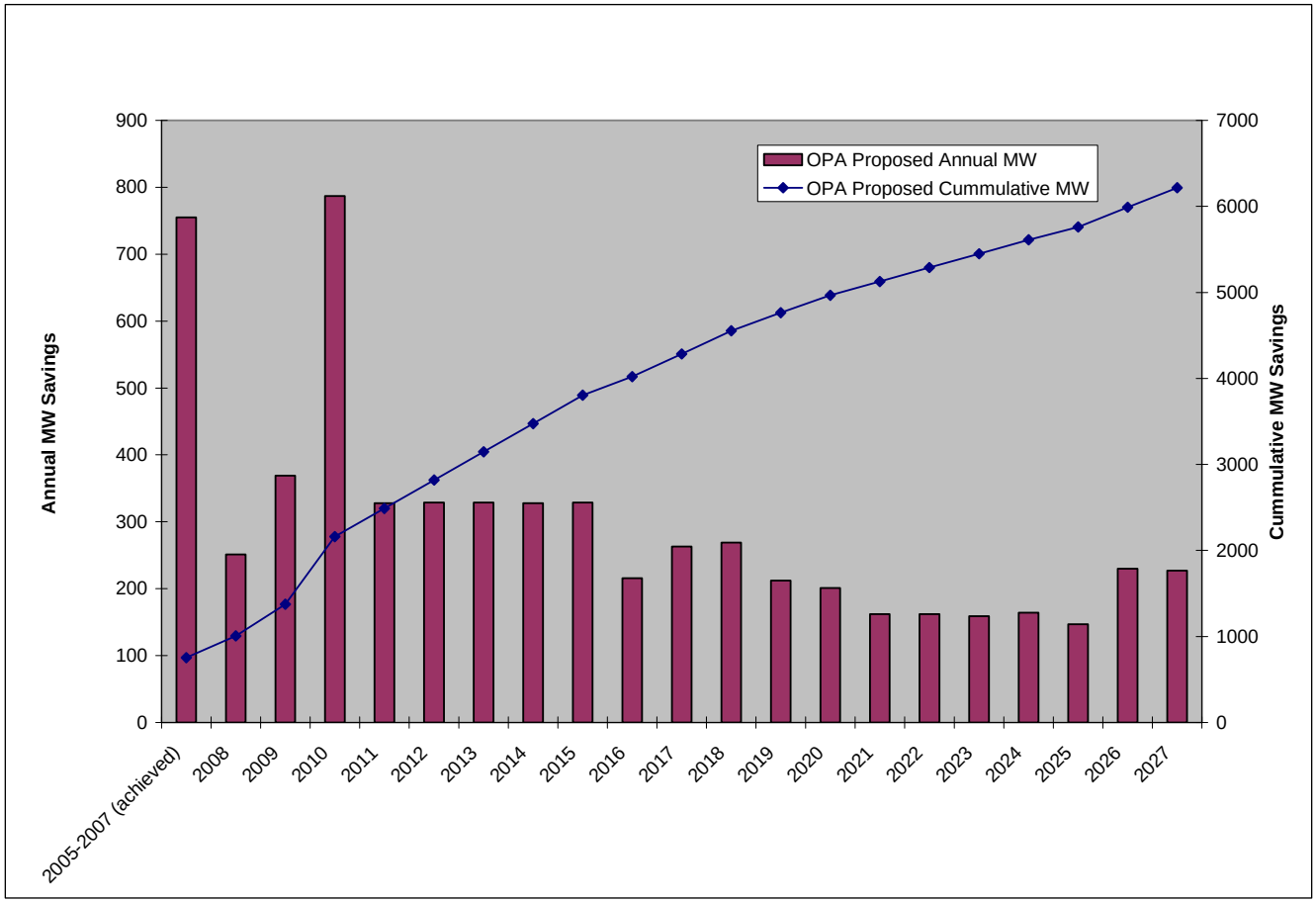


[23] Baseline requirements are provided in Exhibit D-1-1, Attachment 2, page 1.

Q: Please continue with a discussion of OPA's peak demand savings goals.

A: As illustrated in Figure 3 below, annual peak demand savings follow a similar pattern to the electrical energy savings[24]. OPA projects ramping up to a spike in 2010 of just under 800MW of annual peak demand reduction, followed by a sharp decline to around 330MW for the following five years and a continued decline to a low of 147MW in 2025. By 2027, OPA projects cumulative peak demand savings to reach 6,217MW.

Figure 3: OPA proposed annual and cumulative peak demand savings.



[24] The committed peak demand savings through 2007 (755 MW) is taken from Exhibit D-9-1, Table 4. Projected system peak savings are provided in Exhibit D-4-1, Attachment 4, Table 3.

Q: Overall, how would you characterize the pattern of savings the OPA plans to achieve with CDM resources?

A: As discussed above, both electrical energy and peak demand savings follow a similar pattern. After a significant spike in the early years (up to 2010), targets show marked and continual reductions for the remaining years. There is, of course, a remarkable coincidence of the projected peak savings with the years in which Ministerial Directive peak savings targets are to be met.

Q: Are you saying therefore that this plan adequately meets the targets and that the proposed pattern is consistent with the Directive to maximize feasible cost effective conservation?

A: No, absolutely not. While I acknowledge that the plan to ramp up rapidly in the early years through 2010 is both laudable and will require significant effort, I do not believe that the OPA has adequately demonstrated how it will achieve such a fast and extensive ramp up. Furthermore, the failure to follow upon this early effort and success by proposing such a marked decline beyond 2010 with surprisingly low savings targets is both unacceptable and thoroughly inconsistent with the Ministry Directive as initially interpreted by OPA, and with the requirements that the IPSP be economically prudent and cost effective.

Q: Has the OPA, in the plan or in interrogatory responses, explained why it is proposing this pattern?

A: Not adequately. While there is some discussion of capacity building and market transformation, there are no clear indications why very cost effective and prudent program-influenced CDM savings are projected to drop dramatically after 2010. In fact, OPA has presented contradictory evidence, and potential studies that illustrate

increased savings potential through 2020 and beyond. For example, OPA's Figure 14 (our Figure 4) below shows potential Industrial end use savings projections[25]. Note that all curves except Lighting do not even begin to ramp up significantly until 2010, and while some start to level off at 2015, the inflection point for the end use with ultimately the greatest potential savings (Driven Loads) does not occur until 2020.

Figure 4: Industrial potential end-use savings with 0.9% growth (Exhibit D-4-1, Attachment 8, page 71)

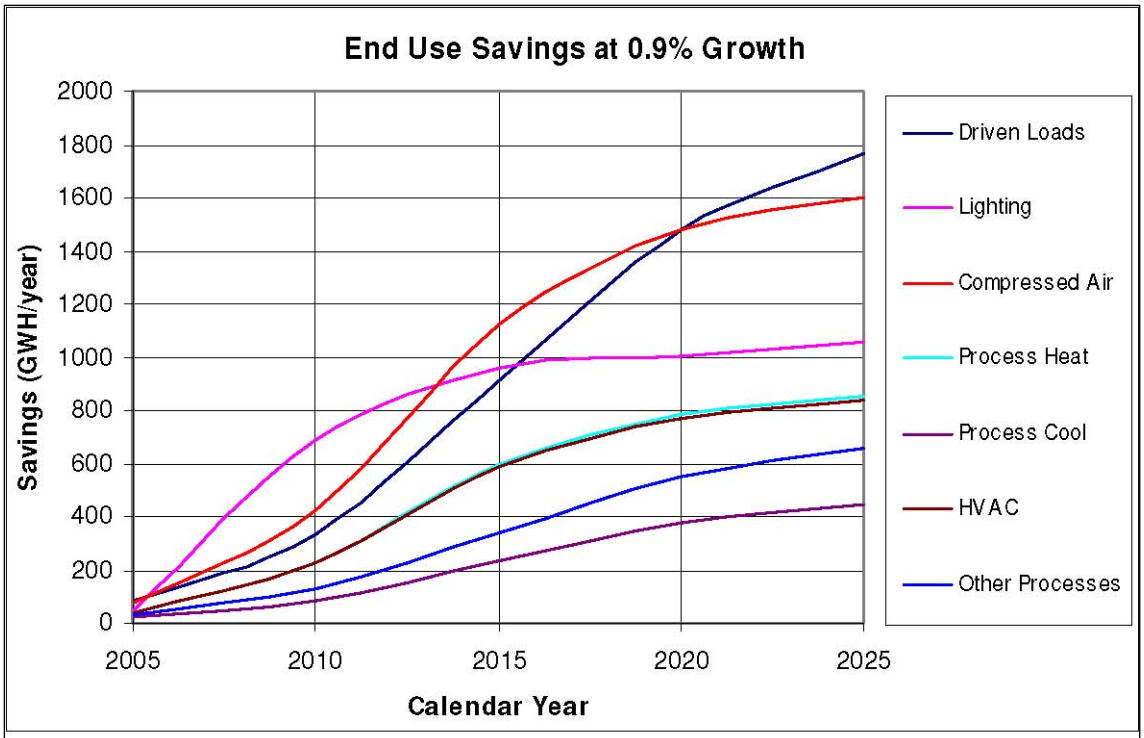


Figure 14 Predicted End Use Electricity Savings (0.9%/Y Growth)

Q: Is there any other evidence that shows this pattern of continued savings potential?

[25] Figure 4 is taken from Exhibit D-4-1, Attachment 8, page 71.

A: Absolutely. Consider the following passage from Exhibit D-4-1 Attachment 6, page 26, where MK Jaccard and Associates discuss the savings potential from energy efficiency in the commercial sector:

"…it is likely that energy efficiency will be accelerating, particularly after 2015, due to:

- *Aging of the existing stock which will force significant renovation and demolition activity,*
- *The green construction revolution will significantly accelerate and likely transform the market after 2015,*
- *Research efforts to improve the efficiency in some end-uses such as lighting will bear fruit after 2015 with available products,*
- *Continued pressure on energy prices will bring about more aggressive energy Efficiency"*

The M.K. Jaccard & Associates study of demand side management potential for the whole of Canada also does not support this projection of declining potential[26]. Indeed Figure 5 illustrates an increasing potential over time.

Figure 5: Economic and achievable potential for Canada from M.K. Jaccard & Associates study.

Year	Annual Savings (PJ/yr)			Savings as Percentage of Reference Case Demand		
	Economic	Achievable Potential		Economic	Achievable Potential	
	Potential	Scenario 1	Scenario 2	Potential	Scenario 1	Scenario 2
2010	417	55	125	7.49%	0.99%	2.25%
2015	614	110	281	10.53%	1.88%	4.82%
2020	768	147	455	12.62%	2.42%	7.49%
2025	918	182	647	14.37%	2.85%	10.13%

I am also persuaded that some of the discussion paper projections of savings vastly underestimate potential in some key areas. In Exhibit D-4-1 Attachment 6, for instance, M.K. Jaccard & Associates present the economic potential and two achievable potential scenarios for Ontario. In the lower achievable scenario they project attaining 10% of the economic potential in Residential Lighting by 2025. In the aggressive scenario they reach 50%. The international trend is increasingly moving toward the phasing out of incandescent lighting (which I understand is the government's intention in Ontario), so even the aggressive scenario of 50% of

[26] Taken from Exhibit D-1-1, Attachment 3, Page 23 of 32

economic potential being achieved by 2025, vastly underestimates this significant future savings potential. It is puzzling that OPA, which advocates for "market transformation" as the major source of savings in the later years projects a remarkably un-transformed market. It may well be that LED lighting products which are just now coming to maturity, offer dramatic savings potential (and much longer-lived products) by 2015 or earlier.

Finally, consider OPA's interrogatory response in Exhibit GEC-SHP-1, Schedule 5: *"The OPA anticipates that the capability to achieve the potential* (to maximize feasible and cost effective contributions from conservation) *will be maximized over time. The annual incremental savings potential may increase, decrease, or remain the same."*

This indicates that while OPA acknowledges that its ability to realize deep savings should improve over the twenty years, it can not predict how the savings potential will change over this period. I recognize that the future holds a lot of unknowns, but rather than setting aggressive and ambitious goals and then striving to achieve them (with Ontario's improving capabilities), the OPA is planning for failure by presenting such inadequately low savings targets.

To summarize, the OPA has a fundamental contradiction in its approach to CDM. While it is actively engaged in starting numerous programs to acquire (primarily) capacity savings, it advocates (without presenting any substantial evidence)[27] that it can make a transition from aggressive "resource acquisition" to a transition step it describes as "capability building" and then to a final phase it describes as "market transformation."

[27] See Exhibit GEC-SHP-1, Schedule 6.

The troubling inconsistency is that once in the "market transformation" phase, OPA projects that the level of savings is *dramatically reduced* relative to the initial resource acquisition phase. If markets are "transformed" and less direct resource acquisition is required, the results should be either sustained or increased savings at lower cost. Instead, we see significantly reduced savings. We will discuss the costs below.

Q: Could it be that OPA has just incorporated that "market transformation" effect into lower projections of load growth, and not counted it as program savings?

A: That is a fair question, since an adjusted load forecast could be a means of recognizing continued savings effects from the "institutionalization" of efficiency. I cannot, however, find any evidence that this is what OPA has done. Load forecasts do not decline over time, and there is no assertion on OPA's part that I am aware of that the forecast includes accelerated rates of efficiency beyond what might otherwise have happened. In fact, as cited above in Exhibit GEC-SHP 1, 3 OPA does appear to claim market transformation effects in its savings projections.

Q: Let's continue with a description of the funding pattern that OPA projects in order to achieve these targets.

A: Figure 6 shows estimated delivery costs for the proposed OPA programs. Each bar is split into Program and Incentive Costs. OPA proposes ramping up funding to an annual budget of around $550 million by 2011 and sustaining this level until 2015. After that, the proposed funding drops to around $350-400 million per year before ramping back up to around $450 million for the final two years.

Figure 6: OPA proposed CDM delivery cost estimates.

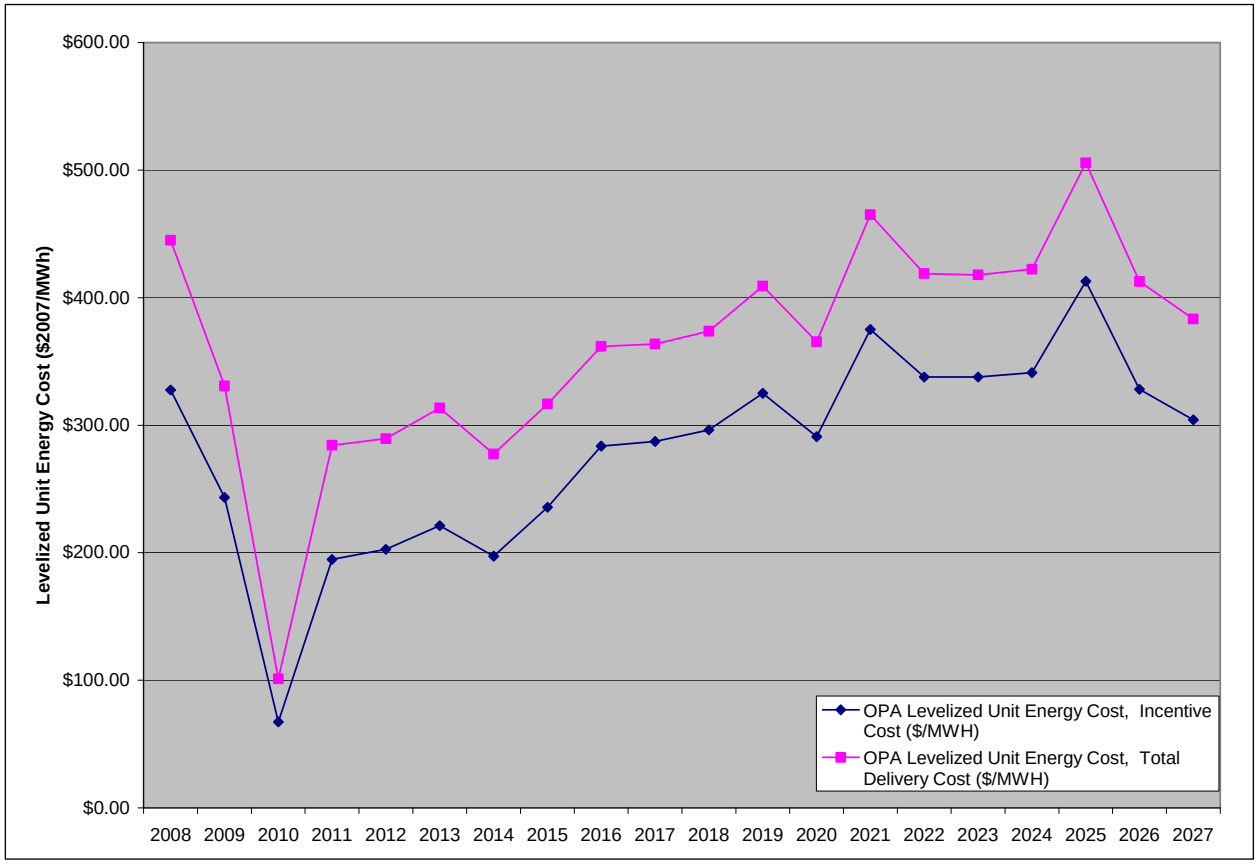
My first observation is that the percentage of incentive to overall delivery costs appears higher than most leading jurisdictions. Efficiency Vermont, for example is in the 40-50% range. Further, it is interesting to note that the incentive costs remain relatively constant throughout the 20 year plan. In fact the percentage of incentive cost to total delivery cost *increases* from a low in 2010 of 67% to a high in 2025 of 82%. This pattern seems to completely contradict OPA's delivery plan since, when the focus is on deep resource acquisition in the early years where incentives will be the main driving force to achieve savings, the incentive percentage is lower than in the later years, when market transformation becomes the primary mode of acquiring savings and the need for incentives should be reduced. I have no way of explaining this inconsistency.

Q: How does this funding level compare with other jurisdictions?

A: In order to compare this level of funding with other jurisdictions, it is necessary to levelize the costs based on the projected savings. Figure 7 displays both the total delivery and the incentive cost (in 2007 dollars) per annual incremental MWh saved. Note that the projected cost per MWh of achieving the highest annual savings goal in 2010 is between three and five times lower than the projected cost in all other years. Furthermore, the general trend, after 2010 indicates a steady *increase* in cost per unit of savings.

As I have already explained, this doesn't make sense. Resource acquisition programs by their very nature require higher expenditures to begin to move the market and provide adequate incentives to encourage participation. It would seem consistent with OPA's approach that when a market segment is 'transformed;' however, the market itself produces the savings; program administration costs can be greatly reduced and there is a lower requirement for providing financial incentives. Why then is OPA proposing spending *more* budget on incentives compared to savings achieved in these later years? If the OPA is proposing continued aggressive resource acquisition efforts, then these spending levels may

Figure 7: OPA annual levelized unit energy costs ($/MWh) (note this does not incorporate lifetime savings).



be justified, but the cumulative effect of transforming some market segments should be combined with the additional savings from continued aggressive acquisition strategies and total savings should be much higher.

To compare with $/MWh metrics that other jurisdictions have achieved, I'll consider OPA's delivery budget and savings projection for four years, 2010, 2015, 2020 and 2025. To be clear, these are first year costs and savings and do not factor in the lifetime of the savings. If, for example, I use the assumption that the savings last for eleven years, the average levelized cost of the savings in 2010 is approximately $9/MWh and in 2020 is $33/MWh). In comparison, I looked at a number of other jurisdictions and collected their overall energy efficiency budgets

and reported annual MWH savings, see Figure 8. It should be noted that there are numerous inconsistencies in the ways different jurisdictions present budget information, so these values should only be used as a general comparison.

Figure 8: Other jurisdictions energy efficiency budgets, savings and $/ First year MWh[28].

Entity	Year	EE Budget	Annual MWH Savings Achieved	$/ First yr MWH
OPA	2010	$495,000,000 ($2007)	4,900,000	$101
	2015	$570,000,000 ($2007)	1,800,000	$317
	2020	$401,000,000 ($2007)	1,100,000	$365
	2025	$354,000,000 ($2007)	700,000	$506
EVT	2006	$28,500,000	56,070	$508
	2007	$39,700,000	105,243	$377
BC Hydro	2007	$72,100,000	549,000	$131
PG&E	2006	$229,362,520	716,000	$320
	2007	$374,887,833	1,662,900	$225
Connecticut	2005	$77,896,758	318,000	$245
	2006	$69,626,719	328,000	$212
Massachusetts	2004	$127,429,412	442,000	$288
	2005	$123,000,000	455,000	$270
New Hampshire	2004	$15,645,779	56,776	$276
New Jersey	2007	$91,388,000	242,270	$377

Compared to the other jurisdictions, in the early years and specifically in the peak year 2010, when savings are projected to be achieved at $101/MWh, the OPA appears to be highly optimistic in its savings projections compared to its delivery

[28] With the current comparability of Canadian and American dollars, I have not factored in any adjustment in the numbers presented in the table.

budget. However in the later years the cost of savings increase, reaching $506/MWh in 2025. This appears to be relatively high in comparison to what other jurisdictions have achieved. Notice too, how all the States in the table above that provide multiple year data, show a *decreasing* $/MWh trend over time. Generally, as entities learn lessons and become more efficient they are able to attain savings at a lower cost. The OPA projects quite the opposite.

Another methodology for analyzing costs relative to savings is to normalize the $/MWh ratios by the depth of savings achieved, or the savings as a percentage of baseline requirements (defined as load level before CDM reductions). Figure 9 shows the result of this analysis. Note again, that I am comparing annual budgets to annualized or first year energy savings. Figure 10 presents a similar analysis presented by Bruce Biewald of Synapse Energy at the Coalition for Environmentally Responsible Economies Conference in April, 2008 (See Exhibit GEC-SHP-2) In this case, costs are compared to the savings for the lifetime of the measure, hence the difference in y-axis scale.

Figure 9: Delivery $/ first year MWh compared to annual savings as a percentage of baseline requirements.

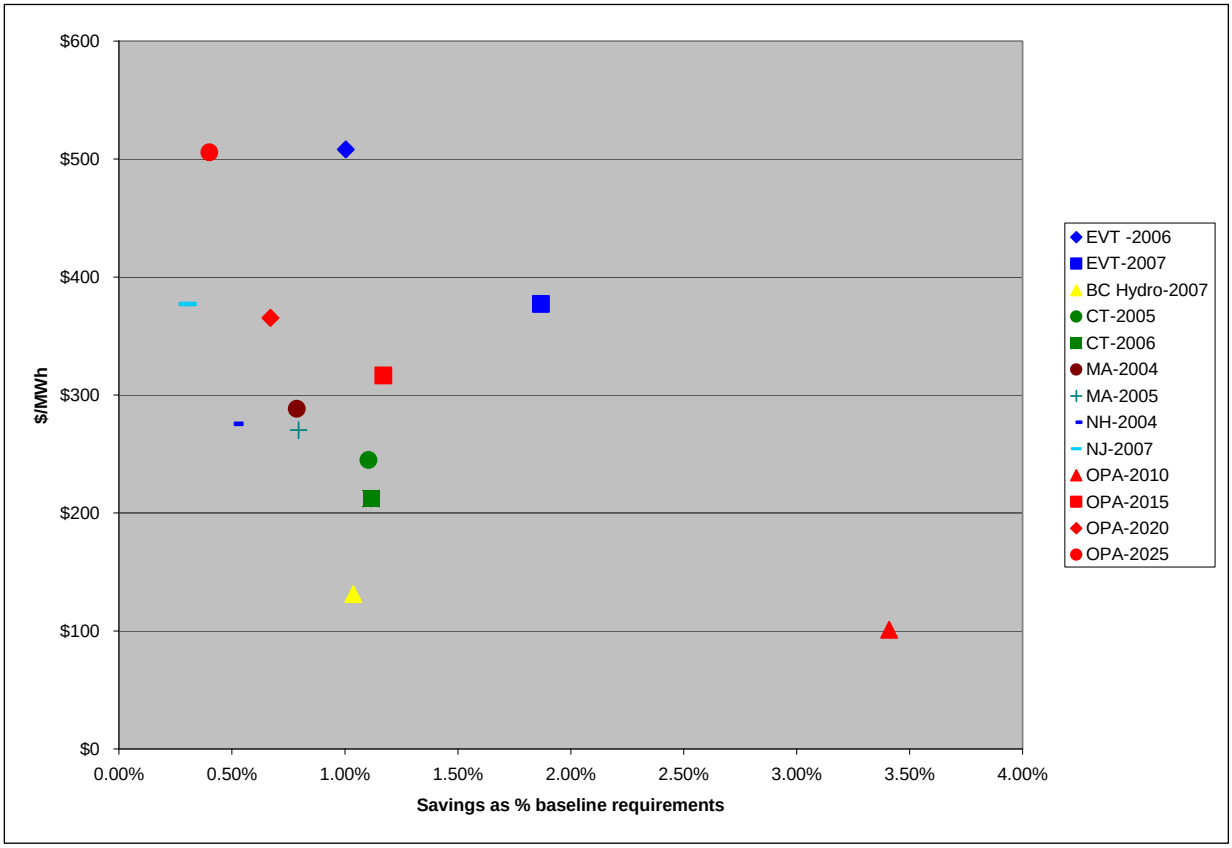
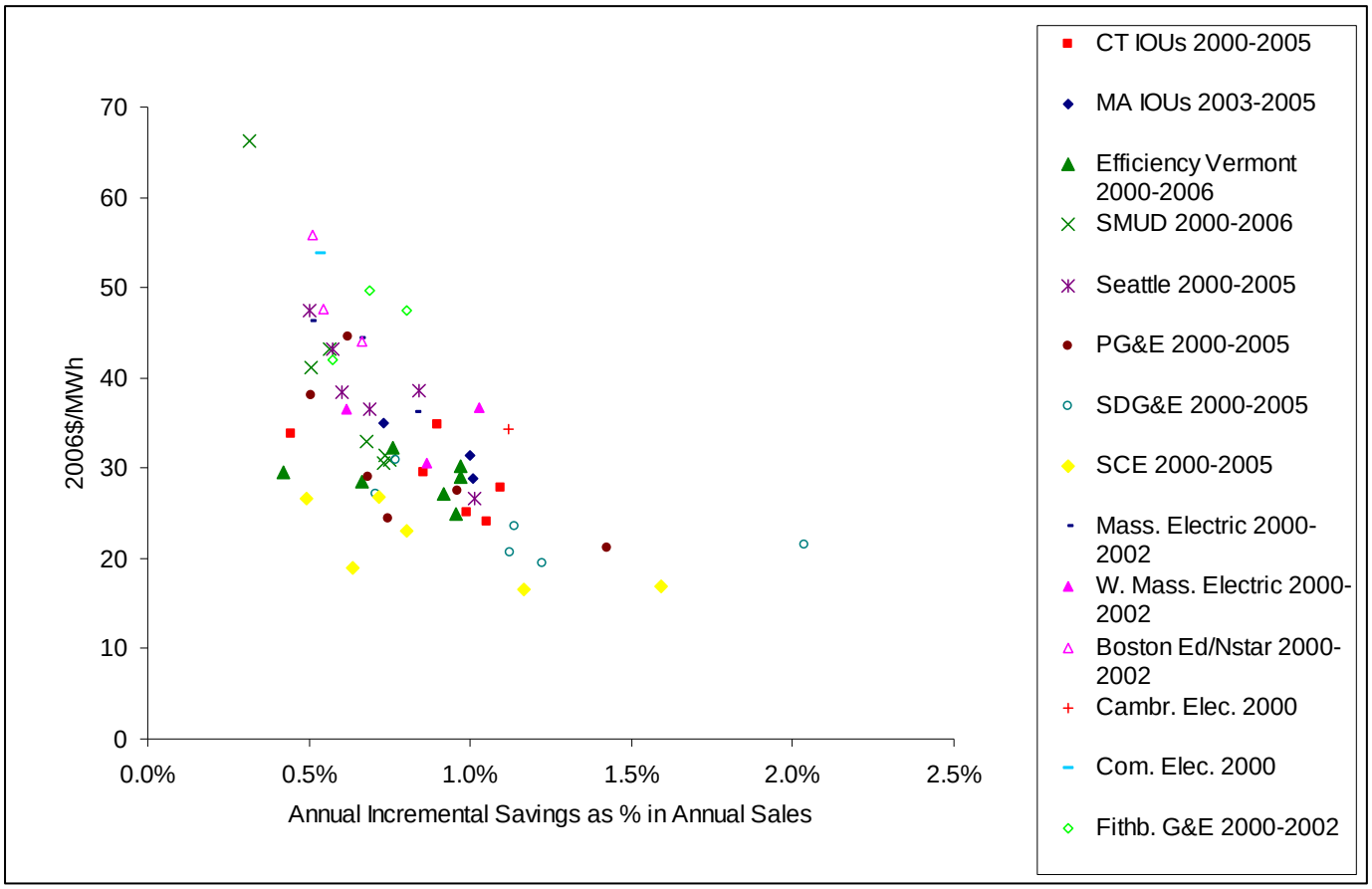


Figure 10: $/Lifetime MWh compared to annual savings as percentage of annual sales (Synapse)



This evidence indicates that the general trend for the cost effectiveness of achieving savings increases as deeper savings are achieved. Both charts above show a falling trendline, in which the acquisition of deeper savings is achieved at lower $/MWh. This will be due in a large part to the increasing economies of scale and the reduction in proportion of administrative and other relatively constant delivery costs. While I do not argue that this pattern would continue indefinitely and the trend could at some point stabilize or reverse as deeper savings become more

difficult to attain, this pattern does support the argument that going deeper can increase cost-effectiveness.[29]

Q: Can you now please describe your recommendations for the level of savings goals that you believe the OPA should be proposing in the IPSP.

A: I will present two scenarios for the savings goals I believe OPA could and should be proposing. The first is the level that I believe the OEB should order the OPA to achieve, and the second is the "stretch" level, the feasibility of which should be evaluated again in five years.

We have seen that OPA's proposal provides an aggressive ramp-up of efforts to a peak of 3.1% in 2010 with the reliance on resource acquisition as the mechanism for achieving these goals. My two scenarios simply propose that OPA build upon this initial effort with both continued resource acquisition and the development of capacity building and market transformation initiatives. At a minimum OPA should sustain a level of 2.5% of baseline requirements, and, as an enhanced scenario, reach and sustain 3%.

As justification for these higher levels I point out that OPA itself projects that it has the capacity to reach this level of savings within the first few years of its plan. Coupled with the evidence cited above that suggests a continuing increase in energy savings potential, I see no reason why this level could not be maintained. I also reiterate the point that Ontario is in a great position to lead the way in achieving deep sustained energy savings, and with the Ministry's Directive should be using this opportunity to strive to reach new and aggressive goals. Acknowledging the uncertainty surrounding the future, I see no evidence to support the modest goals as have been proposed by OPA, and strongly recommend setting these enhanced

[29] Contrast this to OPA's unsubstantiated assertion in a discovery response to a GEC interrogatory: "The annual average peak savings will decline over the long term as easily achievable conservation savings are realized in the near term." Exhibit GEC-SHP-1, Schedule 3, b).

targets to energize, encourage and stimulate the market and allow Ontario to become a national and internationally recognized leader in CDM implementation and innovation.

Q: Yes but this level of savings, is *above* the Identified potential conservation presented in Exhibit D-4-1, attachment 4, Table 2. How do you propose OPA achieve savings beyond this identified level?

A: Actually, although the final cumulative total is above the OPA Identified potential, my annual projections are lower until 2011 when the identified annual incremental potential suddenly drops from 6.9TWh savings in 2011 (4.29% of baseline) to 2.9TWh (1.79%) in 2012. I see little explanation for this apparent marked drop in potential, and suggest that the Directive deliverable dates may have had a significant impact in this determination of potential.

Further, I do not agree that the OEB or OPA should view this or any other potential study as a constraining or absolute limit of savings, especially in development of a twenty year conservation plan. Estimates of Energy Efficiency Potential have been conducted using a number of different methodologies. Such studies frequently underestimate the efficiency potential for any (and sometimes for many) of the following reasons:

a) <u>Failure to account adequately for emerging and unidentified technologies:</u> The technologies that provide increased efficiency continue to emerge. Improvements in lighting (dimmable CFL's, T-5s, LED lighting), cooling (SEER increases), and control systems (rapid expansion of digital control and feedback systems) are important examples.

b) <u>Energy costs have risen faster than most forecasts predicted:</u> As prices increase, whether due to market effects, new environmental (e.g. greenhouse gas) regulatory costs, or due to the structure of market systems, more measures and more applications become cost-effective. Avoided costs used for assessing CDM

potential are often below the actual prices in the market. These costs also stimulate a new level of interest on the part of customers in making efficiency investments.

c) Lowered measure costs: As the demand for efficiency technologies has grown, production costs have often decreased, lowering both consumer and program costs. CFL's now are much closer to the cost of incandescent lighting than they were a decade ago. Efficient refrigerators cost less than their inefficient predecessors.

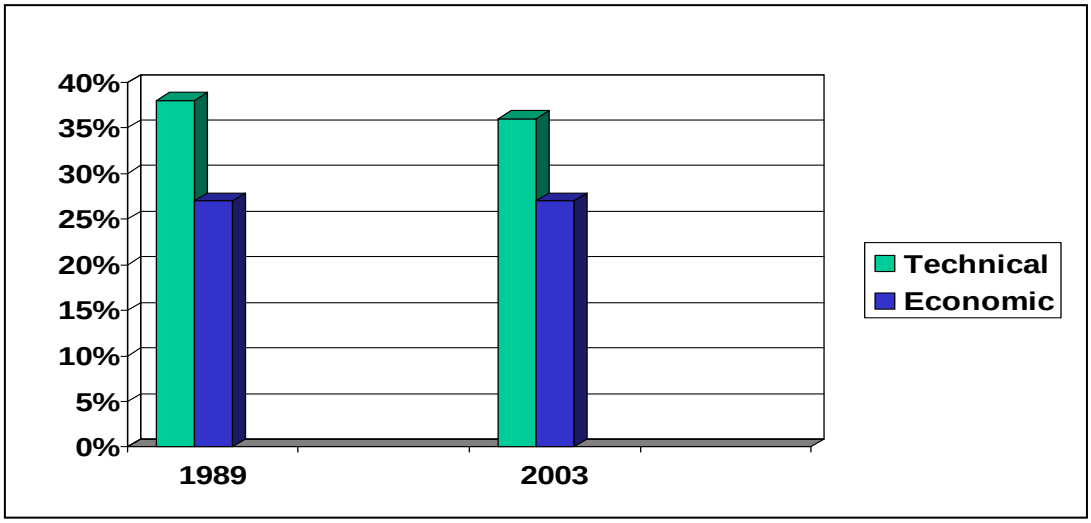
d) New delivery strategies can accelerate adoption to levels not previously experienced. Efficiency and CDM acquisition strategies are finding new marketing approaches that gain levels of adoption that were previously regarded as impossible. The current movement of CFL lighting into the mainstream means that mass-market approaches become effective. New community-based social marketing strategies are emerging that gain levels of participation that far exceed traditional program penetrations. Canadian utilities have experimented with these approaches and attained unprecedented results. Time-of-sale efficiency requirements could dramatically increase savings from retrofit markets.

e) Integrated delivery of CDM creates new opportunities: Deeper savings and better market penetration can often be accomplished by integrating CDM services rather than fragmenting them through a multitude of detached programs. For instance, solar photovoltaic applications have actually been financed through the positive cash flow generated by intensive efficiency savings in the same building. Home Performance with Energy Star, a residential retrofit efficiency program that focuses on thermal savings, provides an excellent opportunity to do direct installation of efficient lighting and identify other electric efficiency measures that it might not have been cost-effective to secure based on the electric savings alone. An integrated offering of efficiency, CHP and demand response services to commercial and industrial customers may increase convenience, reliability and customer benefits.

f) Coordinated strategies with government and other market partners can create real market changes: Increasingly, efficiency programs can be designed to support and accelerate adoption and effective implementation of improved building codes and product efficiency standards. New products and services that were not previously recognized, such as Home Performance with Energy Star create services that the market can increasingly offer effectively.

Furthermore, there is evidence that potential studies do not assess a "fixed quantity" of CDM potential. Figure 11 below is from a presentation by Steve Nadel of the American Council for an Energy Efficient Economy ("ACEEE"). A 1989 study of efficiency potential conducted in New York State determined that there was a significant amount of energy efficiency potential. After fourteen years of fairly active energy efficiency investment by utilities and by NYSERDA a more recent study determined that there is an almost identical level of available efficiency potential. To illustrate why this effect takes place, consider the potential now being considered that new homes might actually become "net zero" in their energy use. I am not aware of any recent potential study that reflects such a possibility.

Figure 11: Comparison of Economic Potential in New York State – 1989 vs. 2003



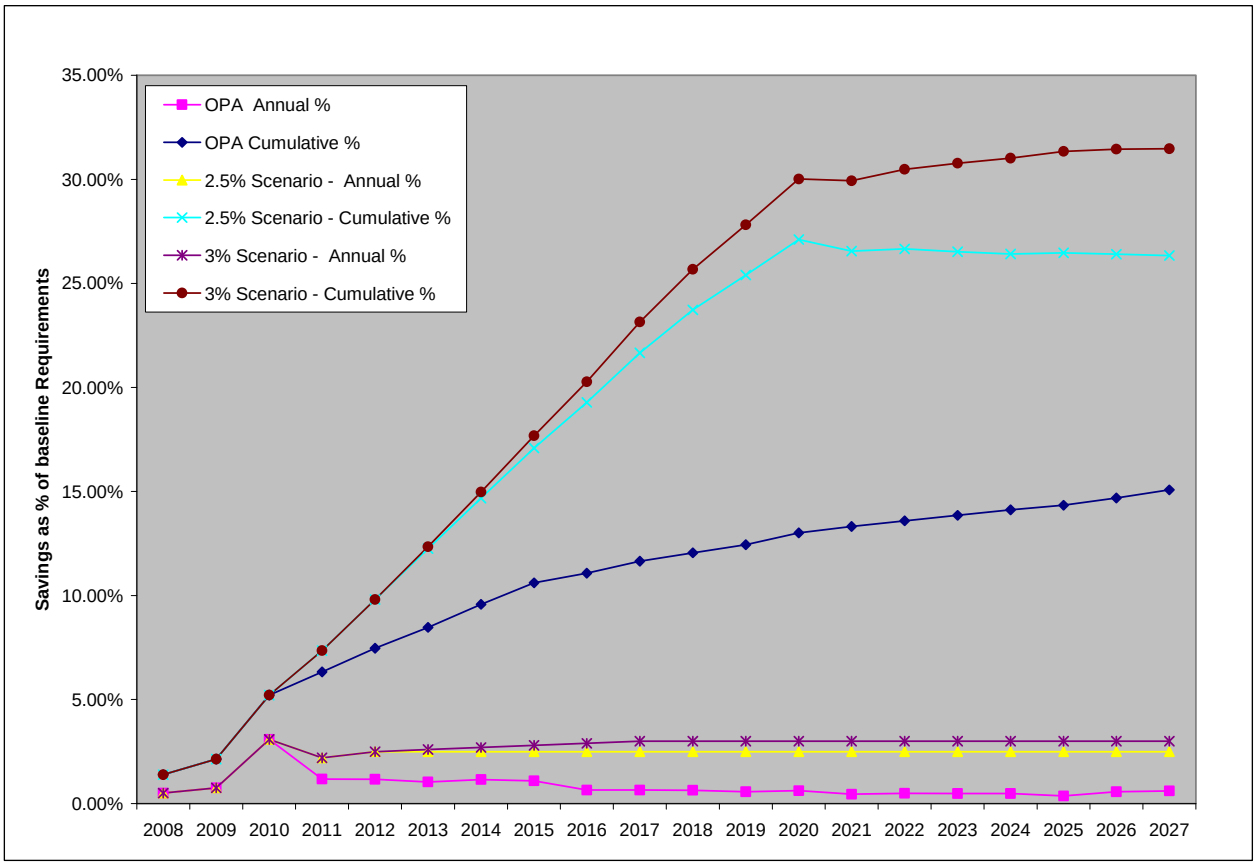
For these reasons I urge that identified potential should not be viewed as a hard and fast limit for achievable targets, especially when considering long term planning goals. In effect, OPA has assumed no progress in CDM just as it has done for renewables and this does not reflect the history in this field to date.

Q: Please describe the level and pattern of savings goals for your enhanced scenarios.

A: As presented in Figure 12, with a 2.5% savings level, OPA could achieve over 26%, and at 3% savings level over 31% of baseline forecast load requirements by 2027.

I should emphasize at this point that to be consistent with OPA practice these projections include all efficiency, fuel switching, customer based generation (including CHP) and demand management savings (CDM).

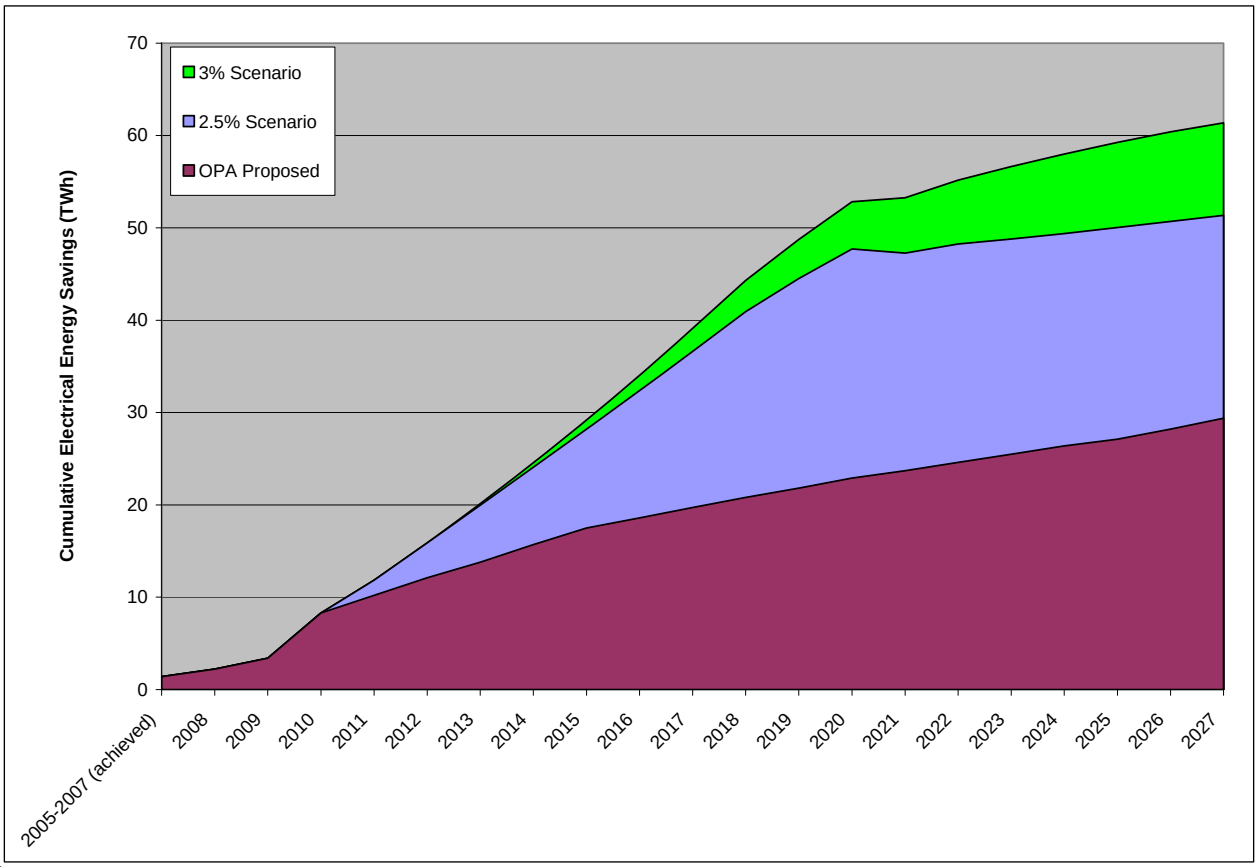
Figure 12: Enhanced scenario savings as % of baseline requirements



Again, incorporated in my projections is the conservative assumption of retirement of 100% of measure savings after an assumed average measure life of eleven years. This explains why between 2020 and 2021 the savings level out, since the savings in the eleventh prior year are subtracted from the new incremental achieved savings. If one presumes that some proportion of participants will replace measures without program support, the achieved level will be higher. The OPA projection displayed on these charts is as presented by OPA (see my earlier comments on our uncertainty about their treatment of retirements).

With these levels of savings, OPA could achieve cumulative electrical energy savings of approximately 51TWh or 61TWh by 2027 as presented in Figure 13.

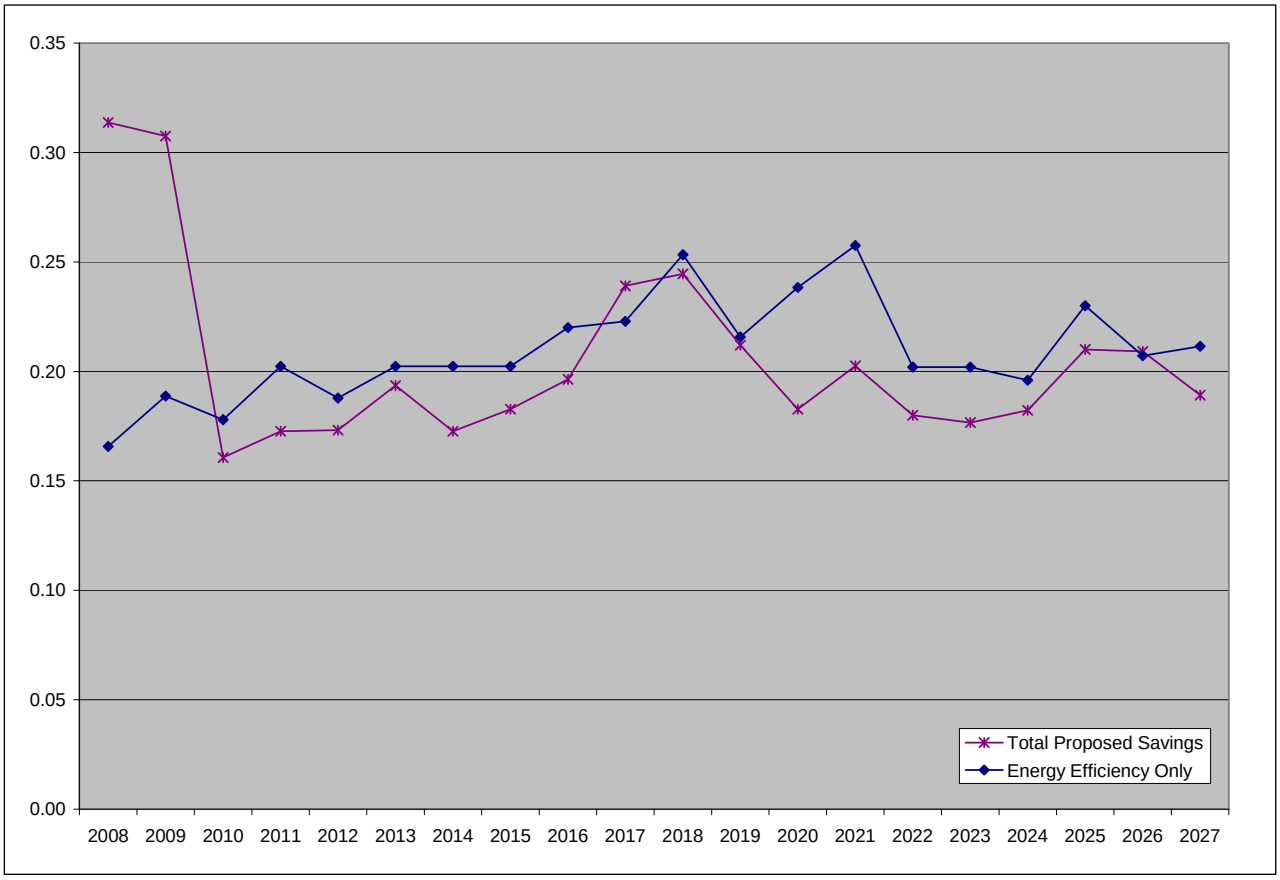
Figure 13: Recommended cumulative electrical energy savings (TWh)



Q: With this level of electrical savings, what level of peak demand savings would you predict for these scenarios?

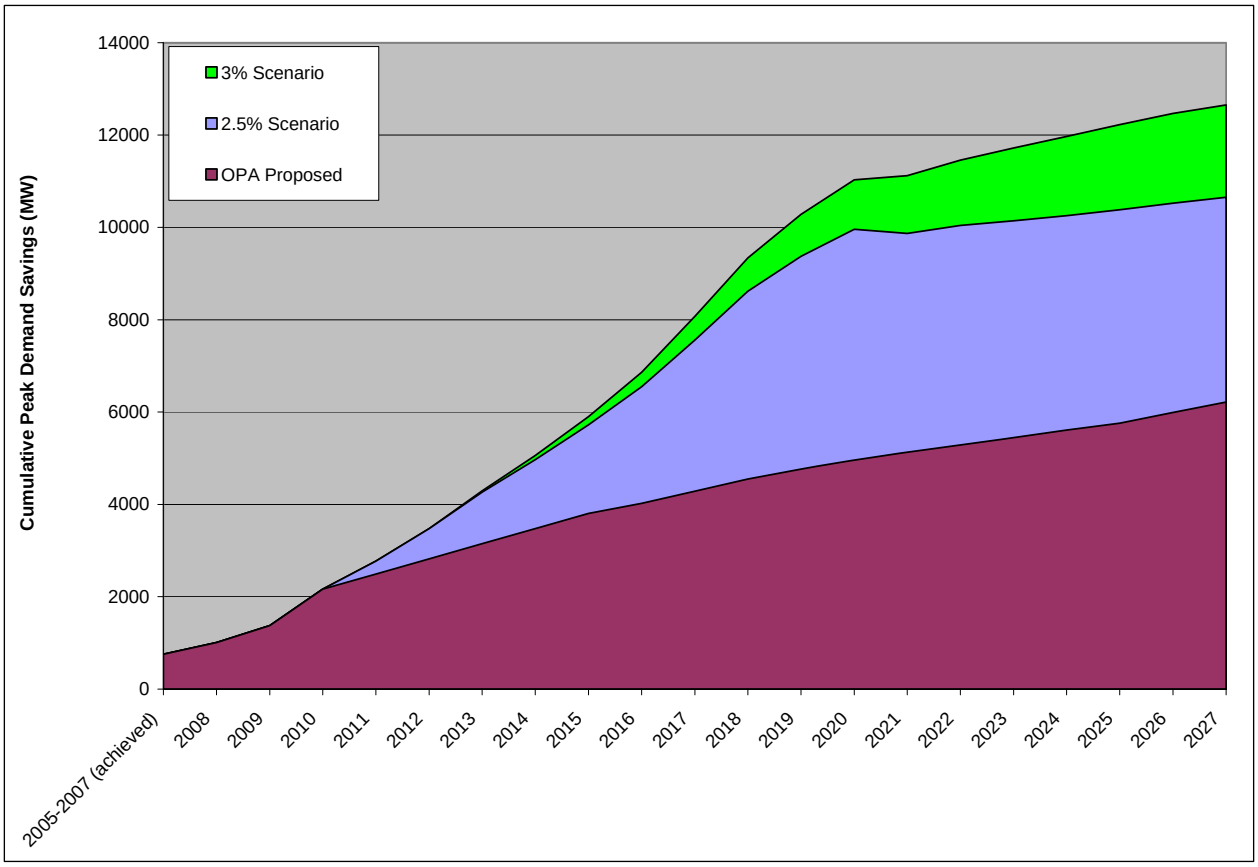
A: To answer this question, I analyzed the MW to MWh ratio proposed by OPA, see Figure 14. Note that in the first two years, with a significant emphasis placed on peak demand the ratio is over 0.3 MW:MWh. After that, it fluctuates between 0.17 and 0.25 MW:MWh. I looked at other jurisdictions and found that these later ratios are in line with most other programs, and so see no reason not to use these yearly ratios as the basis to estimate MW savings for the alternative scenarios.

Figure 14: OPA MW:MWh ratios



Using these assumed MW:MWh ratios, the projected MW savings are displayed in Figure 15. The minimum (2.5%) scenario would provide 10,650MW and the enhanced (3.0%) scenario 12,652MW of peak demand savings. This represents an additional 4,400MW and 6,400MW over the OPA proposal (which is without any measure life retirement adjustment) respectively.

Figure 15: Estimation of cumulative peak MW savings for enhanced scenarios.

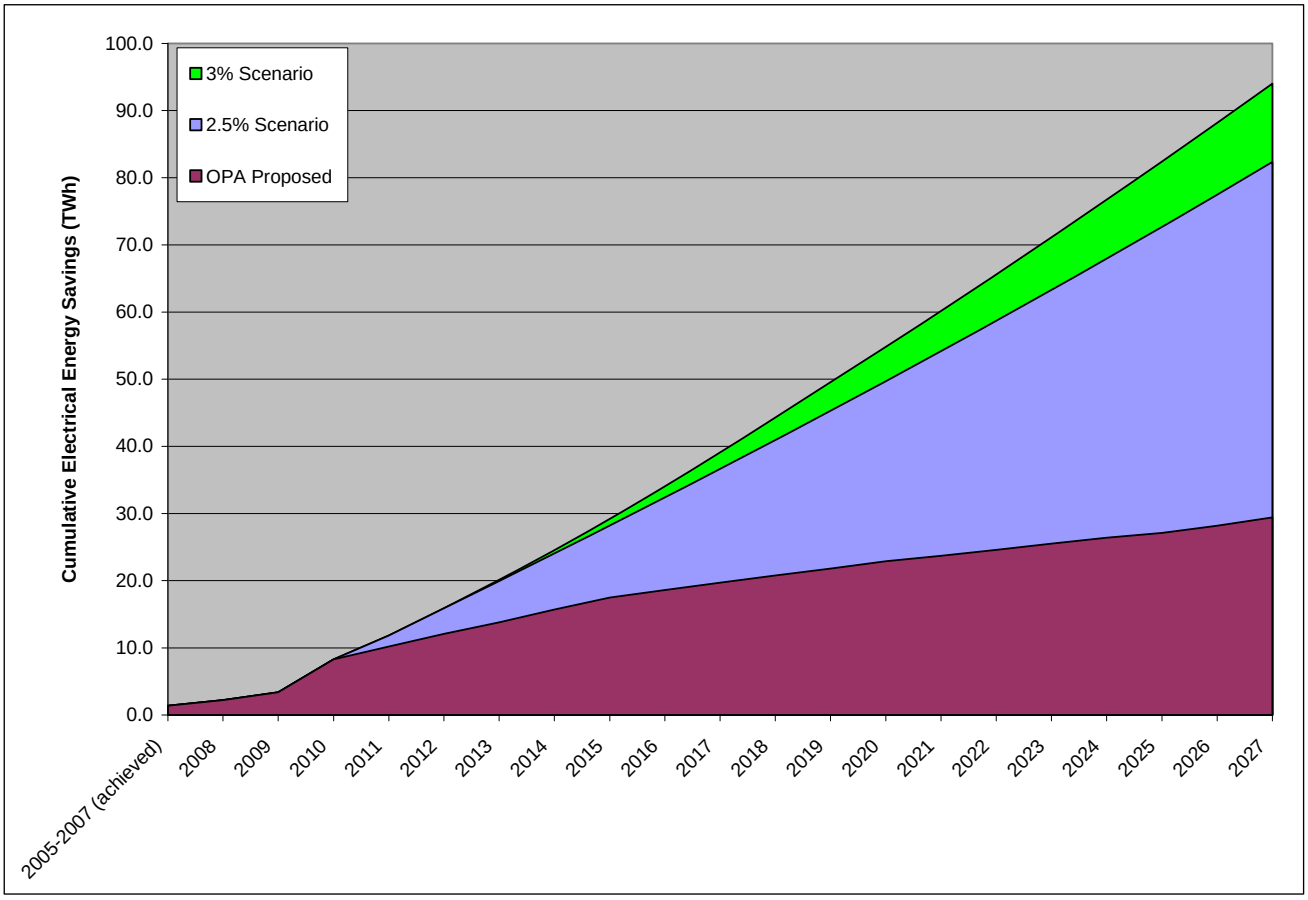


Q: Please provide figures that illustrate the level of savings that would be achieved through your scenarios if the adjustment for 100% retirement of savings for measures after eleven years, is not done.

A: Figure 16 shows cumulative energy savings achieved *without the measure retirement adjustment*, consistent with OPA's methodology.

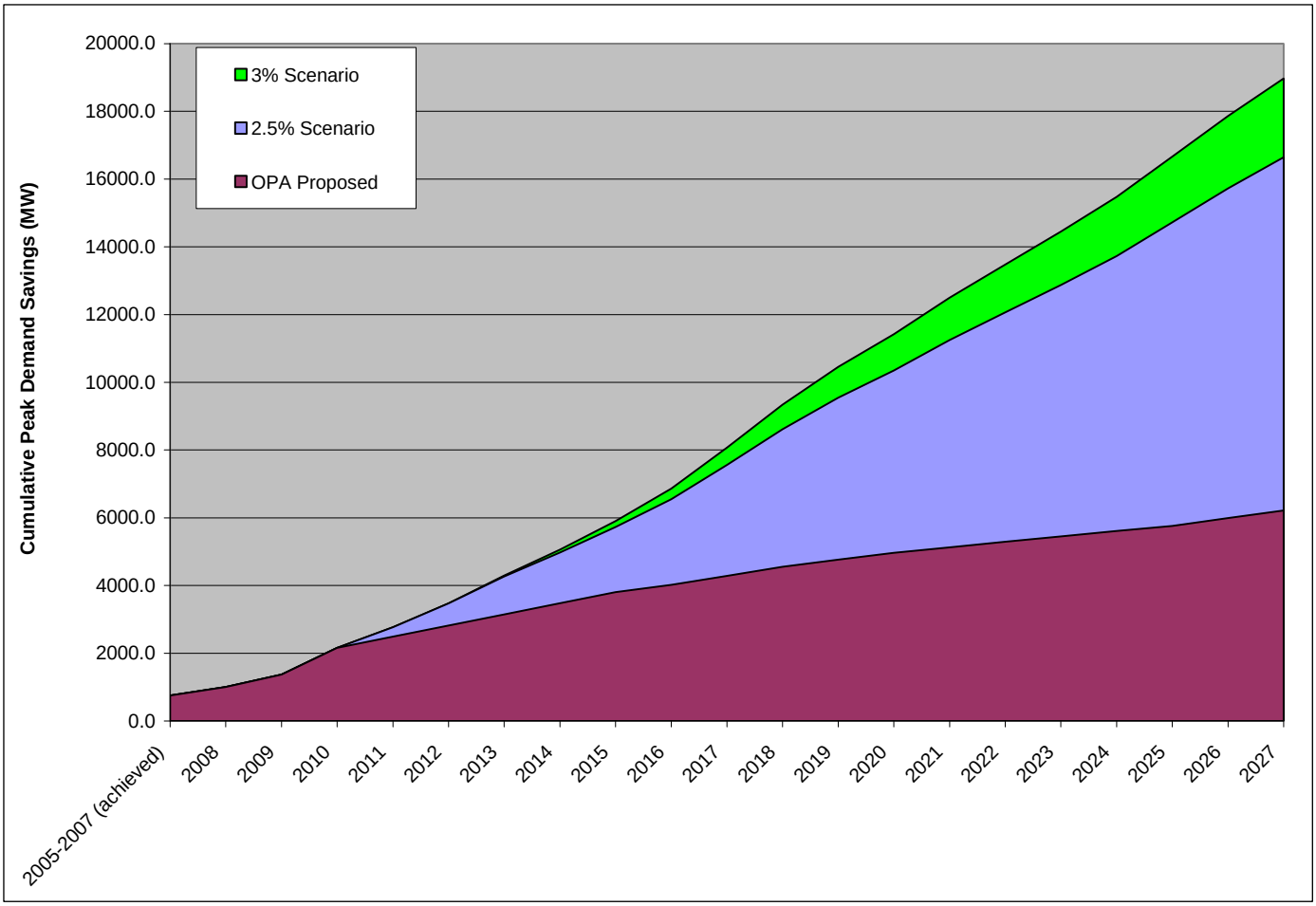
This represents 42% and 48% of baseline requirements for the 2.5% and 3% scenarios respectively.

Figure 16: OPA and alternative scenarios of energy savings without measure retirement adjustment.



Similarly, Figure 17 shows MW savings based on the energy savings above and using the MW:MWh ratio as before.

Figure 17: OPA and alternative scenario cumulative peak demand savings without measure retirement.



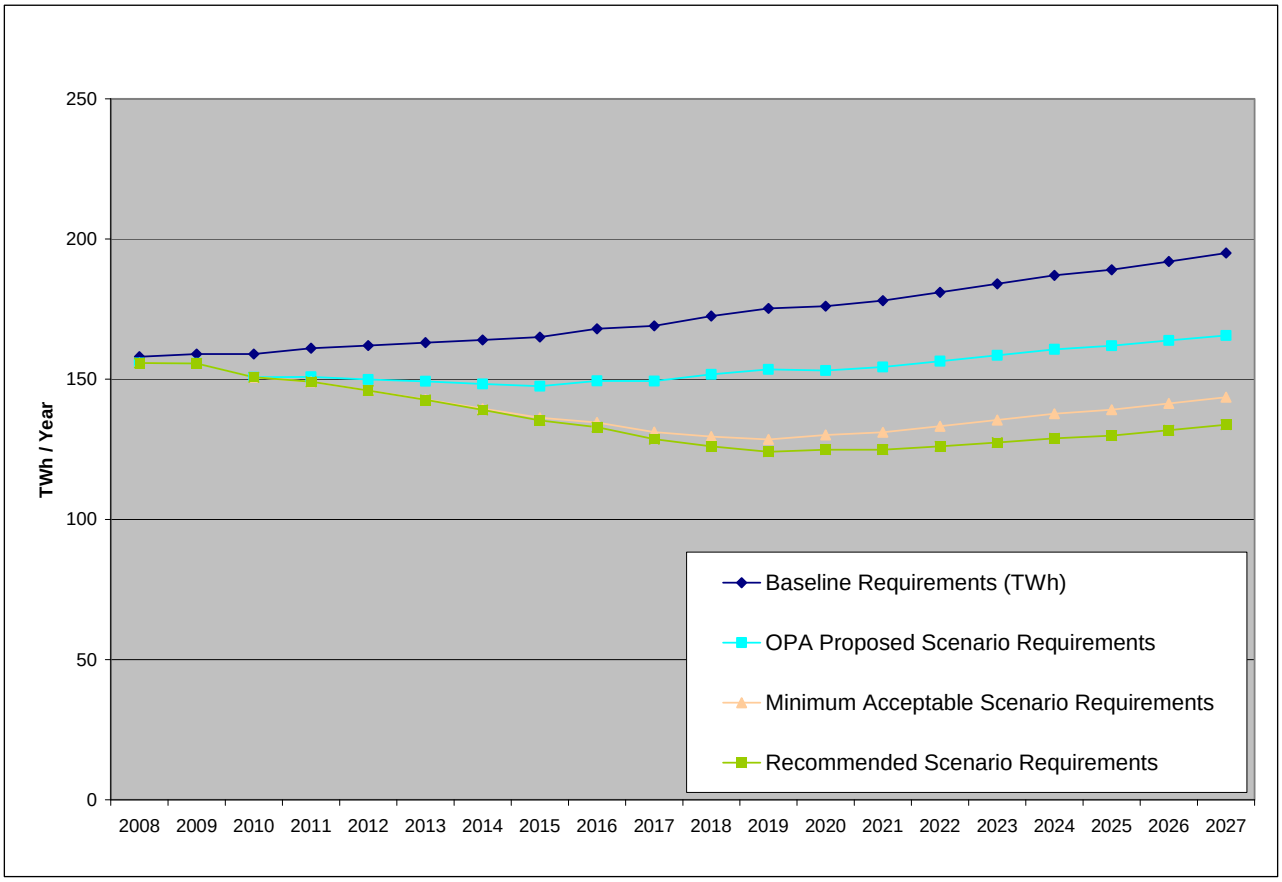
As mentioned, although this is consistent with OPA methodology, these are not the numbers we recommended to be used in Resource Insight's modeling. We believe our methodology represents a significant conservatism in our numbers.

Q: Please provide a chart that shows how your scenarios affect the estimated load forecast as provided in the ISPS.

A: To summarize, Figure 18 demonstrates the impacts to baseline requirements for the three scenarios discussed above. The proposal presented by OPA would result in an estimated load generation requirement of 165TWh in 2027.My proposed scenarios,

by building upon and maintaining the success of the early program implementation, reduce this load generation requirement to around 134 or 144TWh.

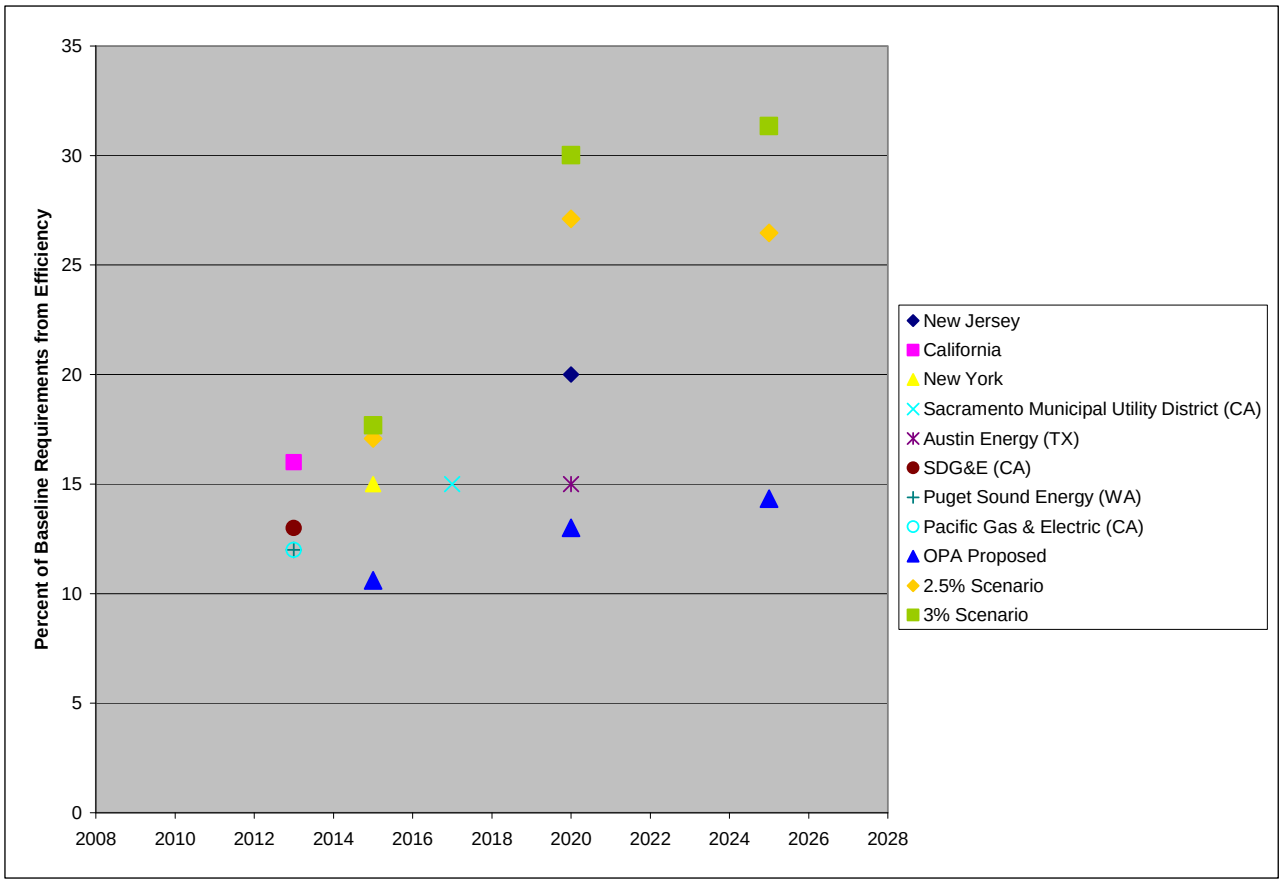
Figure 18: Summary of OPA proposed and alternative scenario estimated requirements.



Q: How do the savings projections of the plan proposed by OPA and your two proposed scenarios compare with other entities' long term plans for conservation savings acquisition?

A: Many States are developing long term deep efficiency portfolios. New York, for example, plans to achieve 15% cumulative savings by 2015, New Jersey 20% by 2020. OPA's proposal, for comparison, puts it at only 10% by 2015 and 13% by 2020 (even without the measure life adjustment). Indeed, as Figure 19 demonstrates, by 2025 OPA would be at a comparable level of cumulative savings to what many other jurisdictions are proposing in half the time.

Figure 19: Comparative cumulative energy savings targets. Note that although I have not conducted a thorough review of the savings projections in each jurisdiction, I am quite confident that these measures do not include customer-sited generation including distributed renewables and CHP, as they are included by OPA in its definition of CDM. Furthermore, OPA's results include "Other Influenced Conservation" that is initiated by market actors other than the OPA and OPA does not appear to reduce cumulative savings due to measure retirement. For these reasons OPA's true cumulative projections may be lower than presented below[30].



My alternative scenarios on the other hand, would put OPA in line with these other leading jurisdictions for the first part of the plan and then continue with an aggressive and exemplary program throughout the remaining years to make Ontario a true leader in the conservation field.

[30] The data for the comparative jurisdictions is based on a Synapse study. See Exhibit GEC-SHP-3

Q: What approximate level of funding do you project would be required to meet the two alternative scenarios you have presented?

A: This is a very difficult question to answer without performing comprehensive and detailed modeling. I have already explained my deep concern about OPA's cost projections, namely that the cost per MWh increases over the twenty year cycle when most of the later savings come from market transformation, which *should* result in lower incentive and program delivery costs. Furthermore, with the evidence suggesting that attaining savings at the levels I am proposing becomes *increasingly* cost-effective, this would indicate that the cost of achieving savings in my scenarios could be reduced. Any estimate I provide therefore will be either based on cost estimates I do not trust or on observations and projections it will be hard to defend irrefutably. With that said I will describe estimates calculated by on a number of methods and then provide my best judgment of the range of costs we would be talking about.

First, (using OPA's average first year $/MWh ratio of $313/MWh) applied to the minimum (2.5%) scenario, which actually acquires a total of 81TWh incremental annual savings (reduced to 50TWh due to measure retirement), would amount to a required delivery budget of $25.3 billion (2007 dollars). Using the same methodology the enhanced (3%) scenario which achieves 92.6TWh (reduced to 60TWh with retirement) would require $28.9 billion.

As an alternative methodology I used OPA's annual $/MWh values and applied them to the annual savings scenarios. This resulted in a spending projection of $29.3 billion for the minimum (2.5%) scenario and $33.6 billion for the enhanced (3%) scenario (again in 2007 dollars). This methodology, however, uses the increasing $/MWh savings ratios which, as discussed, are inconsistent with the even the OPA proposed delivery plan, and inconsistent with what I argue could well be increasing cost-effectiveness of CDM efforts over time.

To illustrate the sensitivity of these budgets to the $/MWh metric, the $/MWh that OPA assumes will be required in 2010, its peak year (which I point out, is a level of savings closer to what I have proposed) is $101/MWh. Using this ratio, the delivery budgets would be estimated at $8.1 billion for the minimum (2.5%) and $9.4 for the enhanced (3%) scenario. While I do not suggest that this is the required budget, it does illustrate the impact of inaccurate cost to savings metrics on budget estimates.

Finally, I consider an estimation of program costs provided in ICF's "Electricity Demand in Ontario – Assessing the Conservation and Demand Management (CDM) Potential" study. For ICF's most aggressive scenario, which projects savings in the same ballpark as my scenarios, it estimates a delivery cost of a little over $10 billion.

With all those options outlined, I would estimate that the range of funding that OPA would require to achieve the savings levels I present is in the region of $15-20 billion for the medium (2.5%) scenario and $20-25 billion for the enhanced (3%) scenario. Either way, I assert that it will remain significantly cost-effective, will increase net benefits and far better represent the Directive's mandate to *"Maximize feasible cost effective contribution from energy efficiency, demand management, fuel switching, and customer based generation"*.

Q: What is your estimation of the total societal costs for these increased scenarios and how do they compare both to OPA's proposed costs and to the societal benefits?

A: The OPA's proposed conservation portfolio calculates the net present value of the societal costs (incremental equipment plus program costs) at $6.9 billion, using a discount rate of 4%[31]. As with program delivery costs, I used both the overall

[31] OPA's net present value of societal costs and benefits is taken from Exhibit D-4-1, attachment 3.

average societal costs per incremental first year MWh savings ratio ($336/MWh) and discount rate (4%), and the annual ratios to estimate the societal costs of the enhanced scenarios. Note that OPA's projected annual societal costs per savings also increase in a similar pattern to its proposed delivery costs.

Using these metrics, the net present value of the societal costs of the minimum (2.5%) scenario is $18.6 - $20.4 billion, while for the enhanced (3%) scenario it is $21 - $23.3 billion (where the lower value is based on total costs and savings and the higher range based on annual ratios). As previously discussed, there is no reason to believe that cost to savings ratio should increase over time so the lower numbers appear more defensible.

The net present value of the societal **benefits** was estimated to be $15.9 billion for the OPA proposed savings level. For a very rudimentary comparison, I inflate this value by the ratio of increased energy savings, using the total incremental annual savings as opposed to the cumulative savings with measure retirement, since this is consistent with OPA's projection. For the minimum recommended (2.5%) scenario this would increase the net present value of the avoided costs to $46 billion (81/28 * 15.9), and the enhanced (3%) level to $52.6 billion (92.6/28 * 15.9).

Using these projections, I estimate that the minimum scenario would result in a net societal benefit in the region of $25 – 27 billion, with the enhanced at $29 - 31 billion.

V: What has been learned about Aggressive Distributed Resource Acquisition Systems in Other Jurisdictions?

Q: You are advocating that Ontario plan to secure a level of CDM savings that is above what any jurisdiction is now acquiring. Your High Scenario projects savings levels beyond what other jurisdictions are currently projecting to acquire for the full time period. On what basis do you claim that this is a credible estimate of what is possible?

A: I have already testified about what I believe is a unique opportunity for creating very aggressive CDM strategies in Ontario. The IPSP is being issued at a time of dramatic change in energy markets and in the approaches to meeting energy needs. I believe that the current version of the IPSP fails to consider these changes, and dramatically fails to meet the tests under which the OEB is to evaluate it.

Certainly, it would be less controversial and more in line with traditional practice if I simply testified that I believe OPA should project a minimum of (for instance) 2.00% savings from CDM per year after 2010. I do, however, believe that a level of savings significantly beyond 2.00% is both attainable and economically prudent and cost effective. I believe this for five reasons:[32]

1. <u>We are using the Ontario definition of CDM.</u> This includes not only efficiency, but also distributed energy (on-site renewable energy under 500 kWh and CHP under 10 MW), fuel switching, demand response and behavior change, so the range of resources to meet the target are broader than what is included in some other jurisdictions.
2. <u>Nobody has yet done aggressive, coherent and integrated CDM implementation.</u> Though we have indications of what is possible, no estimate of achievable

[32] If the OEB feels it must choose a lower and more conservative number than any I propose, I would strongly urge it to go no lower than this number. It provides far greater benefits than the OPA scenario and I believe it is very feasible. Energy efficiency savings levels in a number of jurisdictions are now approaching or planned for 1.5% annually. Adding the other components of CDM makes attaining a level of 2% annual savings quite possible.

potential has taken account of the market shifts we now recognize as possible that can be facilitated and supported by this kind of integrated implementation strategy.

3. Climate change and fossil fuel price increases will drive this agenda whether we take account of them in our planning or not. While climate change and topics such as steadily increasing costs for fossil fuels are not addressed in my testimony, those forces will be driving innovation in efficiency technology, distributed generation, and new financing mechanisms in ways we are not easily able to anticipate. For instance, it is not at all unreasonable to anticipate that solar hot water applications could become standard practice within five to ten years. Nothing on that order is included in OPA projections. Very small-scale CHP applications now in use in Europe might come down in cost and become standard appliances.
4. We still think with a "program" mindset and have only just begun to recognize that there may be "tipping points" at which some long-standing market-barriers in specific market sectors are substantially overcome. This may be happening now with CFL's. I believe that there are plans to ban most incandescent bulbs in Ontario. The line between program effects and just plain changing specific markets are ultimately of limited interest, as long as intelligent support for sustained, aggressive CDM acquisition is maintained.
5. Renewable generation, solar hot water, and new CHP technologies may provide a higher proportion of savings in the later years of the IPSP. OPA does not break out the components of savings from CDM components in the out years, but it is not unreasonable to anticipate that, for instance, integrated solar, the smart grid, aggressive least cost transmission and distribution planning and in general a competitive cost improvement for small renewables may make them much more widely accepted than now seems feasible.

Q: It sounds like you are an advocate for "market transformation" after all. Why are you so hard on OPA about their plan to "transform markets"?

A: I object to the use of the term "market transformation" when what it represents is simply an exit from sustained and intelligent resource acquisition. The OPA uses the term "market transformation" without any clear definition.[33] The implied definition, included in its savings projections as I have discussed above, suggests that somehow "market transformation" will produce lower savings than resource acquisition programs.

OPA announces (without providing any supporting evidence) its confidence that it will not need to keep investing heavily in resource procurement efforts:[34]

> *Over time, the need for procurement of CDM is expected to moderate. A culture of Conservation will emerge on the demand side; CDM delivery capabilities will be built up on the supply side of the conservation marketplace; and various structural changes will occur in and around the market itself. In the longer term, the transformed market will be securing a larger portion of the available CDM resource than it does today, and most of the achieved CDM will occur through market-based transactions, without significant ratepayer support. (Exhibit C-7-2, page 24)*[35]

This is a remarkable and perhaps heartening statement of faith. But it is not based on any evidence of which I am aware. In fact, it sounds disconcertingly like a plan to replicate what happened in Ontario in the 1992-2002 period. (Exhibit C-7-2, p. 38 at 4.2)

My definition of "market transformation" is that a new, more efficient technology or strategy has thoroughly penetrated the market, and the older, inefficient technology or strategy is relegated to the basement, attic, E-Bay and antique shops. The change in refrigerator efficiency over the last 15 years is a good example of real market transformation. Standard refrigerators now use about a third of the

[33] The clearest definition by OPA that I found was in Exhibit C-7-2, page 23: "Market transformation is about achieving a substantial and sustainable increase in the market share of the most energy efficient technologies, buildings and production processes." According to this definition, a rate of 40% acceptance of horizontal axis washers could be considered "market transformation" even though significant additional societal and customer benefits could be secured by 90 or even 100% penetration.
[34] Nevertheless, as we have discussed in Section V, OPA CDM costs are projected to *increase* in those years.
[35] See Exhibit GEC-SHP-1, Schedule 6, a).

electricity they used to consume. No program effort is now required to gain market penetration for this level of technology efficiency since it is all that is made.[36]

Most of what I find about "market transformation" in OPA filings is the words. There is no plan, no articulated strategy. It seems to come as a kind of divine blessing on those who do resource acquisition for a few years. There is no breakout of what technologies or practices might be transformed…instead the concept is general and vague.

The understanding that sustained aggressive CDM resource acquisition implementation and intelligent, coordinated upstream work with wholesalers and manufacturers, combined with political work to get new standards adopted and effectively implemented might help bring about the transformation of a given technology is not even hinted at, and yet it is clear from experience that this is precisely what it takes. I commend the OPA for making some effort to press for better standards and to encourage market players, but its projected numbers demonstrate it has no road map for coordination and success.

Q: Do you have the same concern about OPA's concept of "Capability Building"?

A: I do. OPA does appear to be working with market participants and at least I interviewing them extensively about what should be done. I find, however, no clear definition by OPA of what "capability building" is, and just how it is to be accomplished.

I do not consider the issuance of numerous RFPs and short-term contracts to be "capability building." In fact, frequent changes in program design from regulators,

[36] This does in any way mean we forget about refrigeration as an efficiency opportunity. Efficiency programs should still pay incentives for designs and choices that are more efficient than the new high-efficiency baseline; and should still work to promote adoption of *higher* efficiency standards reflecting these increments in efficiency. It may be a good strategy to accelerate the replacement of old refrigerators and the removal of second refrigerators through aggressive CDM programs, and OPA may have done.

and the re-issuance of RFPs, and the requirement on vendors to re-bid could have quite the opposite effect of "reducing capacity."[37]

Q: What is the risk of simply selecting a lower level of targeted savings and then doing better if it seems feasible.

A: As I have already suggested, that is what OPA is proposing, and I believe it will result in the mistaken "learning" that higher savings are not feasible. On the other hand, the risk of the "wait and see" approach is that Ontario will become locked in to new generation investments that do not get constructed on time and/or cost far more than estimated…and miss the opportunity to secure its energy future at much lower cost.

In other words, the "opportunity cost" of failing to develop the CDM resource could be very high.

Q: Is there a discussion of what has been learned in sustained energy efficiency program implementation that illustrates what you believe can and should be done?

A: There is. I co-authored with Blair Hamilton and Michael Wickenden, an ACEEE paper entitled: *"What Does It Take to Turn Load Growth Negative? A View from the Leading Edge."* In that paper we describe the fact that Efficiency Vermont in 2007 turned Vermont's load growth negative through the aggressive implementation of energy efficiency programs.

We discuss the "lessons learned" from Vermont's experience about what it takes to reach this level of savings. That paper is attached as Exhibit GEC-SHP-4.

Q: What are the conclusions of this paper?

[37] This would be particularly true in an era of declining budgets, and projected by OPA in the out years.

A: First, the paper describes that for the first time, in 2007, the Vermont Energy Efficiency Utility ("EEU") saved enough electric energy (**through efficiency alone**) to turn Vermont's load growth negative.[38]

Second, it references the Vermont Comprehensive Energy Plan which for the first time ever projects negative load growth for an extended planning period.

Third, the paper provides a discussion of the "lessons learned" about the architecture of the EEU that have enabled it to reach this level of savings.

Q: Please summarize those conclusions.

A: There are seven key lessons about the structure of CDM delivery systems to be learned from the EEU experience so far. They include:

1. **Clarity on Goals**
   Appropriately focusing and sustaining efficiency resource acquisition efforts requires that savings acquisition targets be clearly stated and measureable. These goals are best set at the highest policy levels, so they clearly guide regulators and implementers. The goals will be most effective when they express a consistent commitment by political and regulatory institutions to pursue efficiency in a sustained manner.

2. **Mission Alignment**
   Efficiency efforts will only maximize savings if the mission of the implementing entity is fully aligned with the savings objectives. An entity that has energy efficiency as a primary purpose will measure its success by the higher level of savings it achieves. If an implementing entity does not currently have a clear incentive to maximize efficiency (e.g., in many cases, utility shareholder interests now compete with efficiency efforts), it is critical that those barriers be overcome (e.g., with decoupling mechanisms and/or clear performance incentives for excellent efficiency performance). In other words, there must be a commitment at the highest policy levels to create, throughout the delivery system, incentive structures that promote and support the underlying policy objectives.

3. **Motivation**
   A powerful tool for motivating an implementation entity to meet or exceed its goals is a well-constructed, balanced risk-and-incentive mechanism. In Vermont the goals are communicated to the implementing entity through a set of quantifiable

[38] This increased level of savings in 2007 was attained at *lower cost per MWh* than the prior years savings.

resource acquisition and market impact indicators that are incorporated into a performance-based contract with varying incentives to the contractor for each indicator that reflect regulatory assignment of importance of each goal.

For this mechanism to be effective, it needs to have considerable weight. It should motivate exemplary effort and risk-taking by providing significant incentives for meeting and going beyond established savings goals. Such performance mechanisms can also usefully be passed through to subcontractors working for the implementing entity. To assign appropriate importance to the achievement of goals, a structural model needs to have a mechanism that communicates the value of achieving those goals—for example, a portion of compensation tied to achievement of savings goals.

4. Accountability for Results

To the extent that achieving very high levels of savings is the primary objective, the implementing entity should be held fully accountable for achievement of savings results.

One of the significant challenges in moving to the efficiency utility model in Vermont was to shift away from the "preapproval" mindset developed in utility-administered efficiency programs in the 1990s—a mindset that specified exactly what would be done, and resulted in utilities doing exactly what was proposed to assure full program cost recovery. The focus was more on expenditures to implement a program as it had been filed than on achieving results. The dangers of over-specification and micro-management are not likely to come just from utilities -- legislators and regulators may also want a level of control that unduly restrains the implementing entity. Sustained and deepening acquisition of efficiency resources is about people, markets, intelligence, and innovation. Both the power to implement wisely and the accountability for performing must be placed squarely on the implementing entity.

Leaders at the highest policy levels need to recognize that an Energy Efficiency Acquisition System is about thoughtfully, intelligently, and persistently partnering with and moving markets. They need to be willing to exchange a *regulatory mindset* for a *performance mindset*. They need to structure incentives and create an intelligent framework in which the commitment to efficiency will be implemented and then stand back and let implementers move with considerable freedom.

5. Flexibility

If the implementing entity is to be held accountable for results, it must have a high degree of flexibility in the details of program design, resource allocation, and implementation. For example, the implementing entity must be able to alter incentive levels in response to market experience and understanding. The flexibility to go after opportunities that present themselves (such as a community that wants to install 40,000 compact fluorescent lamps) should be both permitted and

encouraged. It is these opportunities that often suggest innovative approaches to new products or strategies for deeper market penetration. The Vermont EEU has made the choice to invest heavily in people and develop longstanding relationships with vendors, trade allies and large customers. The choice to shift dollars to people and spend less on incentives should be within the purview of the implementing entity as long as performance goals are met.

6. Stability and Sustained Effort

Structural models for Deep Efficiency Acquisition Systems should provide for reasonable stability to support sustained resource acquisition strategies, long-term partnerships, long-term financial agreements, and the sustained building of experience and capability in the implementing entity. The assurance of long-term stability needs to be balanced with structural mechanisms that can help to assure efficiency of implementation and guard against institutional complacency. A stable and predictable source of funds is critical, together with an approach that values multi-year budgets appropriate to the forecasted needs of the region. The Vermont EEU has been operating with three-year budgets and goals, but legislators recently approved and regulators are currently considering how to move to an alternate structure that would add rolling 20-year budgets and goals that are adjusted triennially.

7. Robust Information Technology ("IT") Systems

The types of activities that need to be planned, managed, tracked, and reported as part of a Deep Efficiency Acquisition System are extensive and complex. Rock-solid information and customer management systems are essential for credibility, reliability, and cross-functional data sharing. Data systems need to contain extensive customer information, both historical and current, including business characteristics and contacts, metered energy and demand, implemented measures, measure savings assumptions and support, contacts and communications, project tracking, and cross-references to project partners. Such rich data systems support improved planning and evaluation, and development of targeted resource acquisition initiatives; and because they provide information in real time, they serve as a tool for increasing management effectiveness and providing feedback that supports continuous improvement of strategies. The level of effort and commitment of resources necessary to develop and maintain these types of systems are typically and profoundly underestimated.[39]

Q: Are you advocating that these Lessons should all inform OPA's IPSP?

A: I believe they should all inform OPA's approach to CDM acquisition. I am not under the illusion that Ontario is like Vermont, or that an EEU model for Ontario is either appropriate or possible. But I am completely convinced that these

[39] For Vermont's EEU, annual costs of IT system maintenance and development have averaged approximately 3% of total expenditures.

underlying principles, properly applied in the Ontario context should inform OPA's planning and approach to CDM implementation.

VI. OPA's Planning and Performance to Date Does Not Measure up.

Q: With reference to the seven principles you discussed in Section VI, please discuss OPA's approach to CDM planning and implementation to illustrate OPA's planning and performance to date.

A:

Let me begin by acknowledging that the challenge facing OPA is significant, and he specific Ministerial Directives, while intended to drive the development of aggressive CDM implementation, can aggravate the risk of a "ready, fire, aim" approach rather than the development of a thoughtful and sustained effort to build the CDM infrastructure.[40] As discussed above, it is quite clear that OPA's approach to planning is actually driven by the capacity savings targets in the directives. How else would OPA project a savings level of nearly 3.1% check this! of annual sales in 2010, and then a tailing off of savings to around .5% in the out years?

In an apparent effort to ensure that savings are derived from a broad cross-section f customers, subsequent Directives have, in effect, directed the design and priority of initial CDM programs. (See Table 4.2 in Exhibit C-7-2, page 47.)

The projected savings level for 2010 is a very serious challenge and will be difficult to meet. It is perhaps somewhat understandable that OPA is rolling out twenty or more programs (twenty-six by one count…most of them focused primarily on securing capacity savings) rather than carefully designing a long-term strategy. This does not, however, justify an approach that announces repeatedly that the

[40] See Exhibit C-7-2, p. 13. Eight ministerial directives have been issued since June 15, 2005.

whole resource acquisition may be short-lived, and probably can be ramped down considerably in a few years.

Q: Are you concerned about OPA's rather single-minded approach to securing peak savings through 2010?

A: I am. While understanding the savings target Directives are stated in terms of capacity savings, I think there is a risk to rapidly deploying programs that are far more focused on capacity savings than on long term, balanced energy and capacity savings. There is also an increased risk that programs will have to be re-designed to be more comprehensive at a later date and that opportunities for greater savings will be lost rather than identified and recorded for follow-up as initial contact with customers takes place.

In summary, programs designed and implemented with an arbitrary focus on peak reduction will tend to:

a) <u>Ignore (and dramatically reduce the opportunity to acquire) reductions in greenhouse gas emissions</u> which are produced by *hours of use*, not *peak use*.

b) <u>Make mistakes.</u> Load control strategies must pay *each year* for customers to accept changes to their patterns of usage. Efficiency can acquire the peak savings in a more durable manner. Over-reliance on load control, however, may make investment in efficiency non-cost-effective in the short term and thus harder to acquire. Load control as a thoughtful part of comprehensive efficiency will secure deeper savings and be more responsive to customer needs.

c) <u>Miss opportunities to provide other benefits to customers.</u> For efficiency to work, customers must become partners. Customers are likely to benefit more from sustained reductions in usage (lower consumption and bills) than from peak reduction alone. Persuading customers to participate in efficiency efforts means aligning their interests with both the near-term and long-term benefits to the Province. Programs that offer greater savings to customers will be both more effective and cost-effective. Failing to quantify and document adequately energy

savings (and, for instance, resulting greenhouse gas reductions) is simply short-sighted, and not good for customers or the environment.

d) Miss good opportunities. While running a program that will cycle air conditioners off during peak hours will provide peak benefits, promoting installation of more efficient air conditioners and thermal improvements in the home could provide benefits that are both more reliable *and* provide savings during every hour of use. Running a program that does *both* could provide the highest level of energy *and peak* savings.[41]

e) Miss the opportunity to "move" the market. OPA speaks a great deal in its IPSP about "building capacity" and "transforming markets" but the only way to do so is to build what it (glibly) refers to as a "conservation culture". This cannot be done by focusing on one dimension of efficiency benefits. Vendors, trade allies and customers should not be trained to consider "peak energy reduction" as the equivalent of "reduced consumption". A genuine conservation culture will recognize the multiple benefits of efficiency: peak reduction, reduced consumption, lower GHG emissions, lower bills for all customers, increased comfort and convenience, jobs and economic benefits. By focusing on "peak reduction" so exclusively OPA is missing the first step toward truly changing the markets.[42]

Q: Please discuss how the IPSP meets the first key test of establishing and following a clear set of CDM goals.

A: It fails this test. The OPA has a clear mandate to lead and direct the CDM effort. This is a remarkable opportunity, one that is perhaps unique in North American jurisdictions, as I have previously discussed. OPA is a government entity with access to significant resources that is in charge of comprehensive energy resource

[41] Assume for instance, that the load control program contracted for 50 hours of peak interruption a year, but the need for peak avoidance grew to 200 hours a year…the efficiency strategy would be more resilient and cost-effective than a narrowly-defined contract for interruption or "cycling".

[42] There is a fascinating discussion of an earlier vision of a "conservation culture" for Ontario, in a paper issued as Appendix D to Building A Conservation Culture in Ontario. It can be found at: http://www.energy.gov.on.ca/english/pdf/conservation/CAT_Framework.pdf, and addresses many of the themes I have emphasized in my testimony. The OPA IPSP appears to represent quite a different approach.

planning for Ontario. While it needs OEB approval for its budgets and approach, it is the entity in charge. It is responsible for all aspects of Power Supply Planning, so it can act with full knowledge of the other options available to the Province. It can plan, ***and see to it that its plans are implemented.*** It appears to have, once its plans are approved, access to significant financial resources. It has no inherent disincentive to pursuing CDM as most utilities do. It has direct access to the Provincial government, and very wide latitude to pursue the Ministerial Directives. OPA has the opportunity and the framework with the Ministerial Directives to establish CDM as, in effect, a "least cost procurement" process.

I have already discussed OPA's failure to be clear that its goal should be truly "least cost procurement" or treating CDM as the "first resource". OPA approaches this interpretation and then draws back. The direct effect of this decision is a default to the directives, and the adoption of the "wait-and-see" language about CDM. This is a perfect illustration of what happens when there is a failure to set clear policy. As the abrupt decline in the level of projected annual savings documented in Section V makes dramatically clear, the result of the OPA's decision in the area of CDM to consider itself not as a sustained presence, but as an almost a self-sunsetting entity.

There is a certain bureaucratic safety in defaulting to the goals, but the immediate result is the confusion and vagueness that characterizes OPA language about the future of CDM planning and implementation. OPA slips into a bureaucratic mode instead of setting ambitious long-term goals and a bold strategy to attain them. It is precisely this mindset and the failure to take leadership that could create substantial risk, lost opportunities, and lost benefits for Ontario.

It is this bureaucratic mode that chills rather than stimulates the market. ***Without a clear policy direction OPA fails to address the structural challenges implicit in deciding to secure all cost-effective CDM.*** In the OPA filing there is no

absence of helpful studies, provocative discussion papers and public input. The OPA has spent generously on these efforts. But while the OPA relies upon its three interesting and oft-repeated phrases (resource acquisition, capacity building and market transformation) there is no clear picture of where OPA proposes to go or how it proposes to get there.

Q: Please be more specific

A: There are three major issues that face any jurisdiction-wide effort to secure CDM. OPA barely addressed them:

1. **Who will deliver the programs?** If an ambitious long-term CDM goal had been set, it would be clear that comprehensive coverage for customers and a long-term implementation strategy are critical to attaining that goal. Remarkably, I find no discussion of this challenge. I found, for instance, no thoughtful consideration of what relationship OPA proposes to establish for the long term with the LDC's as potential implementation entities.[43]

[43] I did find a paper entitled "Role of LDCs in CDM in 2007: Options Paper for Consultation" dated April 28, 2006, and prepared for OPA by IndEco Strategic Consulting, and Navigant Consulting, as it sought to address three questions about the role of LDCs in CDM implementation posed by the OEB. The paper provides an interesting discussion of what appropriate spending levels might be in 2007 and outlines options for the future role of LDCs in CDM implementation and, if any, how their efforts might be funded. What puzzles me is that I can find no evidence of decisions about these last two long-term questions in OPA's IPSP filing. The closest I can come is a one-page discussion of the role of LDCs in Appendix D of Exhibit C-7-2, pp 99-100. In this discussion, OPA indicates that:
"The OPA has been tasked by the Minister of Energy to assume responsibility for coordinating the delivery and funding of CDM programs through LDCs. The OPA has established two advisory groups to identify funding processes and core programs:

- *The Program Operations Advisory Group (POAG) is to provide advice on the rules and guidelines to be established by the OPA for the administration of LDC funding for CDM for 2007 and beyond.*
- *The Program Design Advisory Group (PDAG) is to provide advice on the selection and design of the OPA's LCD-based programs for 2007.*

I can find no further clarity about any decisions regarding what OPA's long term relationship to LDCs is proposed to be. I did review the master contract agreements on the OPA web site and found them remarkably legalistic and restrictive. They certainly do not communicate that building a long-term dynamic partnership is the goal. Again, I will emphasize that while the details of such a relationship are not appropriate for discussion in this proceeding, the failure to offer any clarity about the broad plan for structure and implementation is directly tied to the inadequate resource acquisition proposed by the OPA in this proceeding. This is particularly true as OPA ramps up savings efforts to meet the 2010 Directive MW savings target.

I do not presume to judge that the LCDs should be the primary implementation entities, but clearly, the aggressive implementation by some of the larger LDCs suggests they could be effective partners. LDCs have been running programs since 2004-5. The OPA could propose the elements of what a long-term partnership would look like and how, and under what terms, stable financing might be provided for local implementation.[44]

I am very concerned that the approach OPA is taking (in what I can glean from the filing) will, at the time of most aggressive resource acquisition ramp-up and spending, actually create uncertainty and confusion at the LDC level. While OPA has designed programs that LDCs have the discretion to run, there is no clear statement of intent that they are being sought as long-term partners. This uncertainty at a time when replacement of third tranche funding must be sought by the LDCs from the OEB creates a serious potential for loss of focus, erosion of capability at the LDC level, and in many of the smaller LDCS, abandonment of any delivery effort.[45]

This absence of clarity is a failure of leadership and is very likely to be the opposite of "capability building." Indeed, it may lead to the erosion of the recent capability that has begun to be built at the LDC level. If OPA wants to rely on the LDCs it is not sending the right signal. Indeed, I am informed that half way

[44] A July 13, 2006 Ministerial Directive ordered the creation of CDM programs to be delivered through LDCs, and ordered that $400 million to fund these efforts should be provided over three years. (Exhibit C-7-2, Table 4.2, page 47) Certainly that suggests an interest in having the OPA support the development of LDC capability.

[45] See the "Guidelines for Electricity Distributor Conservation and Demand Management" EB-2008-0037. It appears from this document that if the OPA does not fund LDC CDM activity, the delivery of such programs is optional for the LDC's and could either simply be dropped or evolve into a separate and potentially un-coordinated set of CDM approaches unique to each LDC. A separate regulatory process would continue, and two distinct and un-coordinated delivery systems could evolve in Ontario. This will cause significant inefficiencies and market participant confusion. The opportunity to avoid just such an outcome is one of the great opportunities before OPA. It is perfectly possible, in the alternative, for OPA to develop partnerships with local LDCs that support and reward local creativity and initiative, but still provide a framework of comprehensive and consistent services throughout the Province.

through 2008, OPA has yet to finalize which programs and at what level it is contracting with Hydro One distribution for CDM delivery in 2008![46]

2. **What are the roles for different parties?** While the OPA may not have fully developed its proposal for the roles to be played by different partners, it would be immensely helpful to define the broad categories of activities it wants to accomplish and what kind of contractors it wants to have provide them.

For example, if the OPA sought to develop the LDCs, (or some other body that delivers CDM services on the ground) as the direct delivery entities, it would be essential to identify the kind of regional and province-wide services required to support effective local delivery.

Developing a marketing image and "brand" that was recognized province-wide, and was reflected in all local program efforts would be one such service which I understand that OPA has started to do.

Work with very large customers, as OPA has attempted to do by contracting with certain trade associations might be another province-wide activity. Work on producing consistent measure assessment and characterization, and standardizing identification systems, such as Energy Rated Homes, Energy Star identification, Home Performance with Energy Star (used commonly in the US) are examples of such services. The point here is to coordinate these regional and province-wide services in a manner that supports and increases the effectiveness of local implementation efforts.

In a similar manner, OPA could contract with vendors who would offer local implementation entities pre-packaged services on reasonable terms such as

[46] Conversation with Marion Fraser, former Policy Advisor to the Minister of Energy.

refrigerator turn-in programs, Project Porchlight, and specialized services for market sub-sectors (grocery stores, national accounts, etc.)[47]

Finally, OPA could conduct solicitations for other CDM services that would enable local implementation entities to offer (for instance) CHP analysis and support, renewable energy assistance and demand-response programs that were consistent, high-quality province-wide offerings that were integrated with efficiency offerings. While OPA has certainly undertaken some of these initiatives, it has offered no roadmap and longer term framework that partners such as LDCs can rely upon to allow them to understand how much and in what way to ramp up their resource commitments.

Q: What role can OPA play to support broad and effective CDM implementation?

A: Simply put, OPA can put out the message that stable, long-term funding will be made available for high-performance implementation. No other single message is more important. Instead OPA appears to be cautious and more regulatory than innovative.

OPA can also become the advocate for policies at the Provincial and national level that support broad diffusion of efficiency and other CDM resources. It can also be an advocate for eliminating legal and regulatory obstacles to adoption of CDM. This would entail a major human resource commitment to support

[47] A study commissioned by the Conservation Bureau and provided on May 11, 2006, by Kelleher Environmental proposed a model for a province-wide program for Refrigerator Retirement and Replacement based on an extensive study of best practices throughout North America. This study on page 36 outlines a very specific approach that includes just the kind of partnership relationship between OPA and LDCs that could be a model for sustained province-wide programs. If run aggressively province-wide in partnership with LDC's this could be an excellent initial partnership program to meet the dual goals of securing high peak savings, and building a model for partnership between the LDCs and the OPA. I note that on page 20 of Exhibit B-2-1 the "Great Refrigerator Roundup" is listed as one of four summer peak-focused programs that is being run in partnership with the electricity LDCs.

research on a broad range of measures and to press for change with the various regulators and legislators.

OPA appears to be contracting for assistance in code and standard development, but it could expand that work to provide training, certification and marketing at the provincial level that would mesh with new construction implementation strategies at the local level.[48]

OPA appears to see the Conservation Bureau as its primary messaging agent to Ontario to create a "conservation culture," but it would be more significant to deliver in addition a less public but even more powerful message that the advocates and implementers of CDM will have consistent, effective support from an organization that will be their ally by providing needed funding and assistance in the regulatory and political processes. [49]

The OPA could help develop and facilitate access to new revenue streams from CDM implementation. In the United States, renewable portfolio standards, and funds from forward capacity markets are providing new revenue sources to fund CDM programs.

Q: Does OPA show any understanding of how it can create the right incentives or CDM delivery entities to do their jobs well?

[48] There is some evidence that OPA is moving aggressively on this front. See Exhibit GEC-SHP-1, Schedule 7 which is OPA's response in Tab 12, schedule 16. Just how much coordination with other program initiatives there is is still unclear.

[49] On pages 45 and 46 of Exhibit C-7-2 OPA presents a useful list of the barriers that keep customers from investing in CDM, and follows it with a list of activities including many of those I have just listed that need to be provided. But in the middle of the list of key support services the same ideological assumption erupts: *"Enhance and support successful CDM delivery channels – by providing market product research to our delivery partners, by improving training, encouraging business networks, supporting research and development, supporting the diffusion of viable new energy saving products and services, and improving sector-wide capability to evaluate projects, target new markets, and deliver CDM products and information.* ***This will support the re-building of the Ontario CDM delivery industry so that intervention by the OPA can decline over time****."*

A: It does not seem to consider the issue in any significant way. For instance, it fails to address the issues of disincentives for LDCs to deliver efficiency and other CDM resources…if it wants to contract with them at all. Yet jurisdictions throughout North America are increasingly realizing how important this issue is to effective CDM delivery.

Q: The OEB made it clear in its Issues Decision with Reasons that issues related to lost revenue adjustment mechanisms ("LRAM") and shared savings mechanisms ("SSM") incentives are not to be litigated in this proceeding. Are you disagreeing with the Board?

A: I am not. I do not think this proceeding is the appropriate setting in which to litigate the design of an effective decoupling mechanism, or the design of appropriate performance incentive mechanisms for local utilities.

If, however, OPA does seek to develop an effective and sustained working partnership with LDCs in the delivery of CDM services, it will have to address these disincentive/incentive issues head on. As far as I can tell they are not even identified as a matter of concern by the OPA. If the OPA is serious about CDM implementation it will have to recognize the power of these mechanisms and take a lead on these issues immediately.

Q: Why are these concerns so important?

A: LDCs will not become strong, active partners in CDM implementation until they operate in a financial and regulatory system in which the economic and regulatory risk of lost revenue from CDM has been removed.[50] I have attached as Exhibit GEC- SHP-5, a paper by ACEEE entitled: *"Aligning Utility Interests with Energy Efficiency Objectives: A Review of Recent Efforts at Decoupling and Performance*

[50] Please note that conventional decoupling efforts have been focused on the revenues lost to utilities from customer efficiency investments. CDM as defined by the OPA brings new and additional opportunities for LDCs to lose revenues (from fuel switching, CHP and on-site renewables) and from efforts of others that affect utility load and that could benefit from LDC cooperation. In addition, the more aggressive the CDM resource acquisition is, the greater the perceived financial risk to the LDC will be.

Incentives" by Martin Kushler, Dan York, and Patti White, Oct. 2006, Report # U061. This study reviews the recent efforts to provide decoupling and performance incentive mechanisms in North America.

I would point out that the LRAM mechanism now in place in Ontario has been widely discredited and is being abandoned in most jurisdictions (see page 6 of the paper). I understand that Hydro One has not even applied for an LRAM as it cannot distinguish what load impacts will flow from its own versus OPA's other efforts.

Let me emphasize again that while I do not think this issue should be litigated or decided in this proceeding, OPA's failure to identify it as a vital component of its relationship to LDCs is an indication of its failure to design a structure that will provide effective sustained CDM implementation. My suspicion is that since the OPA assumes resource procurement programs will be able to wither away, or at least shrink significantly; it sees no need to address the LDC incentive issues.[51]

This failure on OPA's part provides an excellent example of the self-fulfilling prophecy dynamic of its wait-and-see attitude toward exceeding the Directive savings targets. By failing to identify the disincentive issue, LDCs will have less incentive to participate in CDM programs, and limited success will be an indication that there is less CDM to be gained than expected.

I urge the OEB to acknowledge that if LDCs are to continue CDM program delivery either through OPA funding or funding allowed by the OEB, this issue must be addressed. If it is not, I suspect that there will be limited requests for

[51] I have also not investigated whether existing LRAM and SSM provisions would adequately address the revenue erosion treatment required to address the loss of sales from CHP, fuel switching and on-site renewable generation. I do not know whether existing SSM systems reward performance for these components of CDM. Clearly this issue needs to be addressed if there is to be sustained and integrated CDM delivery by LDCs. Even if LDCs are not the primary delivery entities, the erosion of sales will still affect them and their relationships to customers, and should be addressed.

funding by LDC's, and reluctance on their part to develop stronger partnerships with OPA-funded programs.

Other jurisdictions, by addressing these utility disincentive and incentive issues, and by adopting aggressive CDM strategies are helping utilities evolve into strong customer allies, partnering with them to gain deep customer savings and societal benefit in what is an emerging redefinition of the utility mission.[52] I would consider the laying out of such a vision for Ontario utilities to be truly an innovative strategy.

Q: Does OPA indicate that it understands how to develop long term relationships that get the best performance out of its contracting entities?

A: The issue of how to secure excellent performance from contractors includes lessons 3, 4 and 5 discussed in Exhibit GEC-SHP-4. Lessons 3 (creating the right performance incentive structure for contractors), 4 (creating a high level of accountability for performance) and 5 (promoting flexibility and innovation on the part of implementing entities within the terms of a performance contract) all focus on a contracting relationship that is intended to have the contractor focus its attention and effort on understanding the CDM market(s) it serves, so that there is a continuous learning process that increases CDM cost-effectiveness and the acceptance of CDM measures.

Contract terms for implementation of CDM delivery can run the risk of being very strict, bureaucratic and controlling. This might make sense when it is clear exactly what the contractor is supposed to do. But with CDM perhaps the most important thing a contractor can do (in addition to gaining savings) is to gain intelligence about what the market needs and how it will respond. Early in the CDM program design of electric utility efforts, the drive was often to prescribe in great detail just

[52] While I do not discuss the "smart grid" concept in this paper, I do believe that addressing these disincentives will help in the development of this concept and the efficiency and distributed resource acquisition it can both facilitate and benefit from.

how a program was to be run, marketed and what the incentive levels were to be. Regulatory and utility attention focused on meeting those prescribed conditions more than on rewarding learning and intelligent modification.

When the Energy Efficiency Utility was created in Vermont the decision to move away from detailed program designs, (and eventually, even from the notion of "programs" to the concept of customer service offerings) remarkable creativity and innovation was unleashed.

OPA has a difficult challenge in that it will no doubt have to contract with multiple entities. Some of those contracts may be for very specific services in which the range of innovation could be very limited (such as an umbrella contract to offer safe, high-quality refrigerator removal and recycling). In other settings (for instance, contracts with LDC's) the range of services offered by the contracting entity could be very broad and the performance structure should simply set requirements that might include partnership in province-wide service offerings, specific tools, and communications identities (for instance) but allow wide ranges of innovation in program delivery…as long as very clear savings performance goals were met.

The original program designs suggested for the EEU implementation in Vermont re almost completely irrelevant to what the EEU now does. That flexibility to change, to target customers, unique segments of the market, and supply chains differently has been critical to the success of the EEU. A remarkable benefit of this approach to contracting is that regulatory review, battles and protracted program design fights have disappeared. So, very little time is now spent in contentious proceedings and performance has dramatically improved.

For the OPA to incorporate this approach into its contracting, it will have to recognize that CDM requires a sustained focus on offering a service the market

does not provide or generally pay for: an independent consumer-focused, patient, imaginative, impartial and responsive service that helps get the greatest benefit to the customer.

Q: Is there a discussion in the IPSP of how the OPA intends to contract for Services?

A: The OPA provided Exhibit D-10-1, which discusses IPSP authorized procurements, and Exhibit B-2-1 a paper on procurement that discussed Competitive Procurement, Standard Offer Procurement, and Non-competitive Procurement. OPA states that it prefers competitive bidding, but is not clear how it will really motivate contracting entities, private or public to develop the expertise and competence the CDM requires. There is no discussion in this paper of how different kinds of procurement might be used in coordination with one another to build a coherent system for sustained CDM acquisition that does not result in cherry picking and lost opportunities.

My concern is that a procurement process without a clear vision of what the long-erm goals are could create substantial confusion in the markets.

In the near term, I am very concerned by the comment on page 7 of OPA Exhibit B-1-1 which states:

All of the programs to meet the 2010 goals will be carried out in accordance with the directives issued by the Minister of Energy. As a result, they will not be carried out in accordance with the procurement process for which the OPA is seeking OEB approval. The mix of programs will likely change as better opportunities present themselves.

This is a very disturbing statement, because it suggests that the OPA may in fact be revamping its programs dramatically after the three most intensive years of investment. What this suggests is that not only will contractors have a short window for the contracts they sign before 2010, but they can be assured that they will have to go through a whole new process after that at a time when the projected

savings levels and funding levels are (as discussed in Section V) dramatically lowered.

Q: You are not opposed to re-bidding contracts and revising programs are you?

A: Absolutely not. I have testified above that I think performance should be the key to continuing and extending contracts. Contractors should be encouraged to revise programs themselves (within defined limits) to make them more effective.

My fear is that OPA will change contracts and contractors erratically based on its latest theory about how to deliver programs, rather than use the contract relationship to build learning and understanding and steadily support innovation, the development of competency, the retention of excellent staff, and genuine innovation over time.

Q: Please discuss the sixth lesson you discuss in Exhibit GEC-SHP-2

A: The sixth lesson is about the need for stability and sustained effort. I have discussed OPA's failure to recognize the long-term role CDM acquisition efforts will need to play in many instances. OPA's commitment to its own declining role is puzzling in the light of experience in other jurisdictions committed to securing CDM resources where the ramp-up of CDM efforts is the norm.

The June 20, 2007 ICF *Opportunity Analysis for CDM Programs in Ontario 2008-2010* (which I have previously cited) lays the proposition before OPA very clearly:

Based on our review we would suggest two other issues for the OPA's consideration as it considers future opportunities:

1. *The OPA's view of itself as a sunset organization has led it to seek market solutions which would not require continuing programs or market interventions. If the OPA feels that programs and initiatives which support development of market/capability building provide the most effective means of achieving CDM then this approach is appropriate.* ***On the other hand, it should be noted that repeated analyses of energy efficiency potential over the past 20-25 years have continued to show economic energy efficiency potential equal to 20-25% of overall energy use. While energy efficiency has made a significant contribution to energy supply over this period, much of this potential has not been achieved due (to) continuing market imperfections such as split incentives, lack of consumer information and consumer perceptions.***

> 2. ***One of the keys to a successful CDM program is continuity. As will be discussed in section 4, many "Best Practice" programs have become successful over time as they have learned from experience and refined their processes. In addition, in markets with longer investment cycles programs may need to be available over several years before achieving success. Decision makers, among end use consumers and potential allies need to have confidence that the program and any associated funding will still be available in -12 years when they are ready to act.*** (ICF Analysis, p. 17,emphasis added)

It appears that I am not the first to present this issue to the OPA. Yet the rhetoric and the planning numbers reflecting a "sunset mentality" remain in the filing. Had the OPA followed the approach presented by ICF in this proposal it would have laid the foundation for sustained delivery of programs. It would have begun to give the market players confidence that would allow them to staff up, make long-term plans of their own, and plan to be present in the market for a long period of time.

Q: Are there other OPA documents in which the need for a clear, customer focused and sustained CDM effort were identified?

A: Yes. While I have not reviewed all the comment documents of parties in response to Exhibit C-7-2, a number of comments in those exhibits addressed this concern for a long-term commitment to deploying programs.

In addition, a very interesting paper I found on the OPA web site, entitled: *"Energy Efficiency Barriers in Ontario: Listening to the 'Interval Meter Customer' View."* This paper was prepared for the OPA by Energy@Work in October 2007.

This paper is a report on a focus group with interval meter customers. It is interesting to note that the first thing the group did was refuse to restrict its discussion to the "barriers" to adopting CDM identified by OPA and insisted that all barriers to their acceptance of CDM be on the table (pp. 7, 8). I can think of no clearer example of just how customers will take over and educate implementers if implementers are really listening.

Customers discussed macro and micro barriers. The macro barriers are the structural barriers they feel need to be changed at a "macro" lever, and the micro barriers are those that can be addressed on a customer-specific basis. They urged that work be done on both fronts (p.14). Discussions of the structure of the Ontario electricity market, the confusion created by not knowing from whom they are actually buying their electricity pointed to one of the "macro" barriers.

But the resounding message was that customers needed sustained real help:

> *…CDM programs need to provide targeted sector education instead of 'spreading' limited resources across multiple platforms that provide little more than obvious platitudes on energy efficiency benefits.*
>
> *There are excellent examples and models to choose from that show how the development and harnessing of expertise produces sustainable results. Enbridge's programs provide excellent support for both commercial and industrial customers. These programs have evolved, largely by the commitment of staff which actively works with customers and channel partners to achieve sustainable savings. (p. 19)*

To summarize, OPA has had a great deal of input about the need for a sustained and coherent CDM effort. What is not clear is whether this message can overcome its apparent ideological dedication to not running sustained programs.

Q: The final "Lesson" you refer to has to do with powerful Information Technology systems. Are these systems really fundamental to good CDM implementation?

A: Absolutely. Monitoring, Evaluation and Verification ("ME&V") is simply not possible without a consistent system and set of protocols for gathering data about program performance and data.[53] Perhaps more subtle, but equally important are systems that track customer usage and interactions over time. The Vermont EEU shares data with every Vermont utility on a regular basis, and knows as any customer is being contacted what their usage and contact history has been. Though

[53] On page 25 of Exhibit B-2-1, OPA states that is "has produced a complete "Evaluation Framework" for Conservation programs that includes evaluation protocols constructed for the Ontario context. Consultation on this package will occur in late 2007. I have not been able to find this document.

OPA says a number of times that it is working on such a system it is not even clear from its filing what the broad outline of such a system would look like. The best statement I can find on the topic is in Exhibit c-7-2, page 15, where OPA states: *"Reflecting the importance of EM&V in the sector as whole, the OPA also proposed to develop a standardized reporting format that could potentially be adopted for use throughout the electricity sector, thereby enhancing overall knowledge of what is taking place in the industry."*

Frankly, this says nothing. Does the system propose to be linked to LDC customer data?[54] Has OPA pressed for regulatory rules to enable such links? Does OPA intend to require all contractors to use such a system? Does the OPA intend to develop customer confidentiality protocols to protect privacy? Will there be a system for sharing data among contractors? None of these questions are even asked, to say nothing of being answered.

The failure to set a clear goal for development of an Information Technology system will mean that it is difficult or impossible to secure benefits from CDM from future greenhouse gas trading or documentation systems or capacity payments under a forward capacity market system.

Again, the failure to even address this issue suggests the lack of commitment to developing a sustained, aggressive system that will be able to build on customer interactions and experience over time.

VII. Other Issues that OPA has addressed in limited fashion or not addressed at all.

[54] This would be an excellent reason for partnering with LDC's as the base for its delivery system. But I assume the negotiation over building such a system would be a significant undertaking.

Q: Are there other issues in the design of it CDM offerings that OPA has not adequately addressed?

A: Yes. Each of the following topics has the potential to significantly increase the effectiveness of the CDM effort in Ontario. While I recognize that not all of them can or should be addressed in detail in the IPSP, I can find no mention of some of them, and no serious consideration of others:

1. **Coordination of delivery services with Gas programs.** Clearly Enbridge and Union have considerable experience in delivering gas efficiency programs. Indeed, savings from gas programs (primarily through fuel switching and CHP, I assume) are included in the claimed 2007 savings. How will the electric services be coordinated to improve synergies in program delivery for everything from residential and commercial new construction, to retrofit, load control, and fuel switching?[55]
2. **Integrated delivery of all CDM program components.** Customers want convenience and simplicity. How can all the various programs now being offered for CDM be integrated into clear, easy-to-use and customer-friendly offerings? If this happens, savings can increase dramatically.
3. **How will OPA initiatives coordinate, build upon, and support Government efficiency programs and initiatives?** OPA indicates that Provincial (and perhaps Federal) entities are securing efficiency savings. Is there a role for OPA and other delivery partners to support and coordinate with those efforts to improve learning and synergies?
4. **How will OPA coordinate with the Ontario government's Smart Meter program.** In its 2007 Report, OPA states that by the end of 2007, about 1,125,000 smart meters had been installed by LDCs throughout the province. Does OPA have any proposals to partner with what appears to be an excellent customer-feedback system to help use its capabilities to increase customer interest in adopting CDM measures that will further reduce load, rather than just shift the hours of usage?
5. **Has OPA proposed strategies for using CDM aggressively to help with T&D load constraints?** One of the real benefits of aggressive CDM is that in addition to reducing line losses, it can help defer or avoid construction of new load-related transmission and distribution. This topic is mentioned in Exhibit E-2-3, page 5 where there is a 1-paragraph statement that CDM might help with deferral of some T&D measures, but no statement that focused, accelerated implementation is part of a strategy to make such an option work.
6. **Has OPA discussed new financing strategies to increase acceptance of CDM measures?** Astonishingly, this topic, as far as I can find, is not even

[55] There is mention of an integrated approach to fuel switching which was (in 2007) in the design phase. Exhibit B-2-1.

mentioned by OPA…though it is the subject of increasing discussion in other North American jurisdictions.

7. **Has OPA prioritized Codes and Standards as a CDM strategy?** This topic is addressed in a number of contexts by OPA but while there may be good work being done to develop new codes and standards, the piece that is often most important is assistance at the local and trade-ally level to actually gain compliance, and measures and strategies that go beyond compliance and help prepare for the next code update.

Q: Are you saying that OPA should have discussed all these possibilities in detail in its filing?

A: No, I am not. What I am emphasizing is that there is no outline of how OPA proposes to proceed in this massive undertaking that even lists these topics as critical to delivering an integrated and sustained CDM effort.

Q: Please summarize your conclusions.

A: OPA has not proposed the most cost-effective and economically beneficial proposal to meet Ontario's electric energy needs. It does not propose a comprehensive and aggressive strategy to secure all cost-effective CDM. It seems to be doing a lot of things, some of which may be good and important, without a vision of how they fit together in a coherent effort. Its language is laced with rhetorical and unsubstantiated assertions about how capacity will be built and markets transformed. Its numbers belie its rhetoric.

In sum, OPA in its IPSP is proposing an initially aggressive, but ultimately failed CDM strategy as the basis for long term planning and decision-making about other supply options. As such it runs a very high likelihood of increasing costs for Ontario customers, failing to provide opportunities for all customers to participate, and missing an exciting opportunity to strengthen the Ontario economy and the environmental performance of the energy sector. Its plan, as proposed, will increase risk, lessen flexibility, and select a sub-optimal approach to meeting the needs of the Province.

It is important that the OEB recognize and not approve the inconsistency between the asserted level of effort on CDM now under way (which, if effective, will be commendable) and the long-term plan to diminish CDM savings and increase the cost of their acquisition.

Q: Does this conclude your testimony?

A: It does.