TWO-SIDED MARKET

SCHEDULING, DISPATCH AND PRICING

TWO-SIDED MARKETS #4

11 AUGUST 2020

IMPORTANT NOTES

- These slides are solely for workshop purposes only. The content provides general information to support informed stakeholder engagement and feedback.
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- The webinar is being recorded and a link to the recording will be provided after the webinar.
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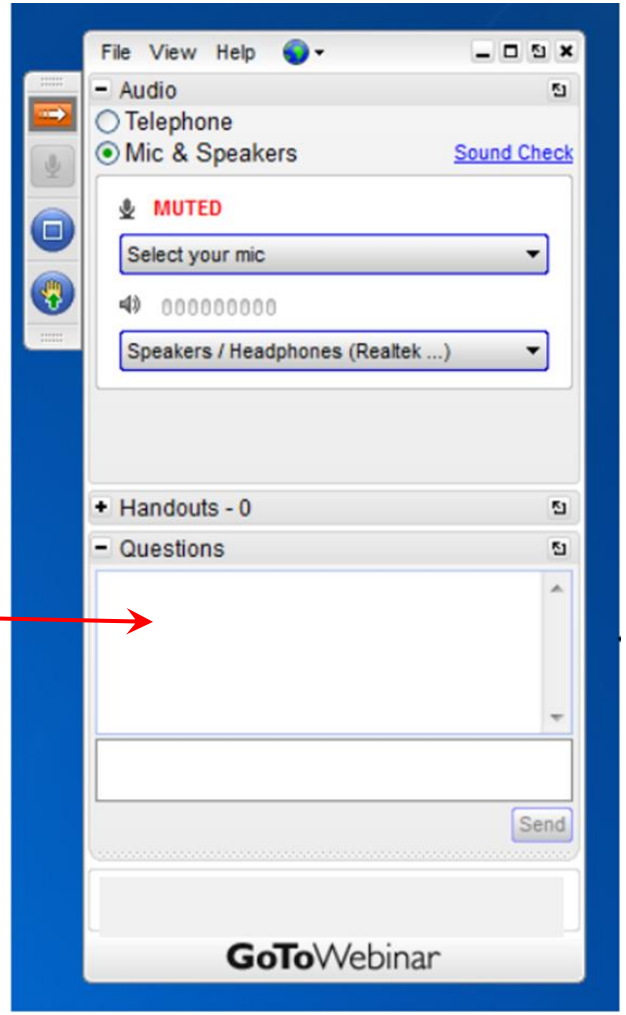
WEBINAR-WORKSHOP LOGISTICS

- All participants are currently in listen-only mode
- We will pause periodically for discussion. Please use the **Raised Hand** to signal that you would like to speak.
- If you would like to record a comment without discussion, feel free to type it into this field.



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OVERVIEW OF WEBINAR

1. Drivers for change
2. Outcomes of more active participation
3. Barriers and incentives
4. Principles for design
5. Current and evolved arrangements
6. Next steps

DRIVERS FOR CHANGE

DRIVERS FOR CHANGE

Responding to wholesale prices in real time has historically posed a challenge to most end-users and the traders representing them in the market. To respond, end users have generally needed to:

1. **Be technically equipped.** This involves having access to the appropriate pricing information, metering and tools to enable them to control activities in response to pricing signals. Without digitalisation, end users would have to manually change their behaviours.
2. **Be able to assess trade-offs.** Participating in the market requires a need to make real time considerations about how and when to trade in response to price. This means making constant assessments about the costs and benefits of withdrawing or injecting electricity now, earlier or later. This has historically meant that participation has been limited to large and sophisticated parties.
3. **Be incentivised.** An incentive to respond to wholesale prices. End users traditionally contract with a retailer to manage their engagement with the wholesale market. While this serves in managing their price exposure, it can diminish the benefits and mute incentives from responding to wholesale prices.
4. **Motivation, ability and opportunity.** These factors relate to an end users ability to be informed about the market, make choices and take actions. Although some end users may have an appetite to respond, certain factors such as type of housing, access to tools or market sentiment may dampen their ability to engage.

As such, the majority of end users have not historically been able to capture the benefits of being price responsive through greater market engagement.

DRIVERS FOR CHANGE

Generally, price responsive demand and supply is good for end users and the market. It helps align supply and demand, results in better utilisation of the power system and improves overall market efficiency – electricity is being supplied at a price where consumers want to use it.

However, under the current arrangements, almost no demand or new sources of distributed supply (solar rooftop PV; battery storage systems) participate actively in the market.

As a result, more price responsive behaviours (demand and supply) that isn't transparent or active in the market:

- Can contribute to the increase in uncertainty when balancing supply and demand across the system, both regionally and locally
- Can influence market clearing outcomes
- Reduces the number of providers participating in the provision of energy services (demand response, FCAS, ESS)

We expect these drivers to become more pronounced, due to uptake DER, batteries, better communications and control equipment.

DRIVERS FOR CHANGE

Driven by digitalisation and new business models, we foresee greater participation in dispatch via a two-sided market can enhance market efficiency and drive benefits to all end users.

- **Technological advances** will mean consumers will not need to monitor electricity prices and decide how or when to participate as these decisions are set up to happen autonomously or through a third party.
- Specific **assets** such as electric hot water, pool pumps, air conditioners, solar PV and batteries can be set and controlled remotely to withdraw or inject electricity at times at which it is most financially beneficial, without impacting the use or value end users obtain from their assets.
- These trends will be supported and accelerated by the entrance of **new services providers** and **innovative business models** (i.e. home energy management services; demand management services).
- The **market framework is evolving** in response to **changing system dynamics**, giving rise to the entrance of new essential system services and resource adequacy mechanisms within which traders can buy and sell services, maximising the value of installed assets while delivering revenue streams to end users.

OUTCOMES OF MORE ACTIVE PARTICIPATION IN DISPATCH

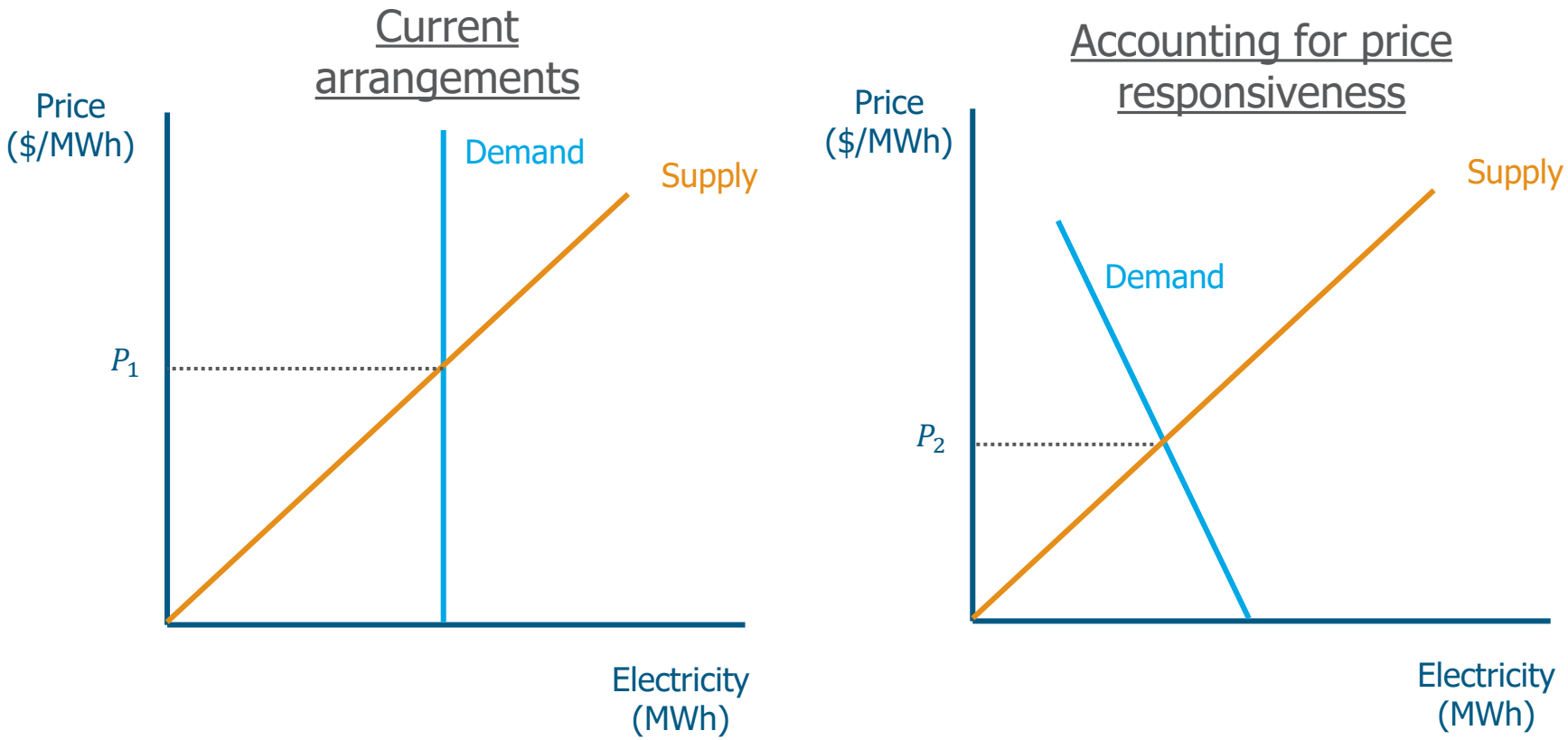
BEING PRICE RESPONSIVE AS AN END USER

- To the extent an end user can express their price responsiveness, they can generally benefit from this flexibility by engaging traders and service providers which enable:
    - Shifting when and how much they consume or supply in respect of market or network prices
    - Access to revenue from demand response schemes
    - Participation in the provision of non-energy services e.g. providing FCAS
- As noted in the drivers for changes, the barriers and costs associated with becoming price responsive are lowering.
- With the removal of these hurdles, some end users may be able to be more responsive position for certain activities or assets and engage more directly in the market.
- Trader business models will continue to evolve to support this capability and capture this flexibility in bringing it to market, customising offers and services to meet different customer preferences and levels of motivation.

BENEFITS TO THE SYSTEM OF PRICE-ELASTIC DEMAND AND SUPPLY

- Efficient consumption occurs when consumers' marginal benefit of consuming extra electricity exceeds the costs of supplying that electricity. Likewise, efficient generation occurs when the value gained in using the electricity exceeds to the cost of producing it.
- When consumers and producers make efficient decisions, it leads to an efficient clearing of the spot market. That is, the intersection of supply and demand results in a price and quantity that maximises the benefit to both producers and consumers of electricity.
- In the short term, greater demand side participation would result in demand shifting away from high price periods, reducing wholesale spot prices in peak periods, promoting competition in the wholesale market. The inverse is true whereby demand may shift actively toward low price periods.
- In the long term, efficient participation from end-users who are both consumers and producers of electricity, should lead to the development of the least-cost combination of resources to meet demand.

BENEFITS OF PARTICIPATION FROM PRICE-ELASTIC DEMAND AND SUPPLY



BENEFITS OF ACTIVE, PREDICTABLE PARTICIPATION

Active responses benefit end users and traders but the full potential and benefits to the market remain to be unlocked, partially due to the lack of transparency of these actions. By traders engaging more of these active, price-responsive activities, we can expect the market will observe:

- **Long term:** More certainty regarding demand and supply from aggregated DER may lead to avoided systems costs i.e. avoiding unnecessary extra generation, network capacity and use of mechanisms to manage uncertainty such as RERT.
- **Short term:** Shorter term demand forecasts can be made more accurate. This means reduced uncertainty for other market participants in relation to demand forecasts and price forecasts, better informing unit commitment decisions. For example, batteries would be able to make more optimal decisions, and committing to provide demand response would be easier.
- **Real-time dispatch:** Prices and dispatch levels in the market become more efficient. Without more active, predictable participation, the price could be too high because demand response wasn't accounted for or too low because load shifting hasn't been reflected. There could also be large, unanticipated changes in demand and generation. This would mean a greater reliance on or use of FCAS.

END USER PARTICIPATION IMPROVES THE SCHEDULING PROCESS

- **More efficient price discovery.** By being cleared through the dispatch engine, scheduled participants' bids and offers are accounted for in determining price and the quantity of electricity cleared for each interval. Greater demand side participation would mean the prices would increasingly be set by the demand side.
- **More efficient coordination of resources.** By submitting bids and offers in advance of real time, scheduled participants signal their intentions to other market participants. More parties signalling their intentions lead to more efficient scheduling decisions.
- **Informing system coordination under scarcity.** Having greater participation in the market enables load to be served at its real willingness to pay. This may reduce the risk of market intervention (i.e. enable excess reserves or involuntary load shedding under conditions of scarcity) lowering administration and total system costs.
- **Informing coordination of services.** The scheduling process also co-optimises the provision of different services such as co-optimising FCAS and energy provision to deliver the most efficient overall dispatch. This may be extended through the introduction of new essential system services.
- **Supporting system coordination.** Facilitate coordination across local and system-wide requirements, including across distribution and transmission boundaries.

BARRIERS AND INCENTIVES FOR PARTICIPATION IN SCHEDULING AND DISPATCH

BARRIERS TO PARTICIPATION IN SCHEDULING AND DISPATCH

Barriers which constrain the ability of end users or traders to participate in dispatch may limit both the individual and collective interests of the market. The design of a two-sided market can explore an approach for addressing and removing these barriers while seeking to establish a level playing field for participation.

Market barriers

- End users' level of market engagement (opportunity, ability, motivation)
- Ability to engage and directly access and respond to spot price signals
- Existing arrangements accommodating non-scheduled resources
- Minimum capability and operational overhead to interface with market systems
- Penalties for deviations

Technical

- Capacity to participate (AGC/SCADA/communications/smart metering)
- Minimum integer bidding thresholds
- Forecasting capability

Regulatory

- Framework for consumer protections for electricity as an essential service
- Network access and pricing arrangements

INCENTIVES

Controllable, price-responsive withdrawals and injections are not naturally motivated to participate in central dispatch (generally opting for flexibility to express their elasticity privately without being required to adopt market participation obligations for dispatch).

Incentives will play an important role in unlocking capacity and encouraging end users and traders to participate in a coordinated manner in central dispatch. Incentives include:

- Avoided cost of withdrawals when market prices > willingness to pay;
- Earn revenue from generation and set market prices for energy and system services;
- Eligibility to access multiple revenue streams (DR; co-optimisation with essential system services; RAMs, distribution service markets to manage congestion);
- Manage exposure from the allocation of non-energy costs (FCAS, RERT);
- Access to locational pricing signals.

FEEDBACK

We’re interested in stakeholder feedback on:

- The benefits or challenges from more end users’ price-responsive behaviours taking part in the market?
- The benefits or challenges from more traders participating in the market?

When considering drivers to increase participation and enable new parties to participate in dispatch:

- What is stopping more traders taking part in dispatch?
- What are other market barriers to participation in scheduling and dispatch?
- What market elements may incentivise participation in dispatch?

PRINCIPLES FOR GUIDING DESIGN

PRINCIPLES

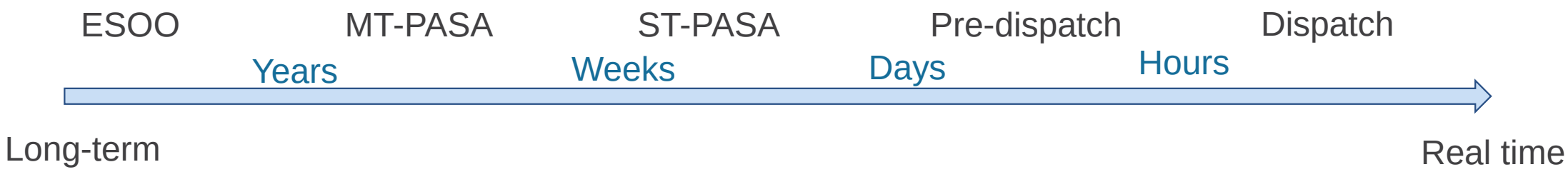
The following principles are guiding the design for arrangements to enable parties to participate in dispatch:

1. End users, via their trader, can choose to participate in dispatch.
2. A level playing field for active participation should be sought, noting constraints might apply to different connection points based on size (e.g. energy volume), scale (e.g. aggregation) and nature (e.g. electrical configuration) rather than technology or business model specific.
3. Promotion of information symmetry. End users, or their nominated trader, have access to the information required to make efficient decisions.
4. Maximise opportunities for the participation of end users and trading of services in the market . Traders should be able to participate to provide services in markets if they are technically capable of doing so.
5. Support transparent and efficient price formation.
6. Avoid perverse incentives arising from participating in selective services or markets
7. Support appropriate cost and risk allocation.

CURRENT ARRANGEMENTS FOR PARTICIPATION IN SCHEDULING AND DISPATCH

WHAT DOES BEING “SCHEDULED” MEAN?

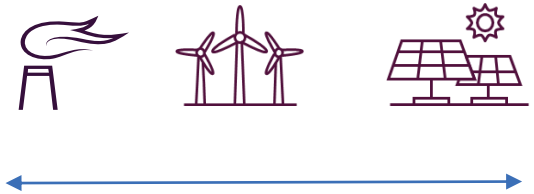
- Includes submitting information for forecasting processes, submitting bids into pre-dispatch and dispatch, receiving and complying with dispatch targets.
- Processes scheduled participants engage in include:



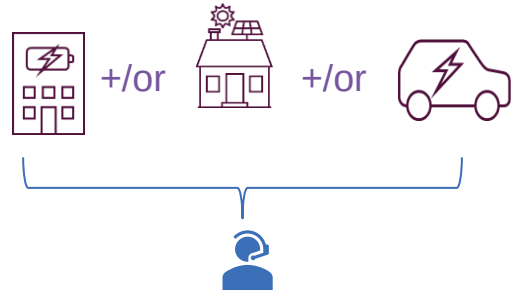
- Certain system services need and expect a high level of service provision (FCAS) that wouldn’t be relaxed for system security reasons. i.e. consequences are material for non-delivery.
- Generally, a degree of flexibility may be accommodated around conformance with energy targets i.e. dispatch of semi-scheduled generation. Arrangements such as causer pays encourages compliance with targets.
- Therefore, the obligations in relation to being scheduled differ across services.

CURRENT ARRANGEMENTS FOR PARTICIPATION IN DISPATCH – GENERATION

- Large generators (over 30MW [except for semi-scheduled category]) are scheduled.
  - AGC and SCADA feeds
  - Submit information into PASA processes; bidding in pre-dispatch and dispatch
  - Contribution factors determined for causer pays cost recovery
- Semi-scheduled generators have a varied set of obligations in relation to meeting dispatch targets. Dispatch targets are binding caps only in some intervals where AEMO has added a flag to the dispatch target.
- Non-scheduled generators, including small generation aggregators and generation from rooftop solar PV, are exempt from the requirement to participate in dispatch.
- In moving to a participation framework focused on the *services* bid in by traders, and not the assets themselves, we can explore how these same services from other types of generation sources may be aggregated to participate in dispatch



Current arrangements



Future arrangements?

CURRENT ARRANGEMENTS FOR PARTICIPATION IN DISPATCH – LOAD

Classification	Characteristics	Examples
Market load	• Non-scheduled load (price-taker) • Calculated in the regional demand forecast	• Market Customer representing residential, commercial end users
Market load > **Scheduled load**	• Equipped to submit bids and take part in central dispatch • Requires adequate telemetry / communications equipment to support the issuing of dispatch instructions and audit of responses.	Small number of scheduled loads classified in the NEM • Pumped hydro storage facilities • Grid-scale battery energy storage systems
Market load > **Ancillary service load**	• Enabled for up to eight ancillary services • Accommodates aggregated responses • Equipped to submit bids, receive instructions, be enabled (requiring control, monitoring and reporting facilities). • Meet the market ancillary services specification.	• Aggregated batteries in a VPP • Aggregated load (via MASP) • Grid-scale battery storage system
Wholesale demand response unit > **Demand responsive component**	• Equipped to submit bids and receive demand response targets • Accommodates aggregated responses • Baseline compliance • < 5MW ‘lite’ telemetry; post-event compliance monitoring • > 5MW requires SCADA feed	• Under development with industry (October 21) • Large end users

FEEDBACK

Of the range of options or approaches for participating active in central dispatch, we're interested in TWG views on:

- Where would more active participation add the most value?
- Which processes associated with taking part in scheduling and dispatch are difficult to participate in?
- What type of foresight do participants have in these processes?
- How might arrangements accommodate a future where more services are aggregated across multiple connection points?

EVOLVING ARRANGEMENTS IN A TWO-SIDED MARKET

HOW TO STRIKE A BALANCE IN HOW TRADERS ARE SCHEDULED?

- As price-responsive activities are increasingly enabled through technology and service providers, we are seeking ways to encourage these behaviours to enter the market.
- If these price-responsive behaviours contribute to become a material source of uncertainty, could it lead to greater reliance on constraints or ‘safety net’ mechanisms to account for unanticipated changes in demand or supply?
- We should be seeking to strike a balance in the framework for participating in dispatch such that participation occurs when:

  The overall benefits of price-responsive behaviours actively participating in the market is greater than the overall benefits of these behaviours occurring outside of dispatch.

- This principle would need to account for:

  The **additional private and market benefits** associated with transparent, active participation in central dispatch as opposed to responses occurring outside the market in a non-scheduled manner.

  The technical and market **requirements, costs and impacts** associated with becoming scheduled, which detracts from the net benefits.

HOW TO STRIKE A BALANCE IN HOW TRADERS ARE SCHEDULED?

Adopting feedback and engagement on this MDI, pursuing a voluntary approach would seek to focus on:

1. Removal of barriers and provision of incentives for traders to participate in dispatch
2. Reinforce existing arrangements for provision of price-responsive information and review the application of this information in market processes (i.e. DSPI)

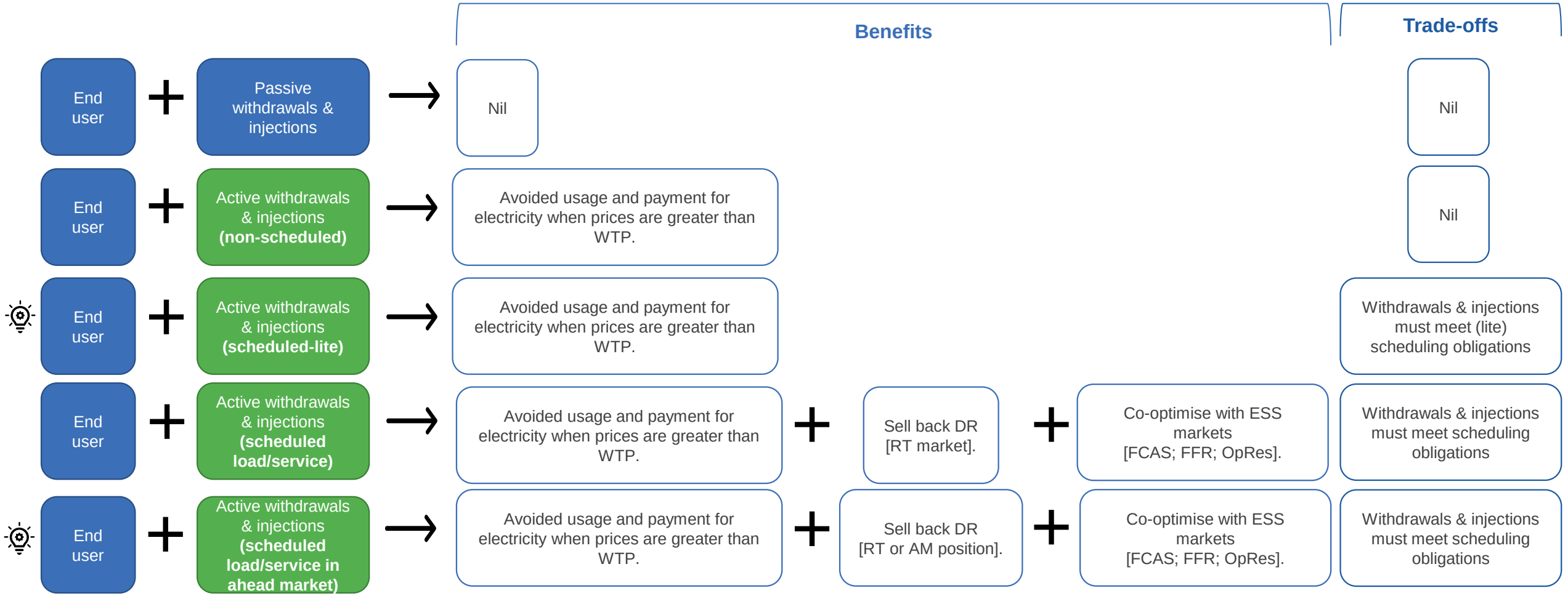
In parallel, work would explore how to:

1. Identify and quantify the costs to market efficiency of those price-responsive behaviours occurring outside of the market
2. Assess the materiality of those costs and capacity to participate in central dispatch
3. In the principle of appropriate risk and cost allocation, it could assign those costs to the party at cause where they have a capacity to participate in central dispatch

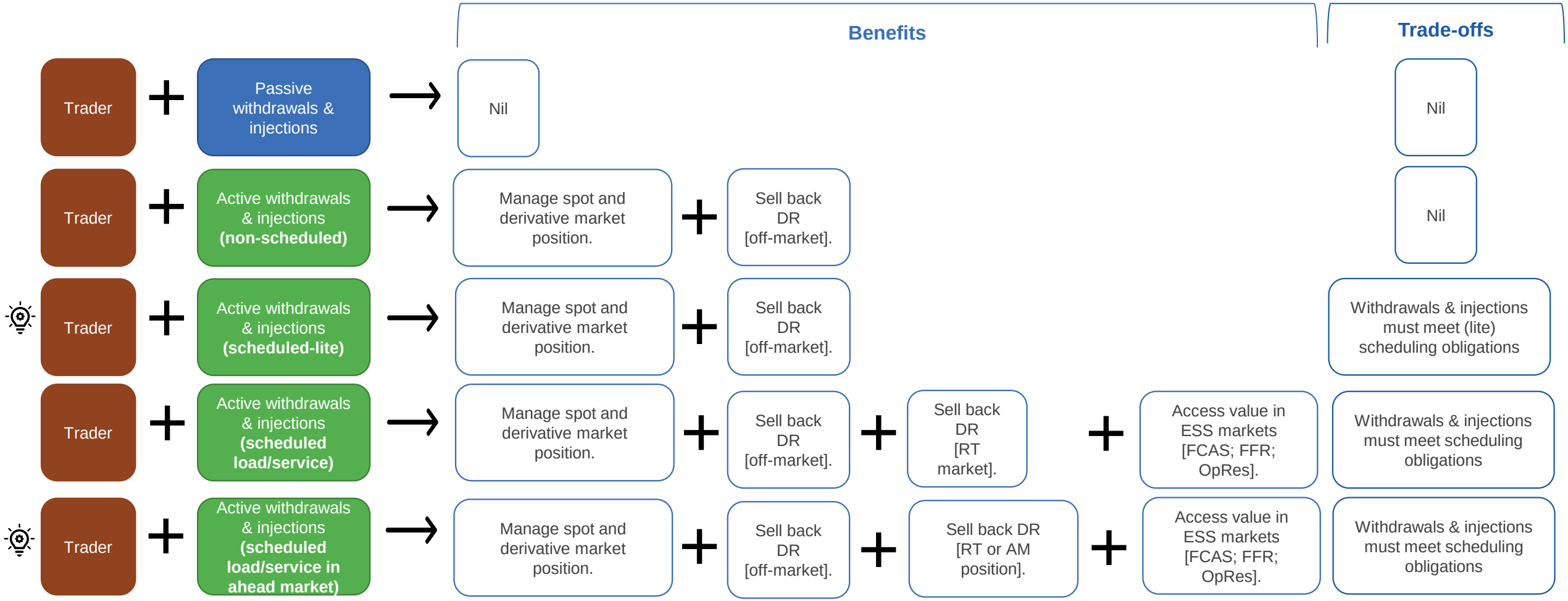
EVOLVED ARRANGEMENTS FOR PARTICIPATION IN DISPATCH

- Evolved arrangements to incentivise traders (representing end users) to voluntarily participate in dispatch are being explored.
- Some arrangements and mechanisms we are looking to explore:
  - Scheduled load model
  - Scheduled load model in a voluntary ahead market
  - Scheduled ‘lite’ model
  - Models for demand response
- We are seeking your engagement and input on the design characteristics of these types of models
- These are not be definitive and would need to evolve as the capabilities of end users and needs of the system evolve over time
- A further session will be planned next month to explore this aspect of the design element in more detail

BENEFITS AND TRADE-OFFS (*END USER EXPERIENCE*)



BENEFITS AND TRADE-OFFS (*TRADER EXPERIENCE*)



VOLUNTARY PARTICIPATION IN AN AHEAD MARKET

Voluntary ahead markets (as being explored in the Ahead Market MDI)

- Facilitate resource commitment, inter-temporal and cross market coordination.
- Determines a schedule of prices and volumes for multiple trading intervals ahead of the real-time market.

Active participation interacting with an ahead market

- Enable end users to take a position in an ahead market and lock in a price.
- Facilitate supply of demand response from broader range of customers.
- Facilitate load shifting.
- An End User with control over the energy it injects or withdraws could trade and arbitrage between the ahead market and the RT market, encouraging participation of price responsive consumers and DER.

Implications of an ahead market for end users depend on

- Type of service (i.e. is the injection or withdrawal passive or active),
- Arrangements for the voluntary ahead mechanism and forward market arrangements.
- Settlement of any deviations between AM and RT

NEXT STEPS

NEXT STEPS

ESB paper in August will contain update on this MDI and interlinkage with other MDIs

- A further technical working group on this topic which will explore evolved arrangements for participation in dispatch will be held next month (date TBD)
- Technical working group presentations on other two-sided market topics will be held over the coming months

For any questions and feedback, contact:

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