



CRA Insights: Energy

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How to put Ontario's power market on a faster track to economic efficiency

The Ontario Independent Electricity System Operator (IESO) recently began a major stakeholdering process aimed at renewing Ontario's wholesale electricity market design. If implemented, the changes under consideration would seem to suggest a real commitment to the use of market-based mechanisms to govern the production and consumption of electricity in the future. Click [here](#) to view the IESO Market Renewal stakeholder engagement plan.

What follows are initial observations on:

- The central objective for having a market;
- The types of efficiencies achievable;
- The most promising actions; and
- Principles to guide market changes.

Each of these observations is fertile territory for discussion amongst market participants and anyone concerned with the shape of Ontario's energy markets.

The central objective of having a market

While the objective of markets is economic efficiency, it is also important to recognize the means to that objective is competition. The whole purpose for having markets (instead of say regulation) is to harness the forces of competition in allocating scarce resources.

In designing electricity markets, it's easy to get caught up in trying to design the optimal mathematical algorithm rather than understanding what is needed to properly foster a competitive environment. Furthermore, in Ontario, the concept of competition and the importance of fostering competition has been either forgotten or overtaken with the pursuit of other goals or policy objectives. If Ontario is to embark on a large market renewal initiative, it is important to remember that markets were introduced as a means to foster competition. Any other goals should be pursued in a manner that is compatible with this pursuit. If this is not achievable, we might want to rethink our objectives for having a wholesale market in the first place.

The types of efficiencies achievable

In economics, the efficiency of a market is frequently evaluated using three concepts: productive efficiency, allocative efficiency, and dynamic efficiency.

Productive efficiency (also called technical efficiency) occurs at a specific point in time if a given level of output is produced with the least amount of inputs. The Ontario electricity market achieves productive efficiency if the least cost resources are dispatched to meet demand.

Allocative efficiency occurs at a specific point in time, if resources are allocated in a way that maximizes the gains from trade or the net benefit attained through their use. This occurs when the social marginal benefit of the last unit produced equals its social marginal cost. In the wholesale market, the social marginal cost would include, for example, the marginal cost to produce the energy plus the marginal cost of emissions. In the Ontario market, allocative efficiency is largely about getting the price right for consumers so that they can make efficient consumption decisions.

Productive and allocative efficiency are static concepts as they relate to the efficiency of a market at a specific point in time.

Dynamic efficiency is concerned more with the pace of investment and innovation in a market. It involves efficient technology choice and timely and efficient capacity investment decisions both on the supply side and the demand side of the industry. In the Ontario electricity market, this would include ensuring we have the efficient supply mix, both at the transmission and distribution level given our demand profile, and that consumers are making the right investments in the technologies needed to manage their consumption.

An important consideration in designing electricity markets is the allocation of risk. If the objective is economic efficiency, then the general principle to apply when designing markets is that the risk should be allocated to those that are in the best position to manage it. This will lead to the lowest level of transaction cost used to manage the risk (productive efficiency) and foster the efficient trading of risk (allocative efficiency).

The most promising actions

It is important to consider which initiatives are likely to provide the largest gains relative to the cost of making the changes.

The introduction of locational marginal pricing (LMP) and more frequent intertie scheduling would help to improve productive efficiency. The IESO already uses their constrained schedule to dispatch resources for energy and reserve in a least cost manner. However, the unconstrained schedule for pricing has provided perverse incentives for some generators to offer into these markets at something other than marginal cost to maximize Congestion Management Settlement Credits. The introduction of LMP should help address this distortion. More frequent intertie scheduling would allow imports and exports to be evaluated at a time frame more consistent with internal resources and help improve least cost dispatch and productive efficiency. It would also offer an additional flexible dispatch response to address the variability with the additions of wind and solar.

The IESO should also consider day-ahead market and improved real-time unit commitment programs as these can also provide net efficiency benefits. There is considerable evidence on

the record that indicates these programs do not always start the lowest cost units so that there are productive efficiencies to be gained. Modifications to the IESO's ancillary services markets, such as adding a competitive real-time market for regulation services could also be added to this list. This could help ensure the least cost resources are used to address the variability caused with the introduction of increased amounts of wind and solar. Other ancillary services, such as a load-following or ramping service could also be introduced.

How material are the efficiencies in these areas?

The efficiency gains will come in the form of lower fuel costs (productive efficiency). The current and future supply mix will most likely be made up of low cost fuel. Wind, solar, hydroelectric and nuclear all have near zero marginal operating costs. Low natural gas prices mean the gas generator costs will be relatively low for the foreseeable future. The fuel cost, as reflected by the Hourly Ontario Energy Price (HOEP), represents a small portion of the overall costs of the system. So, while there may be efficiency gains in these improvements, and they may outweigh the cost of making the changes, they are most likely to be relatively small. If the province is committed to using markets and competitive forces to govern the sector, these changes should be made.

The IESO does not need to invest time in developing a forward market, where suppliers and consumers trade to manage their real-time price and quantity risk. A forward market would evolve organically as suppliers and consumers are asked to take on more risk. Today, given the extensive amount of centralized supply contracts and the involuntary hedge for consumers which is the global adjustment, the need for forward contracting is limited.

Greatest potential for efficiency gains

Currently, the wholesale market and wholesale price signals play little role in driving investment and dynamic efficiencies. Investments in supply are generally decided as a result of government directives and influenced by broader policy goals related to job creation and the environment. Government intervention creates an unmanageable risk for investors so that no investment is likely to occur absent some form of government contract. Similarly, consumption decisions around conservation are driven by administrated programs.

As mentioned previously, the largest share of the cost to operate the system (excluding transmission and distribution) is in the form of payments to suppliers to cover the fixed costs of operation and payments to cover the cost of conservation programs, all of which show up in the global adjustment. This distorts allocative efficiency as consumer pricing is based more on average cost rather than marginal costs. The current pricing system is also likely distorting the efficient deployment of technology. For example, it may hasten consumers to get off the grid to avoid the fixed costs. While the largest share of the operational costs are these types of fixed costs, there is not much ability to reduce these costs over the next 10 years or so as the province has already committed to pay for these costs through contracts and to a lesser degree, through the regulation of Ontario Power Generation (OPG).

So the opportunities to drive real economic efficiencies, dynamic efficiencies, may not be realized for several years. However, now is the time to foster the right environment to enable this to happen. In my view, this starts at the level of government.

Principles to guide market changes

In a recent article published in *The Energy Journal*, Adonis Yatchew and I argue that the deficiencies in Ontario's current system stem from the failure of successive governments to adequately incorporate two important governance and regulatory principles. The first is subsidiarity, which asserts that in a hierarchy, decisions and actions should be taken at the lowest level at which they can be executed competently. In the present context, the implication is that the government should not make choices that can be effectively made by individuals, communities, firms or associations. The second is separation, in this case, a clear separation between policymaking on the one hand, and regulation and implementation on the other.

Subsidiarity suggests that the role of government and regulation should be to correct the market deficiency, rather than supplant it with a more centralized approach. For example, the implementation of cap-and-trade, which essentially places a price on carbon, is a step in the right direction. Governments can establish targets for CO₂ emissions and then allow the markets to meet these targets in the most cost-effective way. This also means that governments need not intervene to select appropriate technologies for the energy sector.

Similarly, the IESO is best suited to ensure there is a sufficient capacity to meet their reliability requirements; governments should not do long term planning. The initial approach was to have the IESO (then OPA) do long term planning and then have the Ontario Energy Board (OEB) review the prudence of the plan. A technology-neutral capacity auction with a regular OEB review of the IESO's forecasted requirements would accomplish this. However, this is still a centralized system. One improvement could be to devolve the capacity obligation to consumers through load serving entities, who would contract in an open market with suppliers to meet their energy needs. This could still be complemented by an IESO-run capacity auction as is done in other jurisdictions.

Separation of functions and roles is the second principle. Even in a more competitive market construct, there will be a need for regulators. The IESO will need to manage grid reliability and the OEB will be needed to regulate the IESO and the licensing of participants. As the Auditor General's report suggested, governments have been over-managing the industry through Ministerial directives, rather than allowing regulators to apply sound economic principals to arrive at binding decisions. The intrinsic tensions created by intertwining policymaking with regulation and implementation are exacerbated in an industry where assets are long-lived. Governments face election pressures, which can result in decisions that, at times, are driven by short-term political exigencies rather than long-term economic or societal objectives. The Government should leave decision making on regulatory matters to the regulators who are best suited to make these decisions and take a longer view on the matters.

Realizing material gains in economic efficiency would require governments to adhere to these principles and allow the forces of competition to drive dynamic efficiency. Establishing rules and guidelines to reduce the role and likelihood of government intervention is a necessary step towards fostering a more competitive minded environment and for achieving meaningful economic efficiency improvements. Other changes could then naturally follow as the IESO (and OEB through oversight of the IESO with appropriate intervention opportunities for affected stakeholders) is allowed to put in place market mechanisms to facilitate effective competition.

What do you think?

We invite interested academics and industry practitioners to comment on these questions in an effort to further the discussion of market renewal in Ontario. We are also looking for your input to help shape the discussion of [the upcoming session on market evolution at the APPrO 2016 Conference](#).

You can either comment here on our [Linkedin discussion](#) or call or email Brian Rivard with your thoughts on any or all of the following topics.

Should fostering competition be a key consideration in our renewal of the electricity market in Ontario? If so, what needs to occur to make this happen?

What areas of efficiencies could be realized in the Ontario electricity market?

What types of changes to the wholesale market should be given priority?

What principles should be applied to govern the Ontario electricity market?

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