

# IEEE PES Asia-Pacific Power and Energy Engineering Conference

November 2015



## Power Industry Challenges and the Need to Innovate

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CEO, Energex

# Overview

- **Sector Overview**
- An industry in transition
- Our future Direction

# Energex

Electricity distributor SEQ

\$12B+ assets

1.35M connected customers

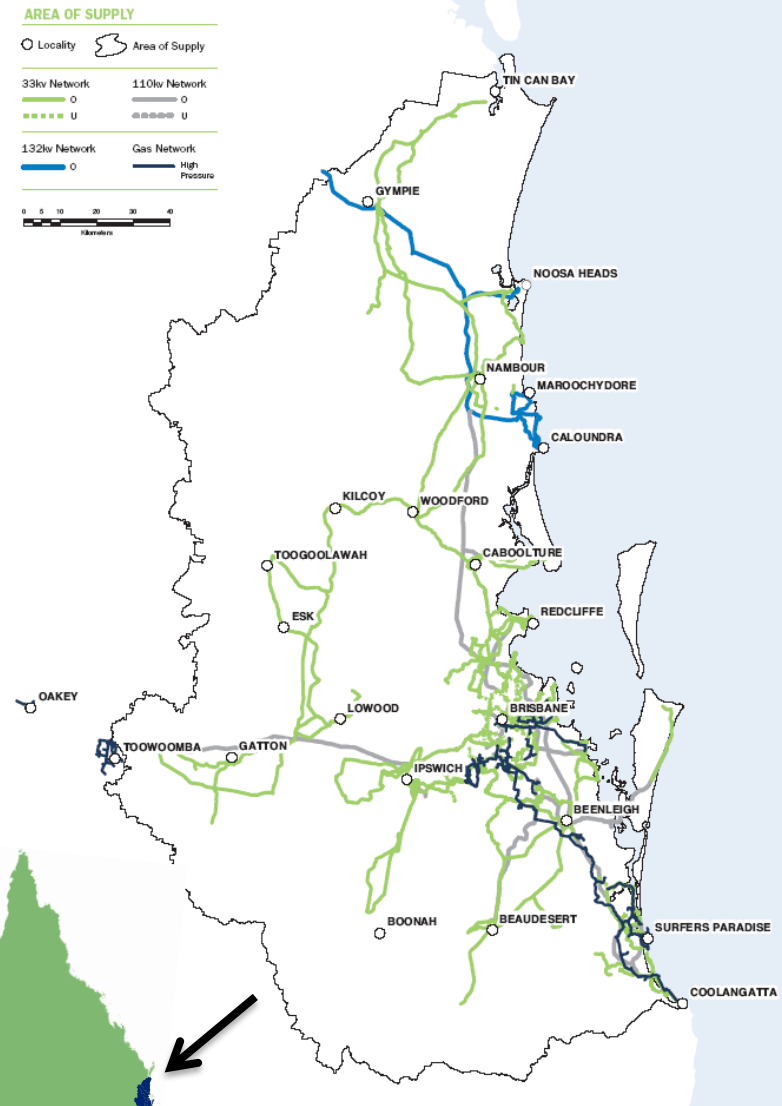
35,100km overhead lines

16,800km underground cables

660,000+ poles

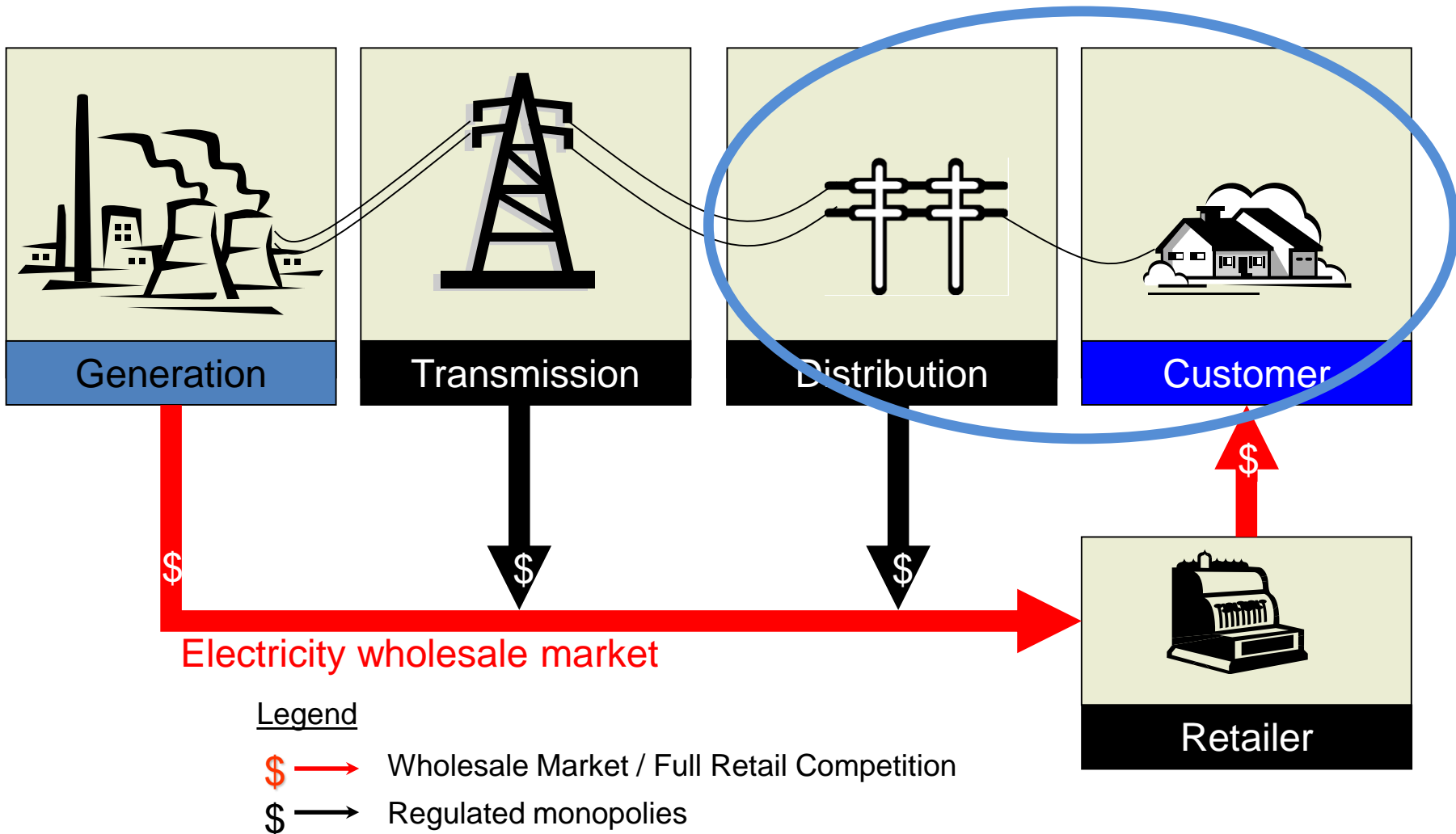
282 substations

2900 staff



positive energy

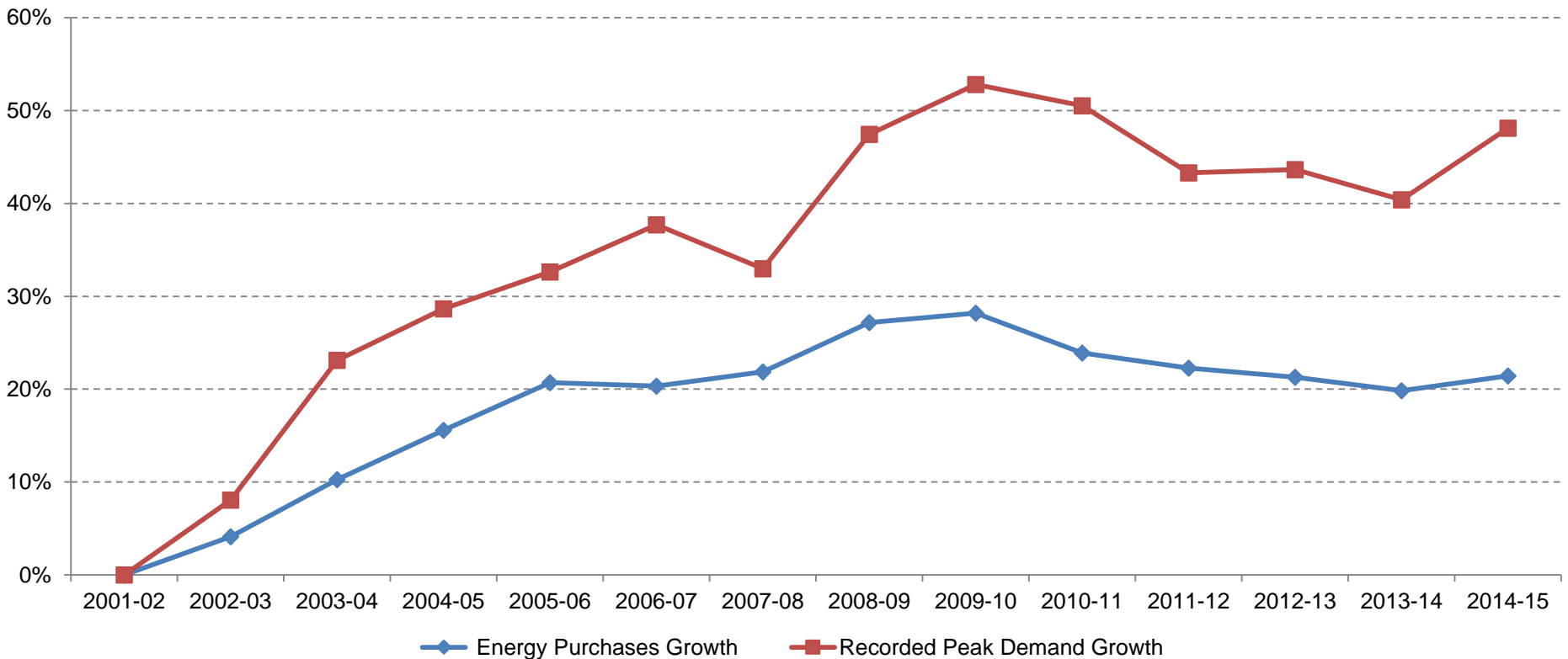
# Distribution and Customer Service is Evolving



# Total Demand vs Energy Growth

Note the disconnect:  
electricity is billed on  
energy but the network  
investment is based on  
demand

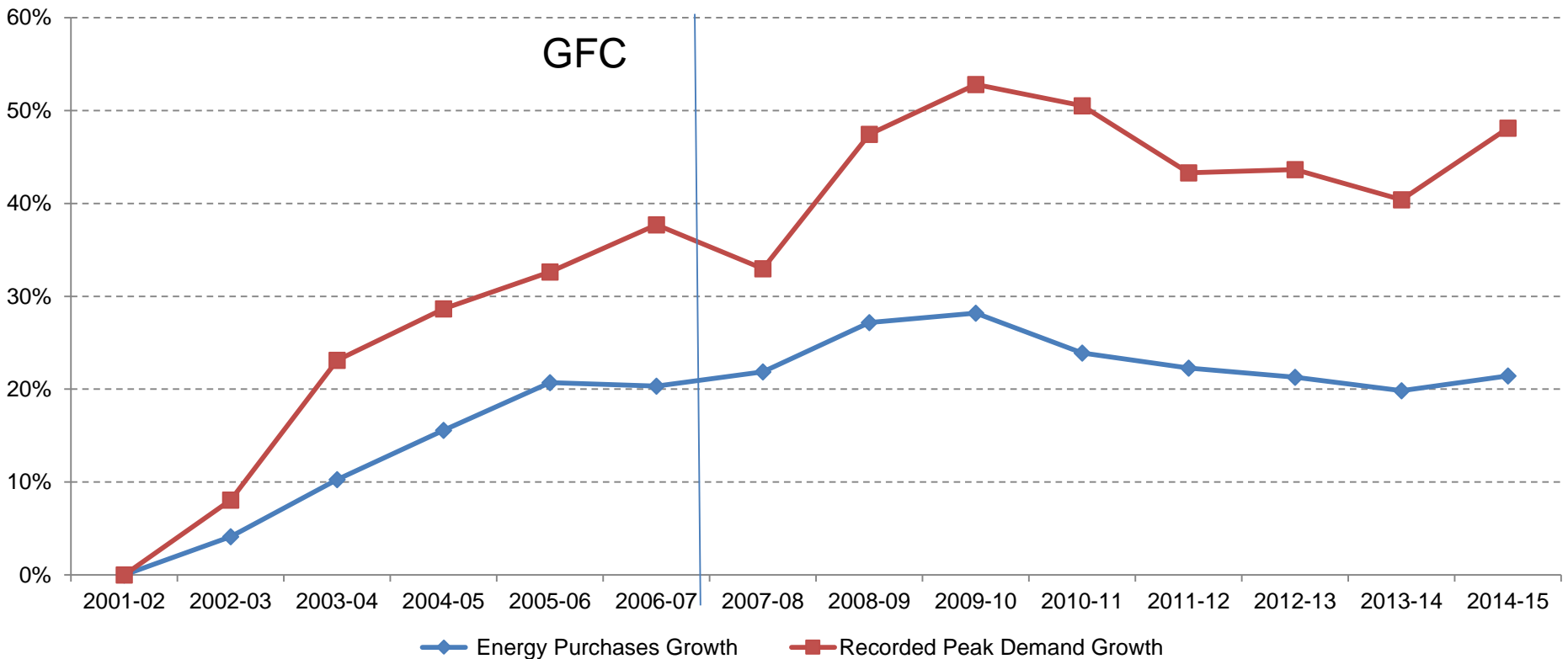
South East Queensland Recorded Peak Demand Growth and Energy Growth



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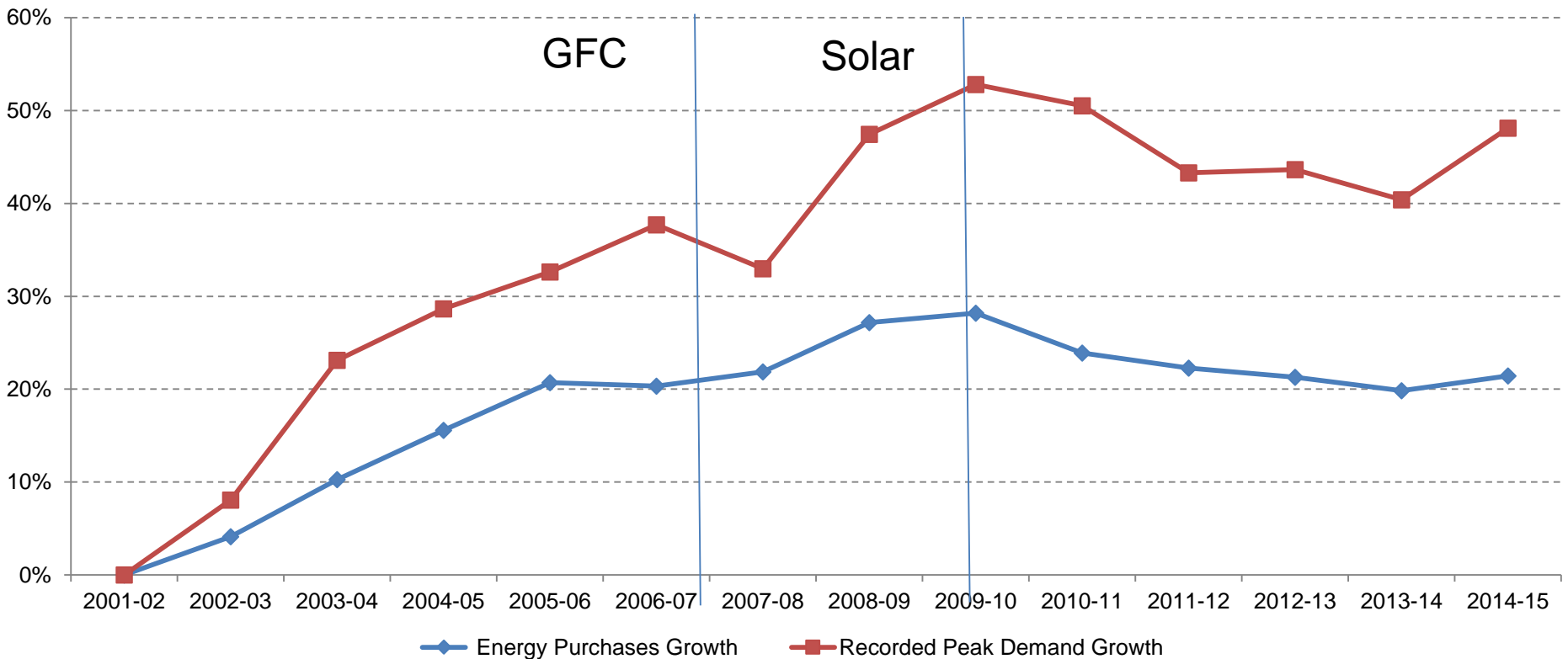
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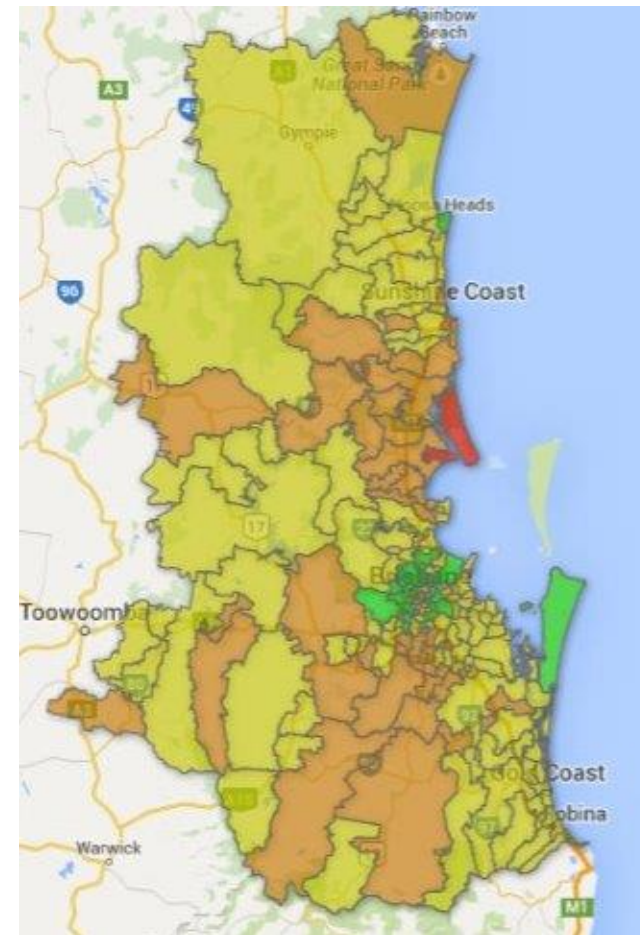
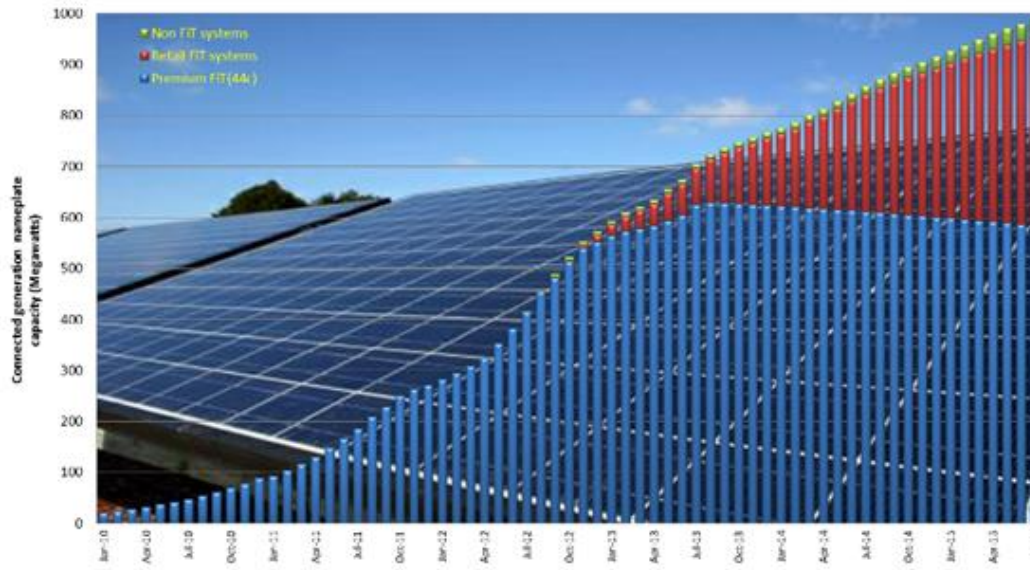
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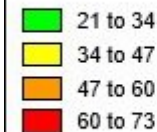


# Energex has high levels of Domestic PV

Grid-connected Solar PV system installed capacity  
ENERGEX



% Saturation by Post Code



Source

~1000MW on installed domestic PV capacity in a ~5000MW network. In some postcodes >60% of customers have PV. Total energy delivered is ~ 7% (1464GWh) of total



positive energy

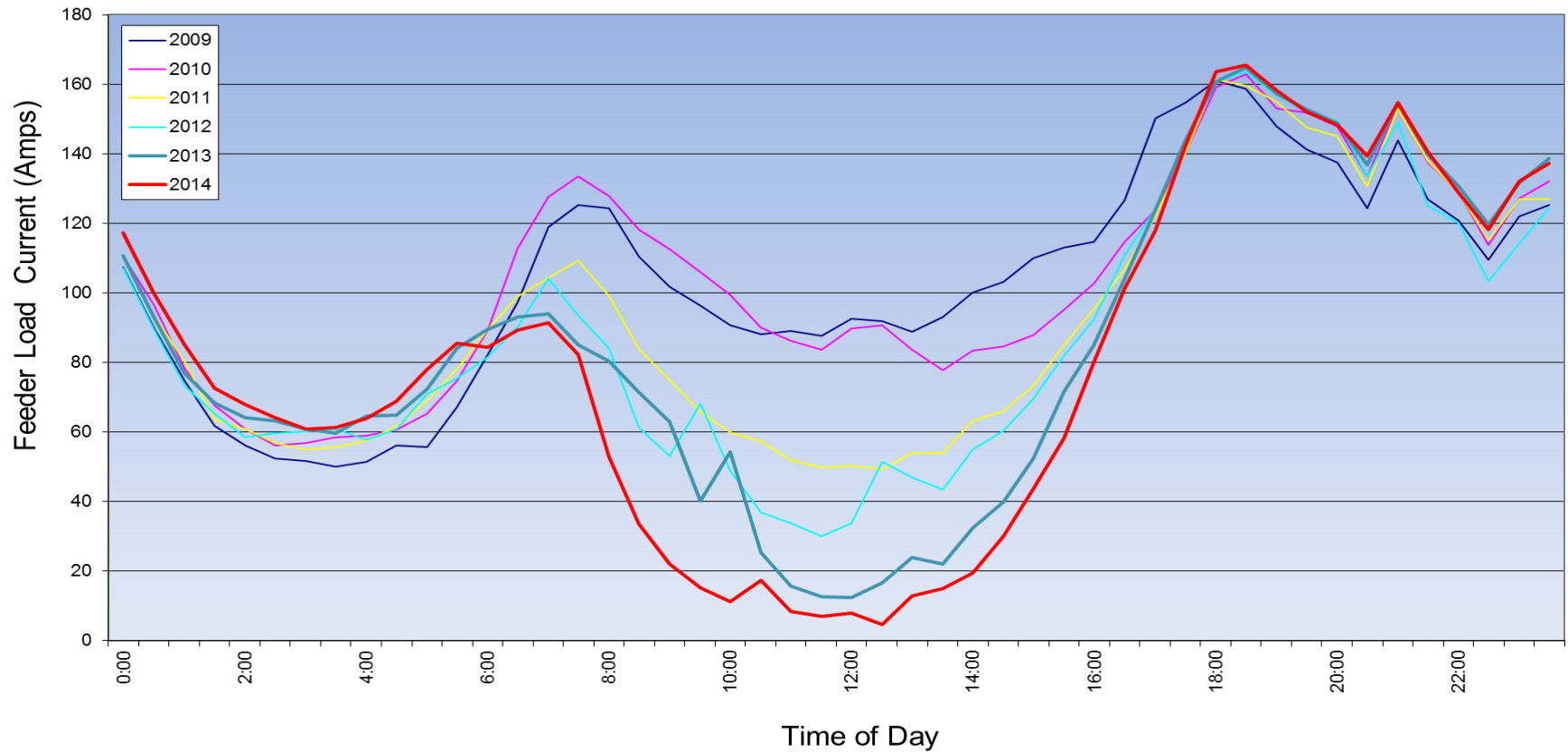


# The Solar PV Impact

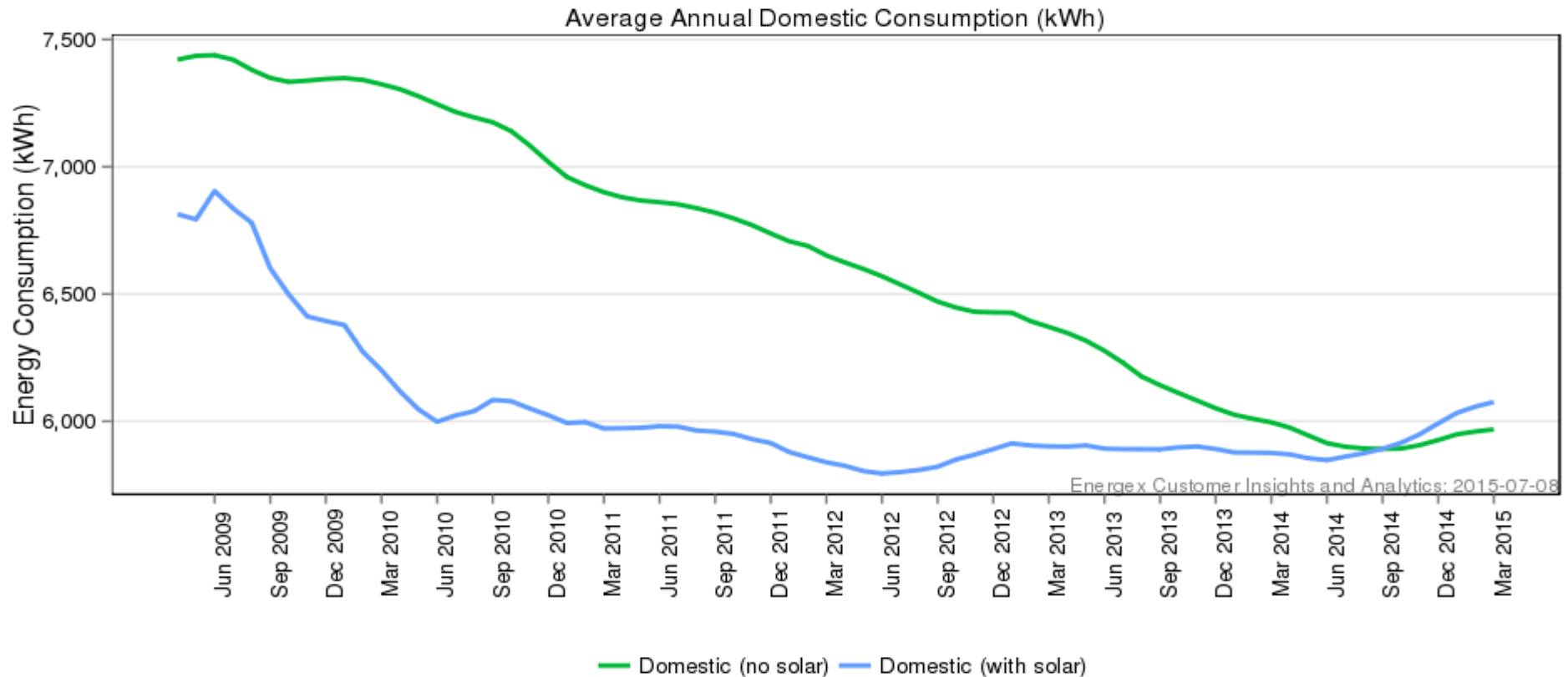
## Feeder 'Currimundi 3A' Impacts of Solar PV

- Currimundi 3A (as at Oct 14)
- 2654 customers
- predominantly residential
- 937 solar PV systems (37%)
- 2930 kW installed generation

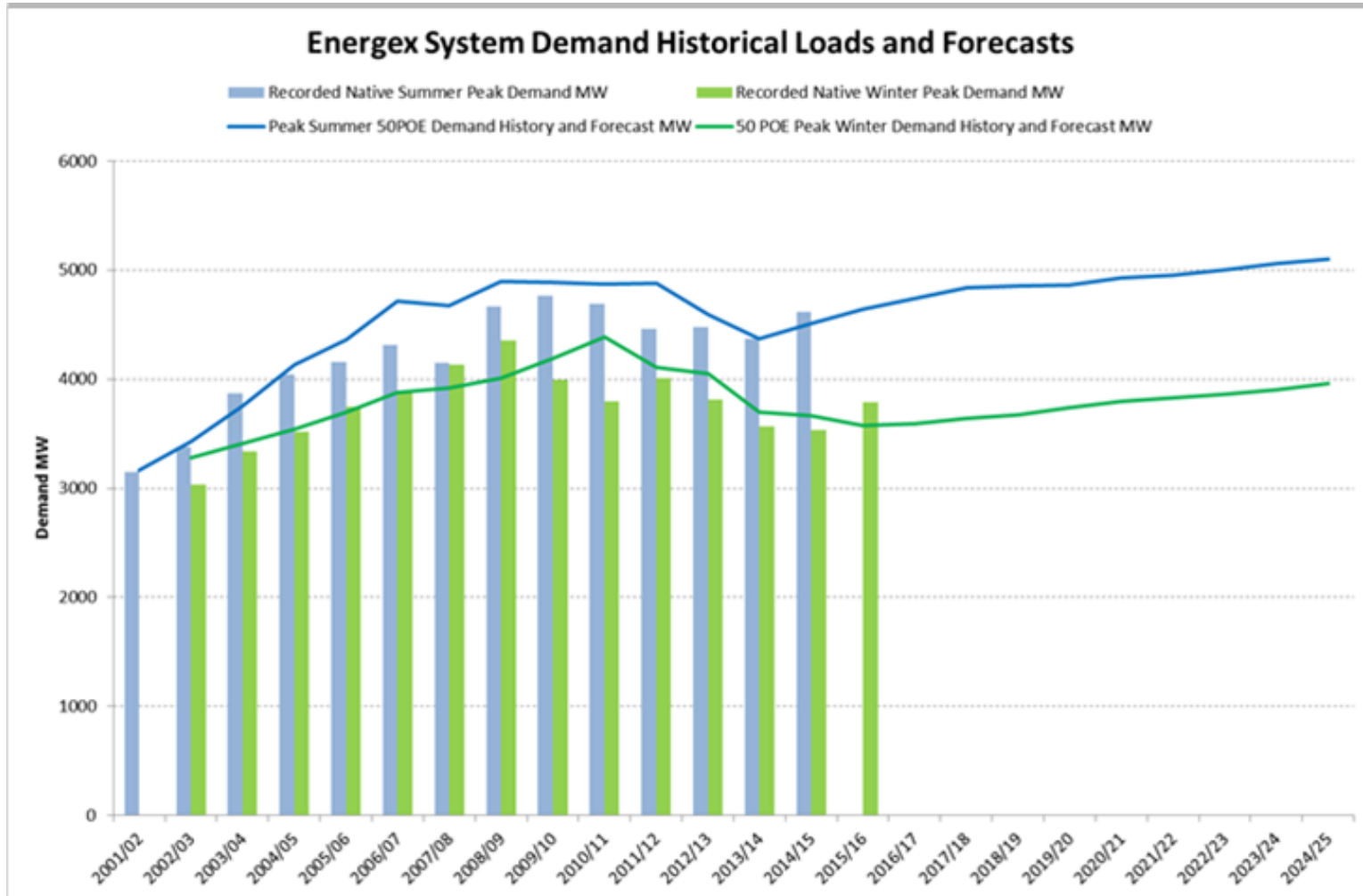
Daily feeder demand on the 2nd Tuesday of October for the last six years



# Energy consumption has been decreasing in the SEQ home



# Energex Demand Forecast



# Overview

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# External forces impacting the Sector

## The new energy customer

- Customers are more sophisticated and exercising greater influence in the energy market



## Changing technology

- Competition and substitutes may reduce dependence on the grid



## Evolving regulation and policy

- Business opportunities and market certainty strongly influenced by regulatory and policy changes



## Disruption to industry value chain

Growing range of new offerings

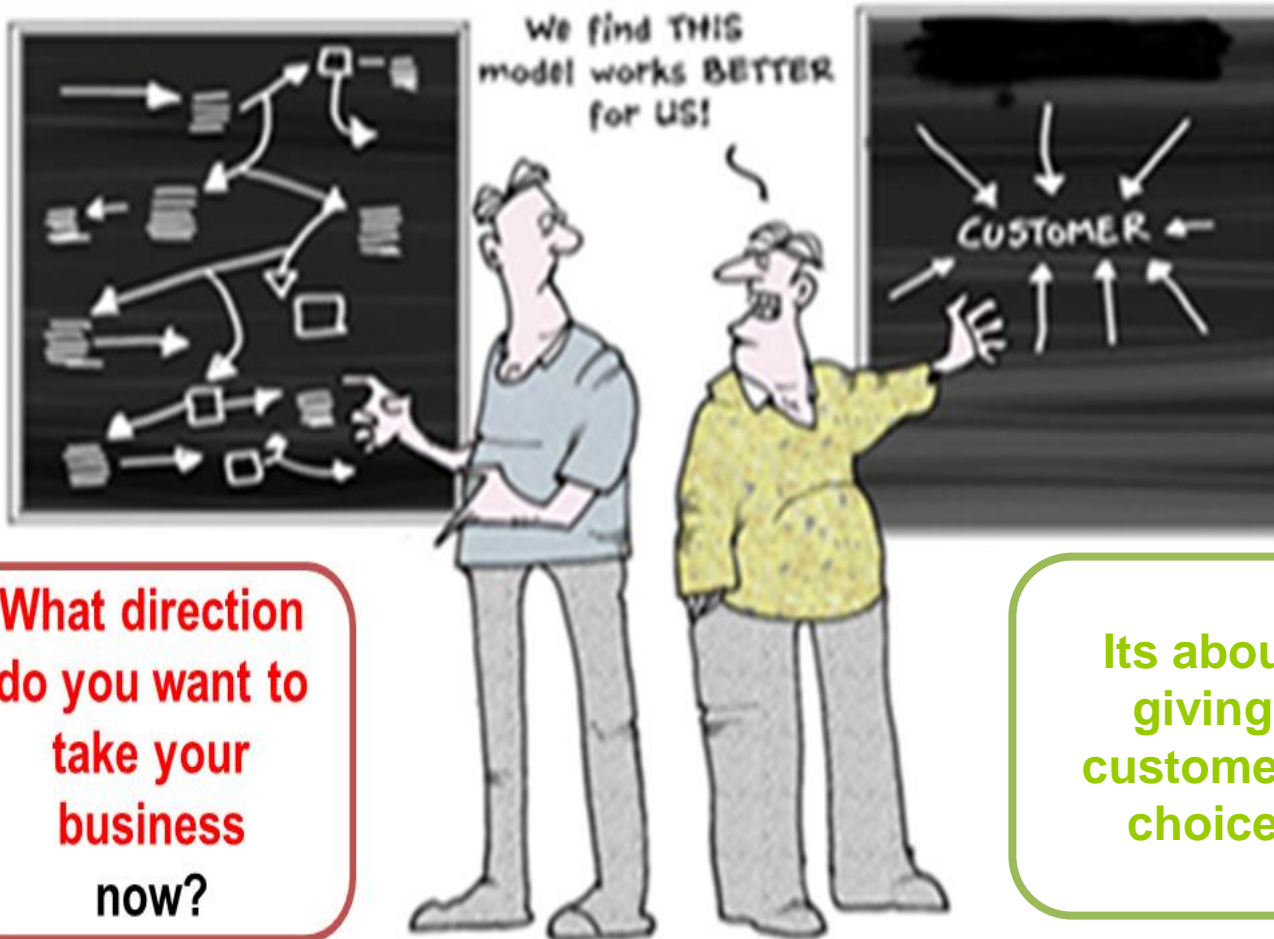
More competition and energy substitutes

New market participants

Traditional utility business model being challenged

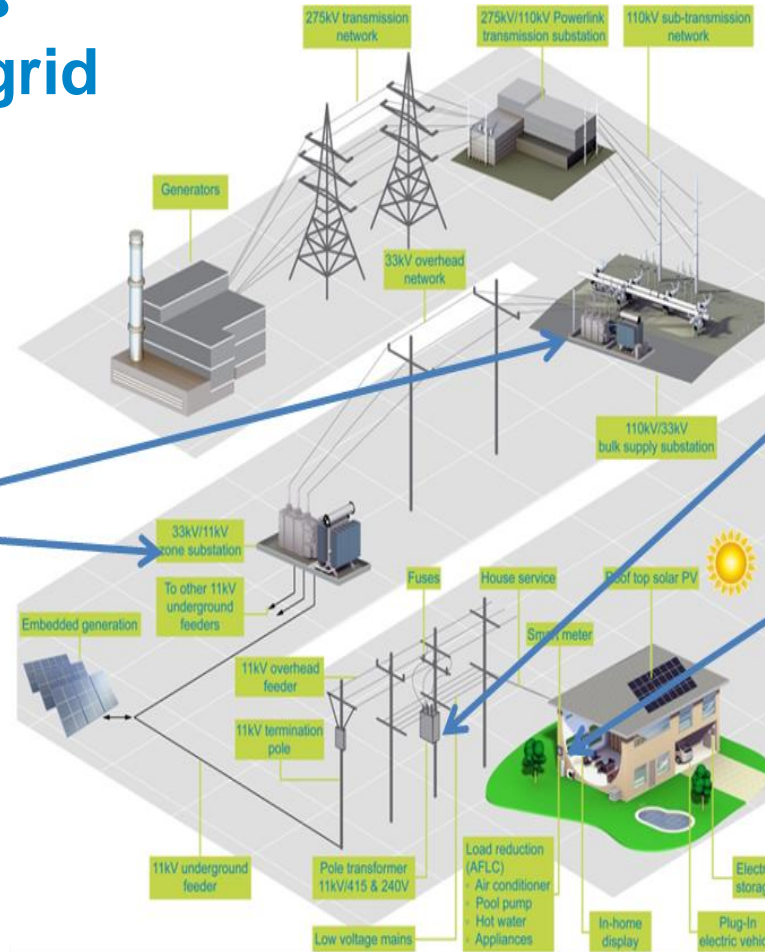


# IT'S ABOUT THE CUSTOMER



Energex continues to transform its operations to deliver sustainable, reliable and affordable service to our customers

# Energex continues its transition to a smart grid



We are progressively deploying new intelligent devices and upgrading our IT and Telecommunications Platforms





Engaging with customers



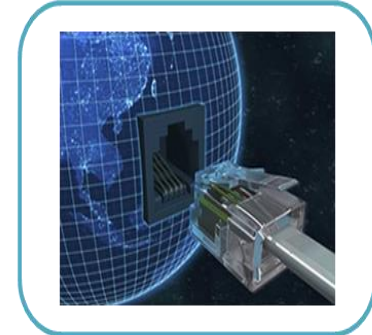
The Network is Resilient



Enabling solar PV connection



Investing in IT

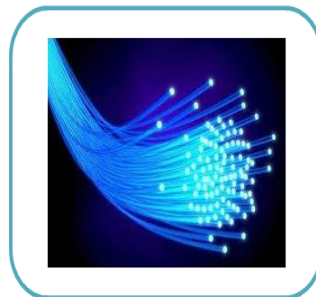


# WHAT WE HAVE ALREADY DELIVERED

Demand Management



Installing fibre optics



Installing smart meters & developing data analytics



We have succeeded in competitive markets



## Battery Pilots



## Meter Pilots



# ***CURRENT FOCUS & NEXT STEPS***

## Limit Capex & Opex through technology



## Skills & Competencies



# Non-network solutions including effective integration of batteries will enable increasing DER Penetration



Load & PV balancing across phases



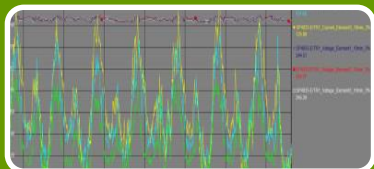
Implement updated inverter standards



Further develop DM capability to use HW load to mitigate duck curve

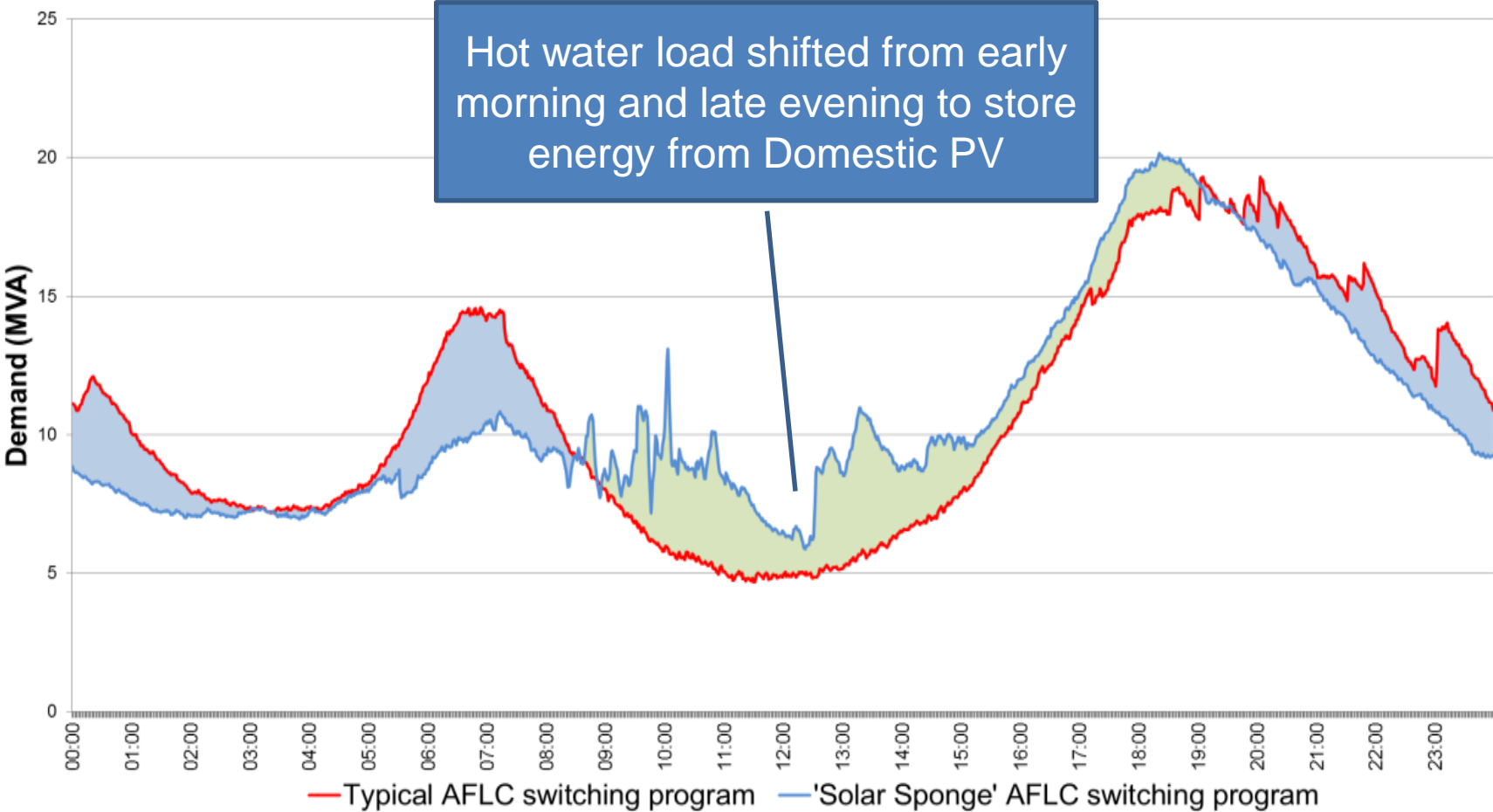


Continue work to confirm hosting capacity of the network



Further develop LV data analytics informed by Advanced meters

# Using our Distribution Management System Software we can now use existing hot water load control as low cost option to integrate PV into the Energex network



# Battery pilots



1

**Market driven**  
battery storage  
pilot

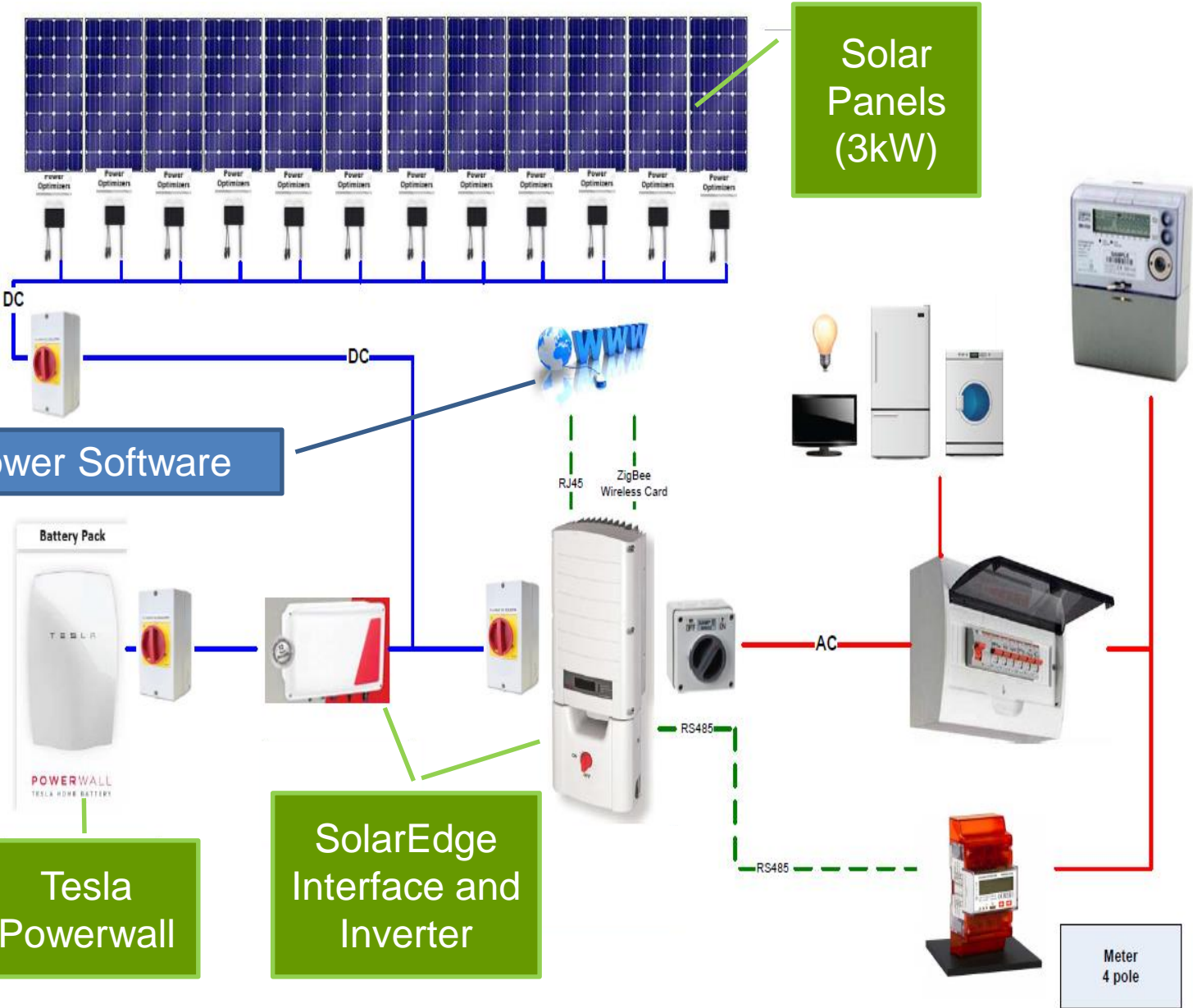
2

**Energex**  
**directed** battery  
storage pilot

*Initial battery pilot  
projects at Esitrain*

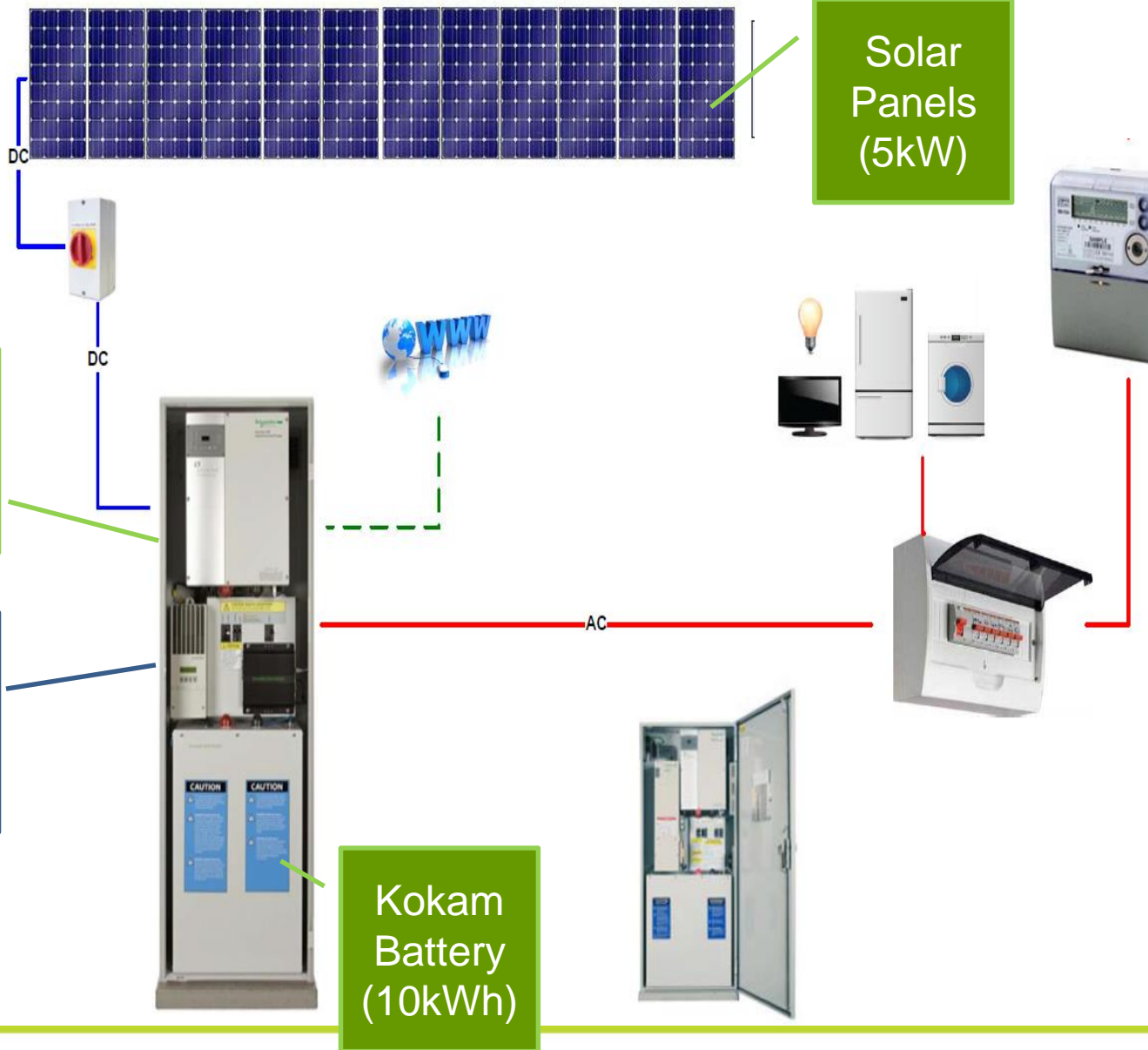
*There are 3 different  
installations – each  
one will provide new  
insights!*

# Tesla & Reposit System (Solar Edge Inverter)



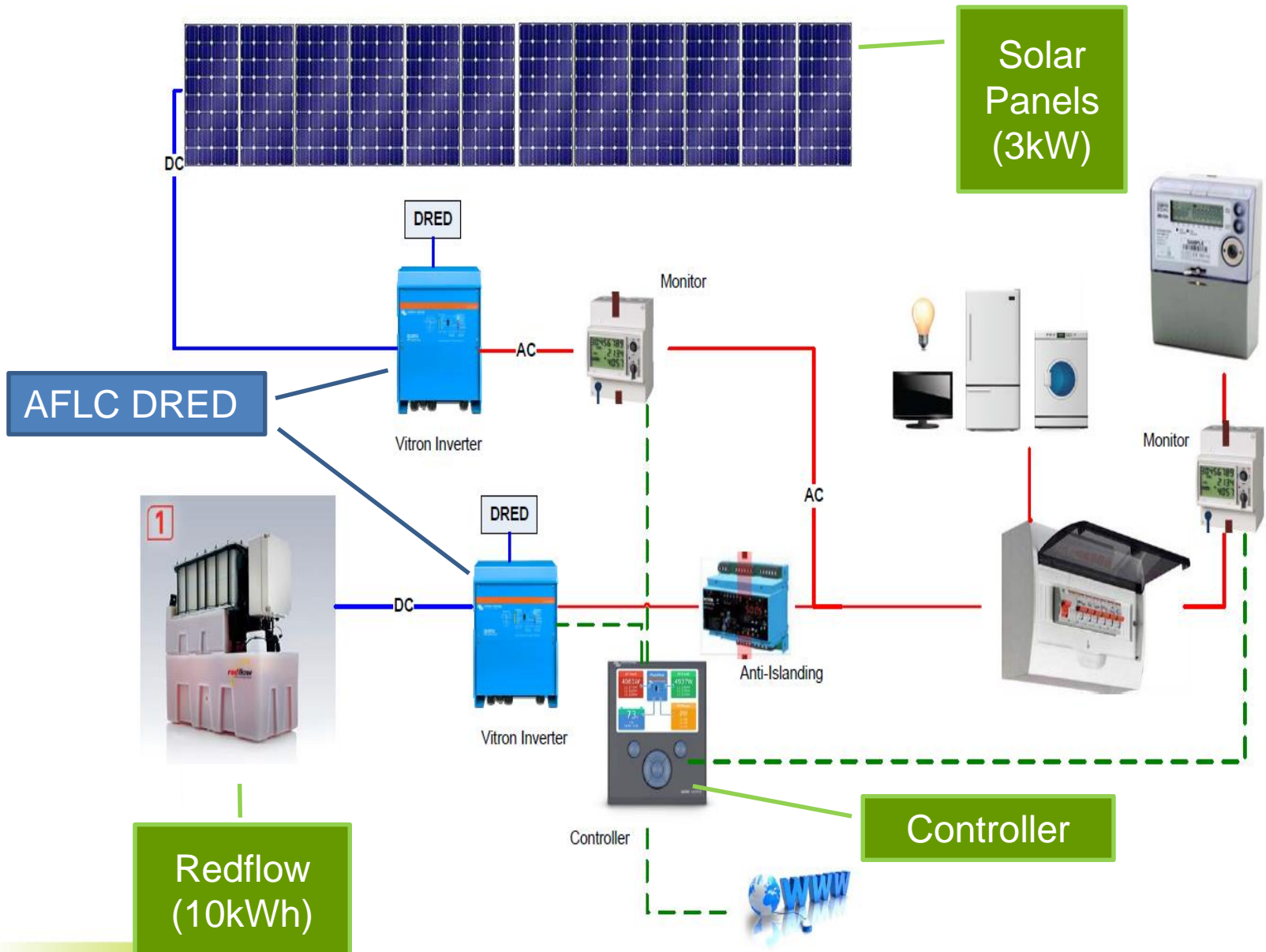


# Sunverge System (Kokam battery)





# Redflow System (AFLC DRED Control)



Solar Panels (3kW)

AFLC DRED



Redflow (10kWh)

Controller

# Market driven battery storage pilot

Goal is to gain control of a number of batteries in close network proximity to operate them as both a “bank” and individually, to gain a better understanding of how we can extract network benefits while meeting customer usage needs



Panasonic

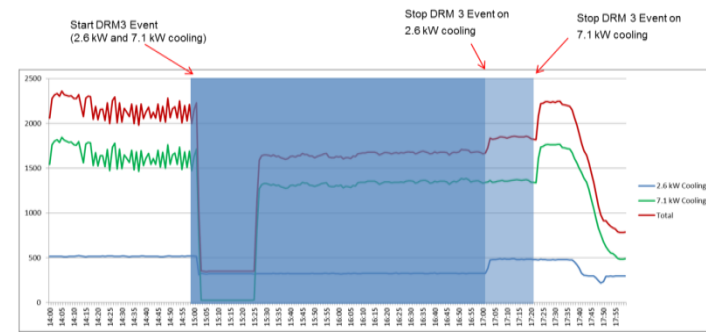


# Monitoring and control

- Incentives will only be paid to customers who install batteries and provide Energex with control and monitoring
- Controlled by an Energex approved interface:
  - AFLC DRED
  - Control system integrated with Poweron DMS
- Remotely read meter that provides engineering and power quality data into Energex's Distribution Monitoring Analytics (DMA) platform



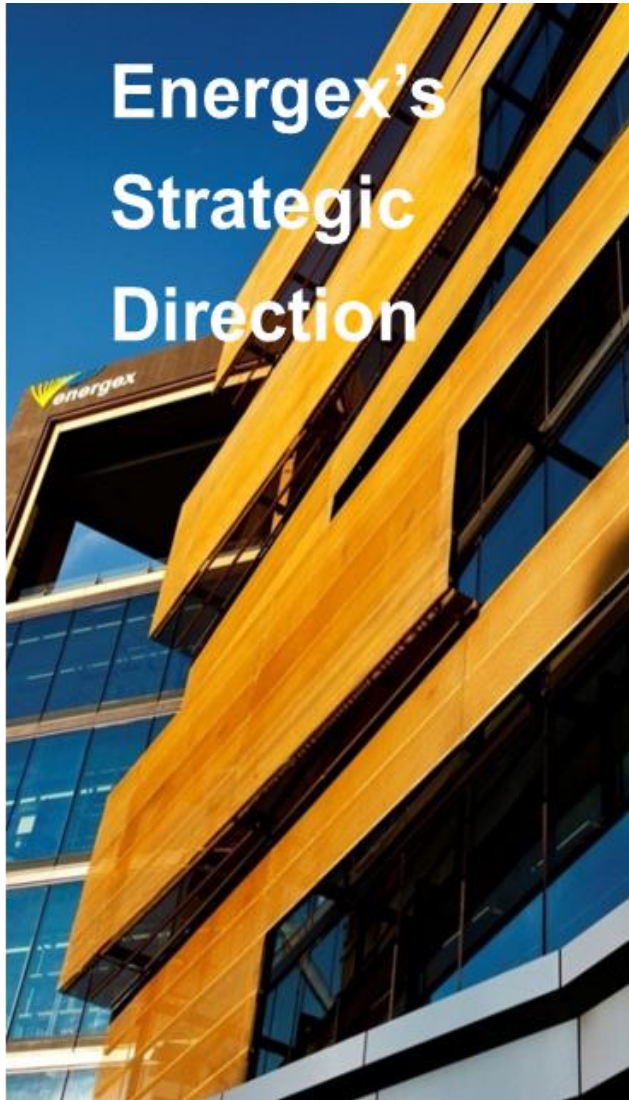
INSTANT. Monitor your energy system in real time. ADAPTIVE. Your energy system habits are learnt and upcoming needs predicted. MOBILE. Multiple user accounts that can be viewed from wherever you are.



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# Energex is establishing a clear roadmap



## **Vision:**

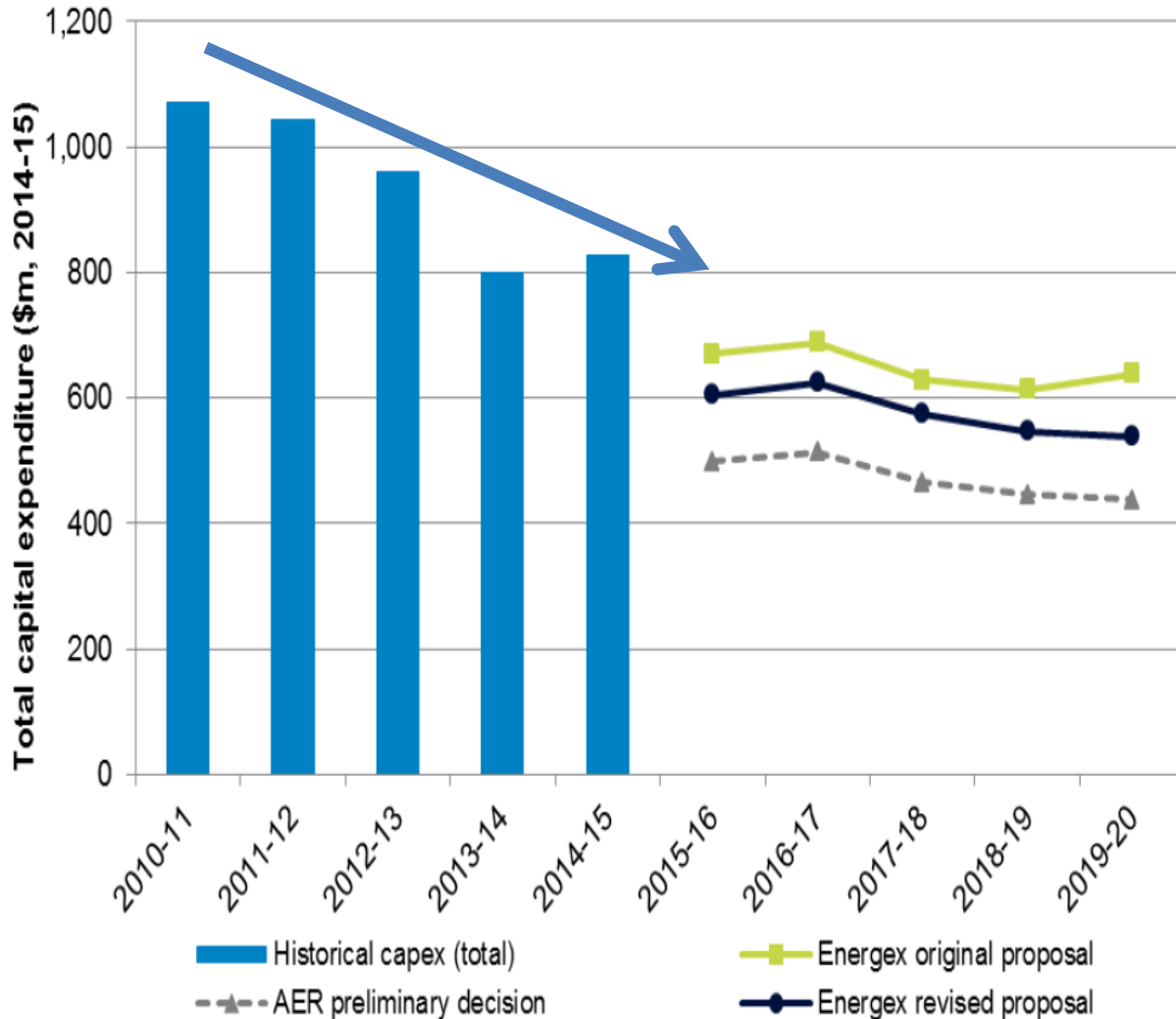
Be the preferred supplier of connected electricity services

## **Purpose:**

Deliver choice and affordability to meet our customers' evolving energy needs



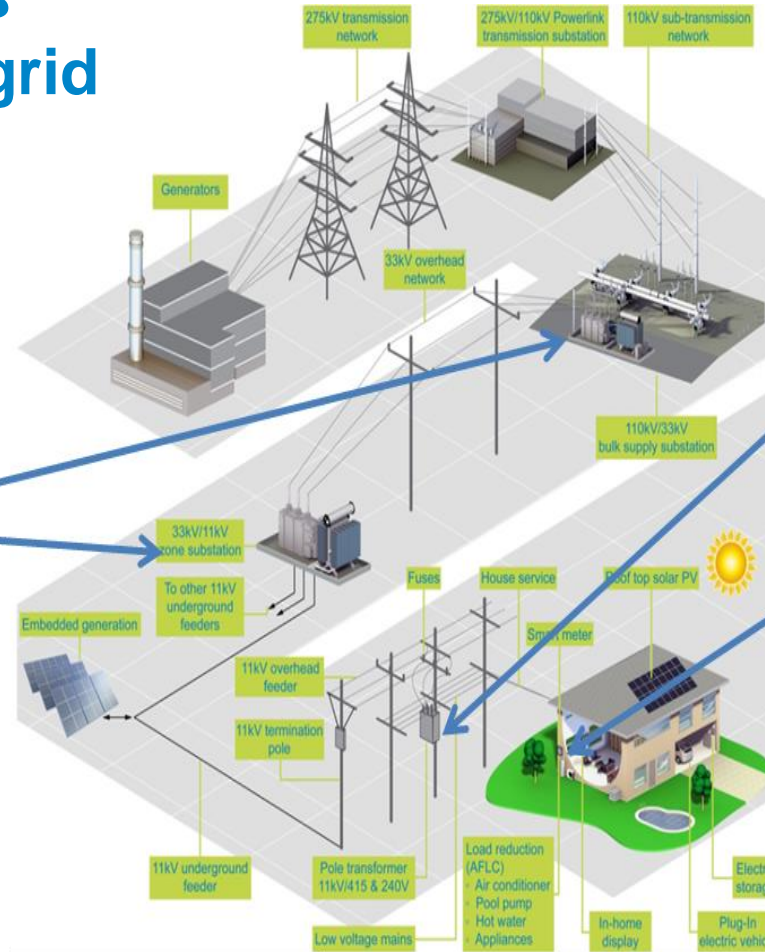
# Capital Spend is Down > 40%



New technology and skills are required to ensure ongoing safe reliable service



# Energex continues its transition to a smart grid

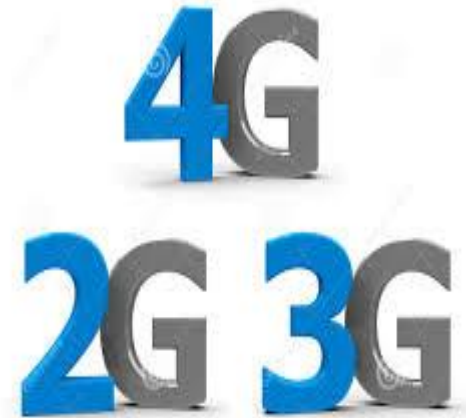


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# Data and communication will be key

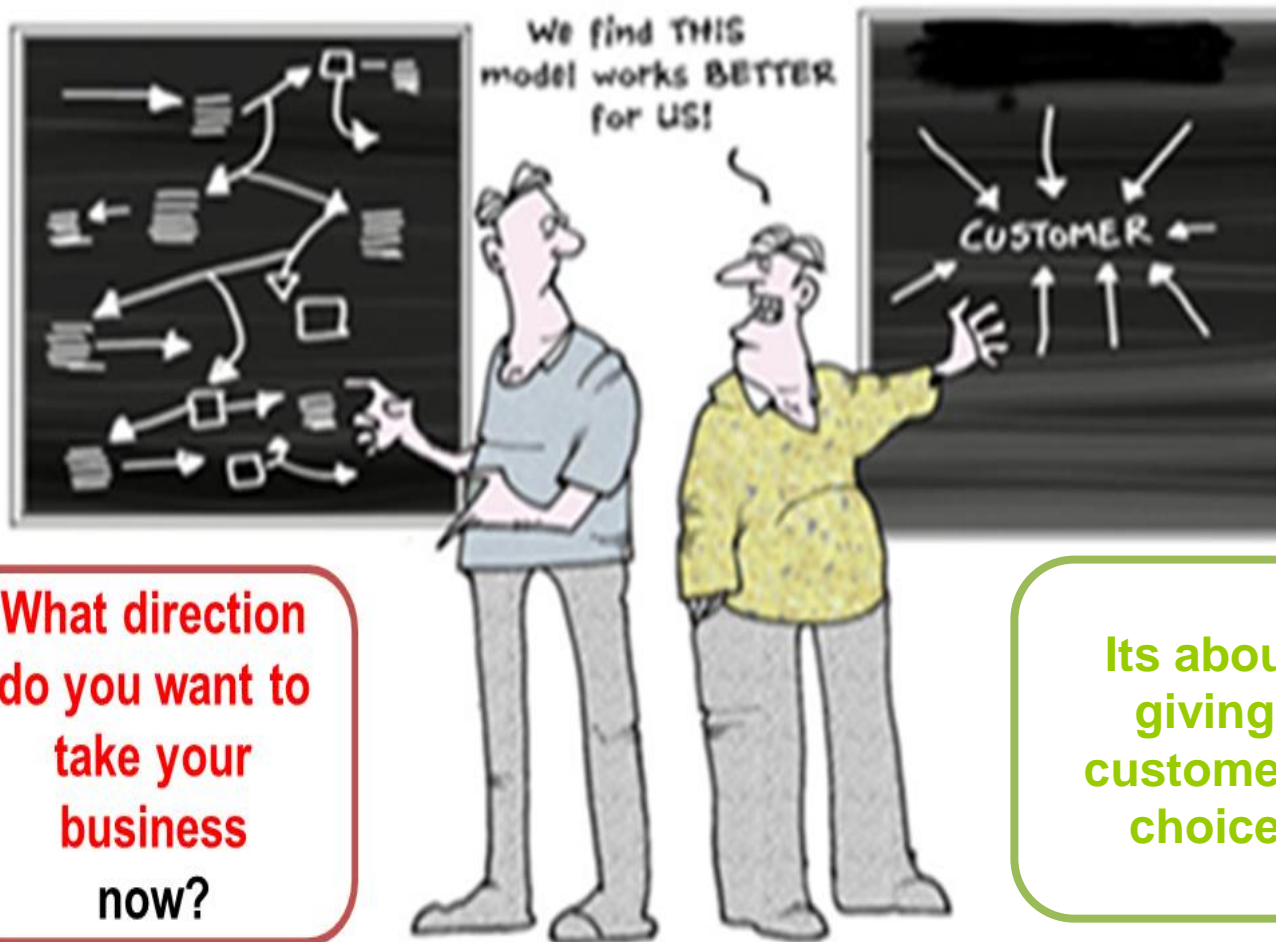


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Dreamstime.com





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positive energy