Settlement residual allocation methodology (SRAM)

Information session

29 August 2022

Introduction

- Purpose
- Presenters
- Protocols

Agenda

Part One – Overview

1. What is SRAM?

2. SRAM principles

3. Our SRAM proposal

4. Pass-through

5. Impacts of the proposal

6. Timeline

Part Two – Deeper dive

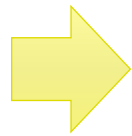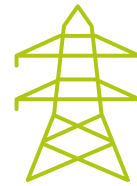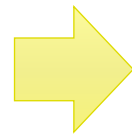1. Settlement residue
2. Usage signals
3. Investment signals

1. What is SRAM?

The wholesale market produces a surplus…

> Loss and constraint excess, or LCE

…some of which is used to help fund risk management products…

> Financial transmission rights, or FTRs
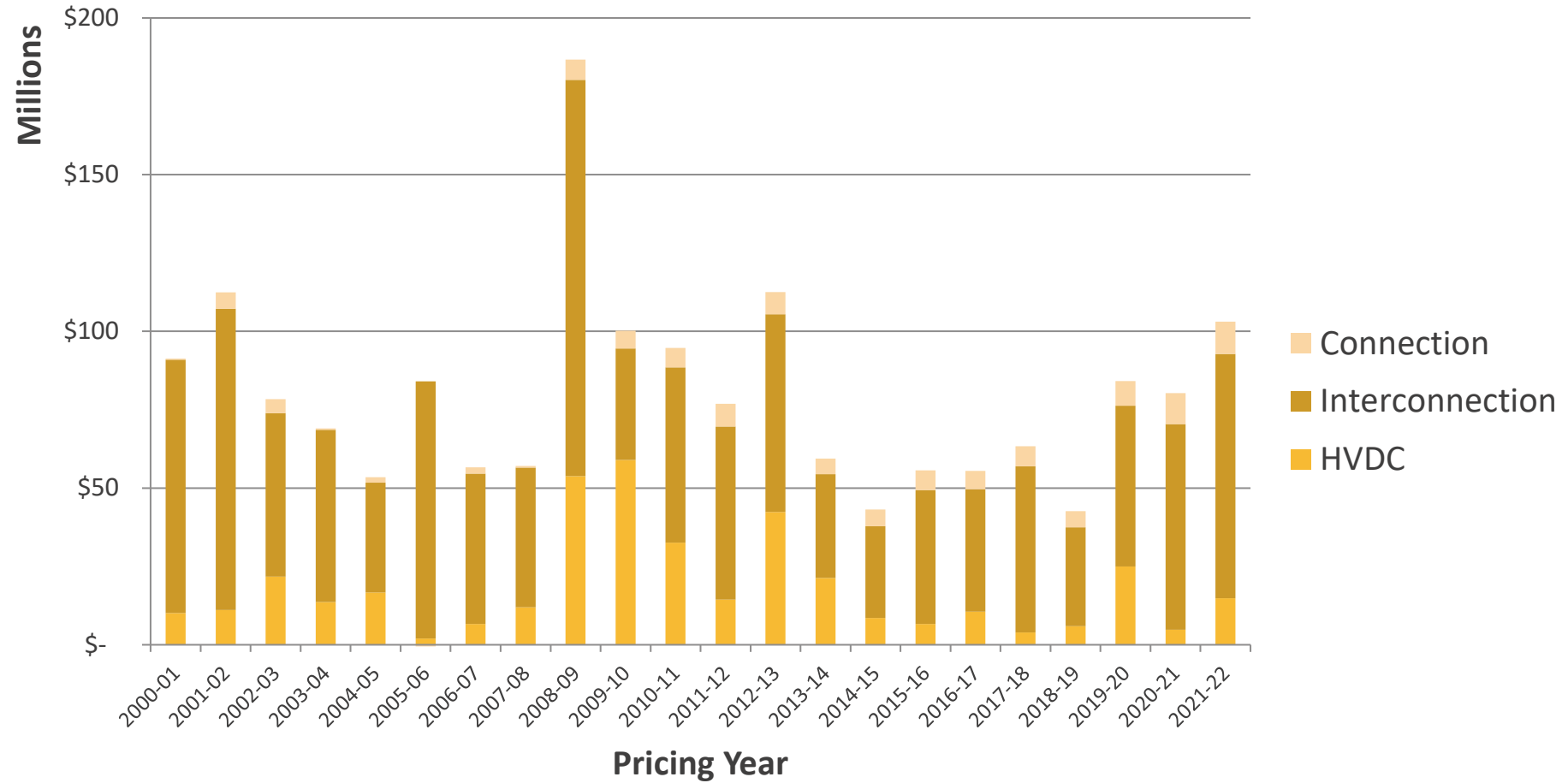
…then the **residue** is returned to Transpower…

SRAM

…who **allocates** it to transmission customers.

1. What is SRAM?

Agenda

Part One – Overview

Part Two – Deeper dive

2. SRAM principles

100%   Reduce **over-payment** for transmission

))))   Don't undermine **grid usage** signals

))))   Don't undermine **investment** signals
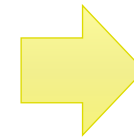
Promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers

2. SRAM principles: reduce over-payment

$$[\text{transmission charges} + \text{LCE}] > \text{costs}$$

2. SRAM principles: don't undermine usage signals

B

$200 per MWh

$100 per MWh

A
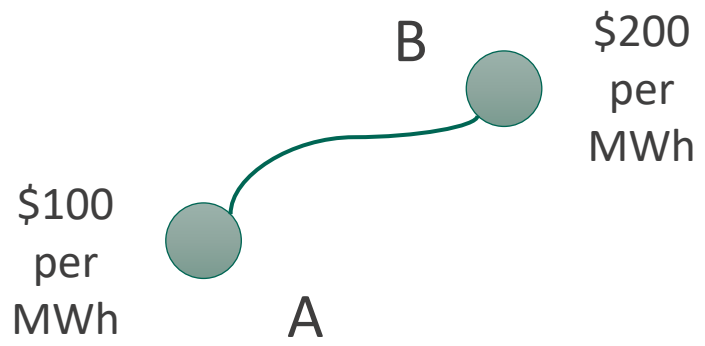
Nodal prices efficiently coordinate grid usage.

The transmission link supplying B is congested:

- using another unit of energy at B will cost $200
- producing another unit of energy at B will earn $200

...plus or minus any change *in rebate*

2. SRAM principles: don't undermine investment signals

B $200 per MWh

$100 per MWh   A

B $150 per MWh

$150 per MWh   A

Nodal prices and transmission charges efficiently coordinate investment.

If Transpower upgrades the link to B, then the nodal price will come down…

…and users at B will be allocated the cost of the upgrade based on their benefit…

…which is smaller if they were shielded by rebates.

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3. Our proposal

Proposed – Simple BB

1. Connection LCE allocation unchanged

2. All other LCE allocated similarly based on 'simple method' regions and allocators from the new transmission pricing methodology

Alternative – TPM charges

1. All LCE allocated in proportion to transmission charges

Rejected – WEM volume

1. All LCE allocated in proportion to purchase volumes

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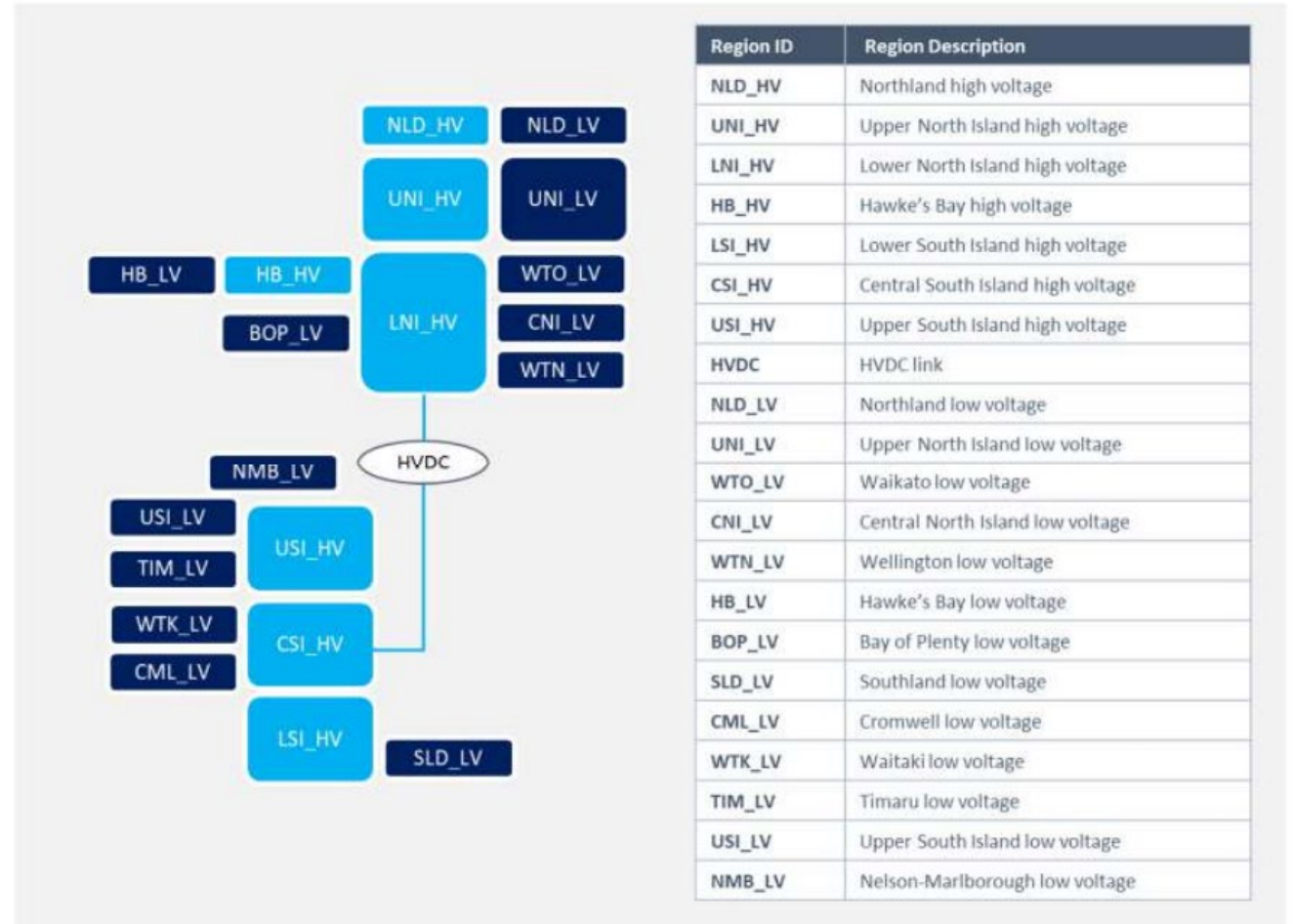TE MANA HIKO

3. Our proposal: Simple BB

Simple BB method uses the same regions and allocators as the TPM "simple method"

Regions and allocators are based on historical flows and are updated 5-yearly – they're designed to be reasonably fixed.

Region ID	Region Description
NLD_HV	Northland high voltage
UNI_HV	Upper North Island high voltage
LNI_HV	Lower North Island high voltage
HB_HV	Hawke's Bay high voltage
LSI_HV	Lower South Island high voltage
CSI_HV	Central South Island high voltage
USI_HV	Upper South Island high voltage
HVDC	HVDC link
NLD_LV	Northland low voltage
UNI_LV	Upper North Island low voltage
WTO_LV	Waikato low voltage
CNI_LV	Central North Island low voltage
WTN_LV	Wellington low voltage
HB_LV	Hawke's Bay low voltage
BOP_LV	Bay of Plenty low voltage
SLD_LV	Southland low voltage
CML_LV	Cromwell low voltage
WTK_LV	Waitaki low voltage
TIM_LV	Timaru low voltage
USI_LV	Upper South Island low voltage
NMB_LV	Nelson-Marlborough low voltage

3. Our proposal: Simple BB

Allocators are fixed	Growth not shielded	LCE mapped to regions
⬇	⬇	⬇
		100%
Don't undermine **grid usage** signals	Don't undermine **investment** signals	Reduce **over-payment** for transmission

Overall	🟠🟠🟠🟠⚪	
Over-payment	●●●●⚪	
Grid usage signals	●●●●●	
Investment signals	●●●●⚪	
Cost/complexity	●●●⚪⚪	
Worst ⟶ Best		

3. Our proposal: Simple BB – usage signals

Allocators are fixed

Don't undermine **grid usage** signals

B
$200 per MWh

$100 per MWh

A

	Worst → Best				
Overall	●	●	●	●	○
Over-payment	●	●	●	●	○
Grid usage signals	●	●	●	●	●
Investment signals	●	●	●	●	○
Cost/complexity	●	●	●	○	○
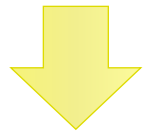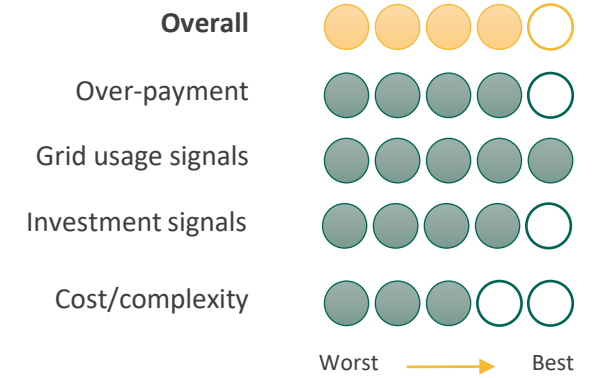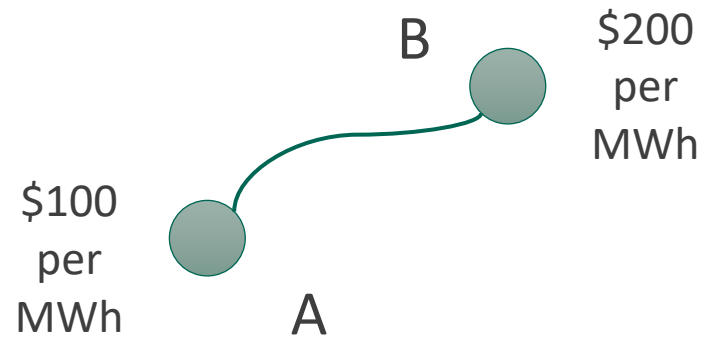
3. Our proposal: Simple BB – investment signals

Growth not shielded

Don't undermine **investment** signals

$150 per MWh

B

$150 per MWh

A

	Worst ——→ Best
Overall	●●●●○
Over-payment	●●●●○
Grid usage signals	●●●●●
Investment signals	●●●●○
Cost/complexity	●●●○○
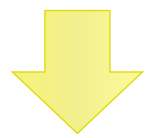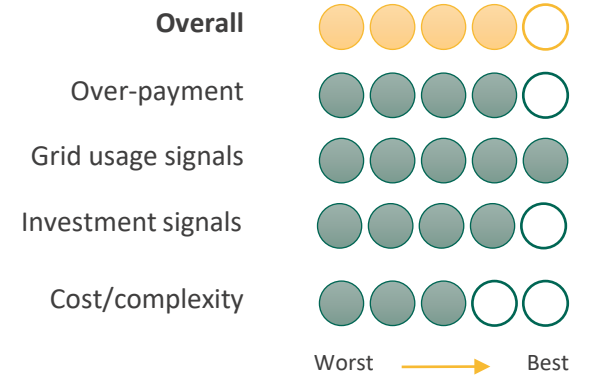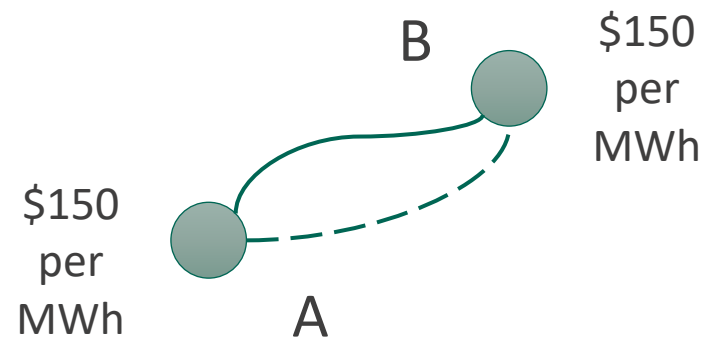
3. Our proposal: Simple BB - overpaying

LCE mapped
to regions

100%

Reduce **over-payment** for transmission

Overall	●	●	●	●	○
Over-payment	●	●	●	●	○
Grid usage signals	●	●	●	●	●
Investment signals	●	●	●	●	○
Cost/complexity	●	●	●	○	○

Worst ⟶ Best
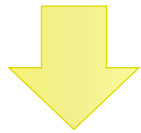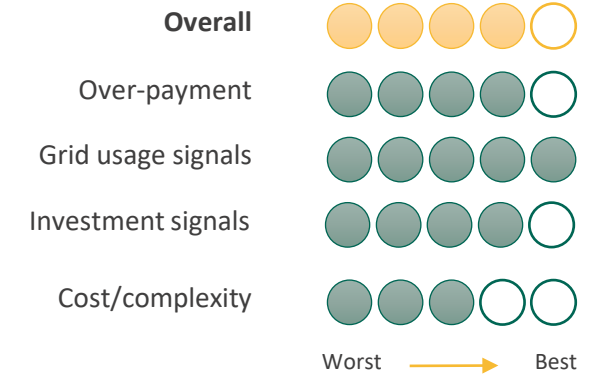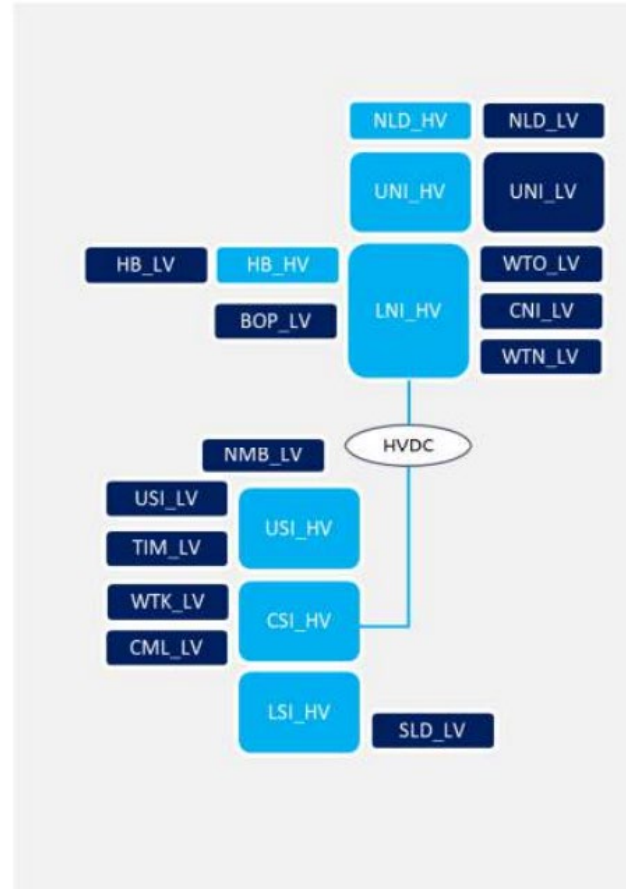
3. Our proposal: alternative – TPM charges

Allocators are fixed

↓

Don't undermine **grid usage** signals

Large TPM customers shielded

↓

Don't undermine **investment** signals

Rebates to large TPM customers

↓

100%

Reduce **over-payment** for transmission

	Worst ⟶ Best
Overall	●●●○○
Over-payment	●●○○○
Grid usage signals	●●●●●
Investment signals	●○○○○
Cost/complexity	●●●●○

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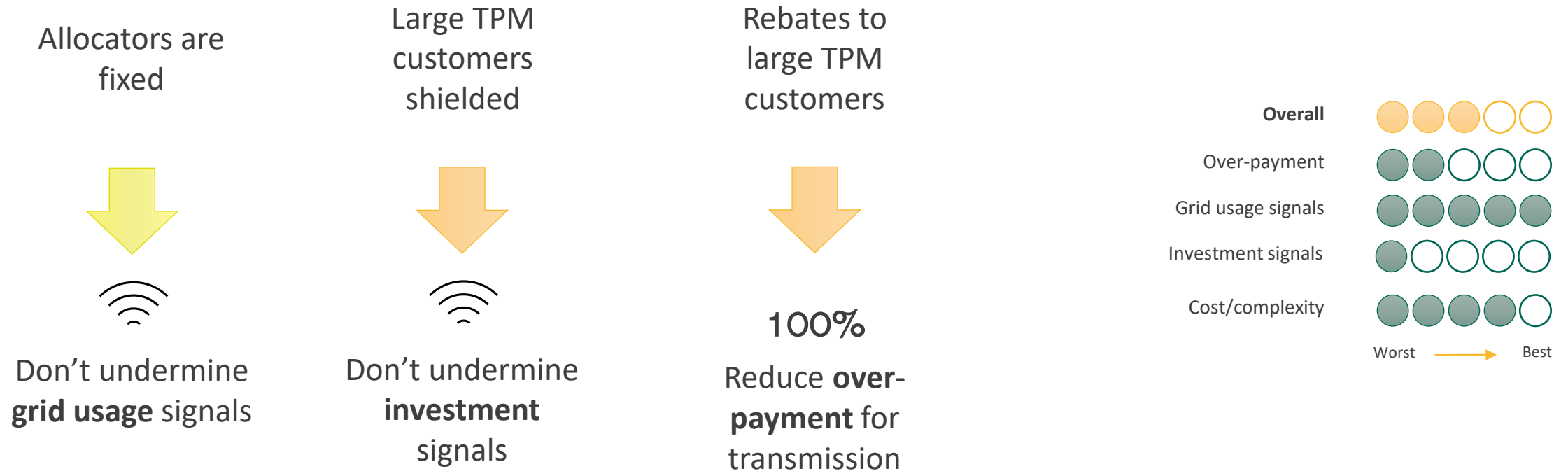
3. Our proposal: rejected – WEM volume

Allocators vary with volume

Large purchasers shielded

Rebates to large purchasers

Don't undermine **grid usage** signals

Don't undermine **investment** signals

100%

Reduce **over-payment** for transmission

!! Increasing usage increases rebate, undermining nodal price signals

Agenda

Part One – Overview

Part Two – Deeper dive

4. Settlement residue pass-through

Agenda

Part One – Overview

1. ~~What is SRAM?~~
2. ~~SRAM principles~~
3. ~~Our SRAM proposal~~
4. ~~Pass-through~~
5. Impacts of the proposal
6. Timeline

Part Two – Deeper dive

1. Settlement residue
2. Usage signals
3. Investment signals

5. Impacts of the proposal

- overpayment addressed

- locational price risk reduced

- nodal price signals preserved

- investment signals preserved

- relatively simple to implement

→ Efficient investment and operation
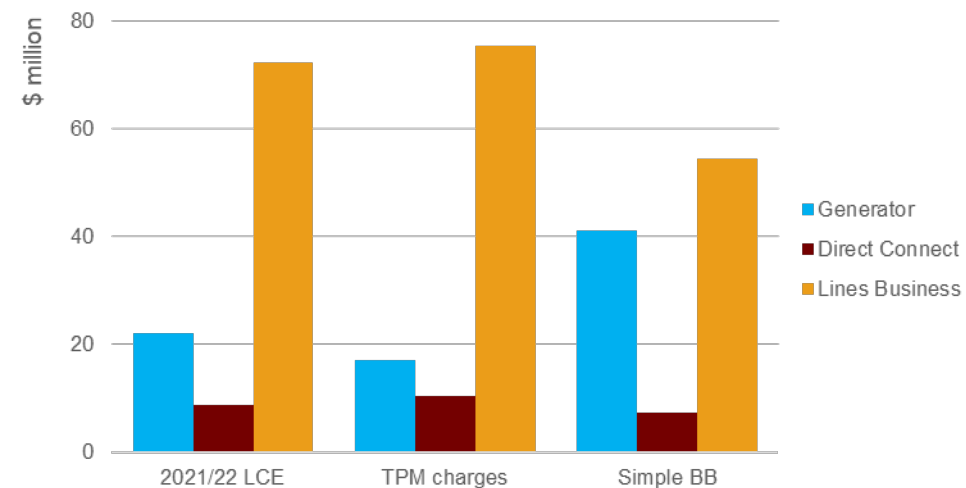
Agenda

Part One – Overview

1. What is SRAM?

2. SRAM principles

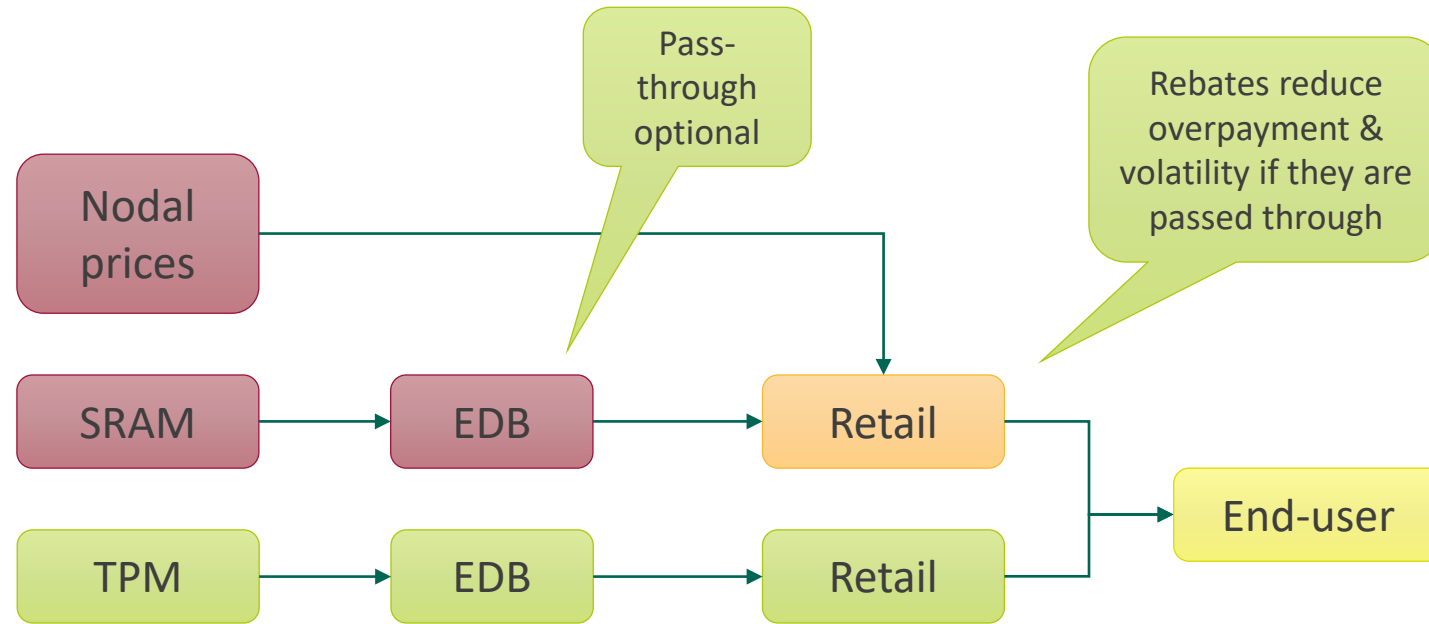3. Our SRAM proposal

4. Pass-through

5. Impacts of the proposal

6. Timeline

Part Two – Deeper dive

1. Settlement residue
2. Usage signals
3. Investment signals

6. Timeline: Consulting now on settings from April 2023

Submissions due 27 September

New SRAM applies to April trading (settled in May)

2019

Discussion as part of TPM 'issues paper'

Jan 2022

SRAM principles consultation

Aug 2022

SRAM proposal

Apr 2023

TPM go-live

Authority decision November 2022 (subject to submissions)
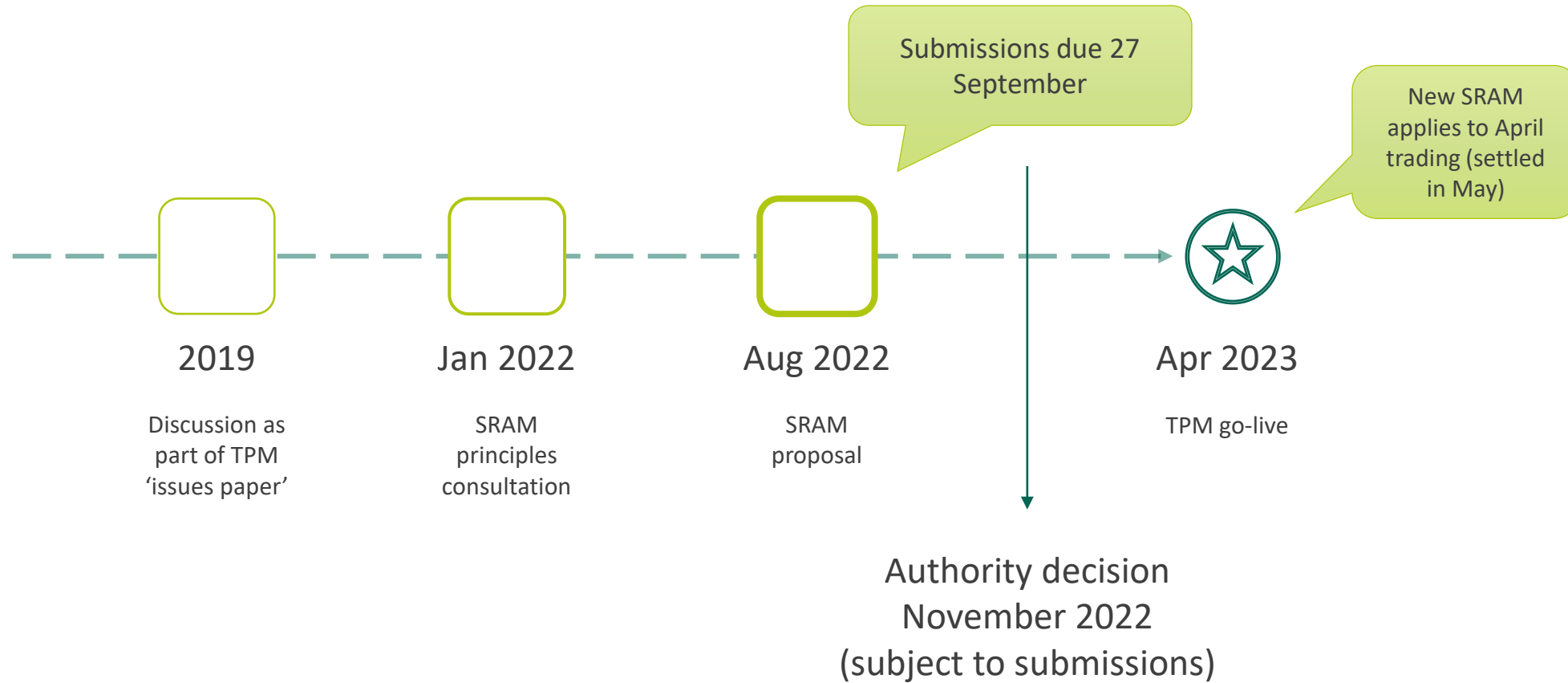
Consultation

- Simple BB is Authority's preferred option, remain open to TPM charges option
- Code amendment drafting presented for both

- Proposing disclosure of pass-through methodology and outcome
- Proposing non-prescriptive obligation to pass-through

Next steps:

- Submissions due 27 September
- decision and code amendment
- Transpower implements SRAM
- SRAM applied to April 2023 LCE (settled in May)

Agenda

Settlement residue comprises LCE and FTR revenue

FTRs are auctioned, generating auction revenue.

LCE tops-up auction revenue if needed.

FTR excess contributes to settlement residue.

The Authority recently consulted on FTR market observations, and is working through submissions.

Diagram:

(a) Wholesale market — Modelled LCE of $136m (100%)

(b) WEM excess (LCE) ($121m, 89%) — Actual excess is lower than modelled rentals

FTR market

(c) FTR rentals ($109m, 80%)
(+)
(d) FTR auction revenue ($137m, 101%)
(−)
(e) FTR payouts ($176m, 130%)

FTR market used $39m (29%)

(f) FTR excess ($70m, 51%)

(g) Non-FTR excess ($12m, 9%)

(h) Settlement residue ($82m, 60%)

TRANSPOWER — Transpower received $82m (60%)

Transpower rebates residue to customers

Note: **all** figures are for the year ended March 2020. % figures are relative to modelled LCE.

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LCE comes from the transport component of nodal prices

Loss and constraint excess (LCE) $= \sum$ Revenue from transport components $= \sum$ [Flow X Separation]

Nodal view

Link view

LCE is a cost for load and generation

Locational marginal price (LMP) = Energy component +/- Transport component

Positive downstream = cost to load

Negative upstream = cost to generation

B $150

$150 A

$100 $200 B A
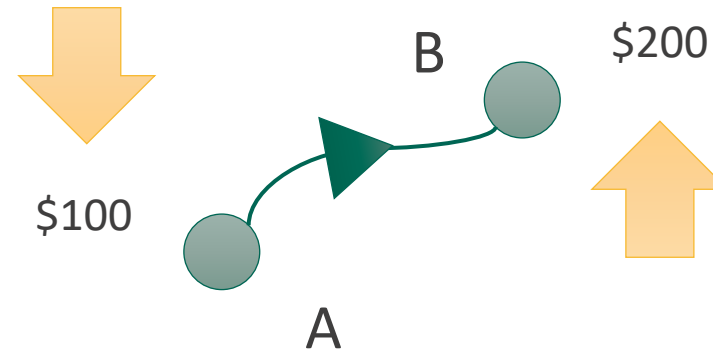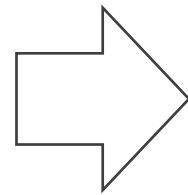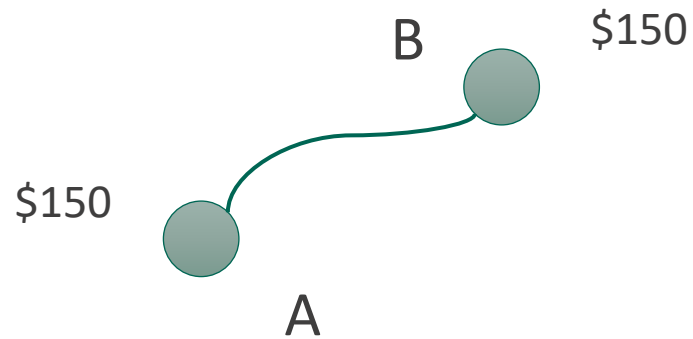
SRAM and TPM are part of a package of changes (1)
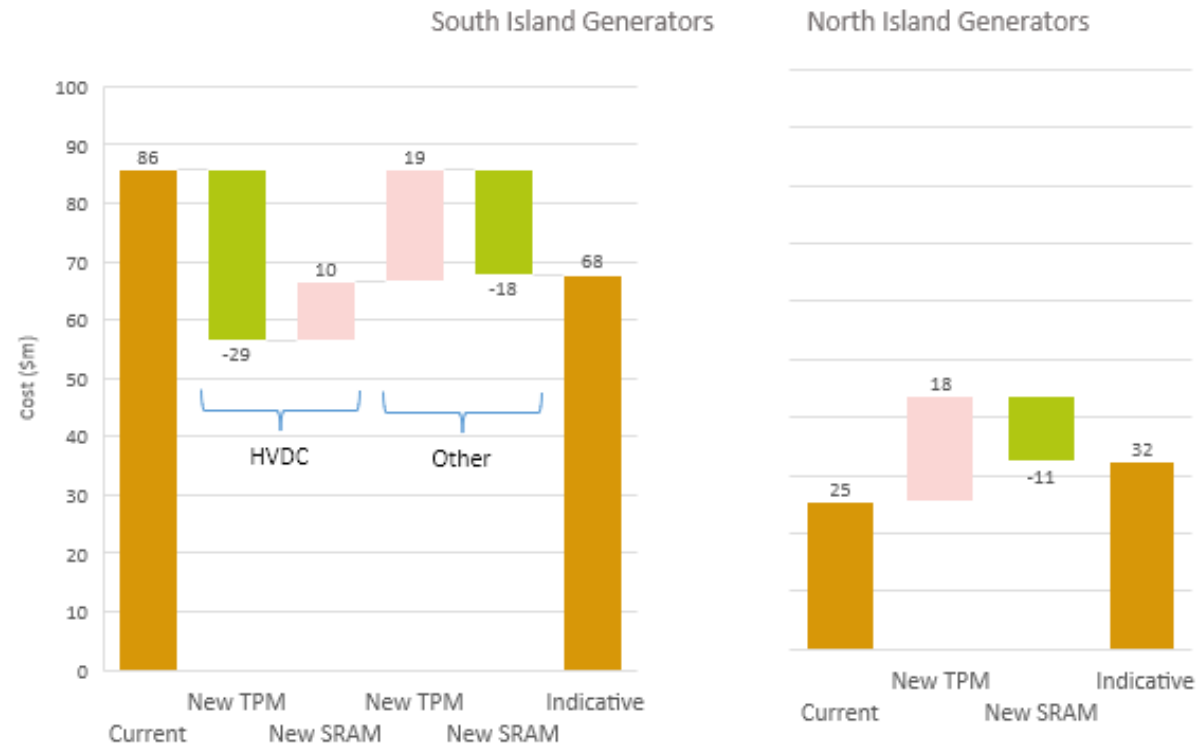
Key:
Current = TPM charges less residue rebates, with current TPM and SRAM
New TPM = impact of change in TPM
New SRAM = impact of change in SRAM
Indicative = TPM charges less residue rebates, with new TPM and SRAM

SRAM and TPM are part of a package of changes (2)
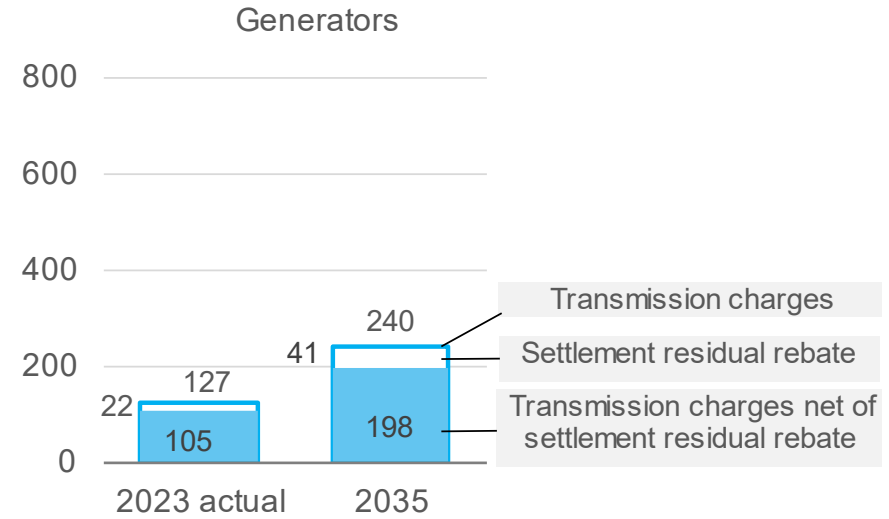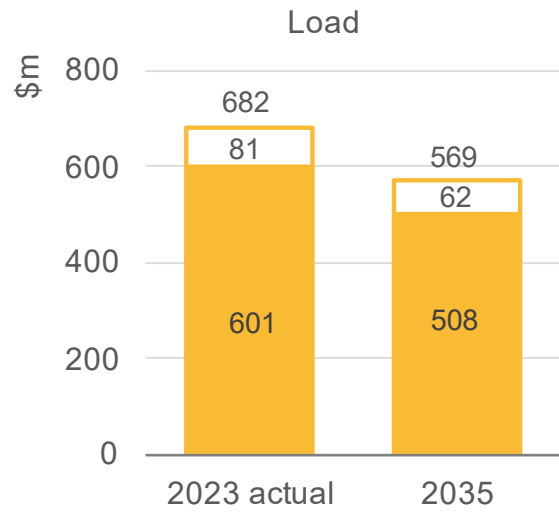
Load

	2023 actual	2035
Top	81 (total 682)	62 (total 569)
Bottom	601	508

Generators

	2023 actual	2035
Top	22 (total 127)	41 (total 240)
Bottom	105	198

Transmission charges
Settlement residual rebate
Transmission charges net of settlement residual rebate

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Usage signals

Signal preserved if rebate fixed with respect to usage...

...even though costs may become less volatile.

Simple BB option uses fixed allocators, based on historical flows

Flow across congested link	500	MWh	
Price separation across congested link	$50	per MWh	
LCE pool	$25,000		<- price difference X flow
User's rebate allocation	2%		
Nodal transport price	$25	per MWh	
Nodal energy price	$100	per MWh	
Nodal price	$125	per MWh	<- transport + energy
User's offtake	50	MWh	
User's transport cost	$1,250		<- nodal transport price X offtake
User's rebate	-$500		<- allocation X LCE pool
User's energy cost	$5,000		<- nodal energy price X offtake
User's total cost	$5,750		<- net transport + energy

User's new offtake	51	MWh	
User's transport cost	$1,275		<- nodal transport price X offtake
Users's rebate	-$500		<- allocation X LCE pool
User's energy cost	$5,100		
User's total cost	$5,875		
Increase in cost	$125		
Increase in offtake	1	MWh	
Price signal	$125	per MWh	<- nodal price signal preserved

WEM options alter signal
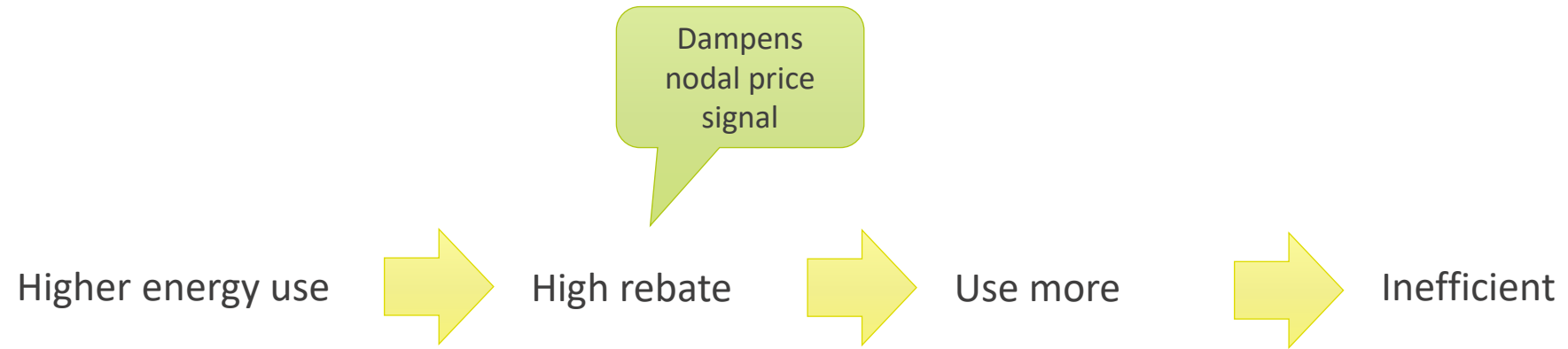
Higher energy use → High rebate → Use more → Inefficient

Dampens nodal price signal

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Investment signalling

Nodal prices, transmission charges, and settlement residue rebates have linked investment coordination roles

Nodal prices

Energy component of nodal prices
Marginal cost of energy production

Additional transmission charge

Transport component of nodal prices
Marginal cost of transporting energy

Price signal (usage and investment)

Settlement residue rebate

Benefit-based charges
Allocated cost of shared assets

Charges recover 100% of cost of transmission

Connection charges
Allocated cost of dedicated assets

Price signal (investment)

Capital contributions
Direct cost of dedicated assets

= WEM
= TPM
= contract

Residual charge
Top-up to cover remaining costs

Cost recovery

Nodal prices and BBCs coordinate investment

Prior to grid investment

After grid investment

Growing cost of using congested link

Fixed cost of upgraded link

Grid users factor nodal prices into their investments...

...and exposure to BBCs

Rebates 'shield' a user from these costs
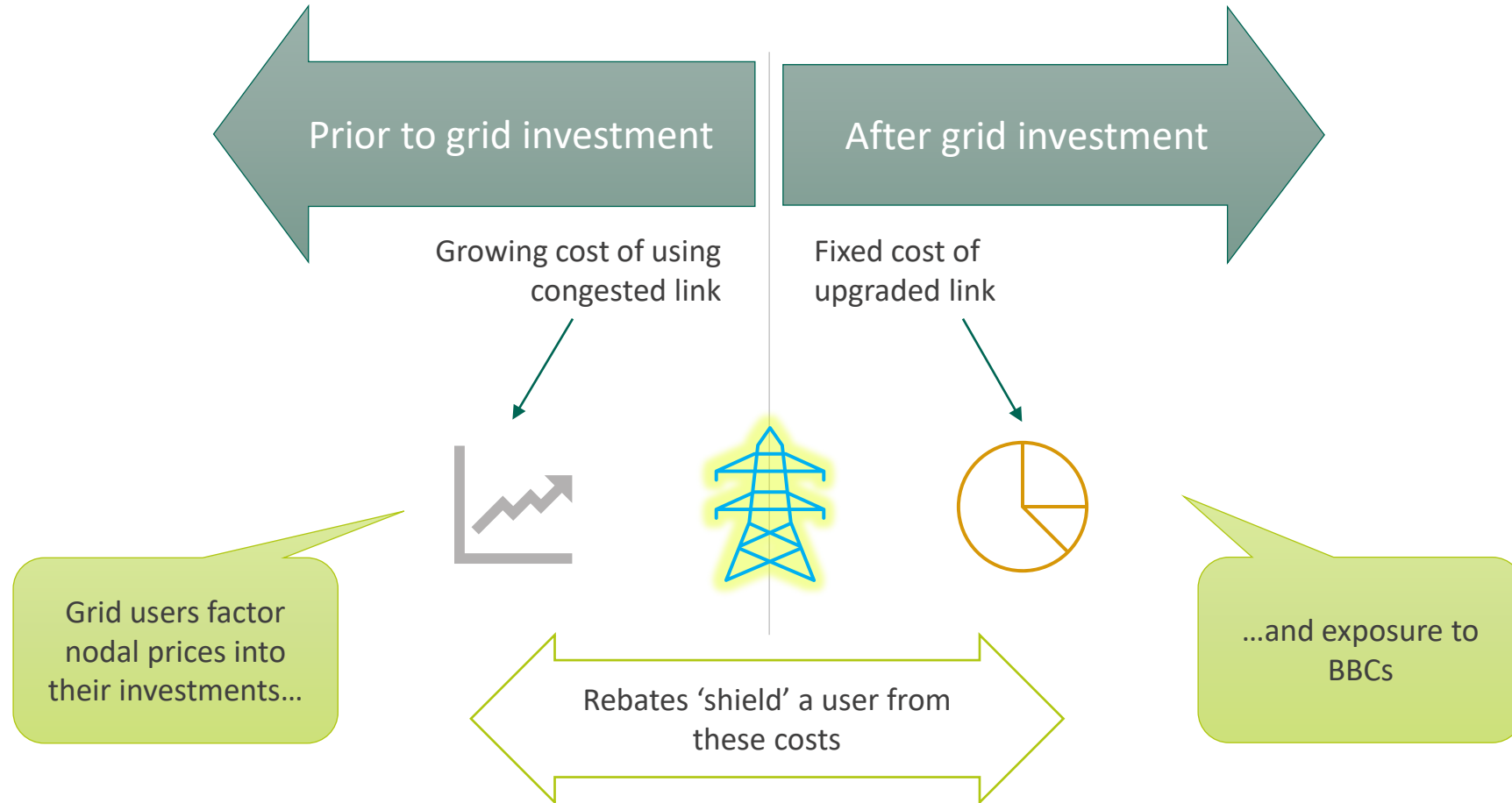
Simple BB shields historical usage, not growth

Up to five-year lag before shielding responds

Unshielded exposure greater if usage is growing

Usage ->

Shielding ->
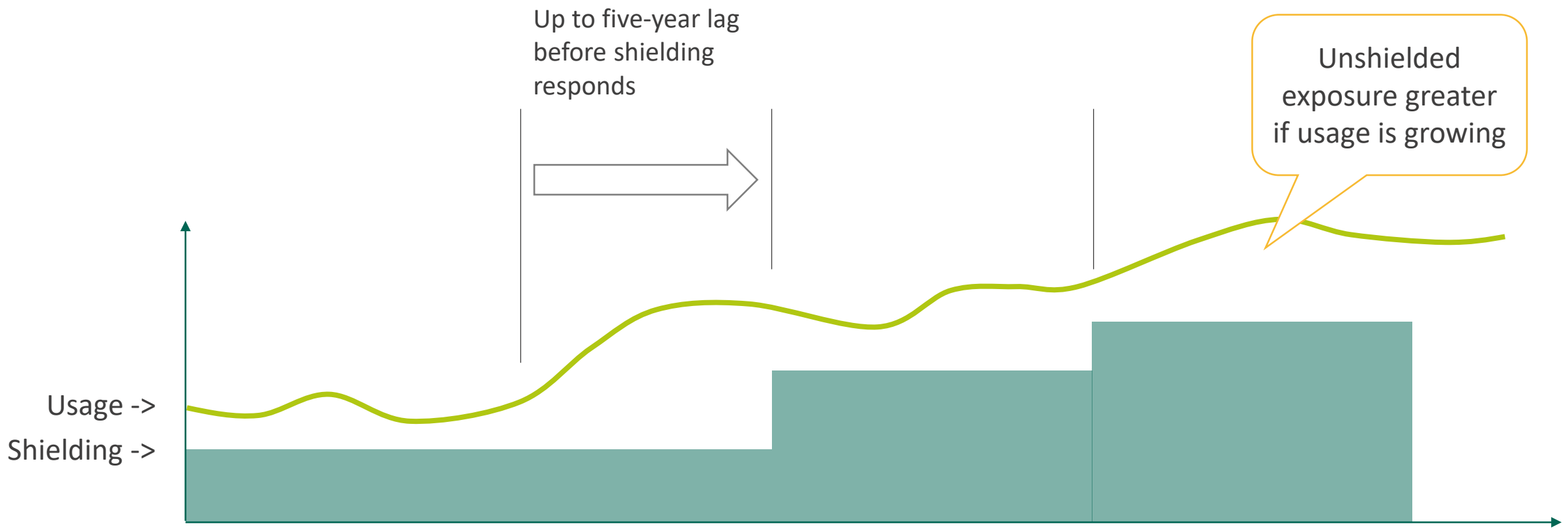
SRAM can influence investment signals

WEM volume option →

- Large purchasers (GWh) shielded
- Under-weight impact on transmission investment
- Upgrade costs fall on others

TPM charges option →

- Large TPM customers shielded from transport component of nodal prices
- Under-weight impact on transmission investment
- Upgrade costs fall on others

Simple BB option →

- Historical usage level shielded, new usage exposed
- Factor upgrades costs into decision-making
- Bear proportionate share of upgrade costs

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Summary

Option A: Simple BB

	Worst → Best
Overall	●●●●○
Over-payment	●●●●○
Grid usage signals	●●●●●
Investment signals	●●●●○
Cost/complexity	●●●○○

Option B: TPM charges

	Worst → Best
Overall	●●●○○
Over-payment	●●○○○
Grid usage signals	●●●●●
Investment signals	●○○○○
Cost/complexity	●●●●○