“Decentralizing Energy Security in Ontario”

Task Force Report on Distributed Generation

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While this paper has been approved for distribution by the members of the Task Force Steering Committee acting in their capacities as individuals, and has been shared for comment with all Task Force members, the Task Force has a varied, broad constituency and thus the paper does not necessarily in all aspects represent the views of every individual member. It is a discussion paper that should be seen as a work in progress.

The proposals in this paper are without prejudice to any regulatory hearing of any sort, and in particular are not to be taken as a pre-judgement of any positions or views taken in any regulatory discussions on transmission rate design.

For more information, visit the Distributed Generation Industry Task Force web site at:

http://ca.geocities.com/dgtaskforce/

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EXECUTIVE SUMMARY

- Distributed generation (DG) is defined as power and/or energy that is produced in close proximity to where it is consumed.

- The Industry Task Force on Distributed Generation is a voluntary ad hoc group of energy industry participants that share a belief in the value of distributed generation – and the need for more accurate reflection of this value in the electricity system.

- The current regulatory regime contains restrictions that hinder the development of economic levels of investment in distributed generation. This is because the current regulatory regime allocates most of the cost savings[1] resulting from distributed generation to persons other than the investor.

- There are significant financial and environmental benefits from widespread usage of distributed generation:

    - Reduced transmission construction
    - Reduced transmission line losses
    - Reduced distribution construction and line losses
    - Smaller, faster projects can contribute to required supply and reduce peak clearing prices
    - Improvement of average fuel use efficiency

- Obstacles to the adoption of distributed generation in the current regulatory regime result from the present regulatory and public policy treatment of upstream charges that are applied to distributed generation, specifically, transmission rates (at a total rate of .9c/kWh) and wholesale service charges (at .5c/kWh).

- Two key recommendations are as follows:

    - Investment in distributed generation creates savings in the form of reduced upstream transmission and wholesale charges. However, under the current regulatory system some of the value of these savings would go to persons other than the investor. In effect, the regulations do not allow all of the savings created by distributed generation to be enjoyed by those who install it. *The Task Force recommends* that the bulk of the savings caused by distributed generation should flow to the investor in the project. This should provide greater financial incentives to invest in distributed generation.

    - The Debt Retirement Charge (DRC) is a tax on energy consumption. Applying the DRC to clean, efficient or renewable energy discourages investment. Under any economic model, requiring consumers to pay the DRC on self generated power makes DG much less attractive and prevents these projects from proceeding. The *Task Force recommends* that the DRC not be applied to clean, efficient or renewable energy-sourced power produced by distributed generation.

BACKGROUND

The Industry Task Force on Distributed Generation is a voluntary ad hoc group of energy industry participants that share a belief in the value of distributed generation – and the need for more accurate reflection of this value in the electricity system. The value of distributed generation (DG) lies in its ability to provide generation capacity in a flexible, timely, economical and environmentally attractive manner. The Task Force believes that a more significant portion of private and public sector investment in electricity supply should be applied towards distributed generation.

In other jurisdictions the unique value of DG has been recognized with regulatory rulings, government programs and co-ordinated action plans designed to quickly increase the installed base of DG in the system. DG solutions do more than increase supply in a cost-effective way by creating efficiencies in other parts of the power system – they open doors for cleaner and more environmentally preferred forms of energy that are the focus of much of the current public attention in energy policy.

The current regulatory regime contains restrictions that hinder the development of economic levels of investment in distributed generation. This is because the current regulatory regime allocates most of the cost savings[1] resulting from distributed generation to persons other than the investor. It is sometimes thought that this approach helps to "share the wealth" brought about by private investment. This view is mistaken. The consequence of this approach is most often that the investment will not be made.

The Task Force is made up of members from the entire spectrum of the energy industry, from generators, to project developers to natural gas and electrical utilities. The consensus around the recommendations in this report is remarkable given the range of interests represented. Inevitably, due to the broad-based nature of the Task Force, views may be expressed by the Task Force that do not necessarily reflect the positions of some of the individual members. One member (Hydro One) opposes the recommendations of the Task Force.

The Task Force is intended to promote and develop ideas that will proceed in a general direction, but can not be expected to address all member concerns in all respects.

2.0 BENEFITS TO CUSTOMERS

While the Task Force believes that Distributed Generation has lasting, long term customer and societal benefits, the need to quickly revise the policies and regulatory framework flow from current supply and price issues that are likely to continue into the medium term.

Ultimately, the benefits of distributed generation flow to the customers:

- Financial Benefits:
    - Transmission construction can be reduced
    - Transmission line losses can be reduced
    - Distribution construction and line losses may also be reduced
    - Smaller, faster projects can contribute to required supply and reduce peak clearing prices
- Environmental Benefits:
    - Most green generation requires favourable treatment as Distributed Generation
    - An increase in Co-generation improves average fuel use efficiency.

Appropriate policies and a regulatory environment encouraging Distributed Generation will result in an increase in environmentally-preferable supply and contribute to reduced peak clearing prices, supporting the government's supply and environmental responsibility, reducing the cost of the price freeze for small customers, and doing so largely through market instruments.

3.0 REGULATORY ISSUES

The problems in the current regulatory regime result from the present regulatory treatment of transmission rates and wholesale service charges. Although the OEB ruled in favour of a net load billing[3] rate structure in its landmark decision of May 2000, certain difficulties remain in some of the codes and procedures which tend to block most of value of the net load billing structure for DG. The current codes and procedures in these areas for the most part have the effect of removing the essential value proposition of distributed generation: To allow customers to economically manage their power usage. The presence of these impediments is not really the result of any deliberate regulatory decision to reverse the impact of net load billing. They are generally seen as an unfortunate side-effect of the circumstances that were in effect at the time at the time the codes were being finalized, when the regulators and stakeholders were facing many other pressing issues related to market readiness which had to take precedence over DG concerns. In fact the OEB noted at the time the codes were adjusted in this respect that it would need to revisit these questions.

Fixing these problems through revised rate design is a laudable long term goal, but is not a realistic short term option. If proceedings were to start today on these issues, it is extremely unlikely that a decision would be made by the end of the year. This would mean one more year written off before investment decisions could be made to invest in new distributed generation, or even to fully operate currently existing distributed generation. Further, there is no indication at the moment that any proceeding to address these issues will be initiated in the coming year.

A number of proponents have argued that DG energy is inherently of higher value than power injected into the grid at points far from load. This idea is based on the fact that the delivered value and price of energy is usually much higher than the value and price paid at the point where it's put onto the system, frequently at a large generation plant outside of a city and far from consumers. In contrast, distributed generation is often able to provide high-quality power very close to the consumer, alleviating the need for long-distance transmission, voltage adjustment, and other costs related to the delivery of power sent from locations far away from customers. This difference between the delivered value of power and the "raw" value of power from distant sources must be better recognized if a proper economic balance is to be achieved between DG and other forms of generation.

In the Task Force's view, the most expeditious way to address this issue is for the government to correct the financial impact of the flawed regulatory design through a financial "work-around" that quantifies the system-wide avoided costs of distributed generation on a KWh basis, and credits them back to distributors, for application to DG projects.[2] This work around amounts to a credit of 1.4 c/kWh on distributed generation that is exported to the distribution system. Because distributors are pass through agents of upstream charges, it would be inappropriate to require distributors to pay these credits out of their revenue requirements.

The breakdown of the KWh charge, and the anticipated volume of power that the charge would apply to is as follows:

Table A: Returning Majority of Benefits of DG to Investors in DG Projects

	Avoided Unit Charge to be Returned to Investor (rough estimates)	**Anticipated Volume of Power Generated by DG**	**Cost of Work Around if applied to Total Anticipated Volume of Power**	**Cost of Work Around if applied to Anticipated Volume of Power Injected to Distribution System (10% to 30% of Total, or 0.16 to 0.48 billion kWh)**
Transmission Rates				
-Network	0.5 c/kWh	1.6 billion kWh/y	$8 million/y	$ 0.8 million to $2.4 million/y
-Connection	0.4 c/kWh	1.6 billion kWh/y	$6.4 million/y	$6.4 million/y
Wholesale Market Charges	0.5 c/kWh	1.6 billion kWh/y	$8 million/y	$0.8 million to $2.4 million/y
Total	1.4 c/kWh	1.6 billion kWh/y	$22.4 million	$8 million to $11.2 million

Note: These figures are broad estimates only. 400 MW of DG operating at an average of 4000 hours per year would produce 1.6 billion kWh/year. The 400 MW estimate is based on 200 MW of new DG and 200 MW of existing DG. It does not include approximately 200 MW of newly installed temporary generation.

The $22.4 million figure under the heading "Cost of Work Around if applied to Total Anticipated Volume of Power" represents what the cost would be if the work around applied to the entire out put of 1.6 billion kWh/year. However, DG power that is used for load displacement already receives the benefit of avoided transmission network rates and wholesale market charges (transmission connection rates are applied to all self generated power larger than 1 MW); it is only the portion of self-generated power that is injected into the distribution system that would be subject to the work around. With respect to existing facilities, it is assumed that more than 90% of the power is produced for load displacement and less than 10% of the power is injected into the distribution system. With respect to new facilities, it may be that up to 40% of power may be injected

into the grid. Although it is not possible to come up with a precise estimate of the amount of power injected into the distribution system and therefore subject to the work around, the above discounts the Total Anticipated Volume of Power to illustrate a scenario where a range of 10% to 30% of DG power is subject to the work around.

The rationale for fixing this issue is set out below.

The misalignment between risk and reward for distributed generation is demonstrated in the following table which compares where the credit for avoided system wide costs will fall under three scenarios: (i) where distributed generation is used only for the purpose of reducing one customer's load; (ii) where distributed generation is used to export power to a distributor (thus reducing the distributor's overall load; and (iii) where a form of load reduction other than distributed generation is used, such as simply reducing load with efficient light bulbs or similar investment.

Table B: Credit for Reductions of energy withdrawn under current regulatory regime

	Distributed Generation (Self Generation Only)	Distributed Generation (Exporting power)	Other Forms of Load Reduction
1. HOEP	√	√	√
2. Transmission Rates			
-Network	√	**X**	√
-Connection	**X**	**X**	√
3. Wholesale Market Charges	√	**X**	√

As shown in this table, all forms of load reduction capture the benefit of avoided commodity costs. The situation is less even-handed for regulated charges, specifically, the present application of transmission rates and wholesale service charges create clear disadvantages to distributed generation. These areas of disadvantage all result from unfortunate regulatory conditions which warrant careful reconsideration in the near future.

Transmission Rates and Wholesale Service Charges

Although all forms of load reduction lead to equally reduced use of the transmission system to deliver power, investments in load reductions through distributed generation are not able to capture benefits of avoided transmission costs. All customers who self generate will have the connection component of their transmission rates grossed up to include self-generated power.

The OEB's decision to "gross up" connection charges for self-generated power was made in the context of avoiding stranded transmission capacity. Although working around the "grossing up" of connection charges takes a different approach than that endorsed by the OEB, it may be that the OEB's concern that network capacity should not be by-passed has been superseded by the need to relieve reliance on the transmission grid and to increase generation capacity.

Customers who reduce their own consumption or that of any other customers through distributed generation will enjoy the benefits of reduced network charges, but only for their reduced load. If they reduce the load of the distributor, the distributor withdraws less power from the transmission system and therefore pays reduced network changes. The distributor is a pass through agent of upstream charges. In that role, the distributor

passes through the benefit of that reduced charge among other distribution customers as opposed to crediting it to the account of the generator.

The same is true for avoided wholesale service charges. Customers who reduce their own consumption or that of any other customer through distributed generation will enjoy the benefits of reduced wholesale service charges, but only for their reduced load. If they reduce the load of the distributor, the distributor (again as pass through agent) gets credit for avoided wholesale service charges. The distributor then spreads those benefits among other distribution customers.

The socialization of avoided upstream charges results from the Ontario Energy Board's treatment of this issue in Chapter 11 of the Distribution Rates Handbook. The Board recognized the temporary nature of its treatment of this issue in the Fall of 2000, in the rush to prepare for market opening, and stated that the issue "will be re-examined at a later date". It never has been.

The scale of the recommended financial work-around

The Task Force is generally of the view that the definition of DG and the rate structures applicable to it should be worked out in a proper regulatory proceeding in due course. However, in the meantime, there needs to be encouragement for efficiency and new supply, and DG is a particularly appropriate form to encourage, so temporary financial measures should be taken to reflect the kind of rate restructuring that is expected. These measures should not prejudice the outcome of a hearing, but will allow for reasonable progress in the field while awaiting a regulatory resolution.

A working definition of "qualifying distributed generation" is needed to clarify the extent to which the financial work-around can be expected to apply. Based on discussions within the Task Force steering committee, the working definition should be as follows:

Qualifying DG projects would have to be downstream of a transmission delivery point, downstream of an LDC meter or downstream of another wholesale market participant meter, and:
a) Emit less than the Ontario Ministry of Environment's existing minimum to trigger NO and SO2 controls under reg 397 (ie less than approximately 25 MW if gas-fired); and
b) Qualify for class 43.1 if they are greater than 10 MW in electrical capacity (ie have high heat rates or be renewable-based)

This is not an all-inclusive definition of DG but is intended simply to define the scope of the present work and recommendations. With such a working definition, the scale of new DG installations that would be covered by this measure is unlikely to exceed 200 MW over the next several years.

As an interim measure, calculation of the upstream savings benefit would not be based on the actual saving to the LDC (which depends on actual operations at time of LDC peak demand) but on a simplified average basis per MWh that reflects the on-peak value to the LDC, and does not add significant complexity to distributor settlement calculations.

4.0 RECOMMENDATIONS

The barriers to DG are largely related to the present regulatory treatment of transmission rates and wholesale service charges. Fixing these issues through revised rate design is a laudable long term goal, but is not a realistic short term option. If proceedings were to start today on these issues, it is extremely unlikely that a decision would be made by the end of the year. This would mean one more year written off before investment decisions could be made to invest in new distributed generation, or even operate currently existing distributed generation.

As mentioned above, in the Task Force's view, the most expeditious way to address this issue is for the government to reverse the financial impact of the flawed regulatory design through a financial work-around that quantifies the avoided upstream charges brought about by distributed generation on a KWh basis, and credits them, or at least the great majority of them, back to distributors for application to DG projects. Wherever customers produce power in Ontario and are unable to access the normal HOEP (Hourly Ontario Energy Price) because of fixed rates created by Bill 210, adjustments should be made to ensure the generation is treated like most other generation in the province and benefits from the full HOEP.

Recognition of DG under energy efficiency programs and incentives

Distributed generation is often categorized outside the domain of energy efficiency because it is viewed to be on the supply side. This has to change. Most DG/CHP technologies demonstrate fuel efficiencies in the range of 75% to 85% compared to a typical large power plant's fuel efficiency of 30% to 35%. The gain in energy efficiency is in addition to the savings associated with reduced line losses and the reduced need for T&D upgrades and expansions which we have addressed in our arguments about rate charges.

There is a need for promoting DG on the basis of energy efficiency. This may take the form of a directly sponsored government energy efficiency incentive program where the producers would be entitled to incentive dollars for each kW capacity that would displace a kW from the grid. Or it may take the form of a program that would reward any generation that may involve some form of heat recovery. Tax incentives in this area have not been as effective or motivating as direct incentives. One may argue this will be just another form of government intervention in the market. Many Task Force members would counter that in view of the existing government interventions such as the price freeze, this form of intervention on behalf of energy efficiency is not only welcomed but also necessary to move this industry forward, at least in the short term.

Debt Retirement Charge

It has often been said that applying the Debt Retirement Charge (DRC) to clean, efficient or renewable energy runs against the grain of provincial energy policy, as it discourages investment in the most environmentally attractive forms of production. A decision to rectify this can only be made by officials outside the Ministry of Energy. Distributed

generation that meets a credible test of being clean, green or efficient could be a beneficiary of any such policy.

Under any economic model, requiring consumers to pay the DRC on self generated power makes DG much less attractive. Charging this "tax" could therefore prevent these projects from proceeding. As a result, it could frustrate the achievement of the other tax incentives that the government has put in place to encourage new green generation. However, exempting these projects from the DRC recognizes that they make a contribution to fixing the problems that the DRC was meant to fund.

Put another way, the DRC is a tax on the legacy of the pre-market opening electricity regulatory regime. All Ontarians are contributing to pay off that legacy. Part of that legacy is an over reliance on centrally-planned large-scale power projects. Distributed generation makes a unique contribution to mitigating the impacts of that legacy through developing new forms of small scale power projects. The question is whether it is better to impose the DRC on power generated from clean and green distributed generation – thereby reducing the likelihood that the projects proceed, or waiving the DRC for these projects so that they can provide additional power and environmental benefits. On the assumption that approximately 200 MW of new generation is brought on through more favourable regulatory treatment, the cost of waiving the DRC on such projects is minor, especially compared to the impact of other decisions on the DRC. The DRC exemption for the approximately 400 MW assumed in this paper is approximately $11.2 million.

Footnotes:

1. This paper uses the term "savings" in a somewhat qualified way. Savings to the LDC are understood to mean "expected savings" that take the form of reduced charges to the LDC, funds that the LDC is not entitled to keep for its own operations but which it must usually pass through to its customers. Although the ultimate clearance of variance accounts will be subject to regulatory rulings, the board's preliminary determination of cost allocations would not have any savings go to a customer who reduces upstream charges through distributed generation. Savings also include the savings in WMSC that accrued to the distributor's RSVA under the provisions of the Distribution Rate Handbook, but which were redirected to OEFC under Ontario Regulation 436/02. When this paper talks about redirection of savings, it is referring to a financial work around to reflect a redirection or concentration of the amount of reduced charges on the group of its customers which are most responsible for causing the reduction in charges.

2. Although one of the ultimate objectives is to improve the returns to the investor, in terms of returning the upstream savings the distributor can only deal with its customer, who is often the "host" of the DG project. It is assumed that the customer will be able to make a more advantageous arrangement with the investor if he or she can rely on the distributor to pass through the upstream savings. In other words, the investor will ultimately be able to benefit from passing through the savings, even though the savings would initially go from the distributor to the customer or host.

3. Net load billing is the practice whereby a customer who has generation on the consumer side of the electric meter is billed for their wholesale transmission charges on the basis of their net consumption from the grid (i.e. total consumption, minus internal generation).

APPENDIX A

Member List of the Distributed Generation Industry Task Force

Almassi, Masoud; Kinectrics Inc., DG Technologies
Ander, Bruce; Markham District Energy Inc.
Anderson, Drew; Cummins Ontario Inc., Cogeneration
Andrews, J. Stephen; Toronto Hydro Corporation,
Bailes, John; John D. Bailes & Associates
Bailey, Joe; Toronto Hydro Energy Services Inc.,
Bettle, Peter; Bruce Power
Bradbury, Douglas; Canadian Niagara Power, Business
Brooks, Jake; IPPSO - Independent Power Producers' Society of Ontario
Brydon, Larry; OZZ Corporation
Buijk, Jan; GE Distributed Power, Canada
Burke, Murray; Technology Solutions Inc.
Burnham, Carole; Carole Burnham Consulting
Burrell, Carl; IMO - Independent Market Operator
Butters, Mike; MBC Energy and Environment, Energy
Button, Frank; Magellan Aerospace Corp., Industrial Gas
Chamberlain, Adam; Power Budd LLP
Chin, Edith; Enbridge Consumers Gas, Industrial
Cotrupi, Nella; Insight Information
Cowan, Nancy; OPGI - Ontario Power Generation Inc.,
Da Cunha, Ivor; Kinectrics Inc., Kinectrics North
DeJulio, Gia; OPGI - Ontario Power Generation Inc.,
Devitt, Kevin; IPPSO
Diruscio, Carmine; Enersource Hydro Mississauga
Drewes, Per; Sol Source Engineering, Photovoltaics
Drolet, Tom; DTE Energy Technologies,Inc.
Estill, Glen; Sky Generation Inc.
Fogwill, Allan; Union Gas, Customer Markets
Fraser, Bruce; Fraser Energy Consulting Inc.
Frick, Scott; St. Catharines Hydro Generation Inc.
Gibbons, Jack; Pollution Probe, OCAA - Ontario Clean Air Alliance
Goldberger, Dan; New Paradigm Capital Corp.,
Greenwood, Ellen; Greenwood Associates and CEIA Ontario
Guenther, Gary; Rodan Meter Services Inc.
Hassan, Fred; OPGI - Ontario Power Generation Inc.
Heeney, David; IndEco Strategic Consulting Inc.
Hookey, Cecil; 635294 Ontario Inc.
Jennings, Tony; PEMI - Proactive Energy Management Inc.
Krause, Art; ECCI - Environmental Communications
Lu, Richard; Toronto Hydro Corporation
Lupandin, Vladimir; Magellan Aerospace Corp.
Macdonald, Colin; Toronto Hydro, Business Planning
Madill, Dave; Technology Solutions Inc.
Manley, Mark

Marcello, Carmine; Hydro One Networks Inc.,
McArthur, Jim; Innovative Steam Technologies
McCormick, Kevin; Hydro One
McGee, Mike; Energy Profiles Ltd.
Monteiro, Ray; Sandwell Consulting Engineers Ltd.
Munro, Peter; Munro Technology
Norris, Paul; OWA - Ontario Waterpower Association
Otal, Shawn; Kinectrics Inc.,
Pattani, Naren; Hydro One Inc.
Pellegrini, Nicki; Macleod Dixon LLP
Perun, John; Pratt & Whitney Power Systems
Pietrewicz, Andrew; IMO - Independent Market Operator
Ronson, Peter; Toromont Energy Ltd.
Rothman, Mitch; Navigant Consulting Ltd.
Rouse, Scott; Energy @ Work;
Ruhnke, Wayne; Ruhnke Consulting Inc.
Rupert, William; Ernst & Young
Sandler, Jonathan; Northland Power, Business Development
Sawaya, Jean; MAN B&W Diesel Canada Ltd., Project
Sebalj, Kristi; Power Budd
Shaw, Susan; Enable Consulting Inc.
Sidlofsky, James; Borden Ladner Gervais LLP
Stasko, Bob; Science Concepts International
Stiver, Bob; Wesco Distribution
Strickland, Catherine; CIEEDAC, Simon Fraser University
Tingle, Ron; Magellan Aerospace Corp.
Tucci, Maurice; Electricity Distributors Association
Vaiciunas, Darius; Collingwood Public Utilities Commission
Vegh, George; Macleod Dixon LLP
Volling, Jurgen; JV Energy Services Ltd.
Walker, John; Mihaly International Canada Limited
Whitehead, Kevin; Whitby Hydro Electric Commission,
Wolnik, Mark; Markham Hydro, Markham Energy Corp.
Wood, Neil; Bruce Power, Power Marketing
Yang, Bunli; BY Associates/E4 Inc.
Yousef, Nabila; YES Energies