Public

P375 'Metering behind the Boundary Point' P376 'Utilising a Baselining Methodology to set Physical Notifications'

25 January 2019

ELEXON

Health & Safety

In case of an emergency

An alarm will sound to alert you. The alarm is tested for fifteen seconds every Wednesday at 9.20am

Evacuating 350 Euston Road

- If you discover a fire, operate one of the fire alarms next to the four emergency exits.
- Please do not tackle a fire yourself.
- If you hear the alarm, please leave the building immediately.
- Evacuate by the nearest signposted fire exit and walk to the assembly point.
- Please remain with a member of ELEXON staff and await further instructions from a Fire Warden.
- For visitors unable to use stairs, a Fire Warden will guide you to a refuge point and let the fire brigade know where you are.

When evacuating please remember

- Do not use the lifts.
- Do not re-enter the building until the all clear has been given by the Fire Warden or ground floor security.

Our team on reception is here to help you, if you have any questions, please do ask them.

Agenda (1 of 2)

- Welcome and Introduction
- Overview of the defect
- Exploring the consequence of inaccurate FPNs in Settlement
  - How FPNs impact Settlement
  - How FPNs are used under the Grid Code
  - Interactions and links between Settlement and Grid Code for FPNs and consequential changes to other Codes
- Review of IWAs and ToRs
  - P375 ToRs
  - P376 ToRs
  - Independence of Assets
  - Effect on Transmission System
  - Metering Standards

Agenda (2 of 2)

- How do/can the two Modifications complement/conflict with each other? (both)
  - Examples of sites that will use Baseline Methodology, operational metering at the asset or both
- Assurance Methods
  - How to ensure integrity of any Baseline Methodologies
  - Assurance techniques for operational Metering
- Next steps
  - How to fun future Workgroups re potentially combining effort

Overview of the defect

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P375:
Settlement of Secondary BM Units using metering behind the site Boundary Point

Saskia Barker, Flexitricity Ltd.

25 January 2019

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Background

- The workgroup for modification P344: Project TERRE has created a new type of BSC Party, Virtual Lead Party (VLP), and a new type of BM Unit, Secondary BM Unit
  - These allow customers to participate in the BM independent of their supplier by separating the roles of Balancing Responsible Party (Supplier) and Balancing Services Provider (VLP)
- The P344 solution requires that Balancing Services Providers (in TERRE and the BM) are settled at the metering at the Boundary Point due to time restrictions
  - The workgroup acknowledged that customer sites are often a combination of sites that can provide Balancing Service and ones that can't
  - For more complex sites there might be a more appropriate metering point behind the Boundary Point which more accurately captures the delivery of the Balancing Service
    - For example, closer to the generator or large load whose output is being varied to deliver the Balancing Service

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Issue

- The P344 solution separates the cashflows related to the roles of Imbalance Responsible Party and Balancing Services Provider, but not the metering
- The Boundary Point meter is usually associated with imbalance-related activities
- Many industrial sites have a combination of predictable, controllable loads or generation and unrelated uncontrollable loads or generation
  - Example: A waste water treatment site may have significant pumping load that must run to schedule as well as a combined heat and power (CHP) generator. The site may be able to modulate the CHP output in response to an instruction in the BM or TERRE, but an unrelated step change in the pumping load could appear to negate, or double, the measured response at the Boundary Point
  - In this case the VLP would need to know when the pumping was going to change in order to post accurate FPNs, this can be difficult since the VLP will often only have access to the CHP
    - If the VLP creates an inaccurate FPN they could be liable for non-delivery despite having delivered the Balancing Services volumes, or avoid charges when failures were masked by independent loads.
- Allowing VLPs to use more appropriate metering closer to the asset delivering the Balancing Service would mean more customers with complex sites will be able to participate in TERRE and the Balancing Mechanism

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Proposed Solution

- Amend the BSC to allow Secondary BM Units to be settled at a settlement quality Meter at a point behind the Boundary Point Meter
- The solution aims to be as similar to existing Boundary Point metering processes to both ensure the solution is as fair as possible and limit fundamental system changes required

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Proposed Solution – Metering Standards

- Standards based on the BSC Codes of Practice (CoPs) or reference the CoPs
- Metering should be subject to rules similar to the Metering Dispensation rules in BSCP601
  - Particularly for existing Balancing Services metering that is as accurate as required by the CoPs but is otherwise not quite compliant
- Losses treated similarly to Settlement Meters
  - The Line Loss Factors at the corresponding voltage level for the metering system, published by the Distribution Network Operators, will be used

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Proposed Solution – Meter Registration & Data

- VLPs will be given the ability to appoint BSC Qualified Agents, similar to the process for the Boundary Point meters
  - Specifically a Meter Operator Agent and Data Collector
- Behind the Meter metering systems will be assigned a 13-digit identifier, similar to the pseudo MPANs Data Collectors currently use for submetering
  - Elexon will keep a register of these IDs which will also record which Boundary Point meter(s) are associated with the site
- A change of VLP process, based on the change of supplier process would be established

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Proposed Solution – Assurance & Independence of Assets

- It is important that the metering point selected is truly measuring independent actions
  - Example: on a site with two water pumps, where turning one off could cause the other to switch on, the metering would need to capture both pumps.
- VLPs will be asked to obtain and keep evidence of the independence of the Balancing Services volume delivered at the metering point (e.g. Line diagrams, etc)
  - The VLP must produce these records if required for Performance Assurance purposes
- The Risk Evaluation Register would be updated to reflect any changes to Settlement Risk
- Behind the Meter metering should be treated the same as the Boundary Point Metering under the Trading Disputes process
- Depending on the outcome of the Issue 71 Baselining modification, it might be appropriate to use a baselining methodology to spot-check the independence of behind the meter Metering for Performance Assurance purposes

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Likely Impacts

- Parties
  - Virtual Lead Parties
  - Data Aggregators
  - Elexon
  - Meter Operators
- Processes
  - VLP registration processes
  - An asset meter register to be created
  - New metering data flows

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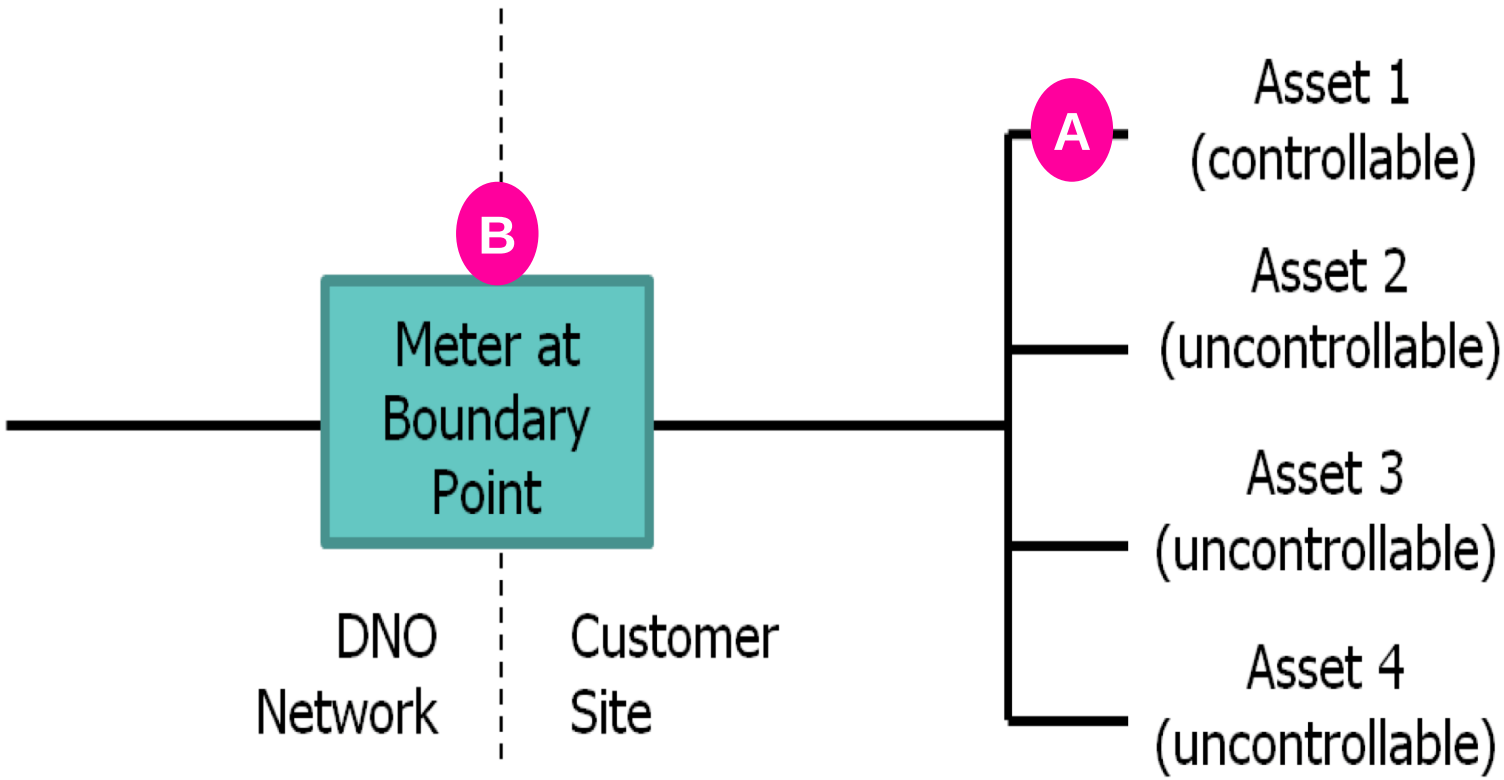
P375 & P376: What’s the defect?

Dr Paul Troughton

25 January 2019

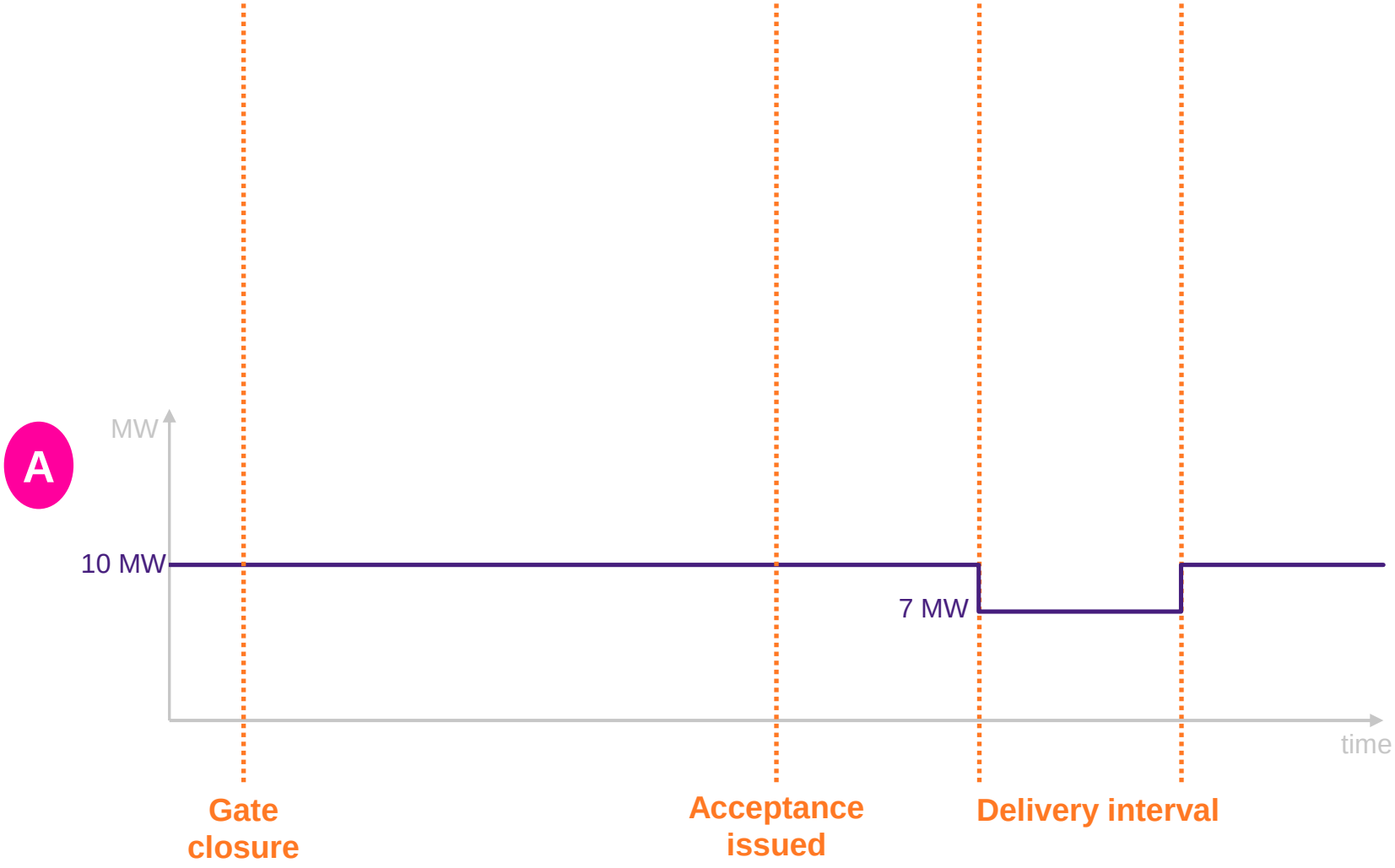
Tension over Physical Notifications

What does the PN represent – for dispatch and settlement purposes?



P375 and P376 address this same defect in ways most suitable for different sites

Worked example 1



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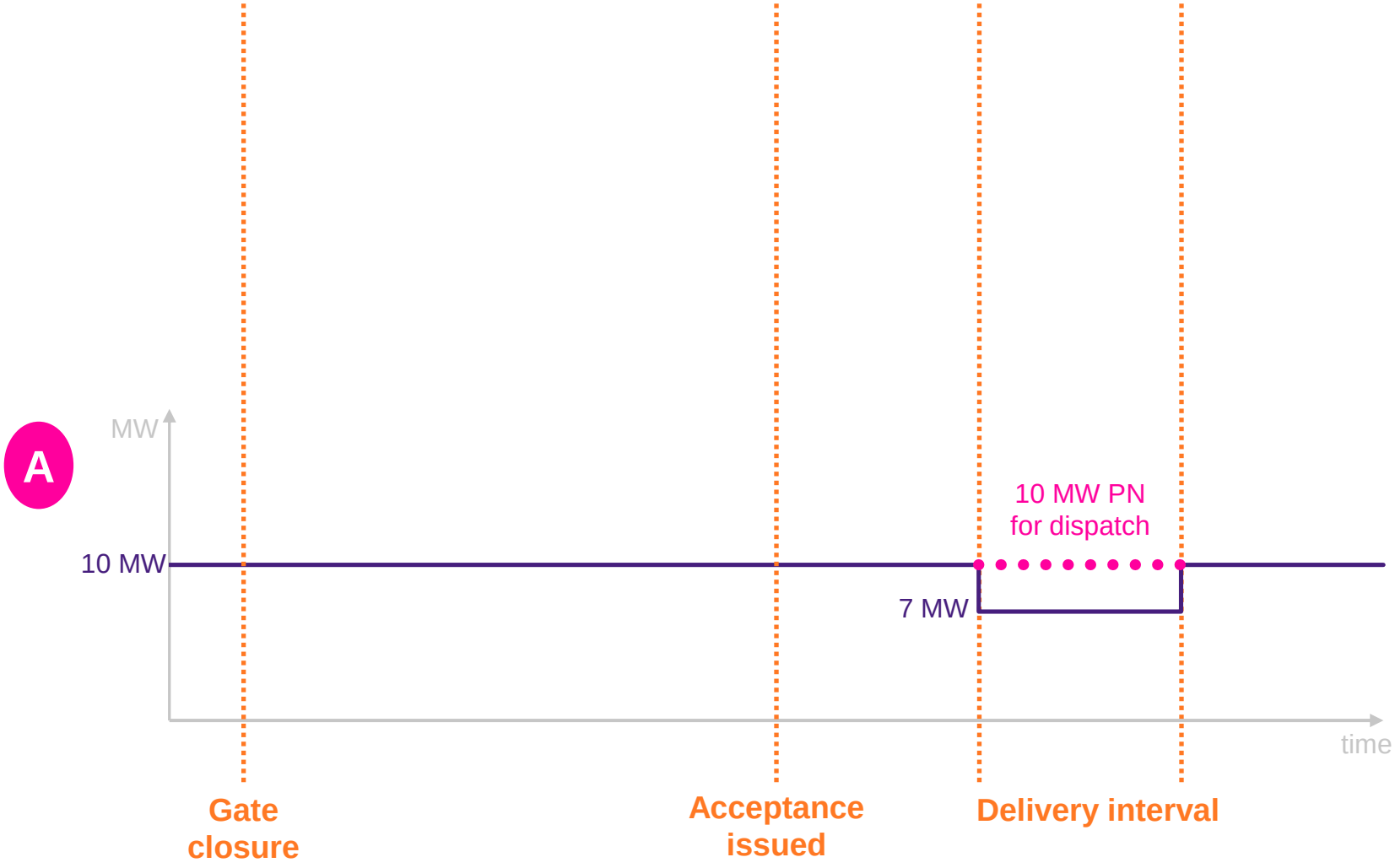

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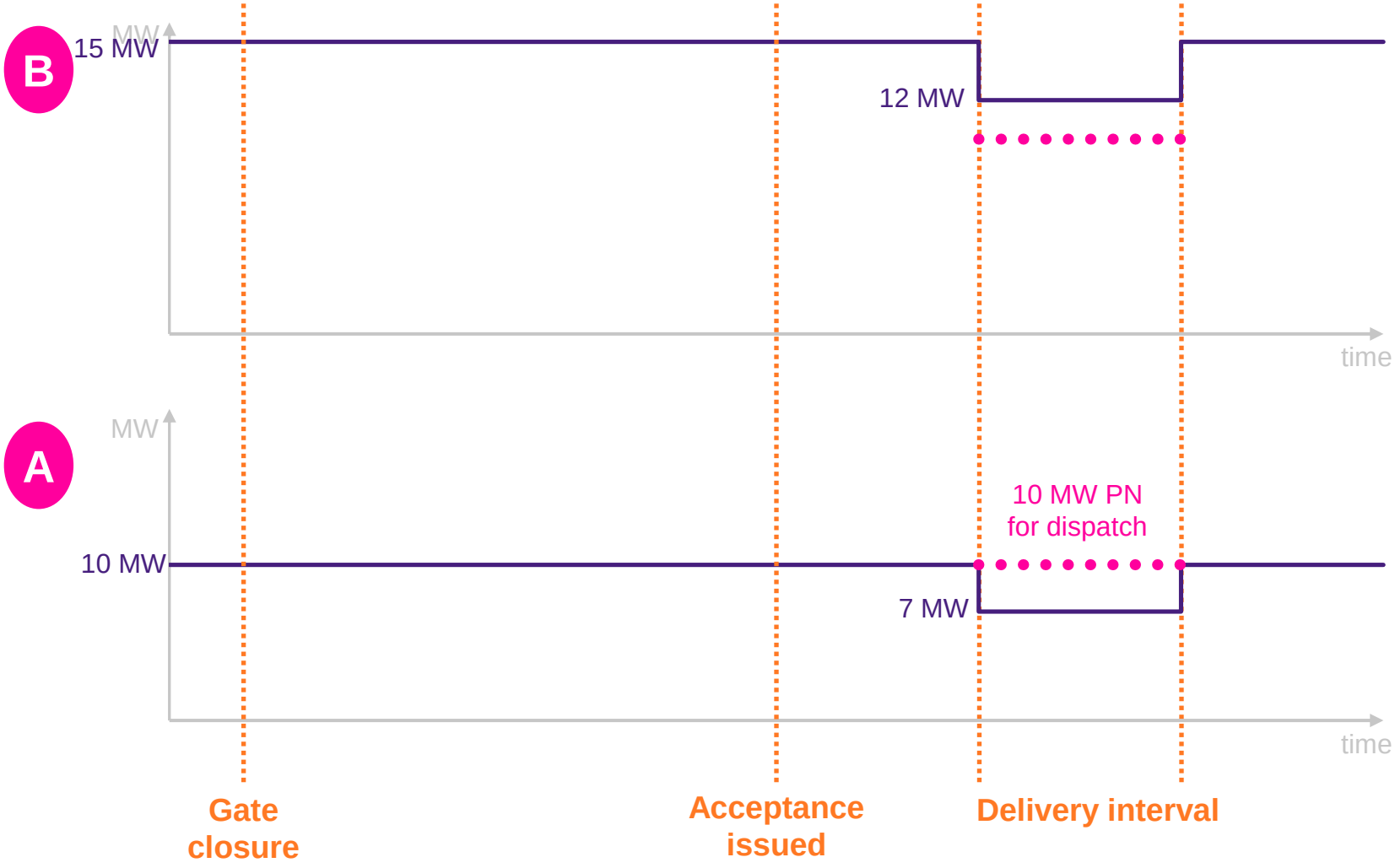

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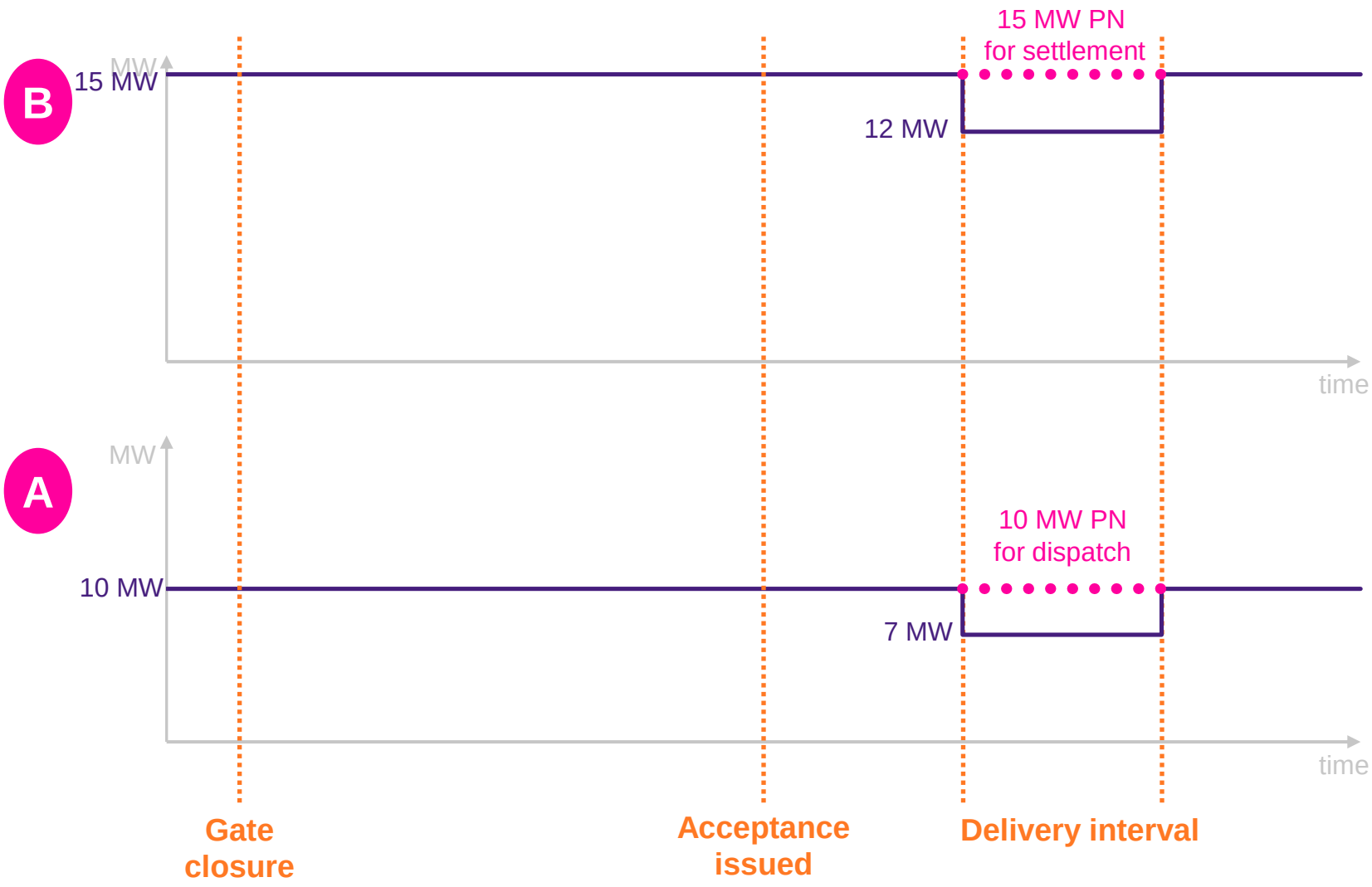

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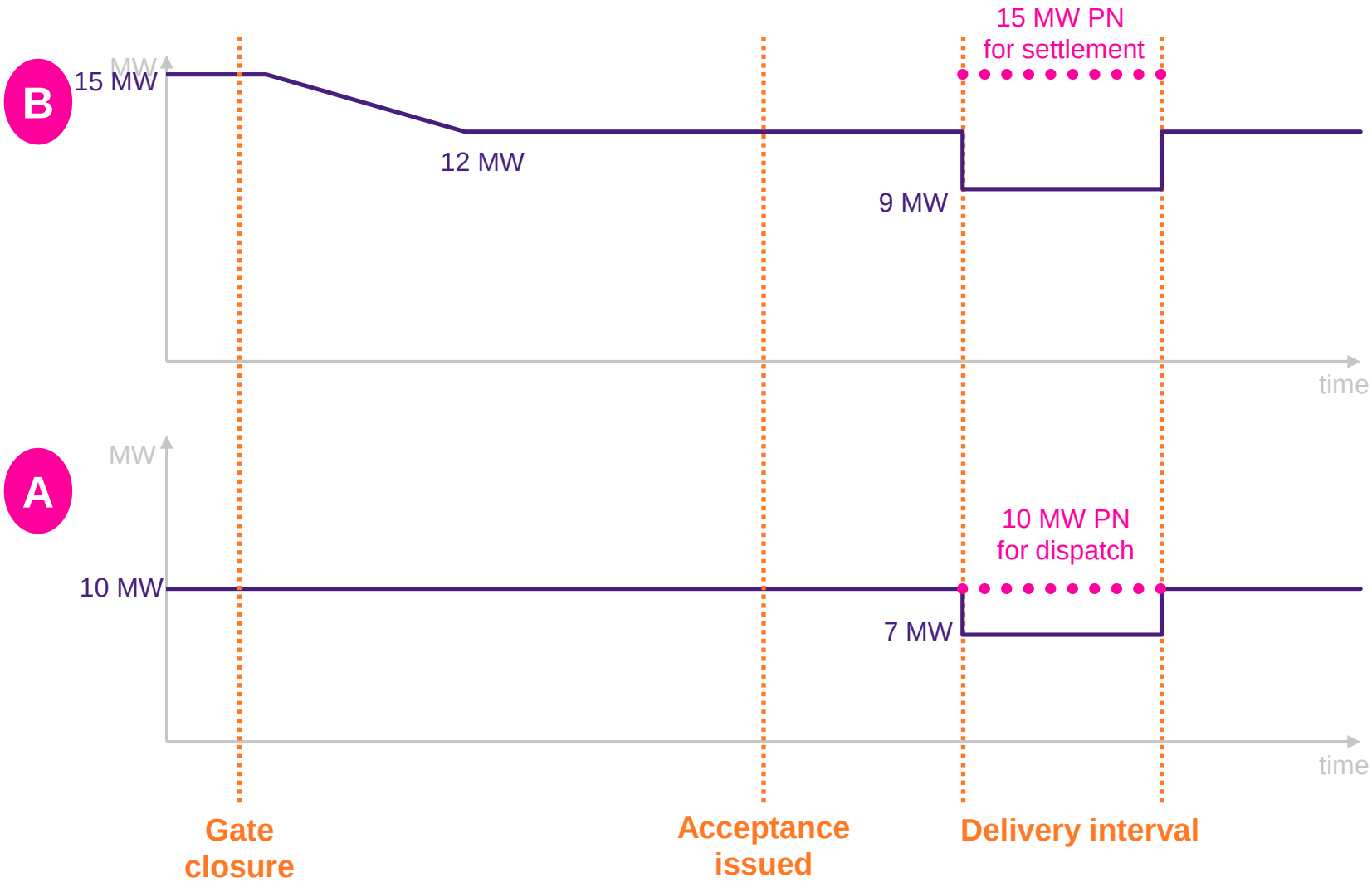

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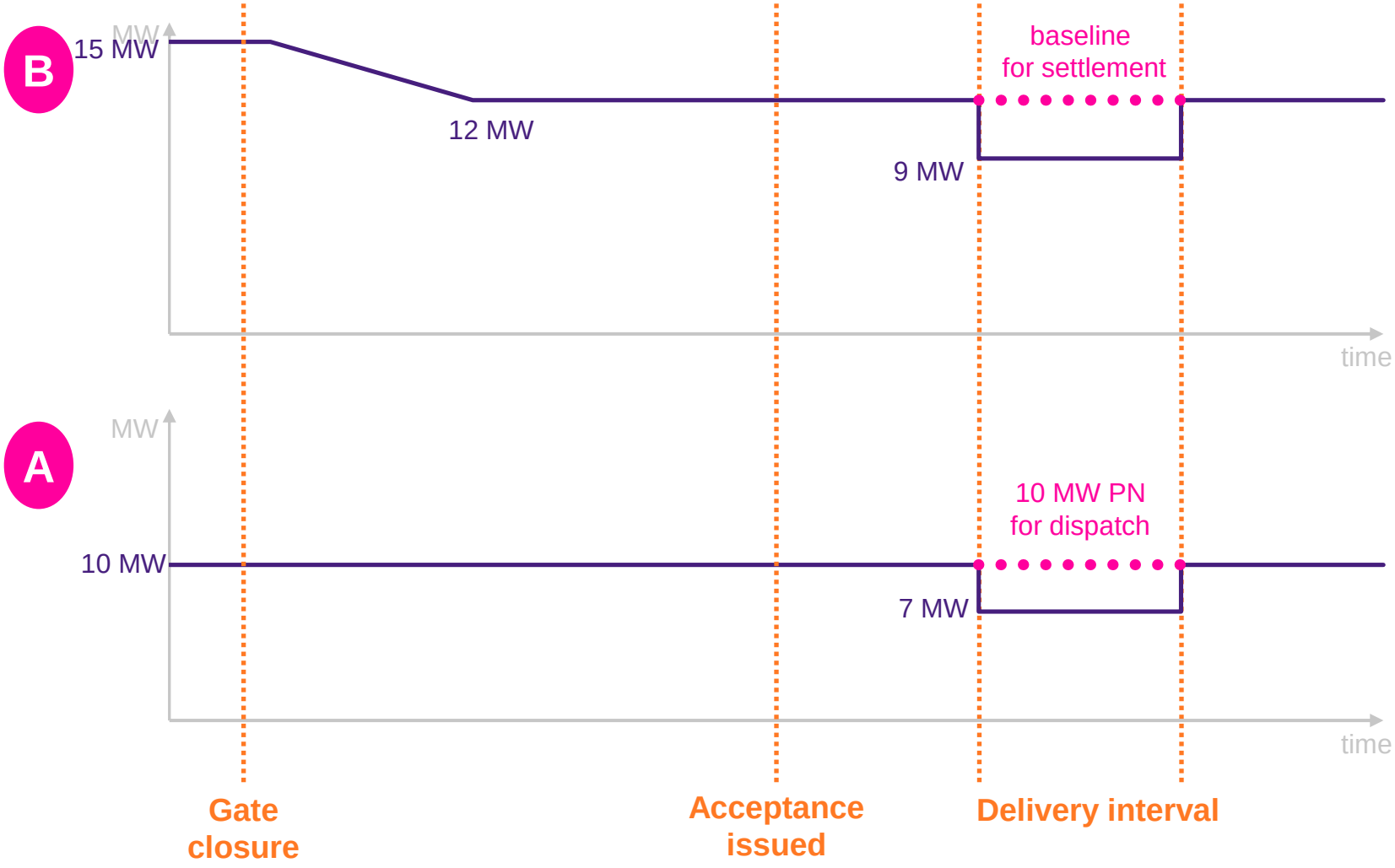

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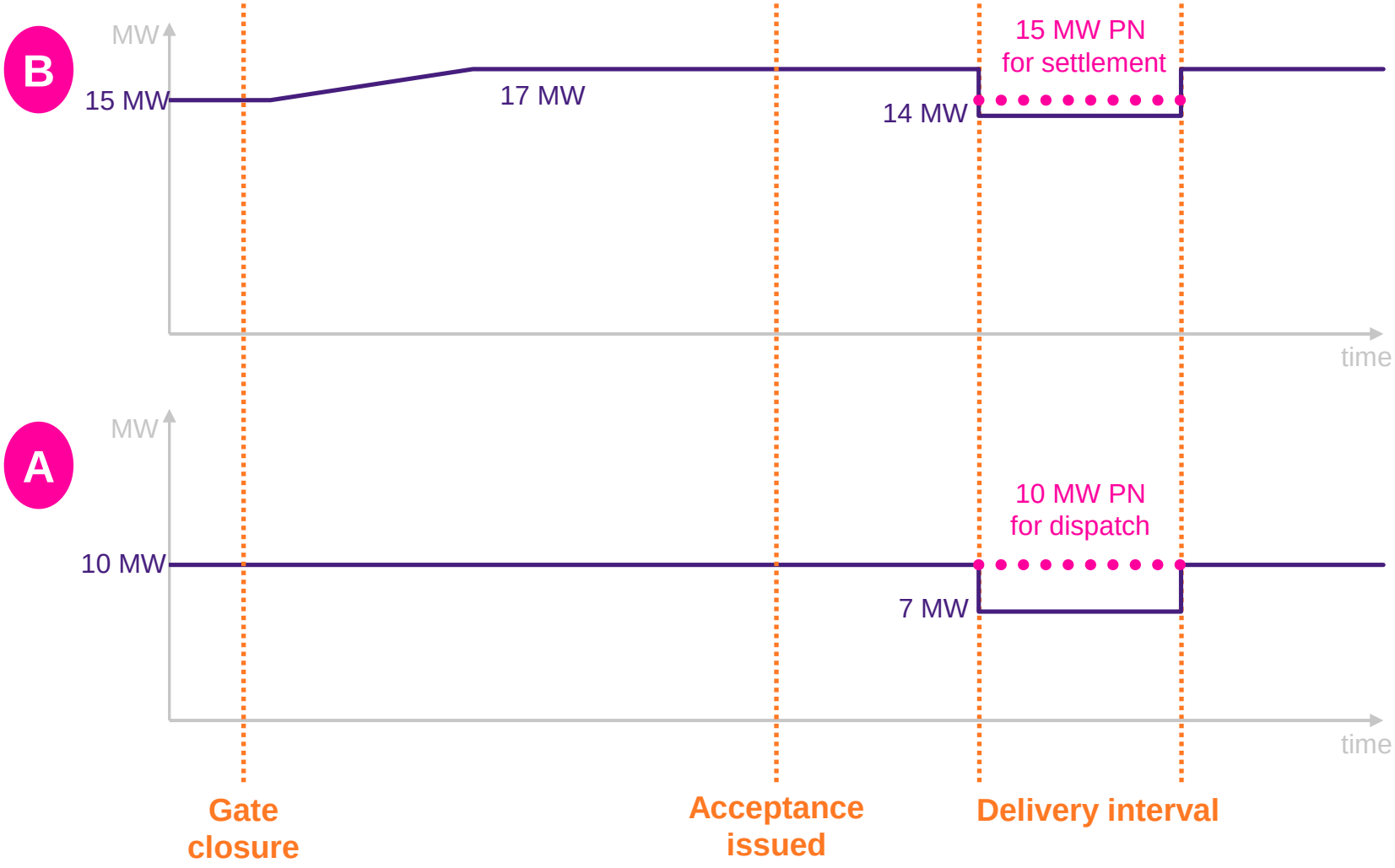
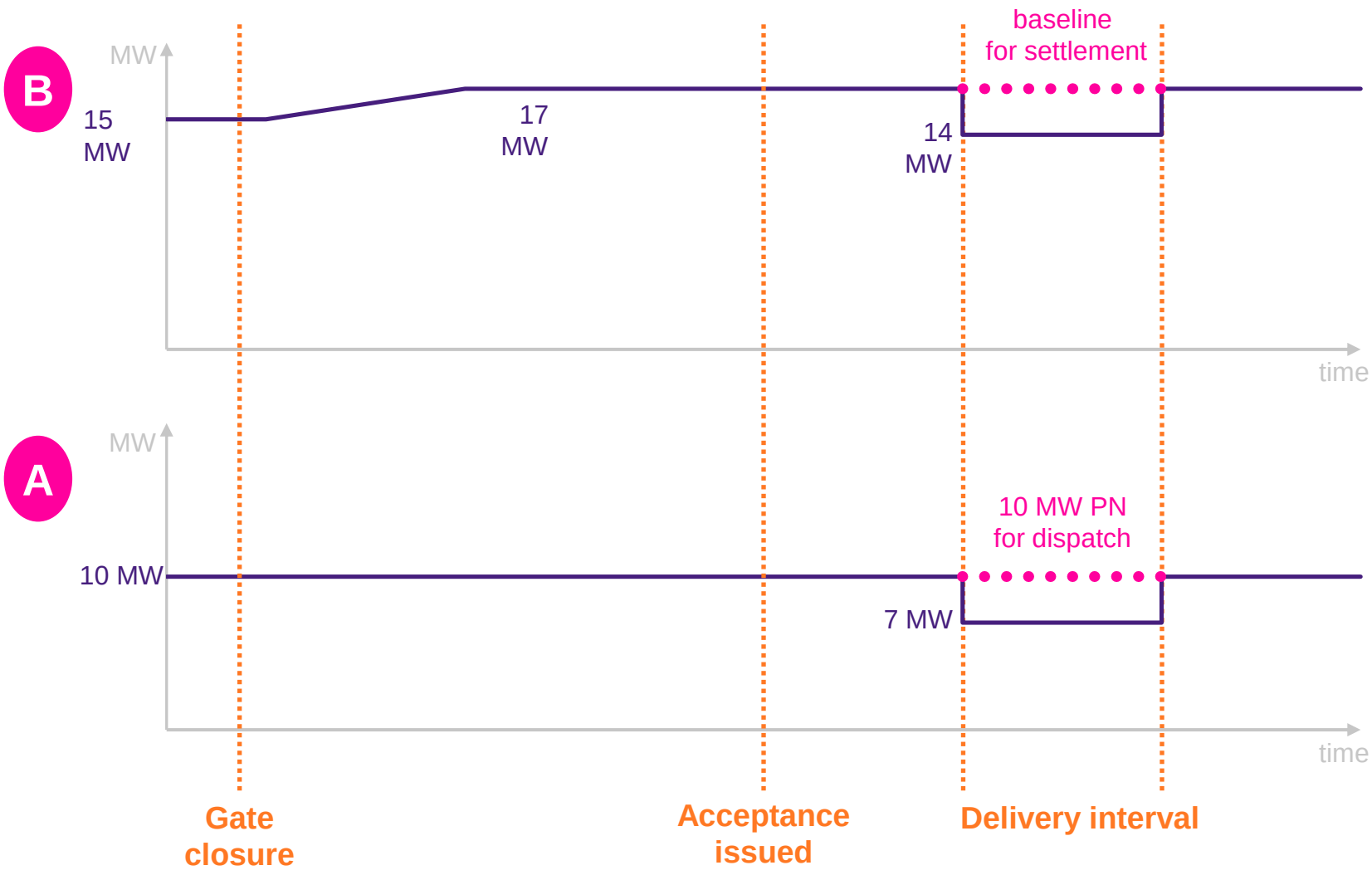


Worked example 3



What baseline methodology?

CALIFORNIA ENERGY COMMISSION

PROTOCOL DEVELOPMENT FOR DEMAND RESPONSE CALCULATION — FINDINGS AND RECOMMENDATIONS

pjm

Measurement and Verification for Variable DR Economic Resources

MIC
8/7/2013

KEMA

Development of Demand Response Mechanism

Baseline Consumption Methodology – Phase 2 Results

Final Report

Australian Energy Market Operator
Project No. 20320008
Prepared by DNV KEMA
October 2013

Preliminary Draft

California Day-Ahead DR Program Baseline Load Analysis and PY-2006 Impact Evaluation – *Final Report (Draft)*

Steven D. Braithwait, Michael Welsh, Dan Hansen, David Armstrong

Christensen Associates Energy Consulting, LLC

January 18, 2008

KEMA

PJM Empirical Analysis of Demand Response Baseline Methods

Prepared for the PJM Markets Implementation Committee

pjm

Customer Baseline Subcommittee Proposal presented to MIC

May 23, 2007

Measurement and Verification for Demand Response

Prepared for the National Forum on the National Action Plan on Demand Response: Measurement and Verification Working Group

AUTHORS:

Miriam L. Goldberg & G. Kennedy Agnew—DNV KEMA Energy and Sustainability

February, 2013

ENERNOC

White Paper

The Demand Response Baseline

Overview

If only two things matter in Demand Response (DR), they w

- How DR resources perform
- How to measure DR performance

It is the second item on this list that we discuss in this paper. Gi
largely in the hands of DR participants, DR aggregators, and e
the weather, it is the second that should be of utmost concern fo
DR program designers.

CHRISTENSEN ASSOCIATES ENERGY CONSULTING

Baseline Analyses Usi
DBP (2006) & AMP (200
Program Data

Steven Braithwait
Christensen Associates Energy Consulti

Conference Call

May 26, 2009

California ISO
Your Link to Power

Customer Baseline Load Review and Recommendation

California ISO
&
Utility Integration Solutions, Inc.

May 26, 2009

Thank you

Dr Paul Troughton

Senior Director of Regulatory Affairs

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Exploring the consequence of inaccurate FPNs in Settlement

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Use of FPNs in the BSC

- To take part in Balancing Services, the Balancing Services Provider (BRP) must submit a Physical Notification to NETSO
  - This requirement is listed in the Grid Code under BC1
  - *BC1.A.1.1 Physical Notifications For each BM Unit, the Physical Notification is a series of MW figures and associated times, making up a profile of intended input or output of Active Power at the Grid Entry Point or Grid Supply Point,* ***as appropriate****. For each Settlement Period, the first "from time" should be at the start of the Settlement Period and the last "to time" should be at the end of the Settlement Period*
- Both P375 and P376 have the same defect; which is at a high level: the affect inaccurate FPNs have on processes within the BSC and Settlement
- To provide more accurate FPN's P375 proposes allowing the FPN used within the BSC to be based on Metering at the Asset, whereas P376 proposes setting the FPN using a Baselining Methodology (this may involve decoupling the FPN for Dispatch from the FPN used for Settlement)

Use of FPNs in the BSC

- It is important to fully understand how the FPN submitted feeds through into the BSC and the affect an inaccurate FPN may have on;
  - Imbalance volumes
  - Non Delivery charges
- Spreadsheet illustrates how the above charges are calculated

Process for Dispatch and Settlement (high level)

DISPATCH

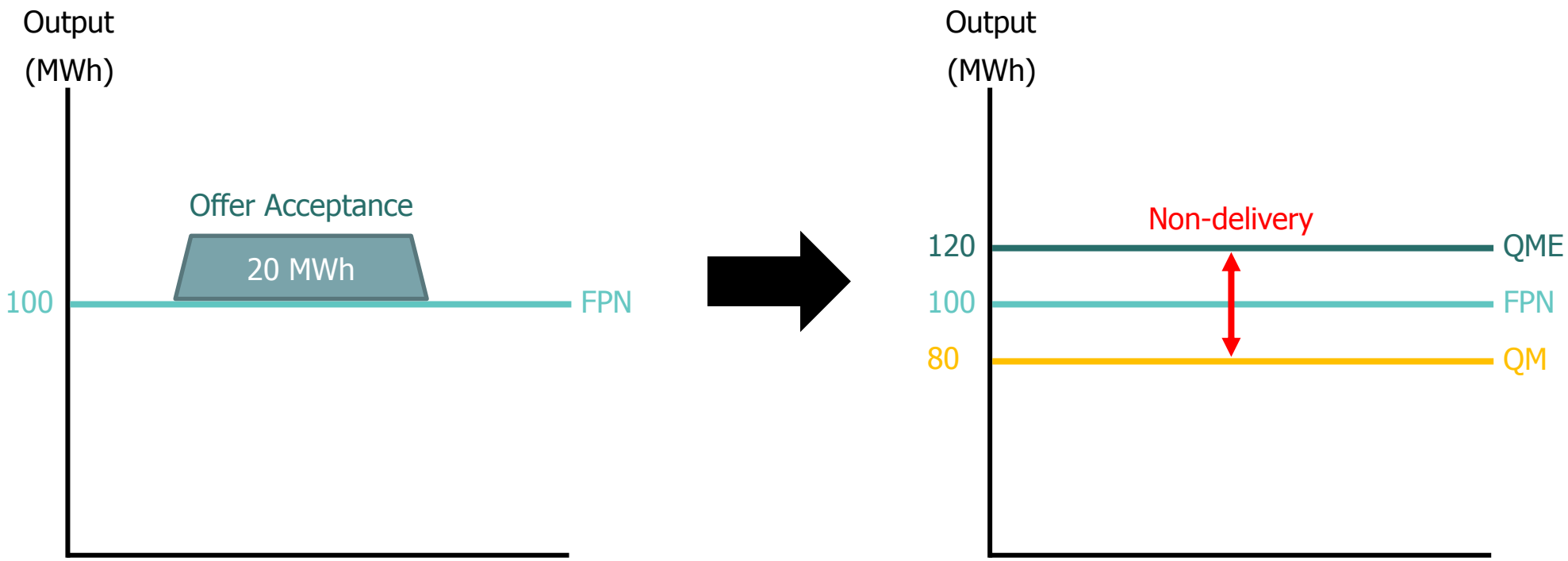
1. BSP submits PN as well as Bids and Offers for BM and / or RR
2. After gate closure the PN turns into a FPN
3. NETSO construct an instruction (BM or RR) using the FPN as a baseline
   - If FPN does not match Operational Metering what happens in terms of dispatch?

Process for Dispatch and Settlement (high level)

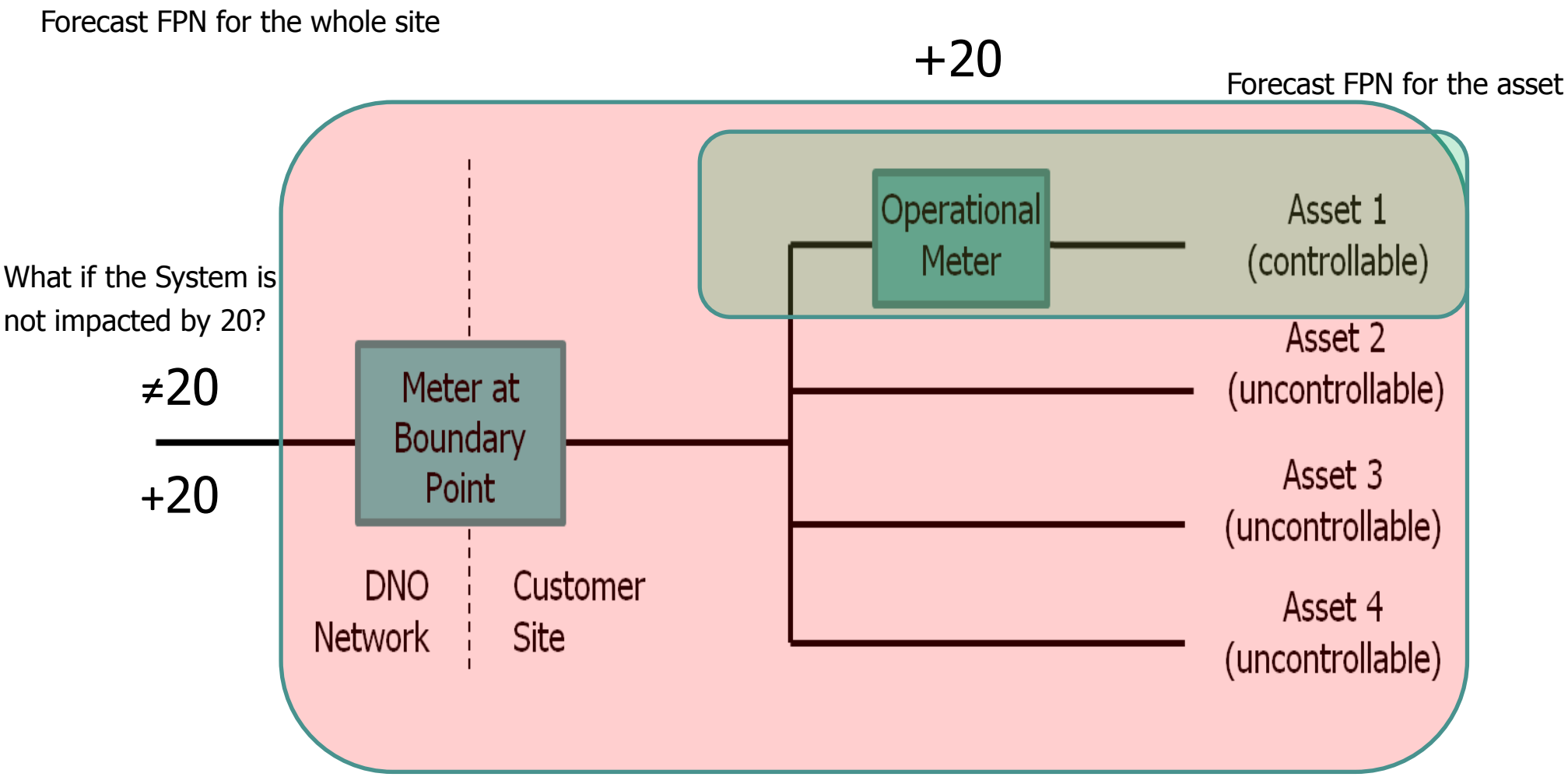
SETTLEMENT

1. SAA uses the FPN as a baseline to create a RR schedule
2. From the RR Schedules and / or BOA instruction Acceptance Volumes
3. The Acceptance Volumes are added to FPN to create expected metered Volumes
4. This is compared to actual metered Volumes with the difference being Non Delivered Volumes
5. Non Delivered Volumes create Imbalance Charges and may result in additional Non-Delivery Charges
6. Acceptance Volumes less Non Delivery Volumes creates Delivered Volumes
7. Delivered Volumes amend the position of the Supplier (BRP) responsible for volumes at the Primary BMU

Example


Output
(MWh)
Offer Acceptance
20 MWh
100
FPN
Output
(MWh)
Non-delivery
120
QME
100
FPN
80
QM

Use of FPNs in the BSC



High level Defect and things to consider

- Difficult to accurately forecast FPNs for a whole site which subsequently affects delivery and imbalance charges
  - May also lead to asset not being dispatched and being in breach of Grid Code
- Settlement Metering assesses and rewards based on the impact to the Total System
- Balance between accurately rewarding delivery; but only if the Total System is similarly impacted?
- Performance Assurance important for P375/P376 to maintain level playing field
  - Baselining could aid assurance

Worked Example

Microsoft Excel Worksheet

Review of IWA and ToRs

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P375 ToRs (1 of 2)

- In addition to the standard Terms of Reference, the P375 Workgroup will consider:
  - What standard of metering will be required? Note any differences between the standards of metering used for other Balancing Services such as STOR (the use of Secondary BM Unit's may be extended further than the use of Replacement Reserve under TERRE).
  - Consider appropriate ways to demonstrate independence of the asset if required? How can we appropriately provide assurance of the impacts of the balancing service on the Total System?
  - How will pseudo MPANs be registered and linked to the asset and how will these MPANs be subsequently be linked to the Settlement Meter?
  - Is the solution, or can it be future proofed against potential future Industry developments, for example domestic assets providing Balancing Services or operating in the Balancing Mechanism.

P375 ToRs (1 of 2)

- What changes are needed to BSC documents, systems and processes to support P375 and what are the related costs and lead times?
- Are there any interactions (complements and conflictions) between P375 and P376?
- Will any new data flows or amendments to data flows be required?

P376 ToRs

- In addition to the standard Terms of Reference, the P375 Workgroup will consider:
  - How will the Baseline FPN be created and by whom?
  - Can the Baseline Methodology be used for purposes other than providing the FPN for Settlement purposes?
  - How will the new service be funded? i.e. should only those who benefit from this service pay for the service?
  - Which Parties will be allowed to use a Baseline Methodology for their FPN used in Settlement?
  - Will there be one Baseline Methodology or will there be different methodologies aligned to Technology type. If so how will this work in practice?
  - What changes are needed to BSC documents, systems and processes to support P376 and what are the related costs and lead times?
  - Are there any interactions (complements and conflictions) between P376 and P375?
  - Will any new data flows or amendments to data flows be required?

Independence of Assets and effect on Transmission System

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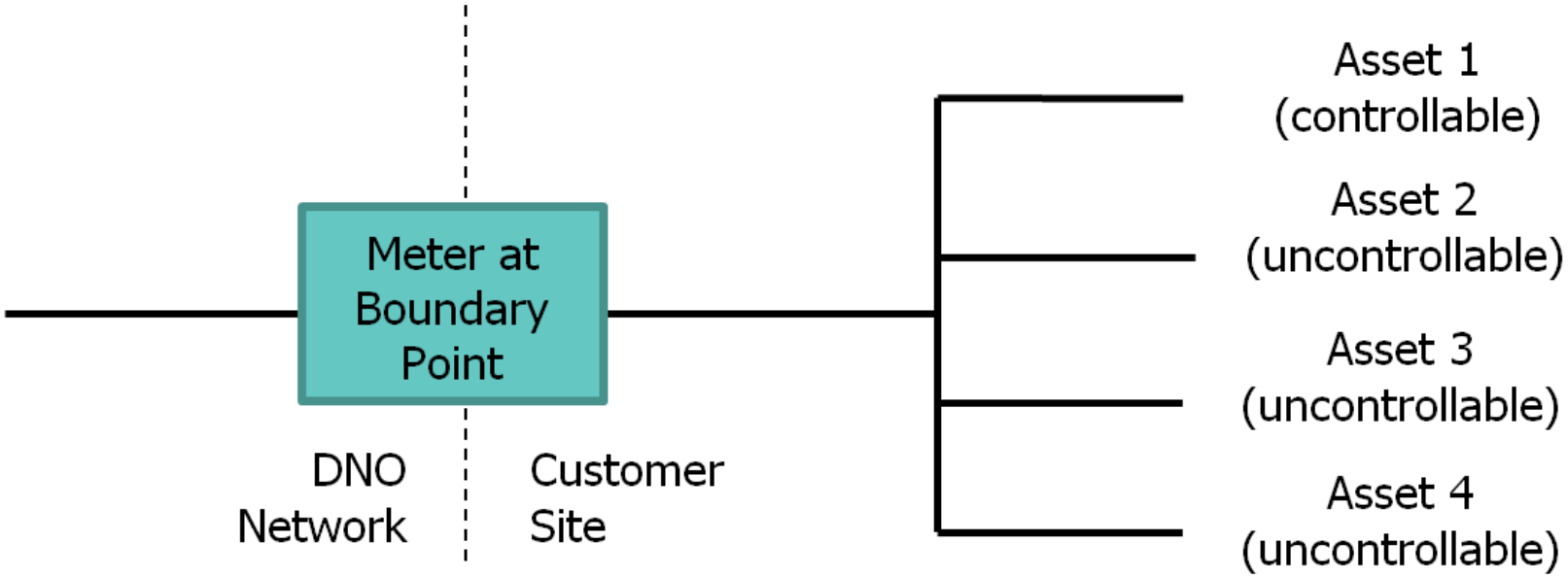
Independence of the asset



Metering Standards

ELEXON

Metering Standards

- The Issue 70 Workgroup recommended that:
  - a set of minimum standards should be developed for any Metering Equipment used to measure delivery of acceptances in TERRE or the Balancing Mechanism ("BSP Metering"). In order to ensure the requirements are proportionate, the metering standards may vary depending on the capacity of the circuits being metered. These standards should be based on the existing CoPs
  - it would be useful to understand what operational metering was used for things like Non BM STOR
  - a solution based on existing CoPs is appropriate for now, and would not preclude further Modification Proposals to address subsequent technological innovation.

Interactions between P375 and P376: Examples of sites where the solutions will be appropriate

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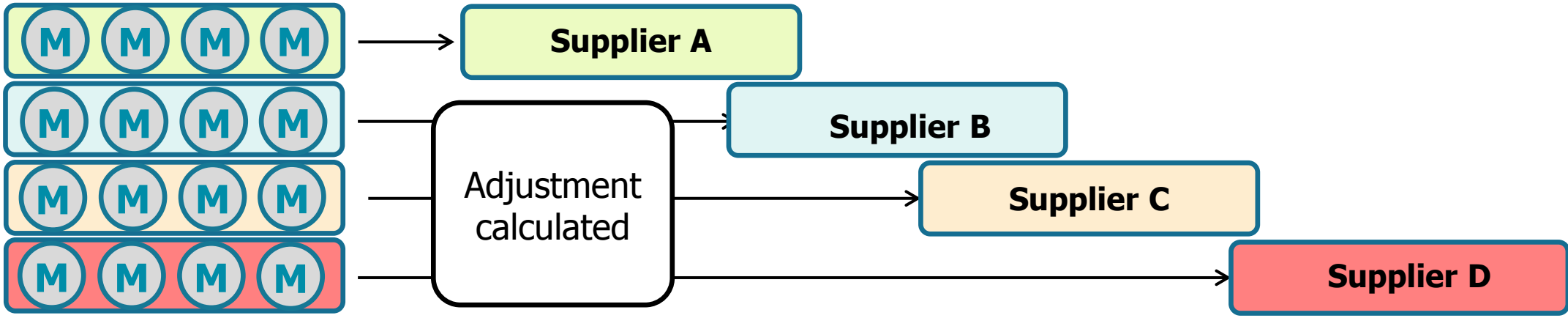
What are Delivered Volumes?

Virtual Lead Party

Secondary BM Unit

A Secondary BM Unit can contain SVA Metering Systems registered by many Suppliers in their Primary BM Units

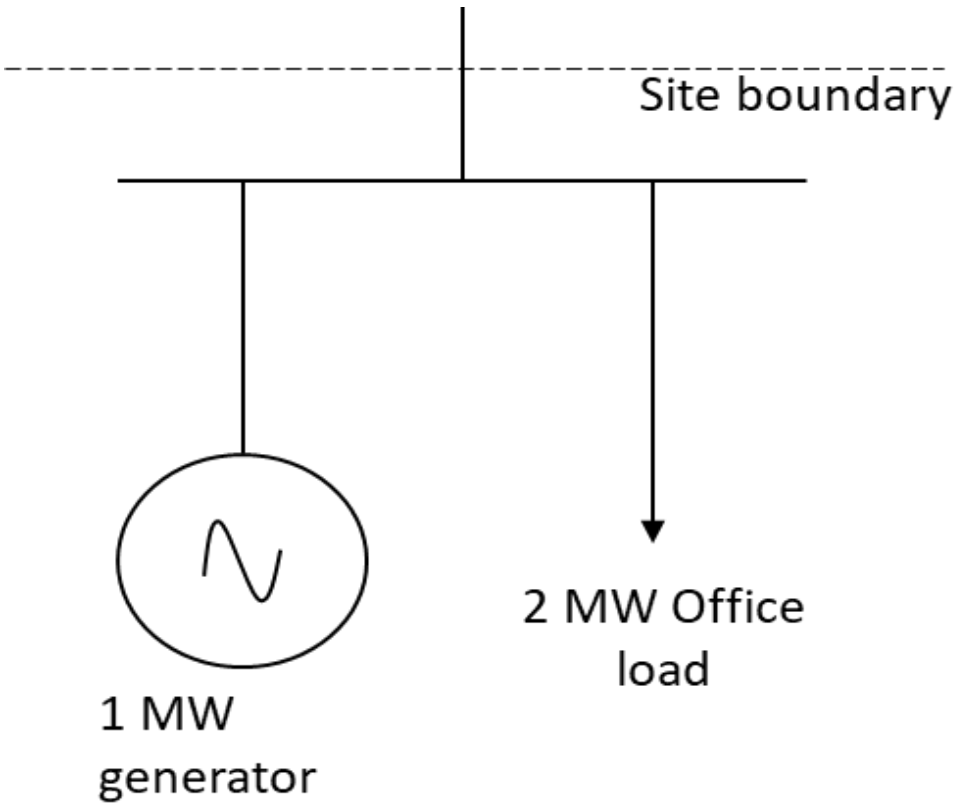
Yes



VLP will be obliged to register all MSID Pairs they wish to allocate to a Secondary BM Units centrally with Settlement on the 'SVA Metering System Balancing Services Register'.

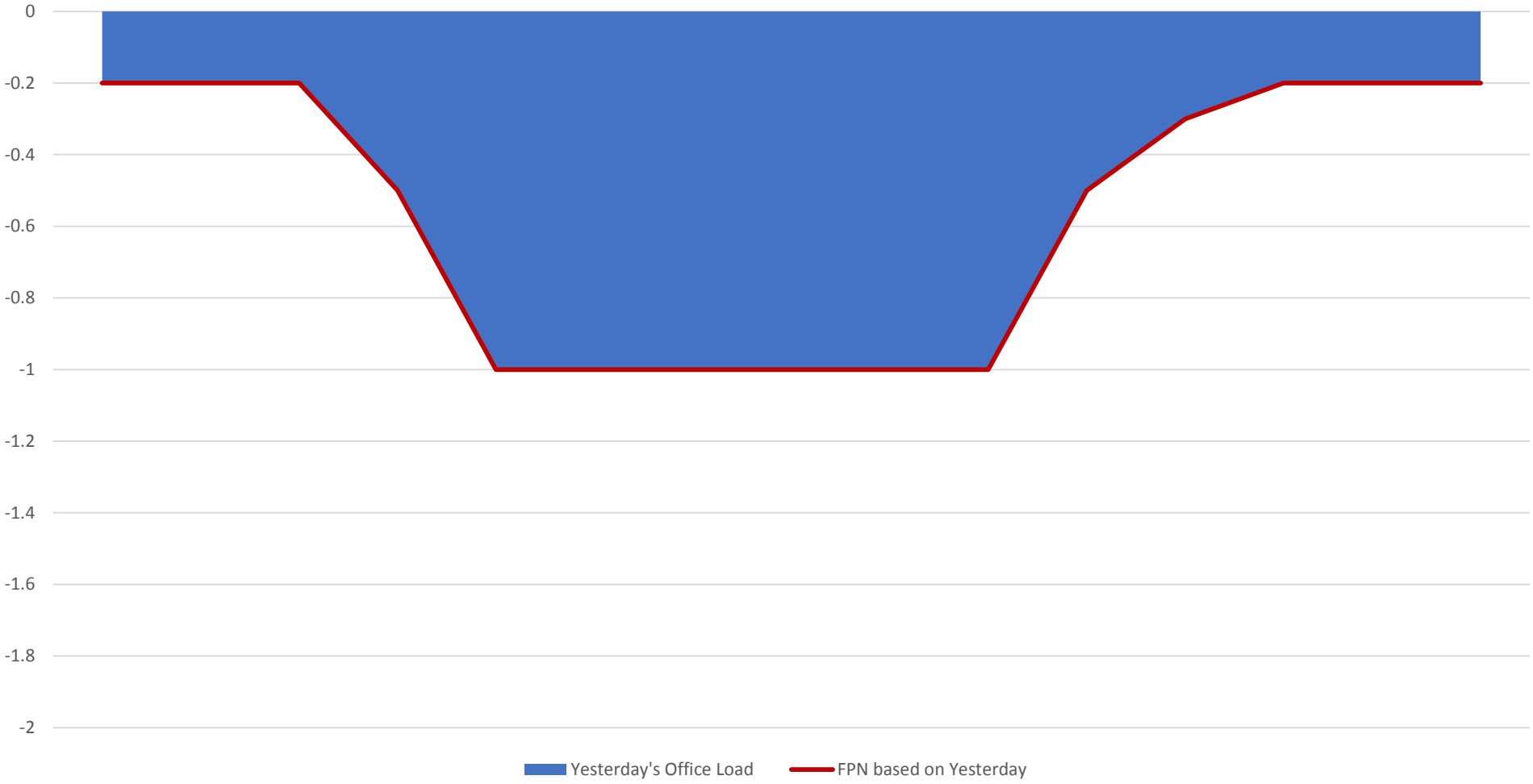
VLP will also provide 'Delivered Volumes' per MSID Pair so that Settlement can aggregate per Supplier per Secondary BM Unit an appropriate adjustment to applied at the Supplier BM Unit level

Example 1: Large office with generation



- Generator:
  - Back up only – runs to instruction
- Office load:
  - Predictable shape, unpredictable magnitude
- Generator used for Balancing Services
- Appropriate balancing Services metering point:
  - Boundary with baseline

Example 1: Large, regular load



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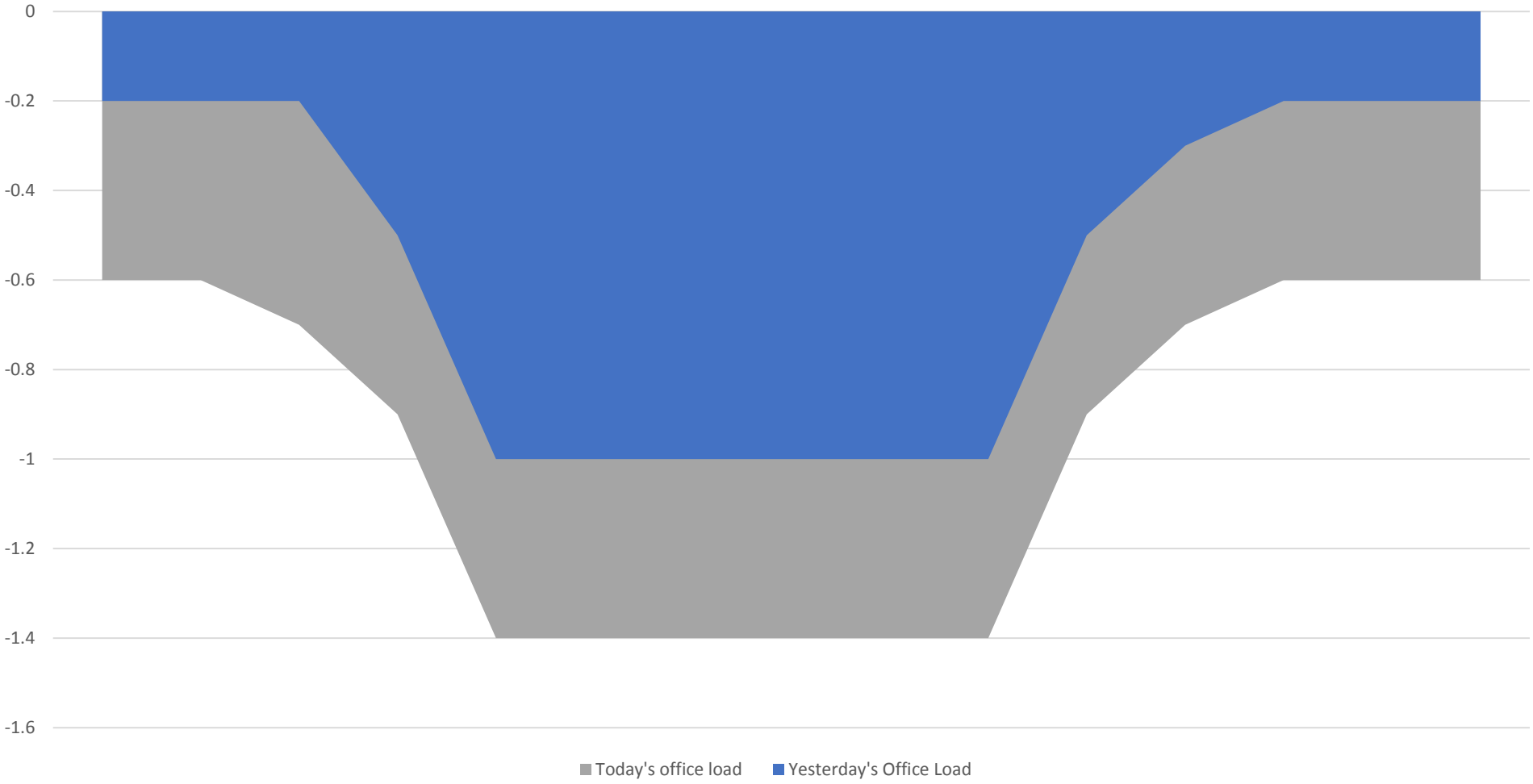
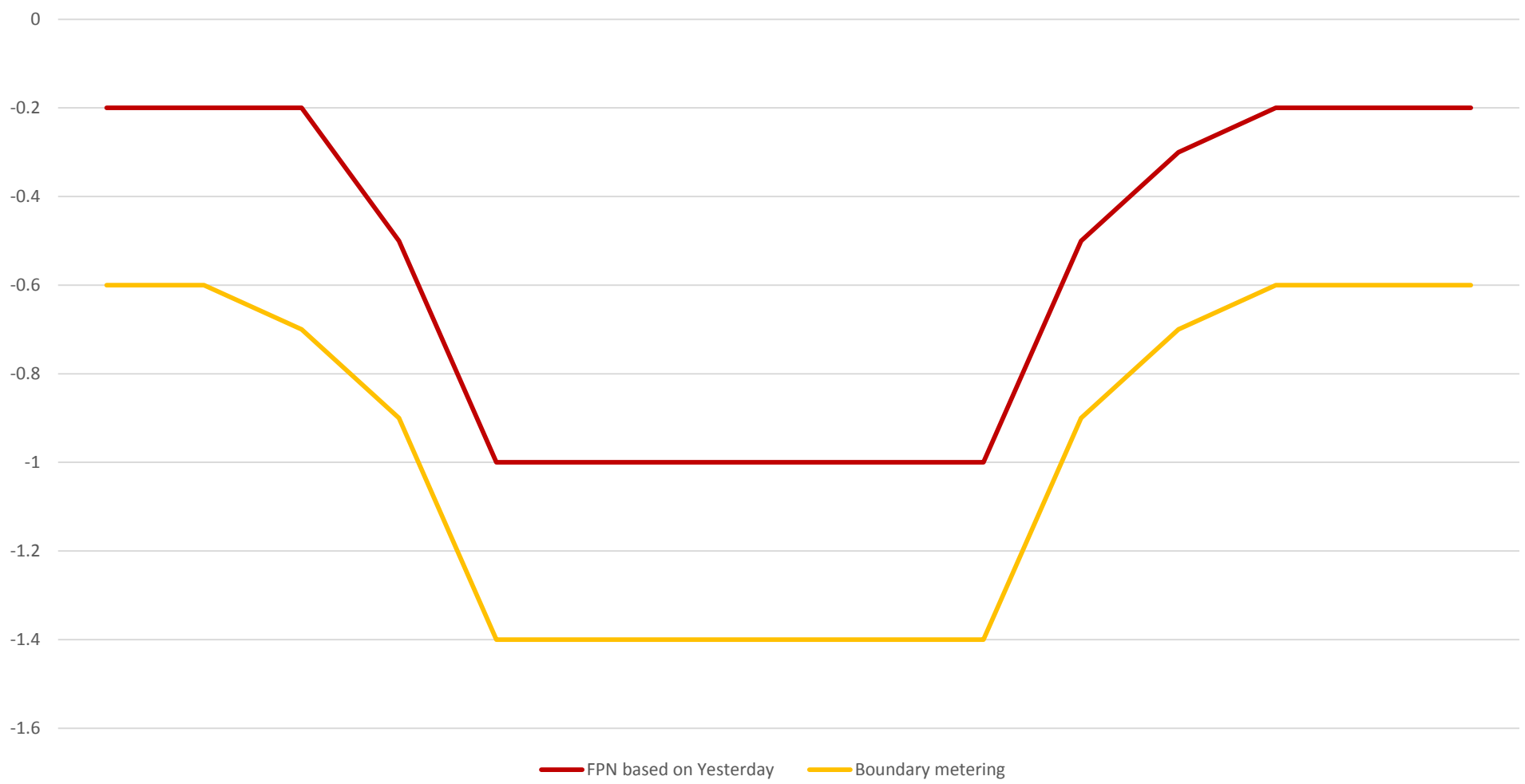
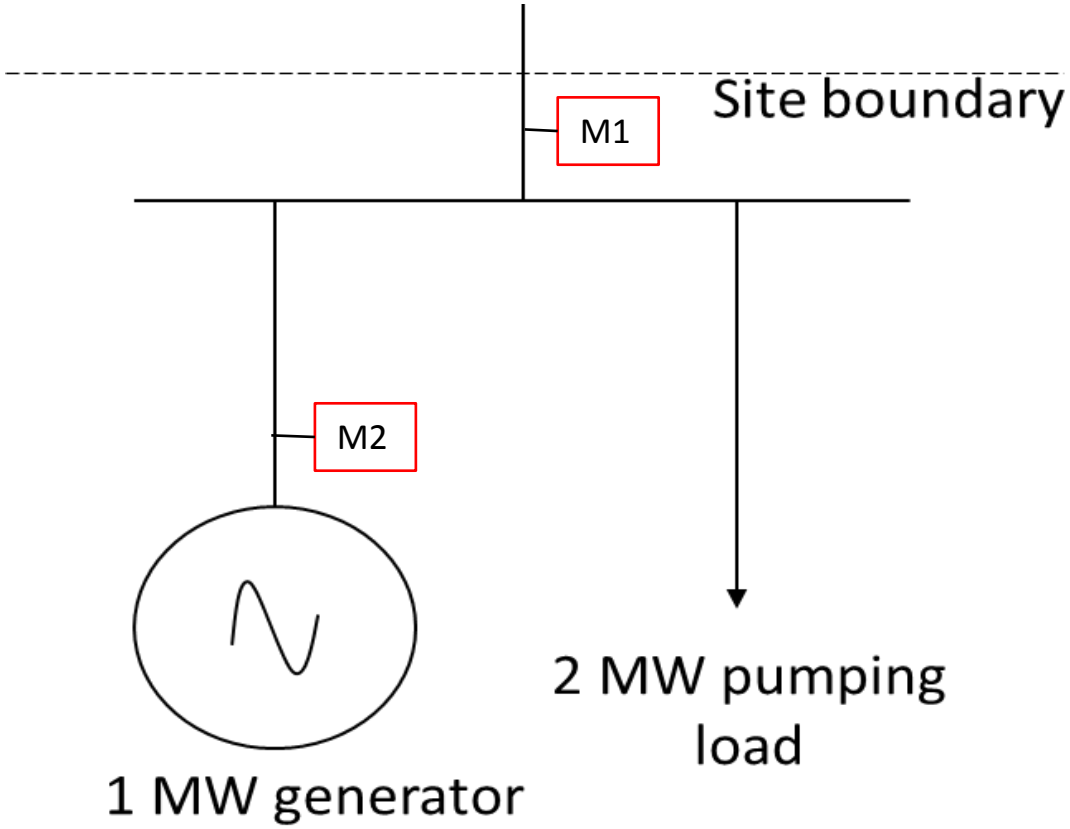


Example 1: Large, regular load

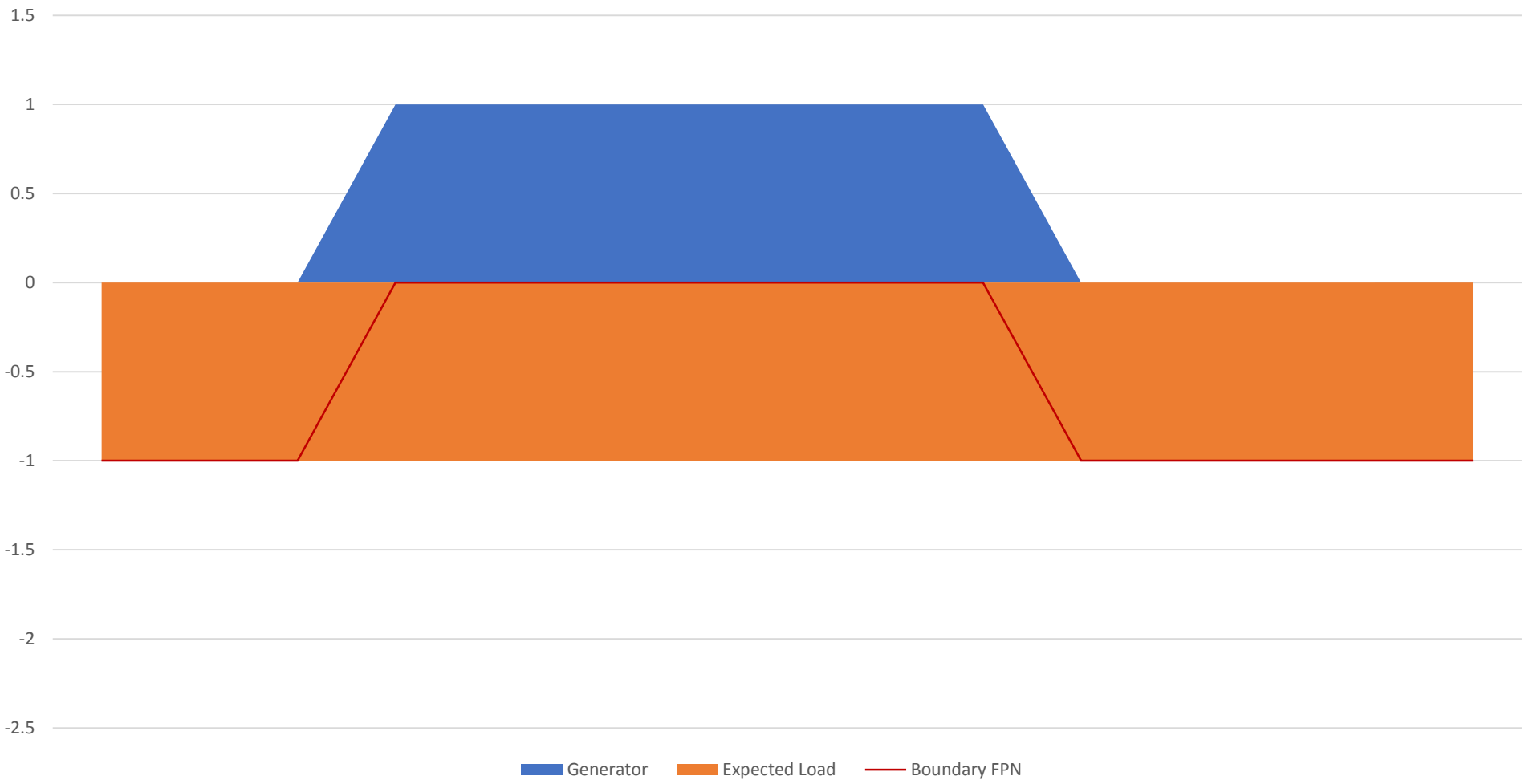


Example 2: Waste Water Treatment Works



- Generator output:
  - Runs to set schedule
- Pumping load:
  - Unpredictable
- Generator used for Balancing Services
- Appropriate balancing Services metering point:
  - Meter 2 – no baseline

Example 2: Waste Water Treatment Works



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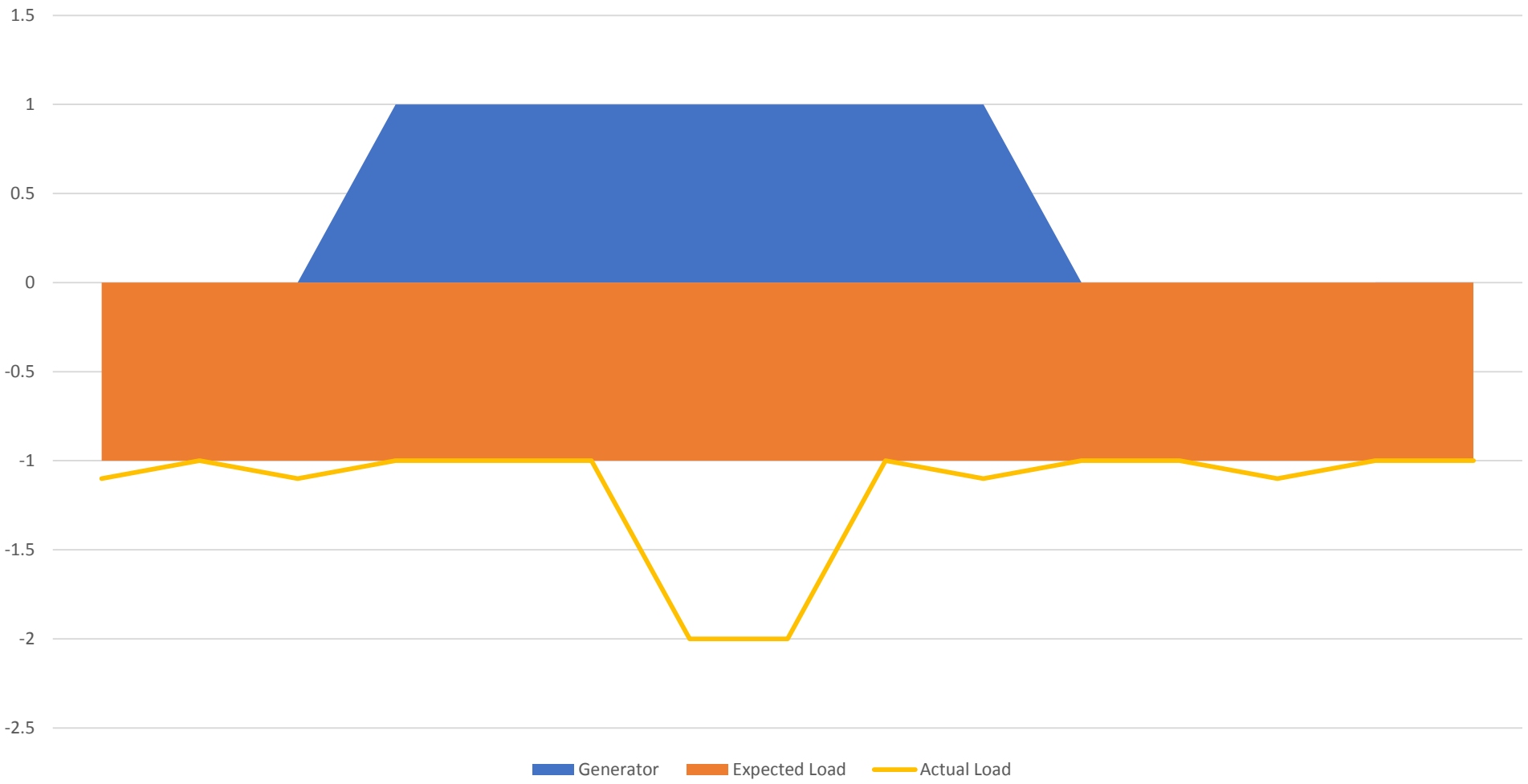

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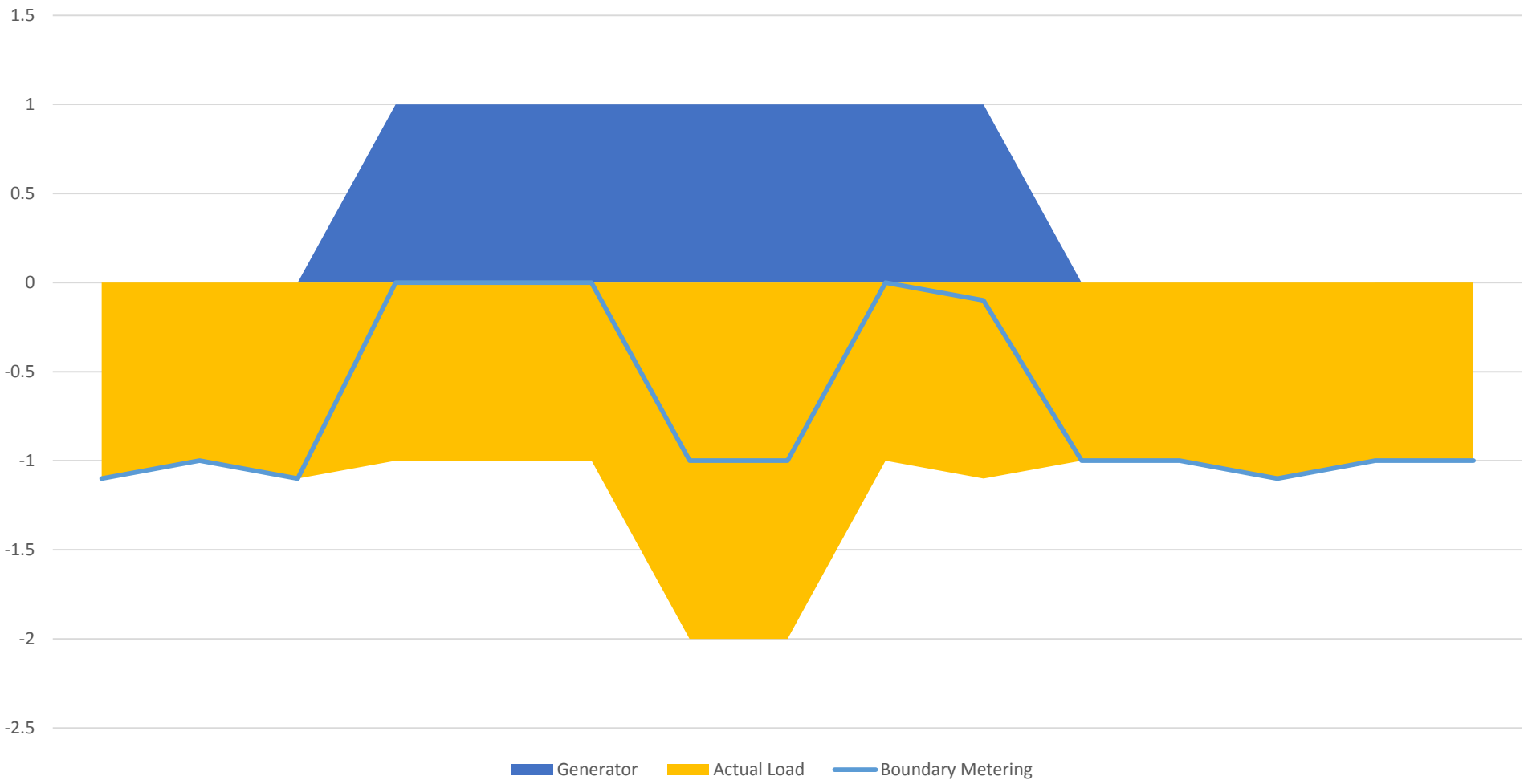

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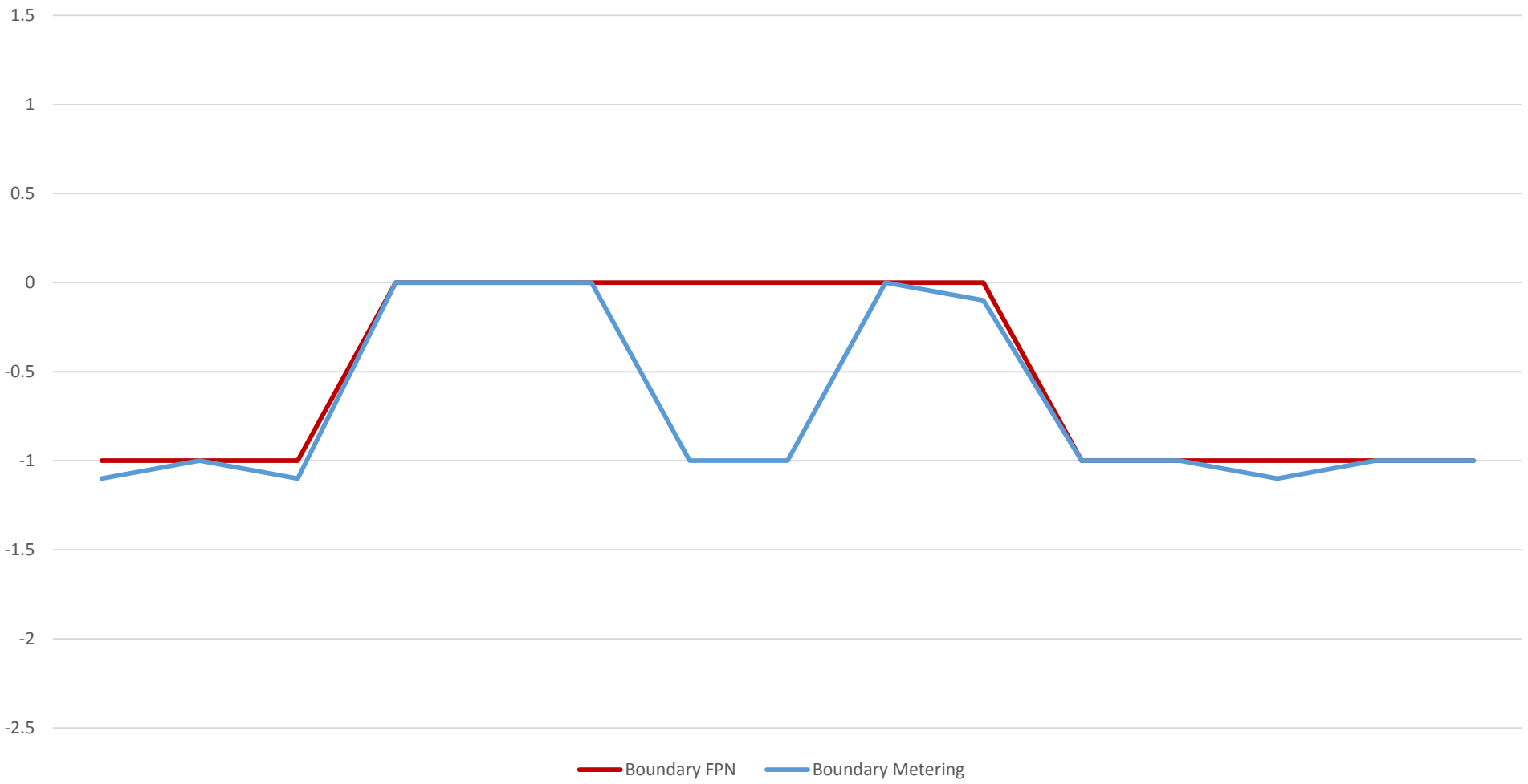
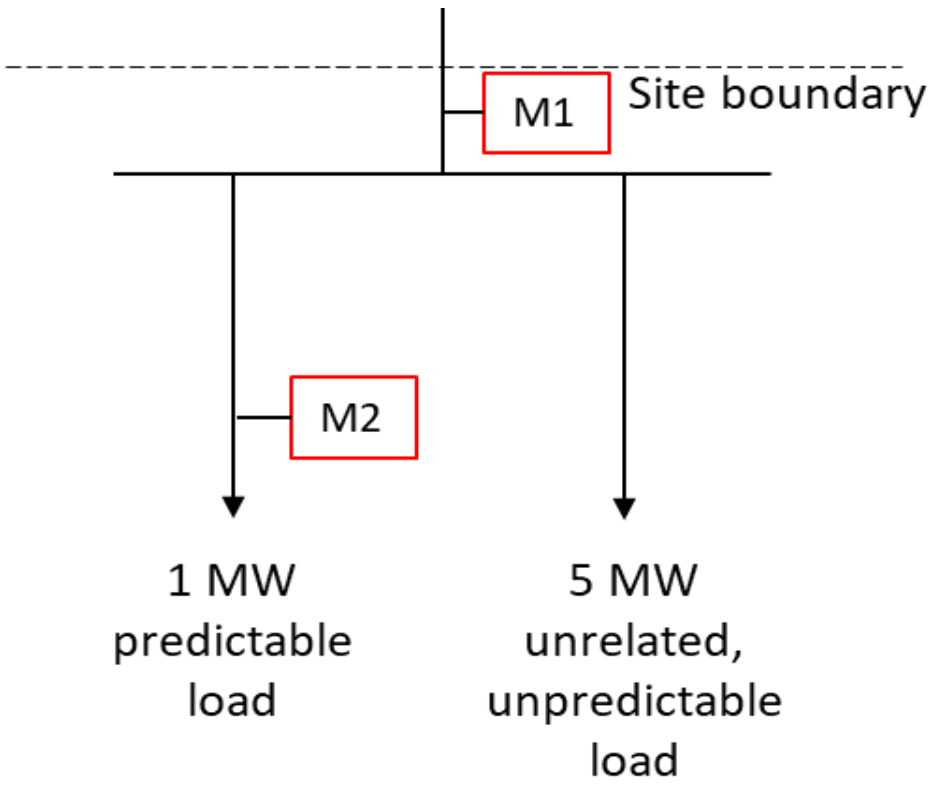


Example 3: Small tenant on large industrial site



- Small, predictable load:
  - Predictable shape, unpredictable magnitude
- Rest of site:
  - Large & unpredictable/ unknowable
- Flexibility in small predictable load used for Balancing Services
- Appropriate balancing Services metering point:
  - Meter 2 – with baseline

Assurance Methods

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Metering Assurance

- The Issue 70 Group agreed that a framework would need to be developed, taking into consideration any new Settlement Risk that could be introduced by the P375 solution
- The existing PAF and its techniques were believed to be sufficient to monitor and respond to P375 changes. It is likely that Asset Metering would be subject to the BSC Audit
- Assurance techniques could include:
  - Registration of metering
  - TAM
  - Potential TAPAP post implementation
  - BSC Audit
- VLPs will be PAPs so can be subject to the Performance Assurance Framework

Next Steps

Progression timetables

Proposed Progression Timetable for P375	
Event	Date
Initial consideration by Workgroup	W/C 21 January 2019
Further consideration by Workgroup	W/C 18 February 2019
Further consideration by the Workgroup	W/C 15 April 2019
Assessment Procedure Consultation	6 May 2019 – 24 May 2019
Workgroup consideration of Consultation responses	W/C 3 June 2019
Assessment Report presented to Panel	11 July 2019
Report Phase Consultation	15 July 2019 – 26 July 2019
Draft Modification Report presented to Panel	8 August 2019
Final Modification Report submitted to Authority	9 August 2019

Proposed Progression Timetable for P376	
Event	Date
Present Initial Written Assessment to Panel	13 December 2018
Workgroup Meeting	W/B 14 January 2019
Workgroup Meeting	W/B 11 February 2019
Workgroup Meeting	W/B 11 March 2019
Industry Impact Assessment	8 April 2019 – 26 April 2019
Workgroup Meeting	W/B 13 May 2019
Assessment Procedure Consultation	3 June2019 – 21 June 2019
Workgroup Meeting	W/B 1 July 2019
Present Assessment Report to Panel	8 August 2019
Report Phase Consultation	12 August 2019 – 23 August 2019
Present Draft Modification Report to Panel	12 September 2019
Issue Final Modification Report to Authority	13 September 2019