ONTARIO ENERGY BOARD

EB-2018-0287/0288

IN THE MATTER OF the *Ontario Energy Board Act*, 1998, S. O. 1998, c. 15, Schedule B;

AND IN THE MATTER OF a consultation regarding utility remuneration and responding to distributed energy resources

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Environmental Defence's Phase I Comments on Utility Remuneration and Distributed Energy Resources

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Contents

Summary

Environmental Defence strongly supports this consultation process and the Board's efforts to update the framework around utility remuneration and distributed energy resources. We believe this is an excellent opportunity to break down the barriers and disincentives to cost-effective distributed energy resources. Consumers stand to benefit though lower energy bills and lower risks associated with an overreliance on traditional supply-side investments and fossil fuels.

The Board has requested comments on the objectives, issues, and guiding principles. Environmental Defence's comments are summarized here:

Objectives

1. **Incentivize Lowest Cost Solutions:** Utilities should be incentivized to pursue or facilitate cost-effective alternatives to traditional infrastructure spending on wires and pipes.

2. **Require Lowest Cost Solutions:** Utilities should be required to pursue or facilitate cost-effective alternatives to traditional infrastructure spending.

3. **Account for DER Benefits:** All DER benefits should be accounted for in the design of rates and the regulatory framework to give customers and utilities appropriate incentives and to achieve lower energy costs.

4. **Align Incentives with Rate Design:** Rate design should align incentives and focus on promoting the most cost-effective energy systems.

Issues and Scope

5. **Include Energy Efficiency:** Energy efficiency should be considered alongside other DERs. It is like other DERs because it shifts/shaves load, can be used to avoid traditional supply-side investments, and faces similar barriers and disincentives.

6. **Include the Gas Sector:** Gas sector reforms should be considered because the gas sector presents unique opportunities and faces similar barriers and disincentives.

7. **Include a Focus on Electric Vehicles:** Electric vehicles deserve special focus to facilitate faster uptake as required by government policy and to be ready for the massive impacts on our electricity systems.

8. **Role of the Utilities:** Utilities should be encouraged to implement DERs that will benefit customers and lower bills.

9. **Role of the Regulator:** The regulator should allow and incentivize rate-regulated activities where that will benefit consumers and lower bills.

Guiding Principles

10. **Economic Efficiency:** Efficiency should be *incentivized* and *required* and all costs and benefits accounted for when considering solutions for distribution needs.

11. **Pragmatic and Customer-First Approach to Competition:** The principles should put customers first and avoid undue restrictions on utility activities and competition.

Objectives

Incentivize Lowest Cost Solutions

Environmental Defence believes a primary objective of this process should be to incentivize utilities to pursue or facilitate cost-effective alternatives to traditional infrastructure spending on wires and pipes. Distributed Energy Resources can help to avoid traditional supply-wide investments in the electricity and gas systems, which in turn lowers costs and energy bills.[1] However, utilities have a major financial *disincentive* to pursue these cost-effective alternatives.

This is a major problem, but the issue is simple. Utilities generally do not earn a return on DER alternatives that can be more cost-effective than traditional supply-side investments. Adopting a more cost-effective alternative will actually *lower* a utility's return, which is generally only earned on wires and pipes. There is a conflict of interest between utilities and consumers.

The Advisory Committee on Innovation described the issue as follows:

> Utilities should be encouraging innovative solutions, including DERs, to meet their system needs when they are cost effective to do so. However, some utilities say, under the current revenue model, that they are not rewarded equally for their own versus alternate solutions. This arises from the fact that utilities earn a rate of return on capital but not on operating expenses. Some innovative solutions involve operating rather than capital expenditures – for example, a contract for demand-response to relieve congestion. Another example, from other sectors that have undergone similar transformations, is contracting for "software as a service" and data-driven solutions rather than making large investments in computer hardware.
>
> … Without a change in the model for remuneration there is limited incentive to change from the past pattern despite the availability of new options that might provide the best long-term value for customers.
>
> Removing any incentive for the utility to prefer one kind of spending over another should also provide customers and service providers more confidence

[1] Tim Woolf, Synapse Energy, *Benefit-Cost Analysis for Distributed Energy Resources,* Prepared for the Advanced Energy Economy Institute, September 22, 2014 (LINK).

that innovative solutions will be considered equally in the utility's planning process.

We believe this should be a primary objective of this process.

Require Lowest Cost Solutions

In addition to incentives, utilities should be *required* to pursue or facilitate cost-effective alternatives to traditional infrastructure spending. Stated colloquially, the regulatory framework requires both carrots and sticks to ensure that the most cost-effective solutions are selected.

Incentives alone are insufficient. More is needed to overcome the significant organizational inertia associated with traditional planning and operations. Innovation can be a challenge for organizations and staff who have been used the traditional way of doing things.

Requirements alone are also insufficient. Attempting to force utilities to take steps that are not in their financial interest can set up adversarial hearings and greatly increase regulatory administration costs. Mandatory directions can simply be ignored in some cases. For example, integrated resource planning has been mandatory in the gas sector for almost 30 years.[2] This requires that demand side management ("DSM") be implemented whenever it is more cost-effective than traditional supply-side investments.[3] However, that is still not happening today.[4]

To make lowest cost planning mandatory, utilities could be clearly and explicitly required to:

1. Consider alternative solutions early in the planning process;

2. Show that they have considered alternatives and selected the lowest cost solution before approval for capital spending; and

3. Identify future distribution system needs asap and invite others to bid on lower-cost solutions.

There also must be realistic financial consequences for not doing so, including a reduced return on traditional investments that could have been avoided through cost-effective alternatives implemented in a timely fashion.

We believe this is an important objective of this process.

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[2] ERBO 462, Decision and Order, April 9, 1990 (Union Gas Rates); EBO 169-III, *Report of the Board on the Demand-Side Management Aspects of Gas Integrated Resource Planning*, July 23, 1993, pp. 1-4.
[3] OEB, *Decision in EB-2012-0451/0433, January 30, 2014*, p. 46-47 (GTA Pipeline); OEB, *DSM Framework*, December 22, 2014, p. 35-36.
[4] OEB, *Mid-Term Review of the Demand Side Management (DSM) Framework for Natural Gas Distributors (2015-2020)*, November 29, 2018, pp. 20-21.

Account for DER Benefits

Environmental Defence submits that the Board should ensure that all DER benefits are accounted for in rate design and the regulatory framework to give customers and utilities appropriate incentives. DERs create a number of positive benefits that are not being property accounted for. For example, distributed generation can help to avoid or lower distribution and transmission costs. If those benefits are not accounted for, opportunities to lower energy bills though DERs will continue to be missed.

This is a classic example of the market failure associated with positive externalities. DER proponents are causing benefits to others that are not reflected in the prices faced by the proponents. As a result, a sub-optimal amount of DER is being implemented. Monetizing the benefits (i.e. the positive externalities) will ensure that economic efficiency and optimality is achieved.

Benefits should be accounted for even if they are not easy to calculate. Ignoring a benefit altogether is the least accurate approach. It assumes the benefit is worth $0. It is far better to make best efforts to quantify those benefits. Synapse Energy describes this issue as follows:

> DER impacts should not be excluded or ignored on the grounds that they are difficult to quantify or monetize. Approximating hard-to-quantify impacts is preferable to assuming that those costs and benefits do not exist or have no value.[5]

One example is the challenge of quantifying the value of the risk-reduction benefits of DER from a project, portfolio, and resiliency perspective. These benefits are described by Synapse Energy as follows:

> Distributed energy resources generally result in reduced risk to the electricity system, relative to traditional supply-side resources. DERs can increase the diversity of the portfolio of electricity resources, reduce reliance upon fossil fuels with volatile prices, reduce planning risk by reducing load growth, reduce risks associated with current and future environmental regulations, and reduce risks associated with outages caused be storms and other unexpected events. Distributed energy resources also help to reduce risk through increased optionality and system resiliency. That is, through their distributed and small-scale nature, DER investments offer greater flexibility in helping the system cope with stress

[5] Tim Woolf, Synapse Energy, *Benefit-Cost Analysis for Distributed Energy Resources,* Prepared for the Advanced Energy Economy Institute, September 22, 2014, p. 36 (LINK).

> and respond to unanticipated changes in the future (relative to large, capital-intensive generation, transmission or distribution upgrades).[6]

These benefits are not as straightforward as some to calculate. However, they are just as important and can be estimated in a variety of ways, such as proxies.[7]

We believe a key objective for this process is to ensure that all the benefits of DERs are accounted for. For a list of those benefits and an example of a framework to account for those benefits, see appendix A and the report cited therein.[8]

The valuation of benefits is a technical task that will require expect input. We recommend that an expert be retained to undertake this critical work as early in the process as possible.

Align Incentives with Rate Design

Environmental Defence submits that rate design should also be employed to ensure that incentives are aligned and that efficiency is maximized. Rate design, DERs, and utility remuneration are intertwined issues. For example, some of the benefits of DERs can be captured most effectively though rate design. Similarly, rate design can help utilities respond to DERs appropriately. For example, a coincident peak demand charge would avoid the need for DER capacity reserve charges. OEB staff described this as follows:

> [A coincident peak demand charge] is closely linked to cost drivers. … The intent is to eliminate the need for specialized charging for distributed generation or net metering since the underlying distribution rate is recovery from customers according to their use. The peak demand rate would reward customers for generation on-peak but also charge them for use when their generator was down for maintenance or repair.[9]

With respect to commercial and industrial electricity rate design, Environmental Defence recommends changes to allocate as many costs as possible to a coincident peak demand charge, and as few as possible to fixed charges, while remaining consistent with the principle of cost causation. This would incentivize positive customer behaviour such as:

- Shifting load off the peak;
- Implementing distributed energy; and
- Implementing energy efficiency.

This would, in turn:

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[6] *Ibid.* p. 47.
[7] *Ibid*. p. 45.
[8] *Ibid.*
[9] EB-2015-0043, Staff Discussion Paper, March 31, 2016, p. 25.

- Make the system more efficient;
- Lower costs; and
- Contribute to lower electricity bills.

Although residential rate design was reformed recently, Environmental Defence submits that it should be reviewed again in the context of DERs. For example, a number of stakeholders discussed the need to update residential rate design to ensure that electric vehicle owners are compensated for the services they can provide to the electricity system and receive the right price signals so they will charge their batteries at the most efficient times. A greater reliance on charges at the peak would encourage residential DERs that help to reduce system costs by shifting load off the peak, such as storage and electric vehicles. We believe a number of options should be explored, including a voluntary rate plan option and broader-based rate design changes.

Electric vehicles represent a major opportunity for the electricity system but could cause unintended consequences if not managed properly. Work is needed now to ensure that the rate and regulatory framework is prepared to properly manage and fully capitalize on this major coming change.

Rate design issues could be addressed as part of this process, but if they are not, we recommend that they be addressed in coordination with this process.

Issues and Scope

Include Energy Efficiency

Environmental Defence recommends that energy efficiency be considered in this process as one of the types of distributed energy resources. Energy efficiency has the essential characteristics of a distributed energy resource because it shifts or reduces load and can be used to avoid traditional supply-side infrastructure investments.[10]

Energy efficiency should be considered alongside other DERs when considering alternatives to supply-side investments. If, for example, a utility is considering an expensive supply-side investment, it should be incentivized to select a cost-effective DER alternative, which could involve energy efficiency in whole or in part. Targeted energy efficiency efforts could be a necessary and cost-effective component of the alternative.

Energy efficiency also shares many of the same barriers and disincentives as other DERs. For example, electricity utilities have a disincentive to propose a cost-effective targeted energy efficiency alternative to a supply-side infrastructure project. Doing so would mean that they would not earn any return in relation to the project. As with other kinds of DER, electricity

[10] National Association of Regulatory Utility Commissioners, *NARUC Manual on Distributed Energy Resources Rate Design and Compensation*, 2016 (LINK), pp. 45 & 49-50.

utilities should have an incentive to implement targeted energy efficiency programs that would be more cost-effective than a traditional supply-side investments.

Including energy efficiency in the scope of this review does not involve duplication of broader regulatory processes regarding gas and electricity efficiency programs. Instead, we are recommending that energy efficiency be considered to the extent that it can help to avoid specific infrastructure projects. In this context, energy efficiency needs to be considered as part of the suite of DER solutions.

Finally, we note that the definition of DER prepared by the National Association of Regulatory Utility Commissioners includes energy efficiency.[11]

Include the Gas Sector

Environmental Defence recommends that the gas sector be considered in this process because the gas sector presents important and unique opportunities when it comes to distributed energy resources. For example:

1. DER in the gas sector provide diversification away from fossil fuels and mitigates risks associated with future environmental regulation;

2. Natural gas energy efficiency programs have historically been more cost-effective than electricity sector energy efficiency programs;[12]

3. Natural gas energy efficiency programs are underfunded in comparison electricity sector programs;[13]

4. The natural gas sector produces far more greenhouse gasses than the electricity sector;[14]

5. Natural gas DERs provide additional benefits to Ontario's economy because they replace spending on out-of-provide gas with spending on Ontario-based energy contractors and made-in-Ontario energy;

6. Avoided cost calculations in the gas sector are not complicated by the surplus baseload issues in the electricity sector; and

7. There are fewer natural gas utilities, creating economies of scale.

[11] *Ibid*.
[12] EB-2015-0049: Exhibit K6.2; Transcript Vol. 6, p. 124, lns. 7-18.
[13] EB-2015-0049: Exhibit K6.2.
[14] EB-2015-0049: Exhibit K6.2.; Exhibit M.GEC.EP.3, p. 1; Exhibit M.GEC.ED.12, attachment 1 p. 17; Transcript Vol. 6, p. 123, lns. 3-8; Transcript Vol. 4, p. 16, lns. 8-12.

Furthermore, DER in the natural gas sector faces the same perverse disincentives relating to DER as discussed above and raises the same issues relating to the role of the utilities. As a result, lessons can be learned from each sector to apply to the other.

Environmental Defence believes special attention should be paid to fuel switching in the natural gas sector. There is little to no work proceeding in this area. In particular, heat pumps are often cheaper than natural gas expansion to new communities after considering all the relevant capital and operational costs.[15] However, Enbridge has a strong incentive to pursue gas expansion over the heat pumps because it only earns a return from the former. Enbridge should be incentivized to pursue or facilitate heat pump projects where they are more cost-effective than gas expansion. Also, applications for leave to construct new pipelines should not be approved where it is established that heat pumps would be more cost effective.

Natural gas energy efficiency is also critically important. However, Enbridge plans to file an Integrated Resource Planning application in the coming months which should address energy efficiency measures that can avoid or defer infrastructure projects. Therefore, a greater regulatory gap exists in relation to fuel switching.

Include a Focus on Electric Vehicles

Environmental Defence strongly believes this process should include a working group or a similar process for focused attention on electric vehicles. The expansion of electric vehicles is going to have a massive impact on our electricity systems, cities, and buildings. This expansion is likely necessary to meet carbon reduction targets as part of our efforts to avoid catastrophic climate change. Of all the DERs, electric vehicles will likely have the most impact. This deserves special focus.

This consultation process presents an opportunity to examine electric vehicles from a coordinated and holistic perspective. Electric vehicles also need to be addressed in other processes, such as rate hearings relating to investments in infrastructure required for electric vehicles. However, a working group would help to ensure those processes are coordinated and provide high-level guidance and proactive attention to this important issue.

A focus on electric vehicles is also mandated by government policy, including the Made-in-Ontario Environment Plan. The Environment Plan calls for carbon reductions of at least 2.88 Mt CO2e by 2030 from electric vehicles.[16] It also calls for electric vehicle uptake to be facilitated by improved rules and the removal of regulatory barriers relating to charging infrastructure.[17] Of course, the OEB is not the only entity responsible for ensuring that these targets are met, rules are improved, and barriers are removed. But it has an important role to play.

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[15] EB-2016-0004, Evidence of Dr. Stanley Reitsma, Ontario's Low Carbon Future: Geothermal Heat Pumps, March 21, 2016 (LINK).
[16] Government of Ontario, *Made-in-Ontario Environment Plan*, p. 24 (The 2.88 Mt CO2e reductions are intended to be primarily from electric vehicles, but also include other low carbon vehicles "in small part." See p. 23.)
[17] *Ibid.* p. 33.

The topics to be addressed could include:

- **Infrastructure Readiness:** Electric vehicles require investments in electricity distribution infrastructure to ensure the system can handle the increased electricity demand. Steps are needed to ensure the system is ready for this and to ensure that all customers have the opportunity to convert to electric vehicles without barriers from their local distribution company.

- **Rate Design:** Rate design has an important role to play in facilitating the uptake of electric vehicles by ensuring that it is cost-effective to refuel.

- **Charging:** Pursuant to the Environment Plan mandate, the OEB should continue its work to facilitate electric vehicle uptake via improved rules and the removal of regulatory barriers relating to charging infrastructure. The LDC's also should be encouraged to develop and/or facilitate solutions to gaps in the charging market, such as customers with on-street parking.

- **Generation and Transmission Capacity:** Electric vehicle adoption will also impact generation and transmission capacity needs. Steps to address these impacts should be coordinated with other OEB work in this area.

- **Rules, Incentives, and Performance Measures:** The importance of this issue warrants specific rules, incentives, and performance measures to promote best practices across all of the LDCs.

The uptake of electric vehicles is increasing quickly. Work is needed now to sure the regulatory framework and electricity system are facilitating this process and not putting up unnecessary barriers.

Role of the Utilities and the Regulator

A major question in this process is the proper role for the utilities and the regulator. For example, many have discussed whether the utilities should be able to earn a regulated return for alternatives to traditional supply-side investments. In our view, utilities should be encouraged to implement innovative solutions that will benefit customers and lower bills. The Board should allow rate-regulated activities where that will benefit consumers and lower bills.

For example, Enbridge should be allowed to move forward with a rate-regulated geothermal program if the Board finds that it will benefit consumers. Potential benefits include: increased cost-effectiveness vis-à-vis gas expansion, helping to develop a market, capitalizing on the Enbridge brand to expand cost-effective geothermal, benefiting from economies of scale, providing greater diversification, removing the disincentive faced by Enbridge regarding alternatives to gas expansion, and others. Whether or not Enbridge should engage in this market should be answered from a customer perspective, not based on abstract principles about the proper role of the utilities and regulators.

Similarly, electricity utilities should be able to earn a return on DERs that can avoid infrastructure spending where that will benefit consumers. For example, the electricity utilities should be able to earn a return on a geographically targeted energy efficiency program that addresses a distribution system need at a lower cost than the traditional wires-based solution.

These examples consistent with a framework that would require utilities to put out DER solutions to distribution needs to competitive bidding. But if there are no market-based solutions or bids for a specific problem, utilities should not be prevented from undertaking projects that will reduce costs and energy bills.

Benefits for customers should be central. For example, some have argued that utilities should not be able to use their name when promoting DERs to customers as this would represent an unfair advantage over non-utility providers with weaker brands. We disagree. If a utility can benefit customers by promoting DERs, it should be allowed to do so. Fairness to competitors is important, but the interests of customers in keeping energy costs as low as possible is of the utmost importance.

Some stakeholders might ask for an explanation of the market failure that justifies utilities earning a regulated return on DERs. A number of market failures are at play, including externalities, imperfect information, underdeveloped markets, and skewed incentives arising from rate regulated natural monopolies. However, we do not believe it is productive to delve into arcane debates about economic theory or the instances where abstract theory diverges from reality. It is clear that mechanisms are needed to align utility and consumer interests and to fill gaps where markets are underdeveloped.

Regardless, we believe the details regarding the appropriate role of the utility and the regulator can only be determined later in this process in a comparison of various options to incentivize the implementation of cost-effective DERs. The roles of utilities and the regulator should be determined after examining the various options instead of being set in stone from the outset based on abstract principles.

Guiding Principles

Economic Efficiency

Environmental Defence submits that the guiding principles should specifically stipulate that economic efficiency be *incentivized* and *required*. This could be accomplished through the following amendment to the first draft principle:

Current Draft:	Proposed Wording:
Economic Efficiency and Performance: The regulatory framework promotes economic efficiency, cost-effectiveness and long-term value for consumers.	**Economic Efficiency and Performance:** The regulatory framework incentivizes and requires the lowest-cost solution (consistent with reliability and safety) and appropriately accounts for all relevant costs and benefits

We believe this wording strengthens the existing principle by replacing the concept of "promotion" of efficiency with the more concrete concept of requirement and incentivization.

The proposed change also specifies that all costs and benefits be accounted for. This is necessary for efficiency. If certain costs or benefits are ignored, we will not achieve the optimal result. We believe this additional detail will assist in guiding the process in the right direction.

Encourage Beneficial Innovation

The draft principle #3 speaks of avoiding measures that **preclude** alternative business models. We suggest revised wording that focuses on **encouraging** desirable innovation, as follows:

Current Draft:	Proposed Wording:
Stable yet Evolving Sector: The regulatory framework maintains the opportunity for utilities to earn a fair return; it neither precludes alternative business models that may be desirable nor impedes the entry of new entities.	**Stable yet Evolving Sector:** The regulatory framework maintains the opportunity for utilities to earn a fair return while encouraging desirable alternative business models, innovation, and the entry of new entities.

Pragmatic and Customer-First Approach to Competition

Environmental Defence does not support a principle limiting the Board to the regulation of the natural monopoly components of the sector. It is not clear exactly what this would mean. Furthermore, it is not necessary for the principles to include such specific restrictions. We also believe this puts undue focus on abstract economic arguments that may not reflect reality. As noted above, and discussed during the stakeholder conference, there is evidence that customers could benefit from utilities undertaking non-wire and non-pipe measures to address distribution needs. Prohibiting them from doing so at the outset via a guiding principle would be antithetical to the purpose of this process.

Conclusion

We thank the Board for the opportunity to make these comments. We hope this process will help incentivize utilities and customers to innovate and make energy less expensive for all Ontarians.

Appendix A
Benefits of Distributed Energy Resources

Table 18. Illustrative Benefit Valuation Options

Party Impacted	Benefits				Valuation Method		
	Benefit Category			Specific Benefits	Monetization	Proxy	Multi-Attribute
Utility Customers	1	Load Reduction & Avoided Energy Costs	a	Avoided energy generation	yes	---	---
			b	Avoided line losses	yes	---	---
			c	Wholesale energy market price suppression	yes	---	---
	2	Demand Reduction & Avoided Capacity Costs	a	Avoided generation capacity costs	yes	---	---
			b	Avoided power plant decommissioning	yes	---	---
			c	Wholesale capacity market price suppression	yes	---	---
			d	Avoided distribution system investment	yes	---	---
			e	Avoided transmission system investment	yes	---	---
	3	Avoided Compliance Costs	a	Avoided renewable energy and energy efficiency portfolio standard costs	yes	---	---
			b	Avoided environmental retrofits to fossil fuel generators	yes	---	---
	4	Avoided Ancillary Services	a	Scheduling, system control and dispatch	yes	---	---
			b	Reactive supply and voltage control	yes	---	---
			c	Regulation and frequency response	yes	---	---
			d	Energy imbalance	yes	---	---
			e	Operating reserve - spinning	yes	---	---
			f	Operating reserve - supplemental	yes	---	---
	5	Utility Operations	a	Financial and accounting	yes	---	---
			b	Customer service	yes	---	---
	6	Market Efficiency	a	Reduction of market power in wholesale electricity markets	---	---	yes
			b	Animation of retail market for DER products and services	---	---	yes
			c	Customer empowerment	---	---	yes
	7	Risk	a	Project risk	---	yes	---
			b	Portfolio risk	---	yes	---
			c	Resiliency	---	yes	---
Participants	8	Participant Non-Energy Benefits	a	Participant's utility savings (time addressing billing, disconnection, etc.)	---	yes	---
			b	Low-income-specific	---	yes	---
			c	Improved operations	---	yes	---
			d	Comfort	---	yes	---
			e	Health and safety	---	yes	---
			f	Tax credits to participant	---	yes	---
			g	Property improvements	---	yes	---
	9	Participant Resource Benefits	a	Other fuels savings	yes	---	---
			b	Water and sewer savings	yes	---	---
Society	10	Public Benefits	a	Economic development	---	---	yes
			b	Tax impacts from public buildings	yes	---	---
	11	Environmental Benefits	a	Avoided air emissions	yes	---	---
			b	Other natural resource impacts	---	---	yes

[18] Tim Woolf, Synapse Energy, *Benefit-Cost Analysis for Distributed Energy Resources*, Prepared for the Advanced Energy Economy Institute, September 22, 2014, p. 45 (LINK).

System-Wide Benefits of Distributed Energy Resources by Type

Table 6. Possible Benefits of DERs to All Customers

Party Impacted	Benefits				Resources			
	Benefit Category			Specific Benefits	Energy Efficiency	Demand Response	Distributed Generation	Distributed Storage
Utility Customers	1	Load Reduction & Avoided Energy Costs	a	Avoided energy generation	G	S	G	S
			b	Avoided line losses	G	S	G	S
			c	Wholesale energy market price suppression	G	G	G	S
	2	Demand Reduction & Avoided Capacity Costs	a	Avoided generation capacity costs	G	G	G	S
			b	Avoided power plant decommissioning	G	G	G	S
			c	Wholesale capacity market price suppression	G	G	G	S
			d	Avoided distribution system investment	G	G	S	S
			e	Avoided transmission system investment	G	G	G	S
	3	Avoided Compliance Costs	a	Avoided renewable energy and energy efficiency portfolio standard costs	G	S	G	S
			b	Avoided environmental retrofits to fossil fuel generators	G	G	G	S
	4	Avoided Ancillary Services	a	Scheduling, system control and dispatch	N	N	N	N
			b	Reactive supply and voltage control	G	G	G	S
			c	Regulation and frequency response	G	G	G	S
			d	Energy imbalance	G	G	S	S
			e	Operating reserve - spinning	G	G	G	S
			f	Operating reserve - supplemental	G	G	G	S
	5	Utility Operations	a	Financial and accounting	G	S	S	S
			b	Customer service	G	S	S	S
	6	Market Efficiency	a	Reduction of market power in wholesale electricity markets	G	G	G	S
			b	Animation of retail market for DER products and services	G	G	G	G
			c	Customer empowerment	G	G	G	G
	7	Risk	a	Project risk	G	G	G	G
			b	Portfolio risk	G	G	G	G
			c	Resiliency	G	G	G	G

N = Never ***S = Sometimes, it depends on the characteristics of the asset***
R = Rarely ***G = Generally***

19

[19] *Ibid.*, p. 21.