The NSW Energy Security Safeguard

10 December 2019

Contents

- 10 years of the Energy Savings Scheme (ESS)
- The new Energy Security Safeguard
- ‘Digital landscape’ research findings
- Investigating M&V 2.0
- What’s next?

NSW GOVERNMENT



10 years of the ESS

NSW GOVERNMENT

Energy Savings Scheme

Reliability

Reduces the need for network infrastructure at peak times

Cuts the amount of firm generation needed to keep the lights on



Emissions

Smooths the transition to a low emissions electricity system

Is still a quick, low-cost way of reducing emissions



Energy Savings Scheme



Affordability

Delivers bill savings for participating households and businesses

Puts downward pressures on electricity costs for everyone

By lowering electricity demand, Energy Savings Scheme:

- Reduces the amount of costly generation and network infrastructure needed to keep the lights on.
- Cuts the amount of generation needed to replace ageing coal fired power stations.

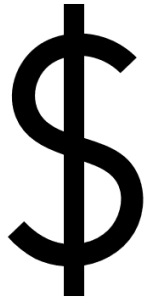
NSW GOVERNMENT

Successes to date



28,000 GWh

Energy savings
by 2028



$6 Billion

Energy bill savings



29 Million

ESCs created
since 2009

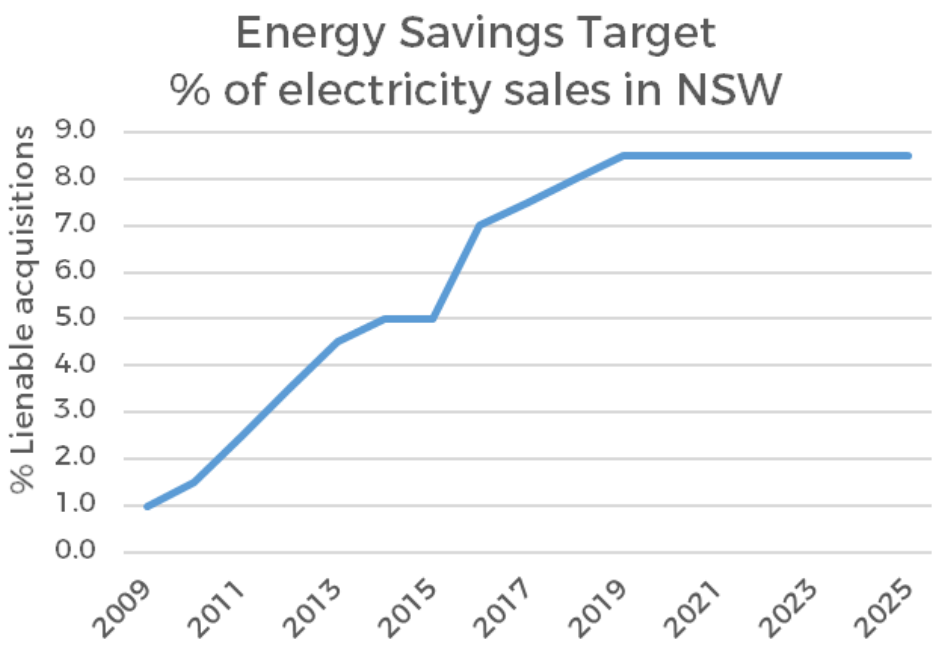
NSW GOVERNMENT

ESCs = Energy Saving Certificates, which represent energy savings.

As of 30 June 2019.

Targets and ESS Rules

Demand Side



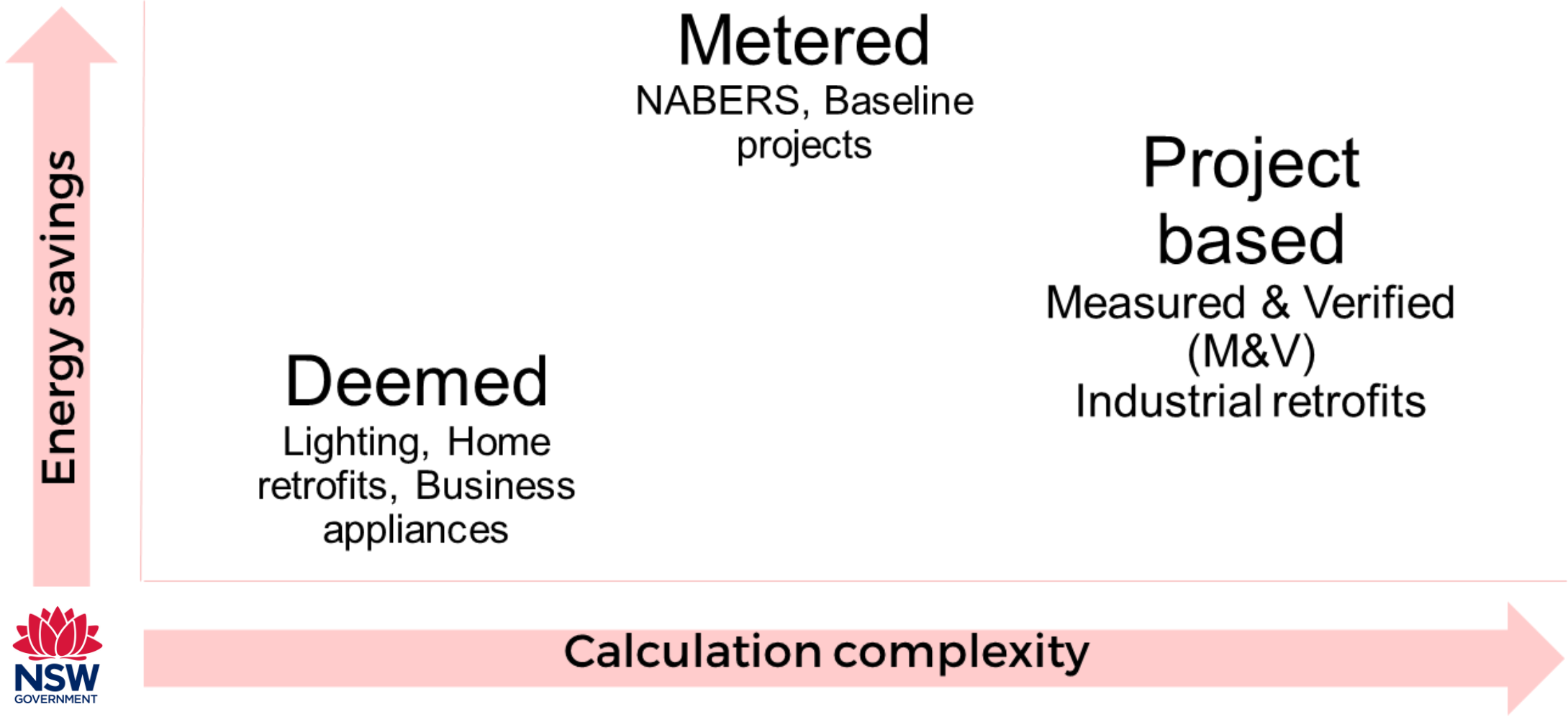
Supply Side

ESS Rule sets out methods for creation of ESCs:

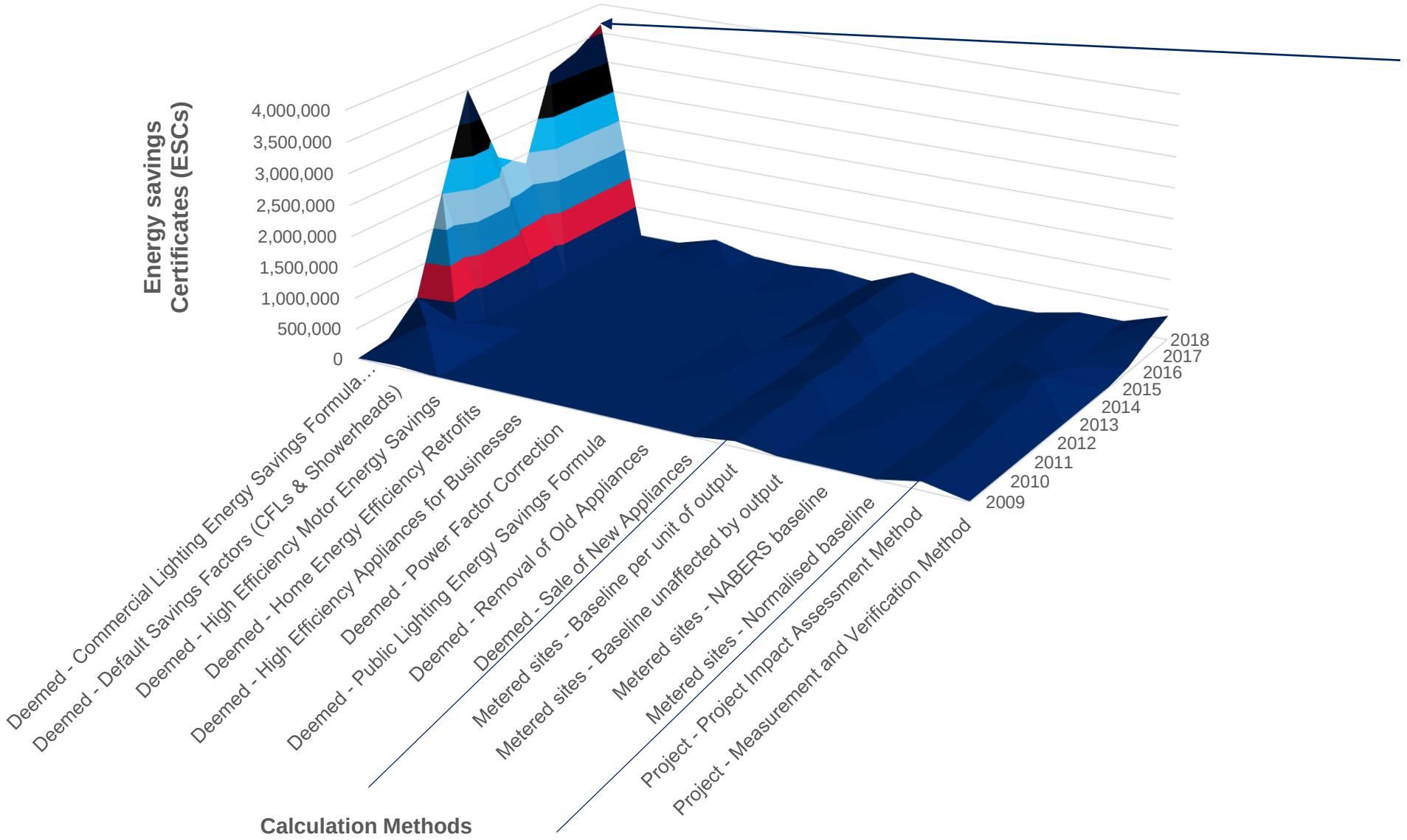
- Eligible activities
- Applicant requirements
- Calculation methods

NSW GOVERNMENT

Methods in the ESS rules



Deemed lighting dominates certificate creation



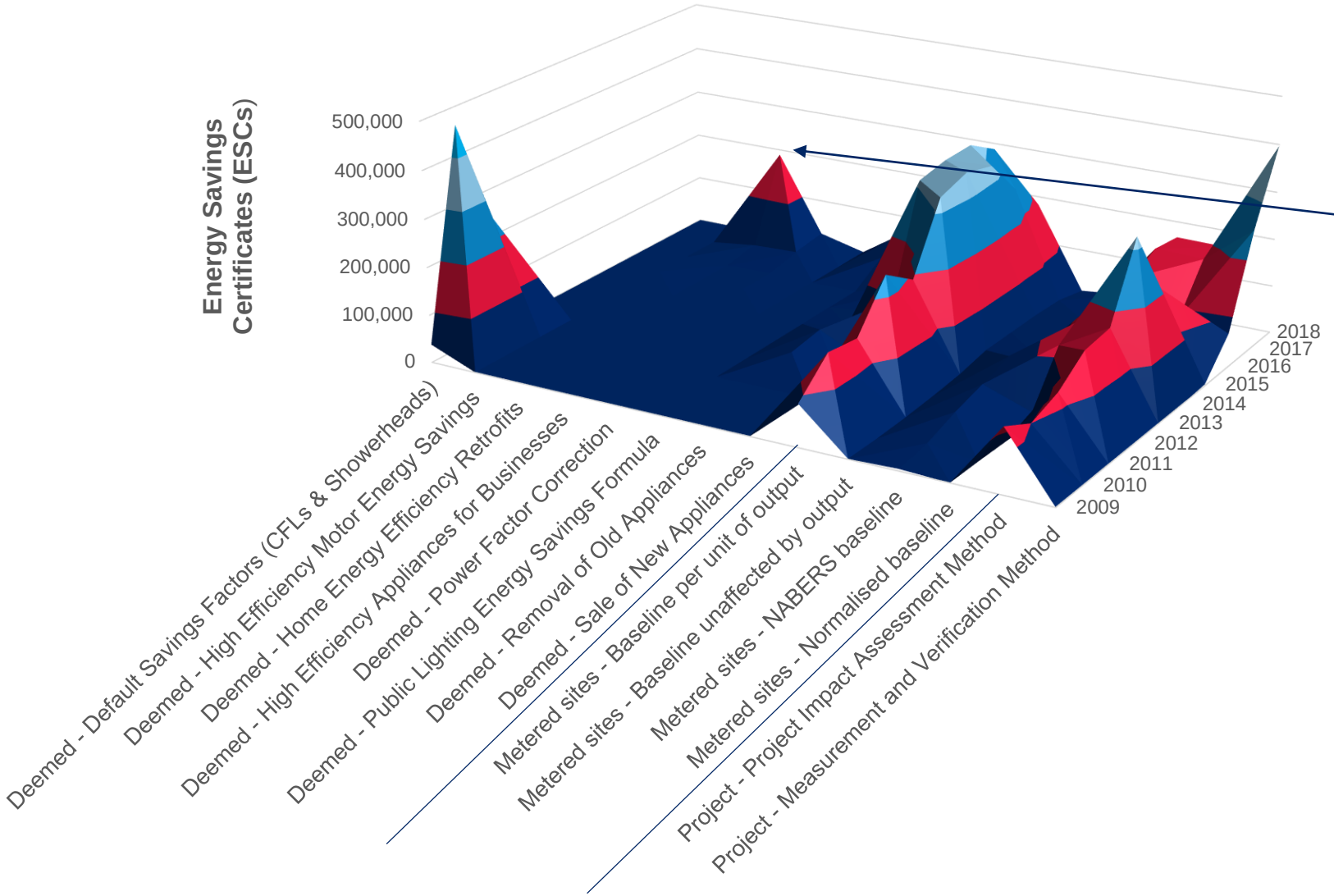
Lighting projects surge as result of deemed savings for ~10yrs upfront for LED upgrades

Transformation of lighting market, but LEDs now becoming business as usual

What's next as the lighting opportunity diminishes?

https://www.ggas-registry.nsw.gov.au/

Need to activate underperforming methods



The same chart with commercial lighting removed

2018 uptick in residential lighting linked to targeted government program

M&V and meter based methods have the potential to scale up to match lighting

https://www.ggas-registry.nsw.gov.au/

The new Energy Security Safeguard

NSW GOVERNMENT

Action 5: The ESS will be reconstituted as the Energy Security Safeguard

"There are a range of technologies that support a more reliable, affordable and sustainable electricity system by impacting when and how much electricity is drawn from the grid, including:

- *energy efficient equipment and appliances,*
- *systems which allow consumers to reduce their electricity demand at times of peak demand (and receive bill savings as a result), and*
- *systems which allow electricity consumers to shift demand to times of higher supply and lower prices (such as when the sun is shining and solar generators are producing electricity)."*

Detailed NSW Electricity Strategy (p.28)
https://energy.nsw.gov.au/government-and-regulation/electricity-strategy



Energy Security Safeguard

1. ***"The first component of the Safeguard will involve***

   - *expanding the existing Energy Savings Scheme to 2050,*
   - *with targets increasing gradually up to 13 per cent by 2030 and*
   - *participants able to receive certificates for an expanded set of activities which reduce demand on electricity and gas networks, including substituting gas for biomass.*

2. ***The second component of the Safeguard will involve***

   - *establishing a new certificate scheme for the deployment of peak demand reduction technologies,*
   - *such as batteries, smart pool pumps and electric vehicle chargers*
   - *that enable electricity demand to be shifted away from peak periods."*

Detailed consultation and scheme design will take place during 2020

Detailed NSW Electricity Strategy (p.28)
https://energy.nsw.gov.au/government-and-regulation/electricity-strategy

‘Digital landscape’ research findings

NSW GOVERNMENT

The current model for incentivising energy savings isn’t scalable – preventing us from reaching Net Zero by 2050.

One-off interactions

A focus on one off interactions, and rewarding participation rather than outcomes prevents us from driving lasting behaviour change.

Complex, siloed processes

Complex, siloed processes create extra administration effort, distance citizens from energy savings, and prevent scale.

Inaccessible to the general public

Programs aren’t citizen-facing, and are difficult to understand or access, preventing us from driving lasting behaviour change.

User research findings

Six key insights:

01.

Significant time is spent on manual tasks

02.

Tools and systems are fragmented

03.

ACPs aren’t equipped to interpret rule changes

04.

Rule changes are missing consistent and effective feedback loops

05.

Expansion of the scheme is prevented by siloed data

06.

Complexity of the scheme prevents end users from engaging

Six Opportunity Areas:

Opportunity 01

Streamline manual data processes

Opportunity 02

A single source of truth platform to view and maintain verified energy savings

Opportunity 03

Smart legislation that is human readable and can be modelled with stakeholders

Opportunity 04

A more transparent and collaborative rule change process

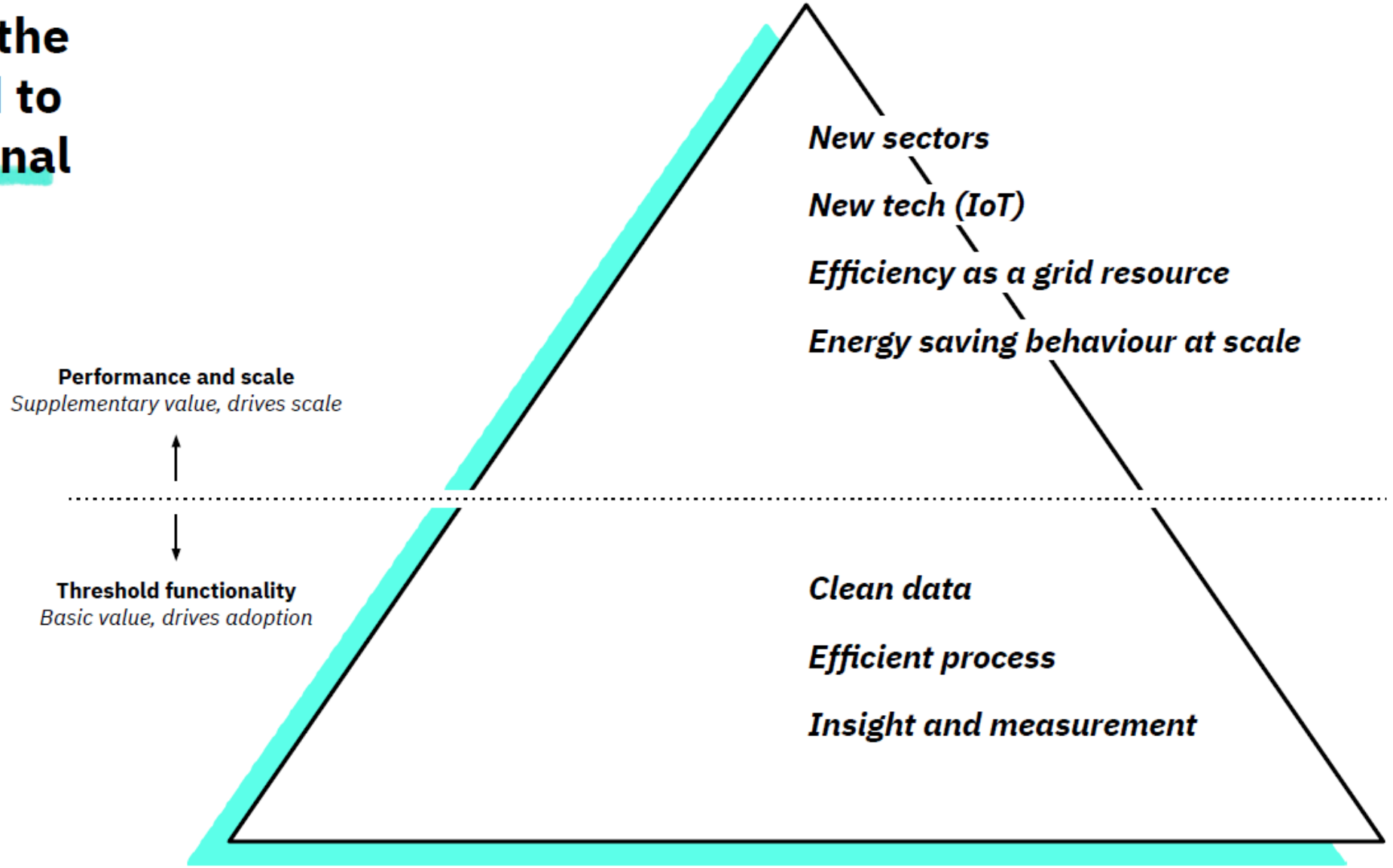
Opportunity 05

More effective measurement and verification of energy savings

Opportunity 06

Bring energy savings closer to the end user

In order to scale the scheme, we need to deliver foundational value first.



The Three Horizons plan breaks down our vision for the Energy Savings Scheme into executable phases of work:

Pilot: 2019-20

Pilot a modern energy savings platform

Horizon 1: 2022

Accelerate and modernise energy savings

Horizon 2: 2025

Transparent and accessible energy savings

Horizon 3: 2030

Energy savings are BAU

We are now exploring 3 digital pathways

Measurement & verification 2.0

- Open source code to turn smart meter/inverter and weather data into an hourly energy savings profile with the ability to quantify daily peak savings

Rules as code

- Code the eligibility criteria and energy savings calculations in the ESS Rule into machine readable formats with the ability to integrate into government or industry systems

Platform and tools enabling the digital transition

- Modernisation of current systems to unify data sources into a ‘single source of truth’ platform to capture and retain the evidence required to verify energy savings

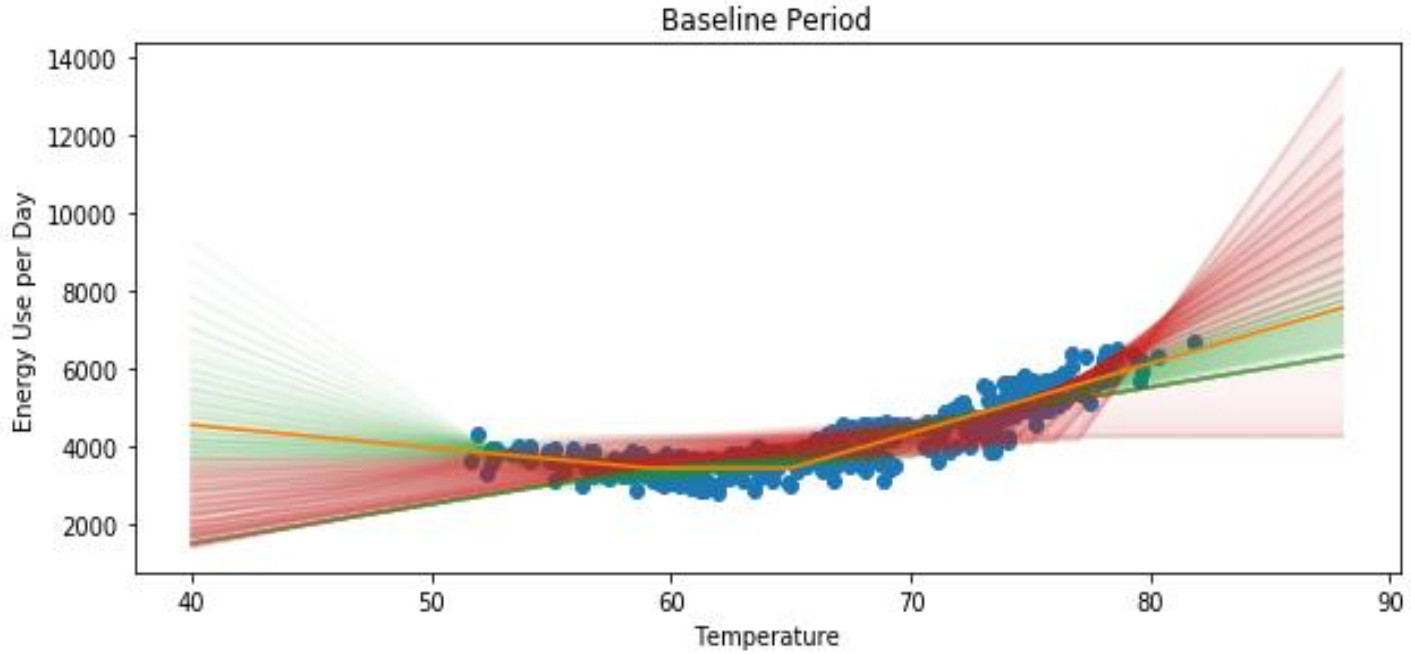
NSW GOVERNMENT

Investigating M&V 2.0

NSW GOVERNMENT

A desire for simple, repeatable M&V models

- Increasing tension between certificate providers and regulator over M&V
- Looking for options to standardise and reduce the risk of inconsistent M&V
- Test CalTRACK methods using the OpenEE Meter source code
- Started thinking about the compliance challenges from using accepted software models



The code loaded the baseline period data (**blue**), tested a series of candidate models (**red** and **green**), then selected the best-fit model (**orange**).

Runtime of the code was 60 seconds, which includes reading 18MB of Weather data and a 16MB Excel file.

Manually tweaking a M&V 1.0 model to find this result would take around an hour.

LF ENERGY OPENEEMETER

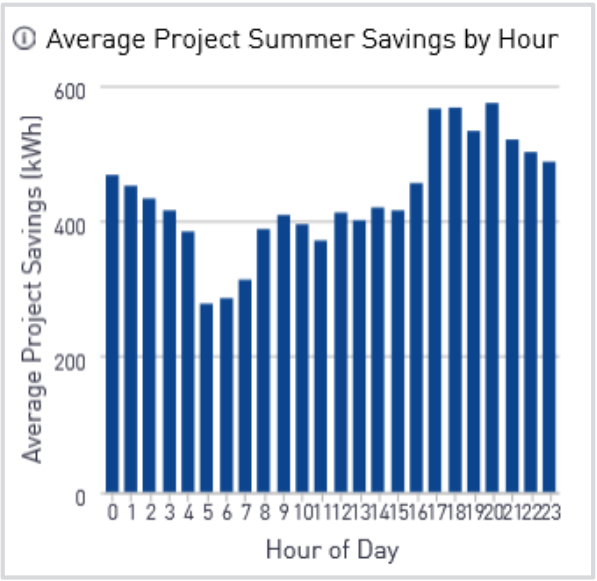
RECURVE

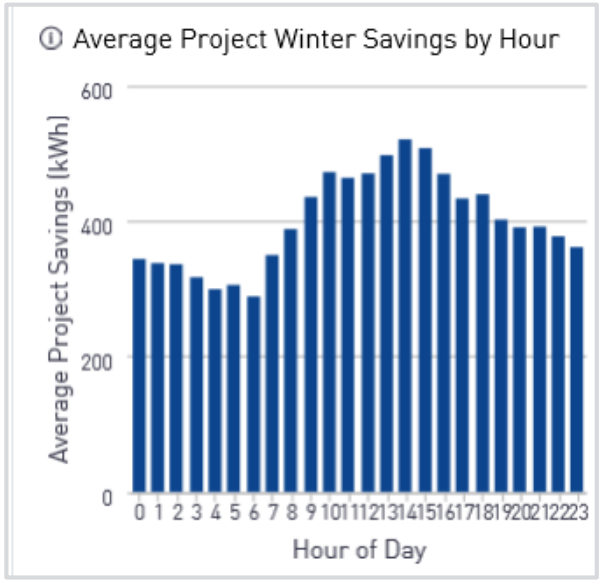
dashboards

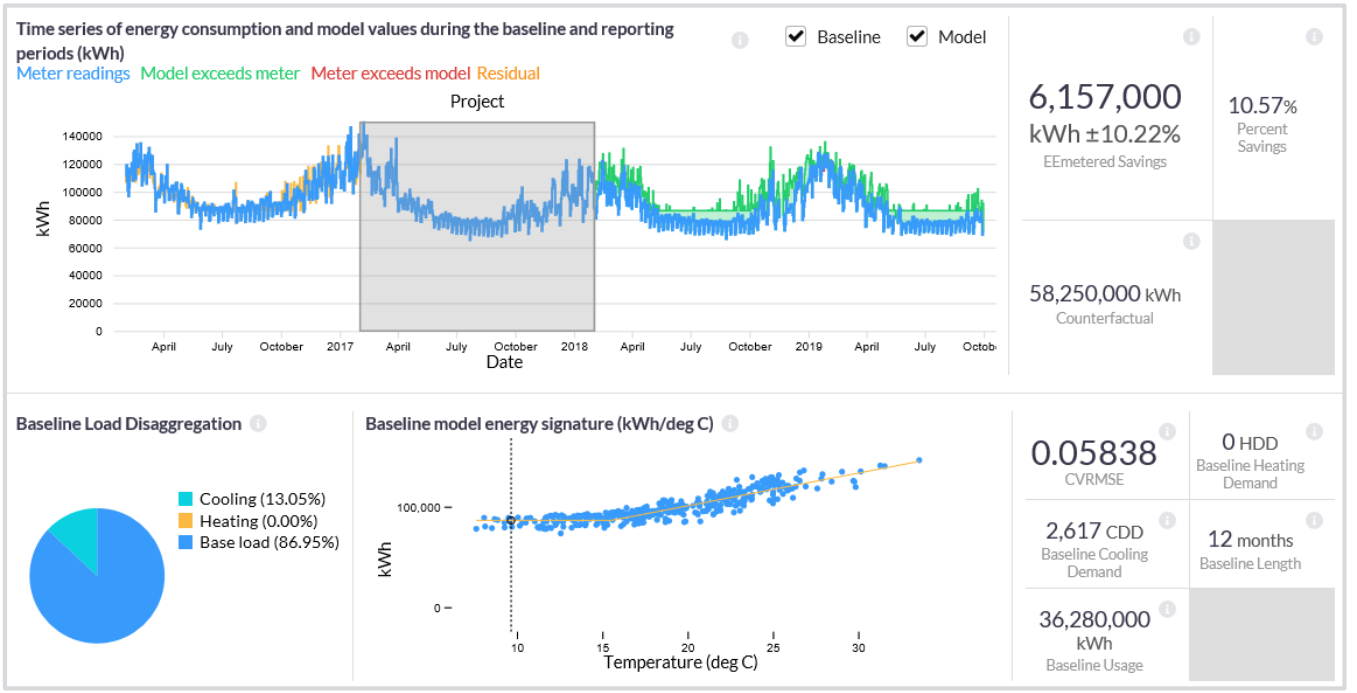
We engaged Recurve to review NSW Government building data:

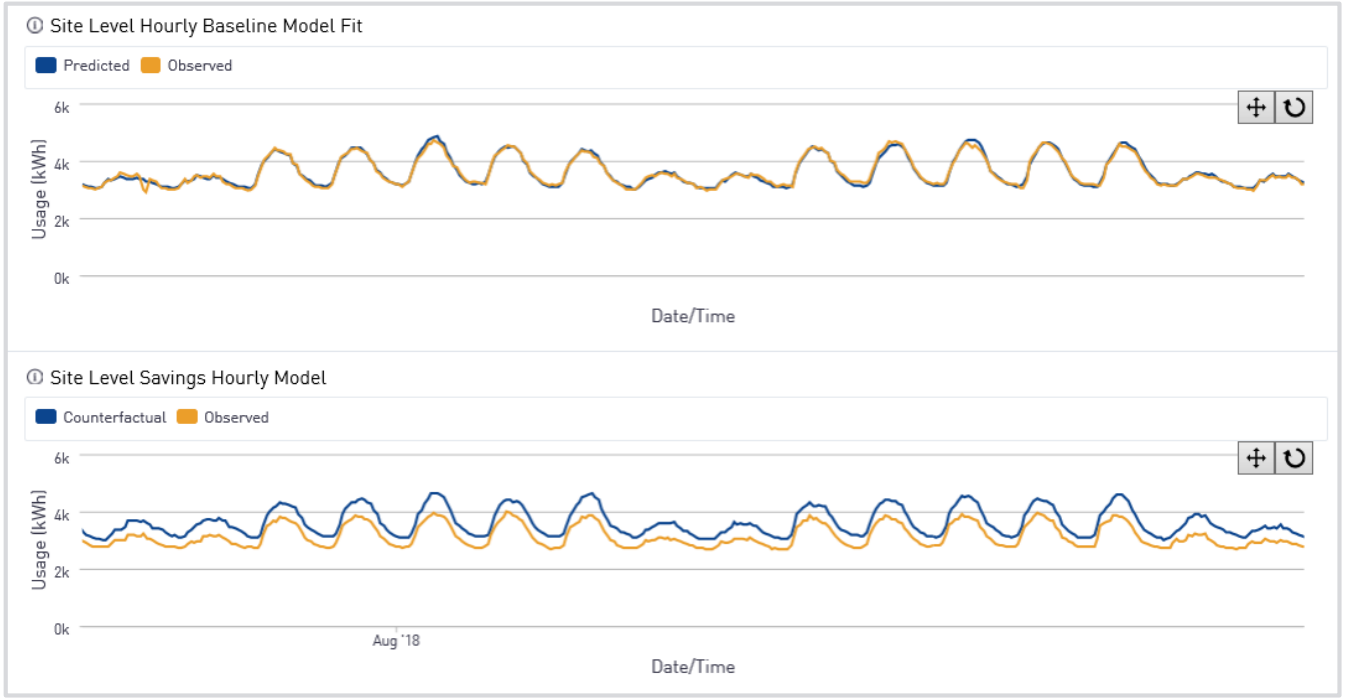
- analyse previous EE projects
- analyse building stock for project targeting

Exciting results from the hourly models at well behaving sites









What’s next for us?

- Consultation and detailed design of the new Energy Security Safeguard starting in 2020
- Ask questions!
  - How might we create the conditions for a move away from reliance on deemed methods, toward the use of metered/real-time data that utilises open source code to calculate energy savings?
  - How might we develop a version of the Californian Normalized Metered Energy Consumption (NMEC) method for use in the ESS?
- Continue investigation of Caltrack 2.0 hourly models to test:
  - potential for calculation of energy efficiency and daily peak savings from the same method
  - limits of modelling ‘badly behaving’ sites and projects vs whole sites with good data
- Collaborate with EEO schemes in other jurisdictions, AEMO, AEMC and ARENA to combine learnings
- Make sure our stakeholders join us on the digital transformation journey

NSW GOVERNMENT

David Pryor

david.pryor@environment.nsw.gov.au