DEMAND RESPONSE DISCUSSION PAPER

UTILIZATION PAYMENTS

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INTRODUCTION

- IESO has retained Navigant to review the arguments for and against utilization payments, as well as explore the impacts this might have to the wider market.
- The following slides provide a summary of that work and a jurisdictional scan.

ARGUMENTS FOR AND AGAINST UTILIZATION PAYMENTS

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PAYMENT STRUCTURES

There are two payment types for DR resources: availability (per MW) and utilization (per MWh)

DR resources may receive either or a combination of both

Availability Payment

- Fixed daily, monthly, or annual payment made to DR resources in exchange for the guarantee that they will be ready to curtail their load when called upon
- Typically compensates DR provider for fixed costs associated with providing the service
- In most jurisdictions, including Ontario, availability payments are used for reliability/capacity DR

Utilization Payment

- Payment made to DR resources when they are called upon to modify their load.
- Typically based on the actual level of curtailment
- Generally intended to compensate DR resources for the variable (marginal) costs associated with providing the service
- In most regions, utilization payments are used for DR that provide economic/energy DR

ARGUMENTS FOR AND AGAINST UTILIZATION PAYMENTS

There are common arguments for and against providing a resource with a utilization payment. The arguments can be categorized as follows:

ARGUMENTS AGAINST	ARGUMENTS FOR
Wholesale Price Efficiency	Reducing Consumer Costs
Disproportional Benefits	Disconnect between Wholesale and Retail Prices
Harm to Other Suppliers	Fairness
Harm to Economy	Other Costs Associated with Curtailment

Each argument has merit, although materiality can vary

What follows are general descriptions of each argument and the underlying rational, they are not intended to be a statement of position or fact

ARGUMENTS AGAINST UTILIZATION PAYMENTS

Wholesale Price Efficiency

- *Real-time wholesale energy prices are an efficient price signal because they match supply and demand based on bids and offers on a minute-by-minute, hour-by-hour basis, and introducing an additional payment could create an inefficiency in the market because dispatchable loads would receive an out-of-market payment that could alter their bid/offer strategy.*

Considerations for Ontario: Argument only applied to loads that receive the wholesale energy price

Disproportional Benefits

- *Providing a utilization payment compensates a DR resource disproportionally relative to a supply resource, because the DR resource did not incur a cost associated with the production of electricity, as such a DR resource should be treated as if it had first purchased the power it wishes to resell to the market*

Considerations for Ontario: Argument is based on a premise that a megawatt of electricity curtailed (negawatt) is not equivalent to a megawatt of electricity
Argument assumes the cost of curtailment (or the value of lost load) for a DR resource is immaterial

ARGUMENTS AGAINST UTILIZATION PAYMENTS

Harm to Other Suppliers

- *Utilization payments will result in downward pressure on wholesale energy prices because DR resources are able to bid into the energy market at prices lower than traditional supply and will be dispatched more frequently*

Considerations for Ontario: To have a material impact on energy prices, utilization payments would have to result in a considerable increase in activation
Under the current market structure in Ontario, most generators are under contract or receive regulated rates and hence have a high degree of revenue or price certainty

Harm to Economy

- *Providing utilization payments will incentivize loads to reduce production in order to provide demand reductions into the electricity market, reducing supply of other goods in the economy and increasing prices*

Considerations for Ontario: Argument only valid for supply constrained and non-trade exposed sectors of the economy where prices are set based on local supply and demand
Ontario has a diversified and open economy that responds effectively to changes in supply

ARGUMENTS FOR UTILIZATION PAYMENTS

Reducing Consumer Costs

- *Utilization payments will increase the level of DR participation and activation, which is a less expensive form of capacity and energy than traditional supply resources, and hence will result in lower consumer costs*

Considerations for Ontario: To have a material impact on capacity or energy prices, utilization payments would have to result in a considerable increase in levels of participation and activation
Under the current market structure in Ontario, most generators are under contract or receive regulated rates and hence consumer costs are largely fixed

Disconnect Between Wholesale and Retail Prices

- *Retail prices don't reflect the real-time fluctuations in the cost of electricity and are inefficient and utilization payments are a way of improving the economic efficiency of the retail price by providing an additional financial incentive during high-price events*

Considerations for Ontario: Argument only valid for customers on retail rates and not exposed to real-time energy prices

ARGUMENTS FOR UTILIZATION PAYMENTS

Fairness

- *Generation resources receive a utilization payment in the form of an energy payment when they produce electricity and DR resources should be treated fairly and receive a utilization payment when they curtail electricity*

Consideration for Ontario: Argument is based on the premise that a megawatt of electricity curtailed (negawatt) is equivalent to a megawatt of electricity

Other Costs Associated with Curtailment

- *There is a cost associated with curtailing demand (or producing a negawatt of electricity), which is equal to the **value of lost load**, which can be higher than the avoided cost of electricity, utilization payments compensate DR resources for these costs*

Considerations for Ontario: For large commercial and industrial customers, the value of lost load can be very high, which could result in limited activation of DR resources regardless of whether utilization payments are offered

WIDER MARKET IMPACTS

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WIDER MARKET IMPACTS

Introducing utilization payments for DR can have both direct and indirect impacts on the Ontario electricity system.

Direct Impacts (Impacts to Power Markets)

- DR resources change their bids into the energy market and are activated more often
  - This would occur is Value Of Loss Load for DR resource was below system cap
- DR participation increases in both the capacity (i.e. DR auction) and energy markets
  - This would occur is Value Of Loss Load for DR resource was below system cap

Indirect Impacts (Secondary Impacts on Power Markets and Outside Power Markets)

The following indirect impacts assume direct impacts occur

- Energy prices, particularly during price spikes, likely decrease
- Capacity prices change, difficult to estimate but likely decrease minimally
- DR resources likely receive higher revenues
- System costs change, difficult to estimate but likely decrease minimally
- Production levels of goods in the economy likely decrease minimally

The indirect impacts are uncertain, what are presented above are first order impacts which would follow if the direct impacts occur. Interactive effects may also occur.

WIDER MARKET IMPACTS – DIRECT IMPACTS

DR resources change their bids into the energy market and are activated more often

- With utilization payments, DR resources would have an incentive to bid values lower than the ceiling price into the energy market as they would receive payment whenever they are activated.
- Each participating resource would have to determine the value of consuming electricity relative to their avoided cost plus the utilization payment and use that to define their bid into the market.
- Experience in other markets has shown that the impact is likely to be small for traditional DR providers but as technologies change, expanded capabilities and changing business models may result in larger impacts on bidding strategies.

DR participation increases in both the capacity and energy markets

- With the additional incentive of utilization payments, there may be increases in the amount of DR that enters the Ontario system.
- The magnitude of this impact depends on whether there is a material increase in revenue for traditional DR or if there are viable new business models that can rely on the changed incentives.

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WIDER MARKET IMPACTS – INDIRECT IMPACTS

Energy prices, particularly during price spikes, decrease

- If the utilization of DR resources increases, there will be downward pressure on energy prices.
- Impact depends on whether DR resources change their bids to be below the ceiling price or if there is significant new entry of DR resources due to the changed incentives.
- If neither of these conditions is true, then the impact on energy prices will be minimal.

Capacity Price Changes

- If DR participation in the market increases and it can meet capacity obligations, then there could be reduced need for other capacity resources. This would put downward pressure on capacity prices.
- However, reduced energy prices increase the net revenue requirement of traditional resources and they would likely increase their bids into the capacity market which could put upward pressure on capacity prices.
- The relative impacts of these two dynamics is difficult to estimate.

WIDER MARKET IMPACTS – INDIRECT IMPACTS

DR Resources Receive Higher Revenues

- With an additional source of revenue, DR resources would likely receive higher overall revenues.
- For current market participants, even if they do not change bidding strategies, they would add utilization payments when prices reach the ceiling and they are dispatched.
- The caveat to the higher revenues is whether there is a reduction in availability prices that offsets the utilization payments.

System Costs Change

- Each of the indirect dynamics discussed above change the overall system cost.
- Incremental activation payments to DR providers would increase costs. Decreases in capacity and energy prices would decrease costs. It is challenging to estimate the relative magnitude of the impacts.
- If utilization payments are, but the mix and level of DR participation and activation remains the same, then the overall ***impact of the change would be minimal***. However, if the change resulted in a large increase in participation and activation remains the same, then the overall impact of the change then the incentives ***could be a material reduction in system costs***.

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WIDER MARKET IMPACTS – INDIRECT IMPACTS

Production Losses

- With the additional source of revenue some DR resources may be incented to bid into the energy market at lower prices leading to more frequent curtailment.
- This could lead to declines in the domestic production of other goods, which in turn could change the price of these goods in the economy.
- These impacts are expected to be minimal, as jurisdictions that added or increased utilization payments did not realize a significant increase in the activation levels of DR.

JURISDICTIONAL SCAN

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TYPES OF DEMAND RESPONSE

DR is a common resource in organized wholesale power markets. In jurisdictions reviewed, participation in reliability programs is higher than economic programs.

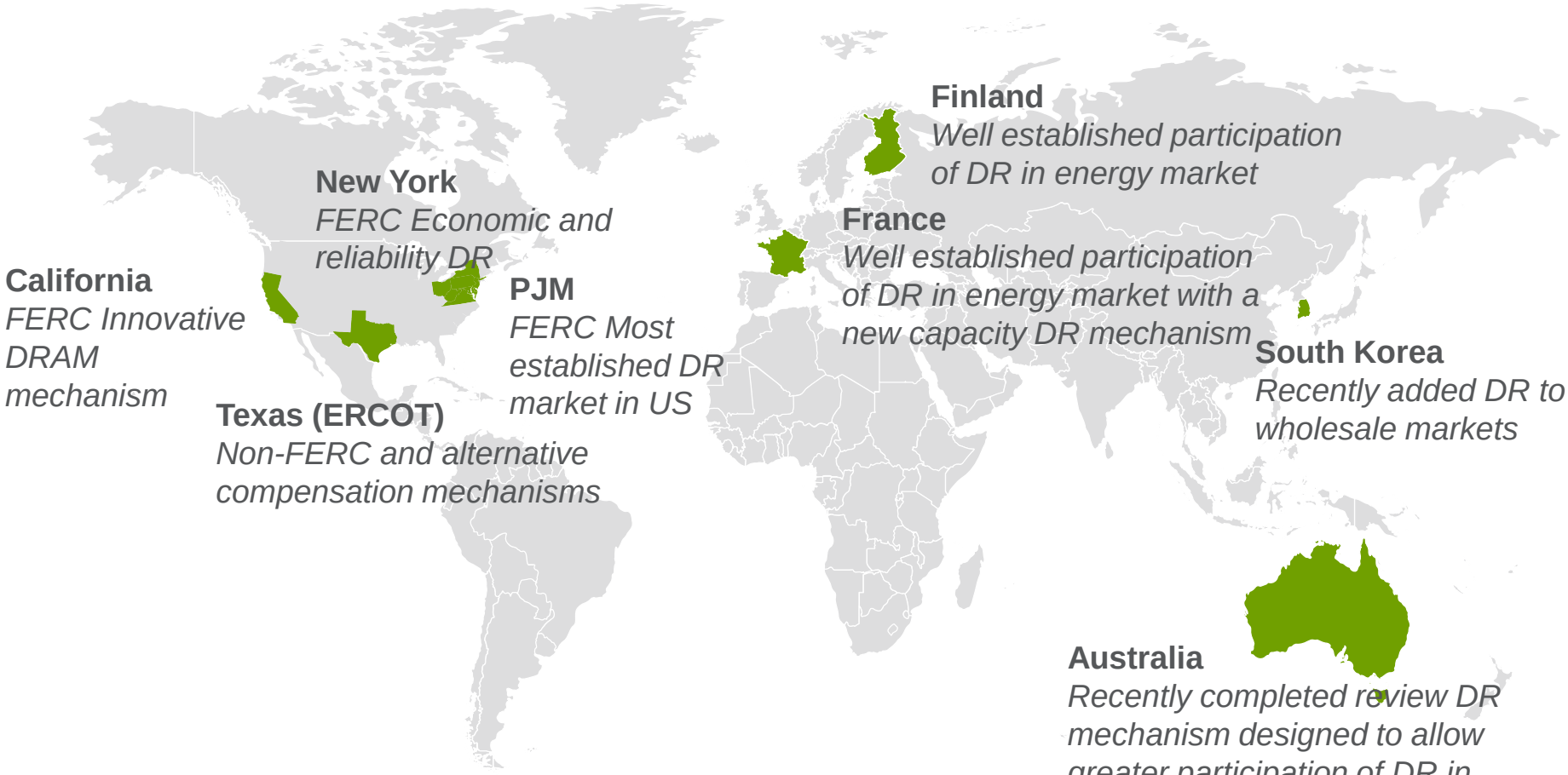
	Economic/Energy	Reliability/Capacity
Receives availability payment	No	Yes
Receives utilization payment	Yes	Maybe
Voluntary availability	Yes	No

JURISDICTION SCAN OVERVIEW

Navigant reviewed markets that have a history of DR, ideally within a power market framework.

- In many jurisdictions, the same DR resource can participate in ***both an economic/energy and reliability/capacity*** programs at the same time, which allows them to collect both availability and utilization payments.
- DR can participate in ancillary service markets in many jurisdictions, however, the requirements for these markets are very specific and the use of utilization payments in these markets is widely accepted.
- Jurisdictions reviewed were selected to cover diverse geography, payment structures, and payment levels
    - PJM
    - Texas (ERCOT)
    - NY
    - California
    - Australia
    - Finland
    - France
    - South Korea

JURISDICTION SCAN OVERVIEW



California
FERC Innovative DRAM mechanism

New York
FERC Economic and reliability DR

PJM
FERC Most established DR market in US

Texas (ERCOT)
Non-FERC and alternative compensation mechanisms

Finland
Well established participation of DR in energy market

France
Well established participation of DR in energy market with a new capacity DR mechanism

South Korea
Recently added DR to wholesale markets

Australia
Recently completed review DR mechanism designed to allow greater participation of DR in markets

JURISDICTION SCAN – RELIABILITY/CAPACITY DR

Navigant examined the features of reliability DR across all jurisdictions

- **Similarities:** provided an **availability payment** in exchange for the ability to use DR in a reliability event.
- **Differences: Also may receive utilization payments** when activated.

Key Points:

- Resources are **dispatched manually**, not by SCED
- When activated, reliability DR resources may also be **paid a utilization payment** (occurs in all jurisdictions reviewed excluding ERCOT).
- For NYISO and PJM, **participation in the reliability DR programs is significantly higher than participation in the economic DR programs**

JURISDICTION SCAN – ECONOMIC DR

Navigant examined the features of economic DR across all jurisdictions

- **Similarities:** required to bid directly into market; dispatched using ISOs' security constrained dispatch algorithm.
- **Differences:** Do not receive availability payment, receive utilization payments

Key Points:

- ***Utilization payments*** provided in all jurisdictions
- Magnitude of the utilization payment has been debated (e.g. wholesale clearing price vs. wholesale clearing price less cost of generation)
  - Jurisdictions reviewed provide wholesale clearing price however FERC jurisdictions have argued that LMP-G is more appropriate
- Variation in participation and activation levels
  - ***Participation has been lower in economic*** than reliability DR programs in jurisdictions reviewed
- Some jurisdictions have a ***floor price for DR*** bidding into the wholesale energy market (FERC Order No. 745)

JURISDICTION SCAN – DR PAYMENT MOTIVATIONS

All jurisdictions provide an availability payment for reliability/capacity DR. Where possible, Navigant also examined the reasoning for economic DR payment types.

FERC Jurisdictions

- In 2011, the FERC in the US ruled that DR resources bidding into the Day-Ahead and Real-Time energy markets should be paid the full locational marginal price (LMP) like other generation resources bidding into the markets.
- This set a requirement for California, NYISO and PJM to provide utilization payments equivalent to LMP.
- These payments are provided for energy only DR and also for reliability DR when it is activated.
- All three jurisdictions opposed FERC Order No. 745 and have suggested that LMP minus generation is a more appropriate payment level.

Non-FERC Jurisdictions

- In Australia and South Korea (where Navigant was able to complete interviews) payments are equivalent to the spot price. This incentive level was reported to have been selected based on fairness, since the DR resources are participating in the energy market like other supply resources
- In South Korea resource which also participate in a reliability/capacity DR program receive both availability payment (requiring them to be available) and utilization payments for energy DR participation
- ERCOT has a program similar to Ontario which provides an availability payment in exchange for the requirement to bid into the energy market. They have not had any participation in the program since 2014.

JURISDICTION SCAN –DR PARTICIPATION SUMMARY

Seven of the eight jurisdictions reviewed have economic DR. Lower participation in economic DR may indicate that utilization payments are not high enough to incent resources to curtail.

Jurisdiction	Economic Participation	Reliability Participation
California	160 MW	200 MW under contract for 2018/19
NYISO	0 MW (No bidding activity since 2010)	1,192 MW 2016
Mid Atlantic US (PJM)	2,096 MW in 2017 (decreasing or stagnant)	9,123 MW 2016
France	1.522 GWh (2015) and 10.313 GWh (2016)	N/A
Finland	200-600 MW Day-Ahead; 0-200 MW Intraday	N/A
South Korea	Unknown	3,885 MW 2016
Texas (ERCOT)	N/A	Only 3 events since 2008
Australia	Unknown	N/A

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