



# Power Ledger

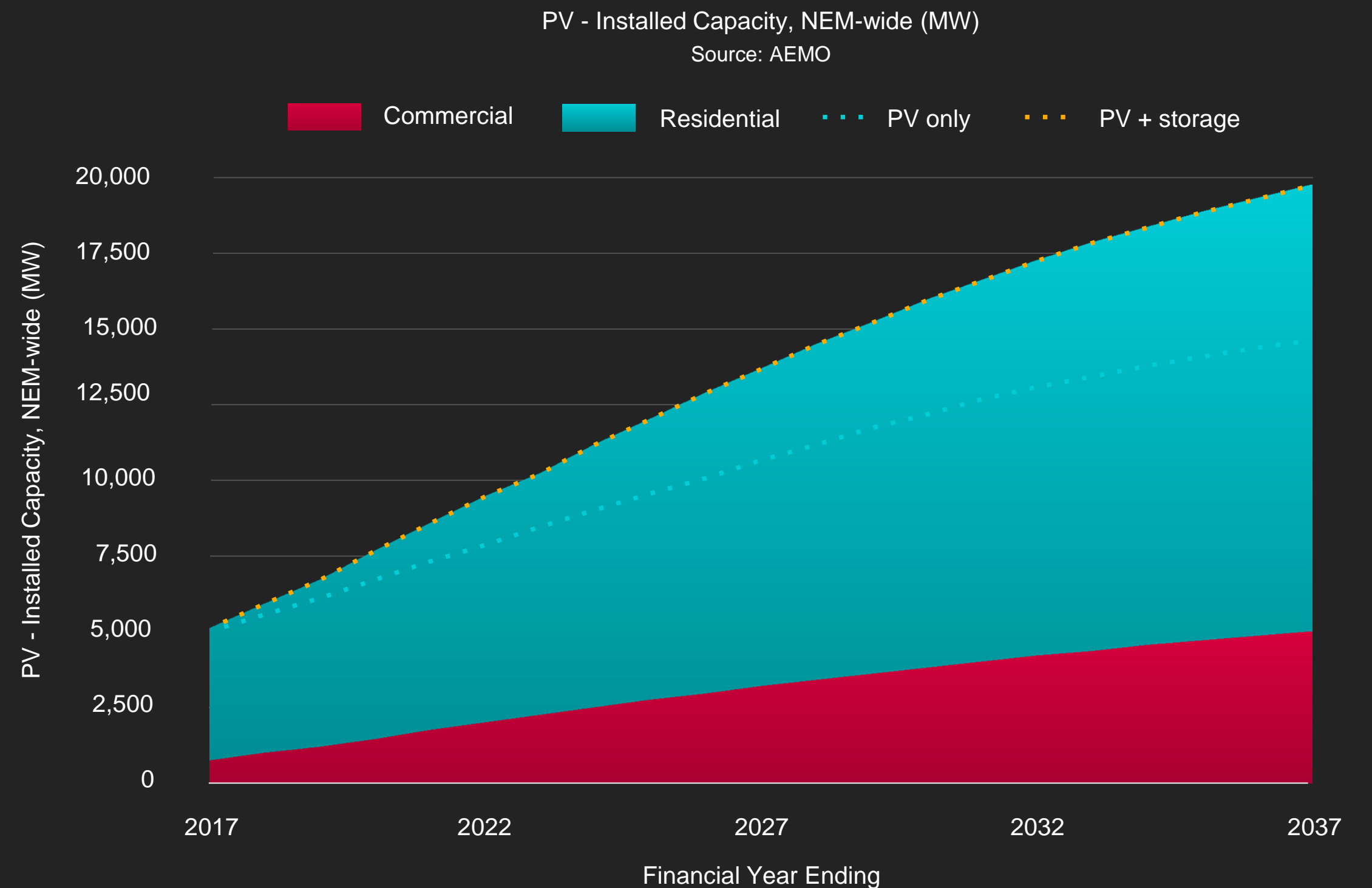
Driving Value From Distributed Energy Resources

March 2019

# Solar PV Uptake

## Key Drivers

- Falling system costs make solar PV competitive with or without subsidies
- Increasingly more viable for SME and industrial customers
- Around half of mass market PV generation is exported to the grid
- Rapid uptake of rooftop PV continues to reduce peak demand and operational consumption
- Rooftop PV installations are forecast to grow at avg. annual rate of 8.7%





# Distributed Battery Uptake

## Key Drivers

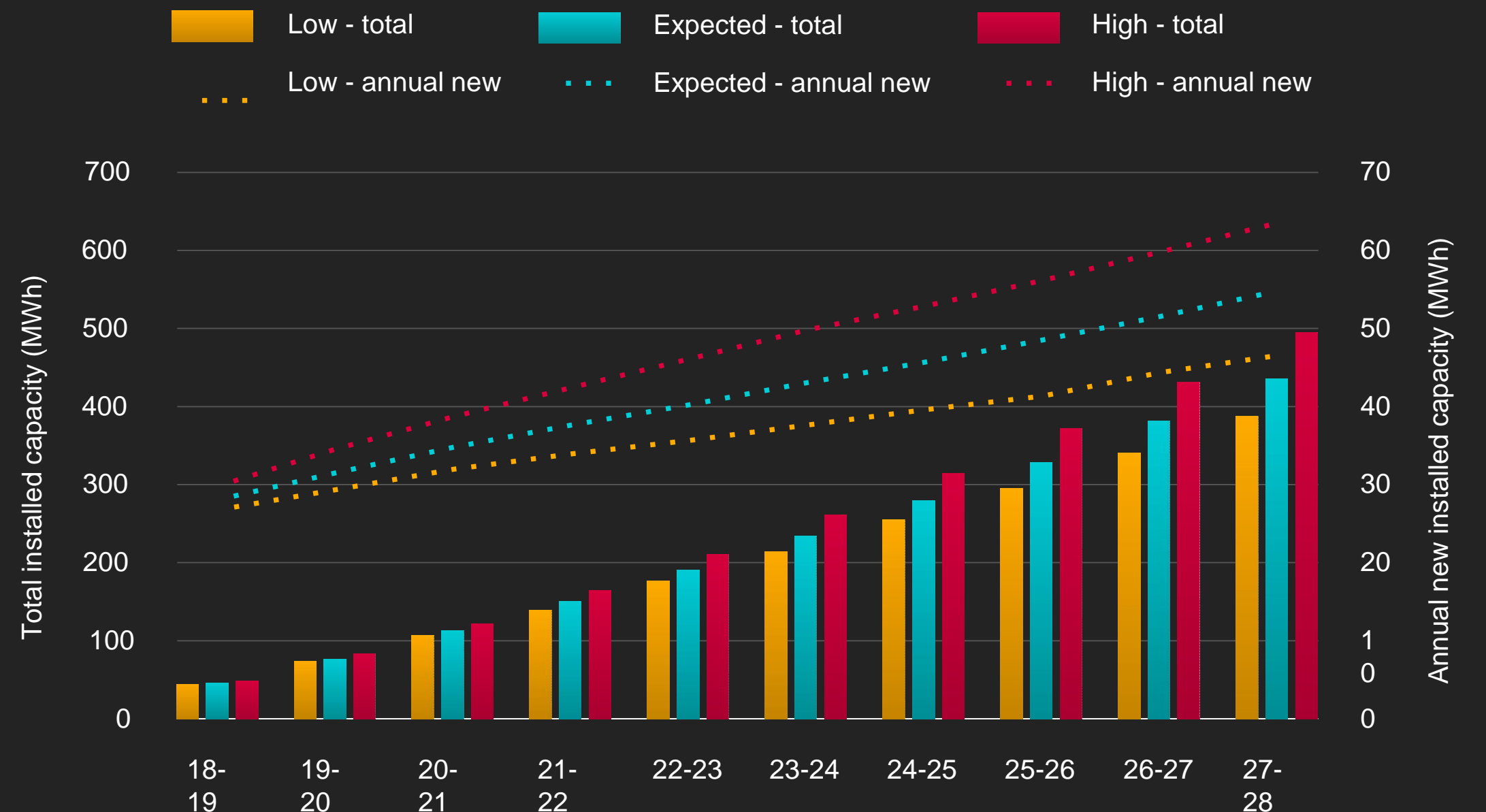
- Grid defection
- Regulations allow greater integration of storage into grid
- Li-ion price declines
- Price declines drive long-duration growth
- Utility-scale solar and storage
- Greater number of regions emerge
- Use of energy storage to defer transmission and distribution upgrades
- Revenue streams diversify

...Uptake has been under-forecast before.

Should we be doing more to prepare?

Installed capacity of battery systems, 2018-19 to 2027-28 financial years  
WEM SOO, 2018

Source: ACIL Allen



# Grid Defection

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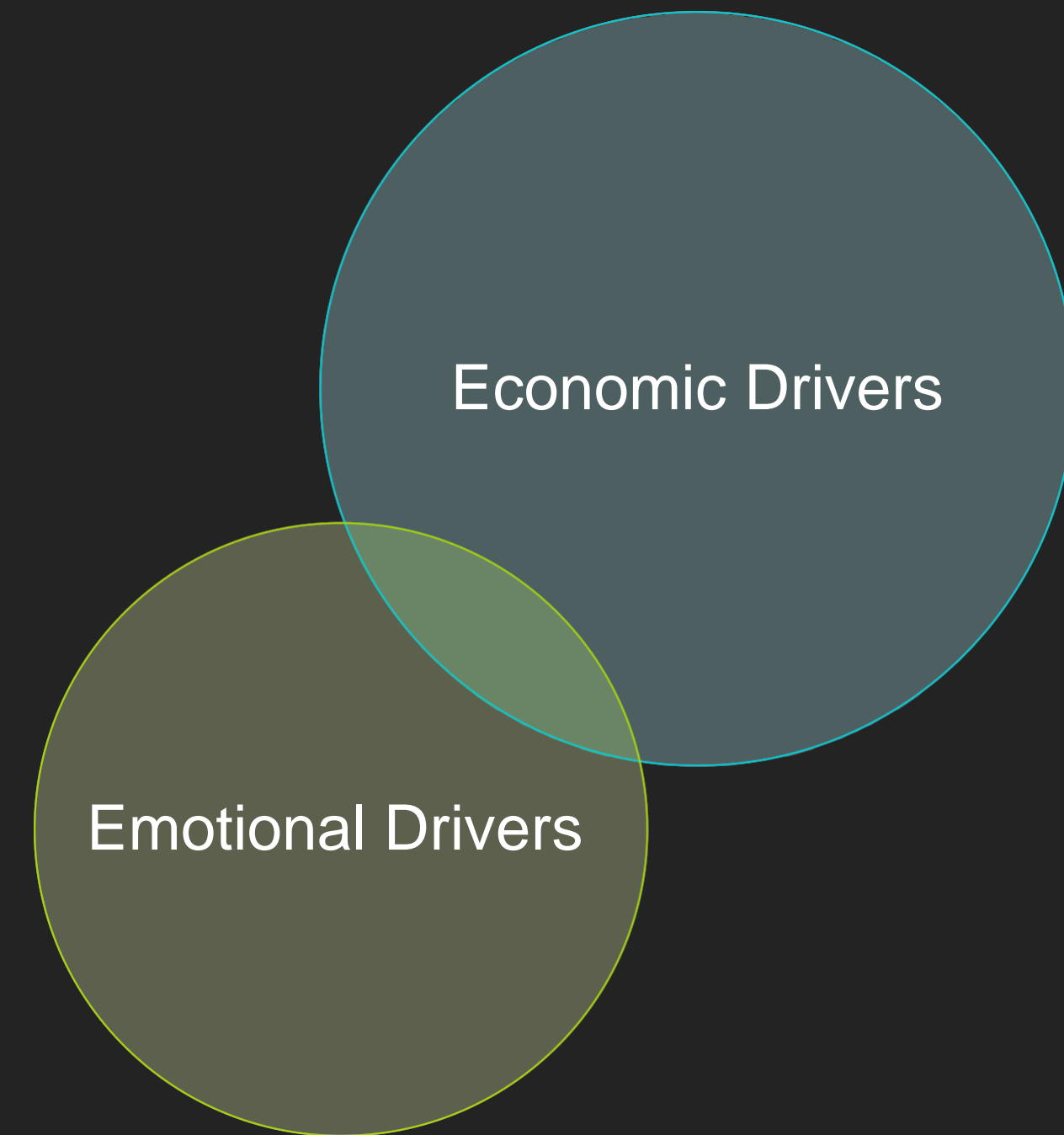
Grid defection is fundamentally driven by economics, but emotional drivers also come into play.

## Economic Drivers:

- Falling solar PV costs
- Decreasing export tariffs
- Increasing electricity prices

## Emotional Drivers:

- Being more 'green'
- Greater autonomy
- Control over future energy costs



# Increase in Network Charges

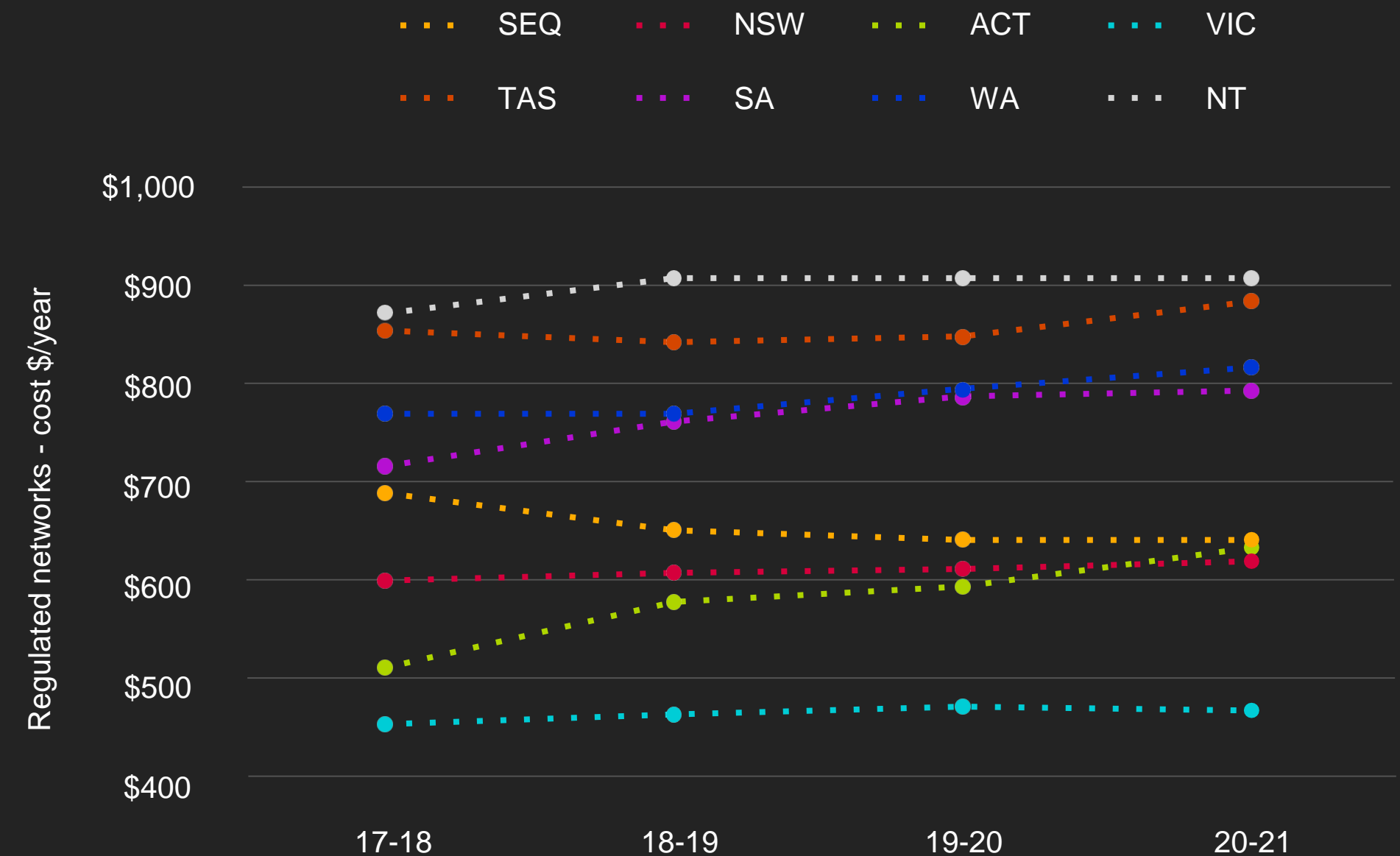
Increase in network charges is linked to increase in uptake in PV.

State	% residential dwellings with PV installations
QLD	32.60%
SA	32.10%
WA	26.10%
NSW	17.80%
VIC	15.60%
ACT	14.20%
NT	14.20%
TAS	14.210%



Network cost component of annual electricity bills for representative consumer

Source: AEMC



# xGrid

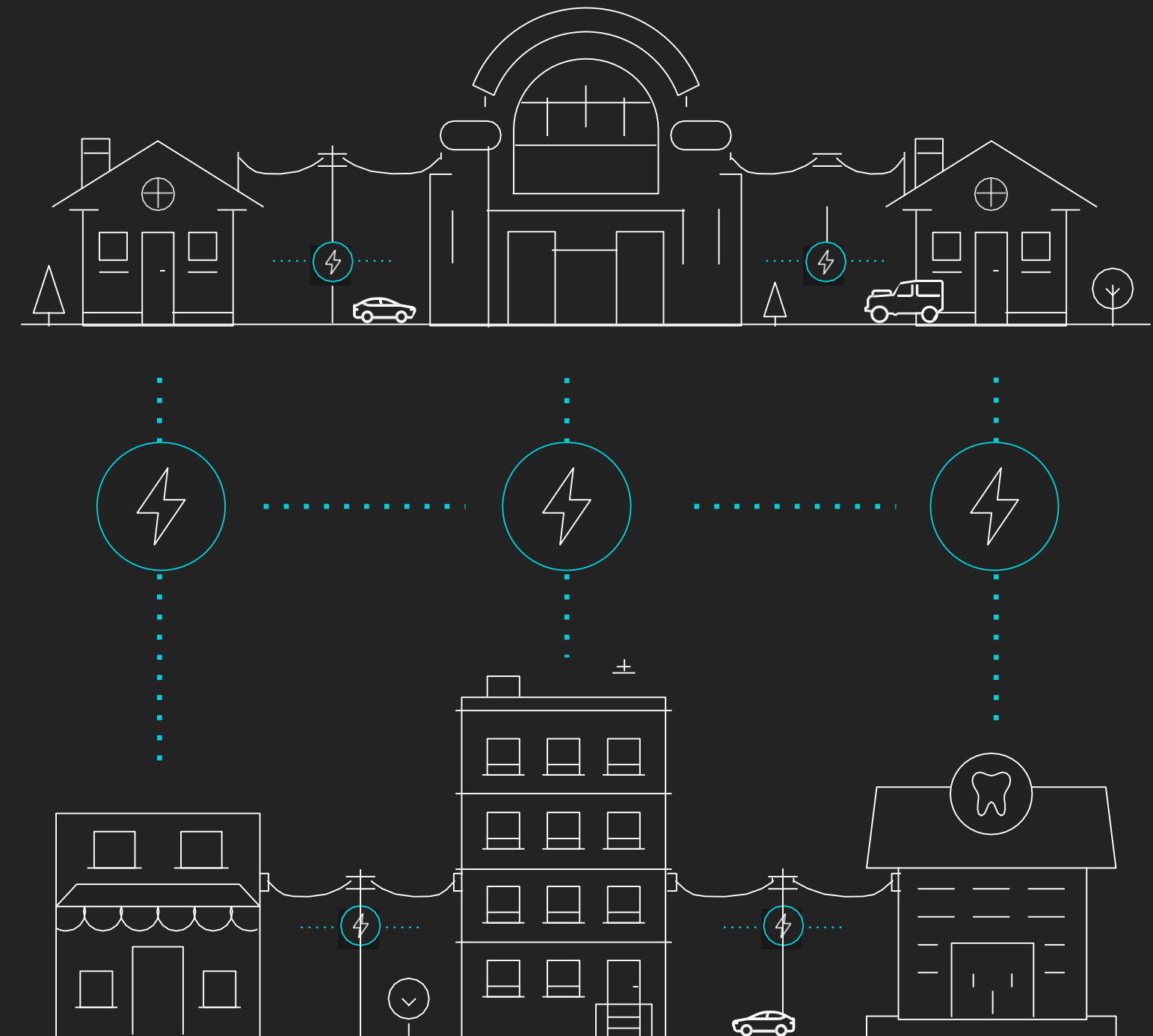
Peer-to-peer electricity trading across the regulated electricity network.

## BENEFITS

- Competitive advantage for innovative retailers to obtain and retain customers
- Enables more customers to access low-carbon energy
- More competitive electricity prices for consumers
- Better returns for customers generating excess energy
- Supports overarching energy system

## FEATURES

- Real-time settlement
- Detailed billing and usage data
- Automatically converts electricity credits to fiat currency
- Transactions viewable on the blockchain



# μGrid

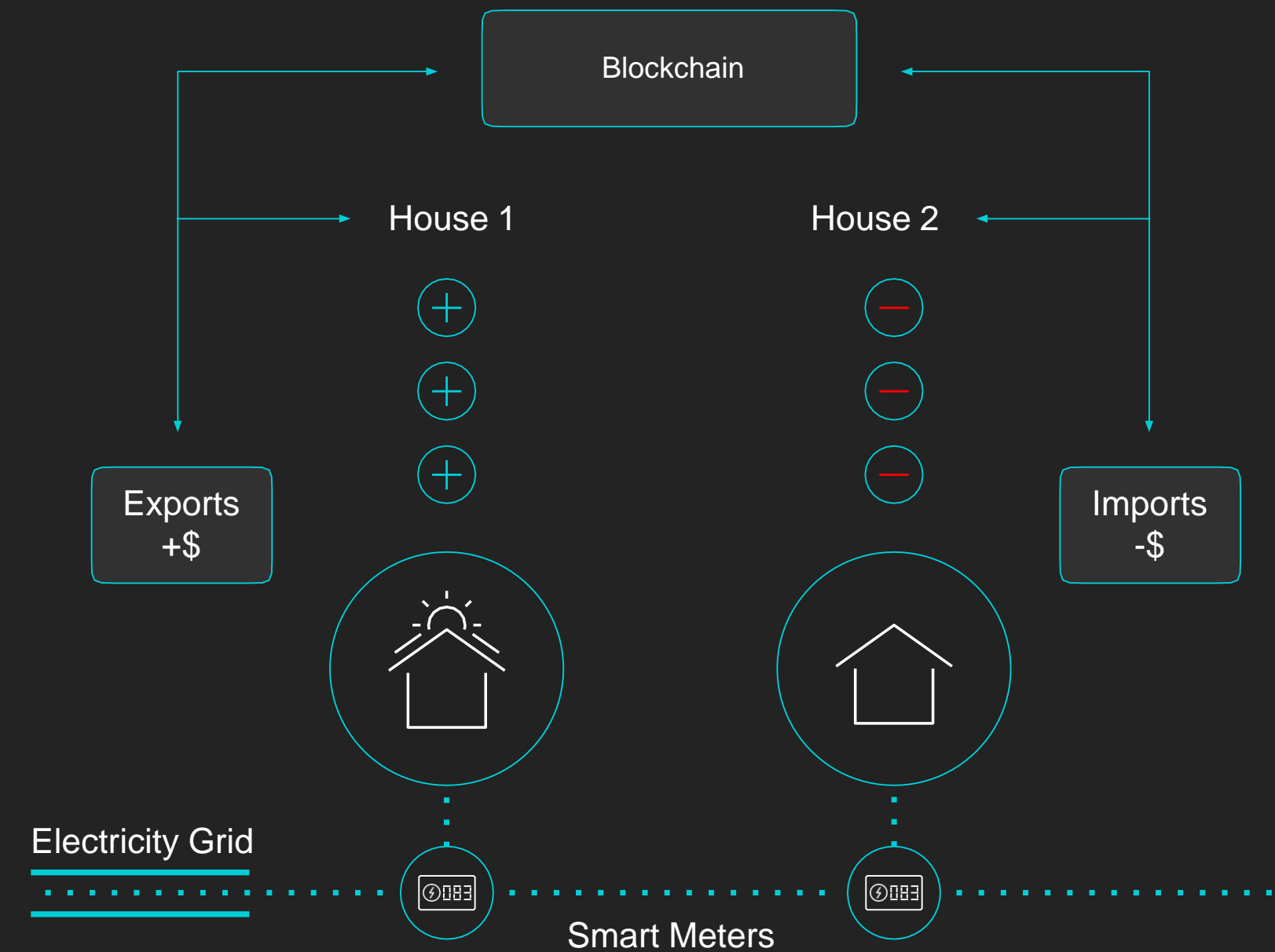
Peer-to-peer electricity trading behind the electricity meter (microgrids).

## BENEFITS

- Tenants access cheaper, greener electricity
- Can be implemented on greenfield and brownfield developments
- Improved visibility over energy consumption
- Potential revenue stream for building managers
- Improves sustainability of development

## FEATURES

- Real-time settlement
- Detailed billing and usage data
- Automatically converts electricity credits to fiat currency
- Transactions viewable on the blockchain



# VPP 2.0

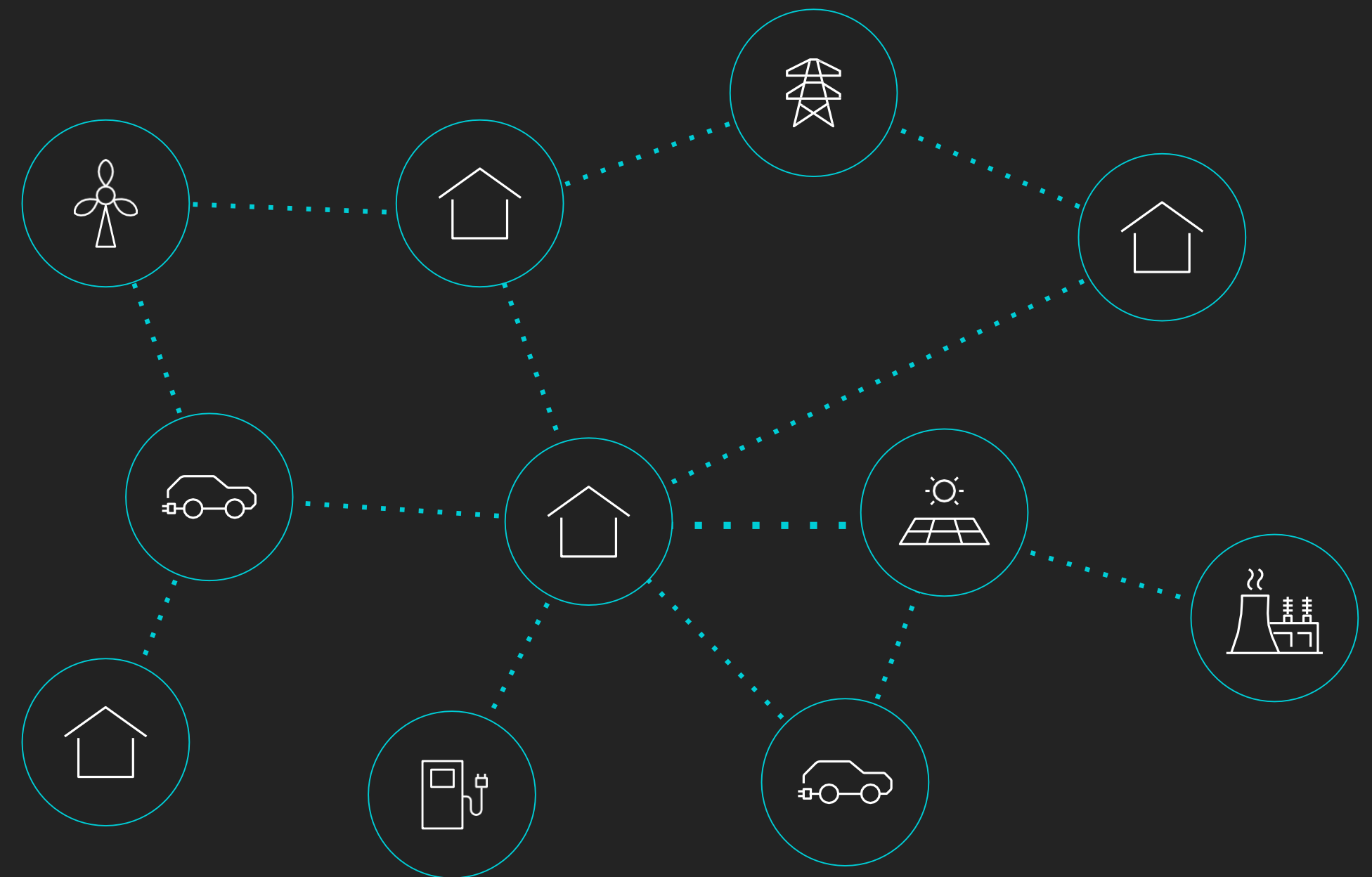
Enables energy companies to automatically manage supply and demand.

## BENEFITS

- Reduces risk and cost for energy retailer
- Consumers contribute to solving price spikes and demand shortages
- Households with solar and batteries can sell frequency, capacity and ancillary services to their energy company
- Faster payback period for household on their battery
- Daily settlement

## FEATURES

- Automatically manages supply and demand
- Real-time capacity management and load shaping
- Optimisation of uses for highest value





# Asset Germination Events (AGE)

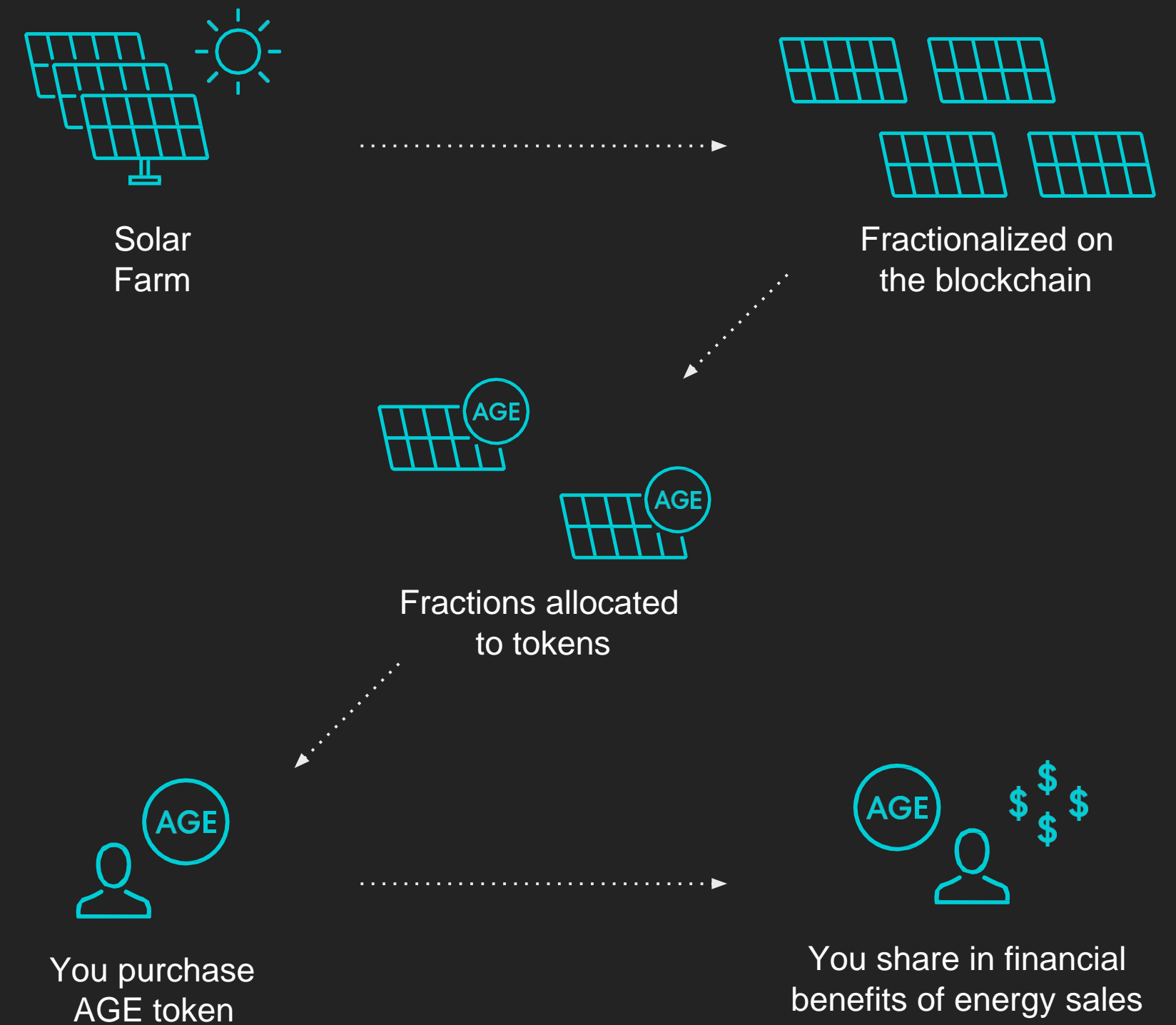
Allowing everyday investors to own a piece of tomorrow's energy systems.

## BENEFITS

- Supports uptake of clean energy
- Available to everyday retail investors, not just high net worth individuals
- Tradeable
- Reduces mistakes in asset registers and is more secure
- Diversifies cryptocurrency portfolios with a compliant, dividend-paying token

## FEATURES

- Security token developed with oversight from regulators
- Profits automatically distributed to token holders
- Exchange-tradable tokens
- Participants have legally enforceable rights to underlying assets



# C6 and C6+

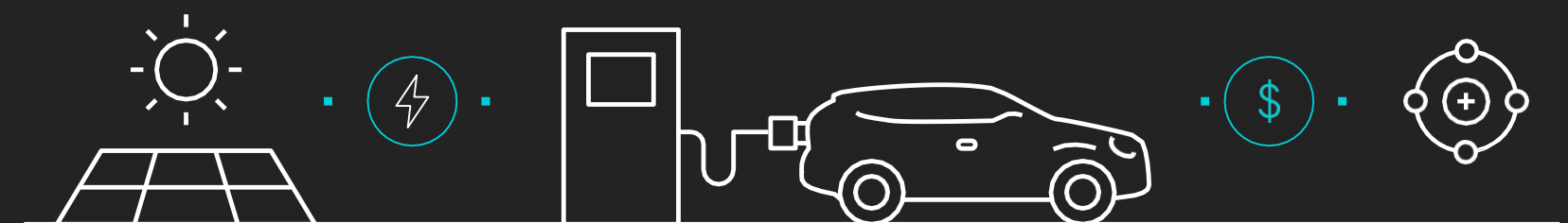
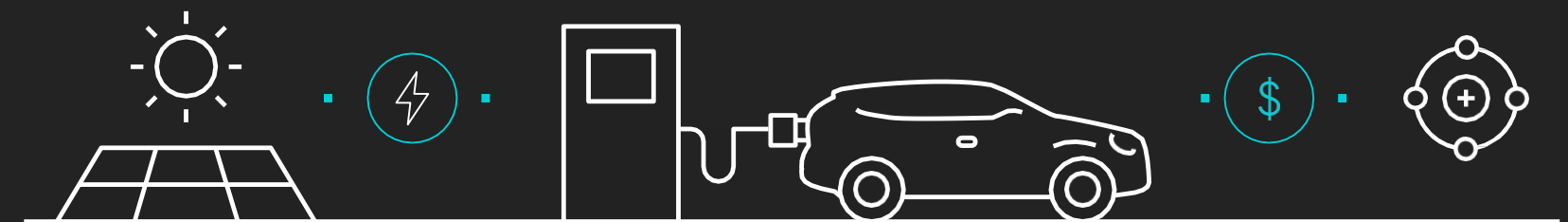
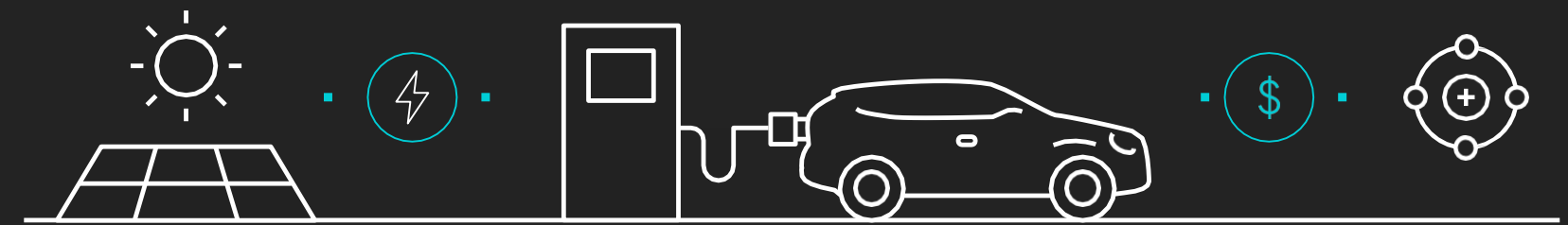
Monetize, trade carbon & renewable energy credits more efficiently.

## BENEFITS

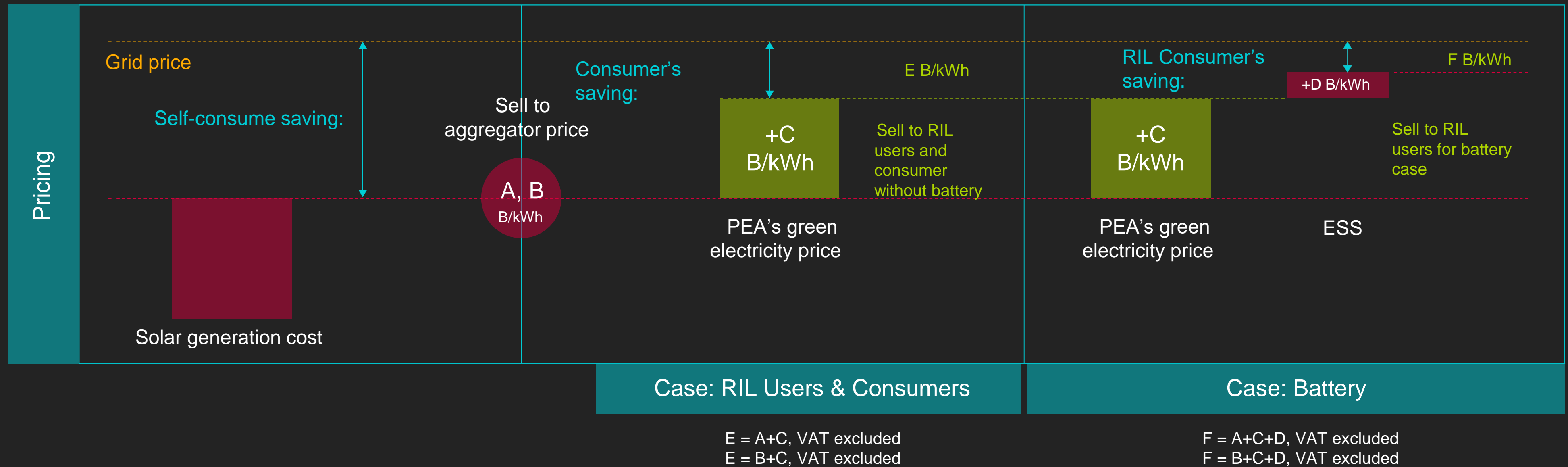
- Improved ability to forecast and monetize future income
- Reduced barriers to claiming carbon & renewable energy credits
- Reduced burden of collecting and parsing data
- Transparent pricing for buyers and sellers
- Creates liquidity in carbon and renewable energy credit markets

## FEATURES

- Accurate measurement of energy generation (C6)
- Easily generates regulatory compliant reports (C6)
- Automates process to issue credits (C6)
- Enables credit trading in efficient, transparent, liquid market (C6+)
- Fast market settlement (C6+)
- Allows consumers to purchase and retire renewable energy credits via an exchange (C6+)



# Value Creation



# Regulation

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## ENERGY MARKETS

- Creation of local P2P markets to provide clear price signals for owners of distributed energy resources to stay connected and continue to provide energy back to the grid
- Markets need to provide financial recognition of the types of services DER can provide to the market

## NETWORK MANAGEMENT

- Current network charges are not designed to reflect the benefits that can arise from optimising locally generated renewable energy at the P2P level
- A category of network charges should take into account the reduced use of the transmission network and the more efficient utilisation of the distribution network

## ACCESS TO DATA

- Current rules make it difficult to access real time data from smart meters required to maximise the benefits of innovative new technology like blockchain
- Direct access to this type of granular data will increase the security and accuracy of the PL platform



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