Climate Change Advisory Council Secretariat

CB WG Meeting 2

20th April 2023

Agenda

Time	Agenda Item
13:30	1. Opening of Meeting
13:45	2. Carbon Budgets Methodology
14:15	3. Carbon Budgets Work Plan and Topics for Meetings
15:00	4. Scoping of Modelling Work
15:30	5. Invited Speaker – Learnings from the ESB Networks Dingle Project
16:15	6. Next Steps and Agenda for next meeting
16:20	7. AOB
16:30	8. Meeting Close

1. Opening of Meeting

Action Number	Date Raised	Description	Owner	Due	Status
1	09/03/2023	Secretariat to invite a speaker to provide an update on demographics and inform the group about the process for outputs from the 2022 Census.	CCAC Secretariat	Q2 2023	Update provided at CB WG Meeting 2 on 20/4/23 and CSO presentation scheduled for Meeting 6 on 8/9/23
2	09/03/2023	Working Group members to provide written comment on the draft methodology and list of topics for consideration by 20/03/2023	CB WG Members	20/03/2023	Comments received by 20/03/2023

1. Opening of Meeting

Carbon Budgets Working Group Terms of Reference

- Updated to amend minor typo and reflect potential for both members from an individual organisation to attend meetings as required:

  Where appropriate, members of the working group may also designate one alternate member with the agreement of the Chair, who can act as a substitute in the event of the member's unavailability, or both may attend meetings based on individual organisation's requirements.'

- Terms of Reference and membership to be published on the CCAC website

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2. Carbon Budgets Methodology

1. Introduction: Clarification regarding the Second Carbon Budget Programme

'…subsequent carbon budget proposals will need to be made at least one year before the end of each of the current carbon budgets and ***each proposal will always be made up of a programme of three carbon budgets*** *for the State.*

As part of the second programme of carbon budgets, the Council is required to submit to the Minister (1) proposed amendments to the provisional carbon budget (CB3 from 2031-2035) and (2) a provisional carbon budget (CB4 from 2036-2040), not less than 12 months before the expiry of CB1, being the budget for the period 2021-2025. ***On the expiry of CB1, the Second Carbon Budget Programme will comprise CB2 from 2026-2030, CB3 from 2031-2035 and provisional CB4 from 2036-2040 (as these will be the three carbon budgets in effect).'***

2. Carbon Budgets Methodology

2.1 Baseline Year and Emissions Target: Impacts of adjustments to the historical inventory

'Adjustments to the historical inventory may impact the first programme of carbon budgets.'

*'However, this revision would be a **purely mathematical adjustment** to the first carbon budget (2021-2025) and/or second carbon budget (2026-2030) accounting for the adjustment to the greenhouse gas emissions reported for the 2018 baseline year.'*

2. Carbon Budgets Methodology

2.7 Assessment of Treatment of Methane: Correction re reference to New Zealand split-gas approach and note 'Paris test' consideration of methane pathway

'New Zealand has notably taken a split-gas approach, with a 2050 net-zero policy for long-lived gasses and a separate target for biogenic methane i.e., a reduction of 10% by 2030 and 24-47% by 2050 compared to 2017'.

'Notably, the 'Paris Test' carried out as part of the first programme of carbon Budgets did explicitly consider different pathways for methane emissions with the analysis showing that the temperature impact of the carbon budgets depends on the assumed mix of gases'.

2. Carbon Budgets Methodology

2.9 Assessment of Treatment of Maritime and Aviation emissions: Scope to consider this additional impact

'Despite the Regulation excluding International Aviation and Maritime emissions from legislated carbon budgets, there is scope for the Carbon Budgets Working Group to carry out an assessment of these emissions for their impact on carbon budgets and compliance with the Paris Agreement and report to the CCAC on their additional impact for consideration'.

2. Carbon Budgets Methodology

2.11 Review of Global Carbon Budget: **Suggested addition of a statement on the principles to be used in recommending carbon budget values**

- The basis for consideration of CB proposals is already outlined under the Act. The Carbon Budgets Working Group is tasked with assisting and advising the Council in development of a methodology and evidence base for carbon budget proposals in line with the Act.

2. Carbon Budgets Methodology

3.1 Pathways development and Modelling: **Helpful to agree a standardised set of input model parameters for 2030 starting points**

- Initial work to agree a standardised set of input model parameters for 2030 starting points along with discussion and agreement of how iterations and assessments will be sequenced to be included in the work plan.
- Updated Research and Modelling Group Schematic and a separate Carbon Budgets specific map to be developed and included in a subsequent version
- Updated references to the GOBLIN and FERs CBM models

2. Carbon Budgets Methodology

3.3 Analysis of Macroeconomic Impact of Carbon Budgets: Suggested expansion to also quantify the potential economic benefits and opportunities of transition pathways

'In relation to carbon budgets, this will specifically involve testing of the results of the scenario modelling carried out under Section 3.1 in relation to jobs, impacts on the economy, impacts on sectors and distributional effects ***in addition to the potential economic benefits and opportunities of transition pathways****.'*

2. Carbon Budgets Methodology

3.4 Analysis of Societal Impacts of Carbon Budgets and Just Transition:
Reframing to focus on broader societal impacts and Just transition

'There are many societal impacts associated with selecting different Carbon Budgets. Most notable amongst these are the significant changes required across all sectors of society and the associated challenges and benefits that arise. ***Mobilising society to deliver on carbon budgets*** *is essential and complex, acknowledging the varying capacities and infrastructures available to different groups and regions within Irish society.'*

'Consideration of just transition as part of the pathways development and modelling outlined under Section 3.1 will be informed by informed by a ***Carbon Budgets Working Group discussion of how just transition aligned to climate justice and ethics, can be reflected*** *in the carbon budget process.'*

2. Carbon Budgets Methodology

3.5 Biodiversity Considerations: Studies expanded to account for impacts of forestry targets on biodiversity and obligations under the Global Biodiversity Framework and the EU Nature Restoration Law

'It is intended that further small-scale studies will be carried out in 2023 to build on earlier work on biodiversity, with a particular focus on ***impacts of offshore wind and marine generation on marine biodiversity and the effects of new forestry targets on biodiversity****.'*

'In addition, post-hoc analysis of proposed carbon budgets for potential impacts on biodiversity accounting for obligations under the ***Global Biodiversity Framework and the EU Nature Restoration Law*** *will also be undertaken, as it is not necessarily feasible to directly build in biodiversity constraints to the modelling outlined under Section 3.1.'*

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3. Carbon Budgets Topics for Meetings

CB WG Meeting No.	Proposed Date and Time	Topic(s) for Consideration
1	Thursday 9th March 2023 10:00 – 13:00	Carbon Budgets Methodology
2	Thursday 20th April 2023 13:30 – 16:30	Carbon Budgets Methodology / Scoping of modelling work
3	Wednesday 31st May 2023 10:30 – 13:30	Vision for 2050 and Beyond/ Scoping of modelling work/ International approaches to carbon budgets
4	Thursday 29th June 2023 13:30 – 16:30	Climate Justice and 'Paris Test'/ Macroeconomic Impacts of carbon budgets
5	Thursday 27th July 2023 13:30 – 16:30	Focused discussion on methane/ Socioeconomic considerations
6	Friday 8th September 2023 13:30 – 16:30	Biodiversity Considerations/ Populations Projections (CSO)
CB WG Workshop 1	Week 2 September 2023 (TBC)	Input model parameters for 2030 starting points, scenario development and assumptions
7	Thursday 19th October 2023 13:30 – 16:30	Landuse Review/ 2024 Projections Process (EPA, SEAI & ESRI)
8	Thursday 23rd November 2023 10:30 – 13:30	Role of Negative Emissions/ TBC
9	Friday 15th December 2023 13:30 – 16:30	TBC

3. Carbon Budgets Draft Work Plan

Description	2022												2023												2024											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Preparatory Work																																				

Item	Description	2023									2024												
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	**Modelling / Analysis Iteration 1**																					
1.1	Agree inputs, paramaters and assumptions																					
1.2	Core pathways development and modelling																					
1.3	Paris Test Assessment																					
1.4	Additional modelling and testing of results																					
1.5	Post-hoc analysis																					
2	**Modelling / Analysis Iteration 2**																					
2.1	Agree inputs, paramaters and assumptions																					
2.2	Core pathways development and modelling																					
2.3	Paris Test Assessment																					
2.4	Additional modelling and testing of results																					
2.5	Post-hoc analysis																					
3	**Modelling / Analysis Iteration 3**																					
3.1	Agree inputs, paramaters and assumptions																					
3.2	Core pathways development and modelling																					
3.3	Paris Test Assessment																					
3.4	Additional modelling and testing of results																					
3.5	Post-hoc analysis																					
D	**Key Deliverables**																					
D.1	Modelling / Analysis Iteration 1 Results																					
D.2	Modelling / Analysis Iteration 2 Results																					
D.3	Modelling / Analysis Iteration 3 Results																					
D.4	Carbon Budgets Technical Report																					
D.5	CCAC Carbon Budget Proposals																					

3. Carbon Budgets Draft Work Plan

Item	Description	2023									2024												
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4	**Research/Consultancy**																						
4.1	Review of international approaches to carbon budgets																						
4.2	Pathways to 2050																						
4.3	Macroeconomic Impacts of the Transition (TBC)																						
4.4	Paris Test (TBC)																						
4.5	Marine biodiversity impacts of offshore wind (TBC)																						
4.6	Effects of new forestry targets on biodiversity (TBC)																						
4.7	Just Transition Research (TBC)																						
A	**Key Inputs**																						
A.1	2023 Greenhouse Gas Projections (EPA)																						
A.2	2023 Provisional Inventories (EPA)																						
A.3	Ireland's National Inventory Submissions 2024 (EPA)																						
A.4	2024 WEM/WAM Projections (EPA)																						
A.5	2024 Provisional Inventories (EPA)																						
A.6	Land Use Review																						
A.7	Ireland's Long Term Climate Strategy (DECC)																						
A.8	Intercensal Population Estimates (2017-2023) (CSO)																						
A.9	National Population and labour Force Projections (CSO)																						
A.10	ESAB Input to the proposal of a EU target for 2040 and 2030-2050 greenhouse gas budget (ESAB)																						
A.11	Proposal for EU 2040 climate target (EC)																						
A.12	Conclusion of Global Stocktake (COP28)																						

3. Carbon Budgets Draft Work Plan – Risk Register

ID	Date Raised	Risk Description	Likelihood of the risk occurring	Impact if the risk occurs	Severity (rating based on likelihood and impact)	Mitigating Action	Progress on Actions	Status
1	20/03/23	Revision of carbon budgets, as provided for under Section 6D of the Act	Medium	Medium	Medium	The Minister, at any stage, can request a revision of carbon budgets as provided for under Section 6D of the Act. The potential for the minister to request a revision of carbon budgets has been reflected in both the Carbon Budgets Methodology and the Terms of Reference for the Carbon Budgets Working Group. The role of the Carbon Budgets Working Group in responding to any request from the Minister to the Council for a review will be determined by Council if it arises.	Ongoing Monitoring	Open

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4. Scoping of Modelling Work

Demographics and Population Projections

CSO update on plan for 2023/2024:

Detailed Census results will be used over the summer to revise the intercensal population estimates, i.e. from 2017-2022. These are planned to be published before September along with the latest estimate for 2023.

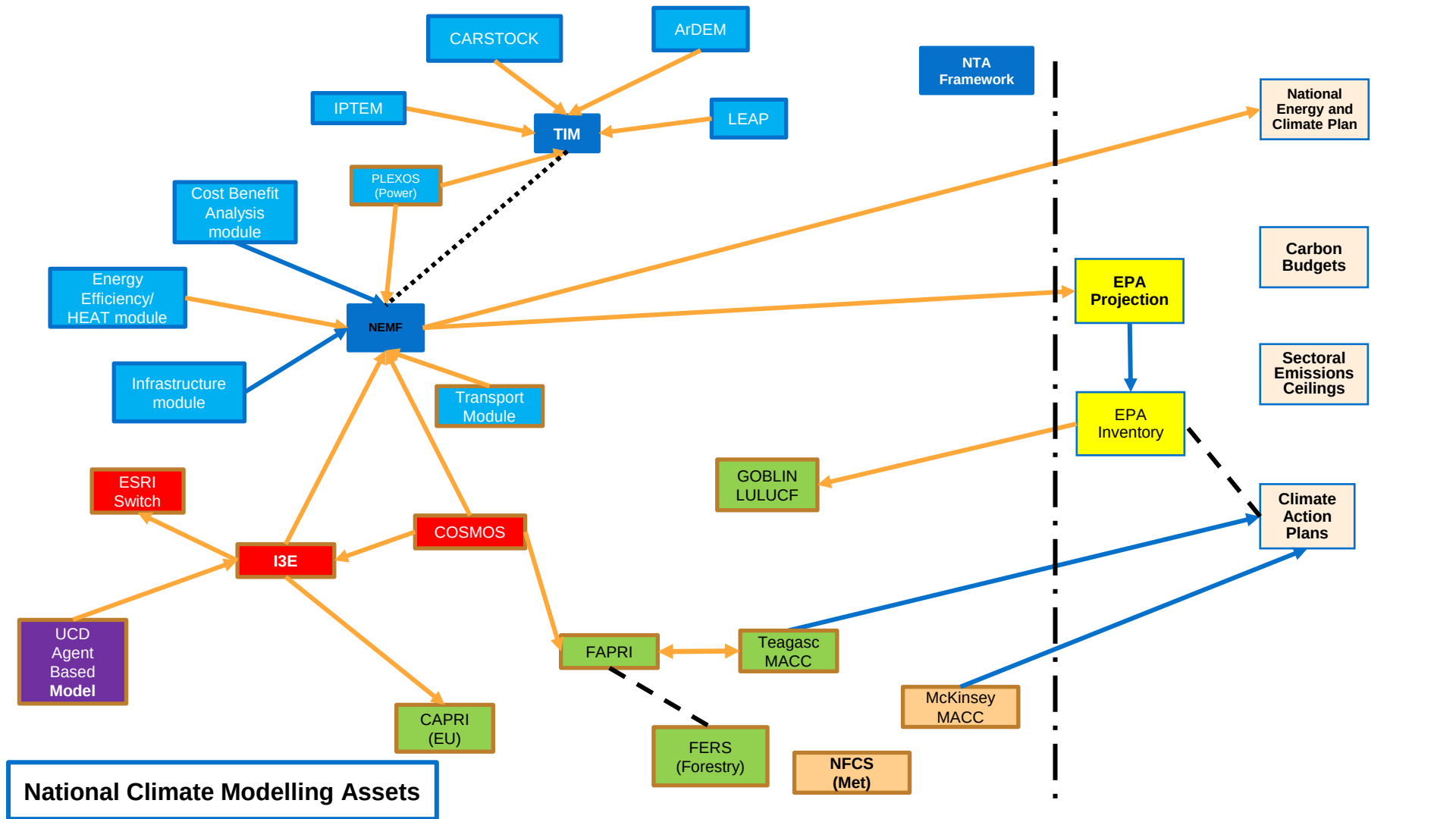
Work on the next round of national population projections can then begin. This will involve forming an expert group that we expect to meet at least three times to decide on the assumptions that will underpin the projections. At this point we expect the timeline to be similar to the last round of projections which would indicate the expert group to meet initially in Q4 2023, have its work complete by Q1 2024 with publication of the national population and labour force projections in Q2 2024.

4. Scoping of Modelling Work

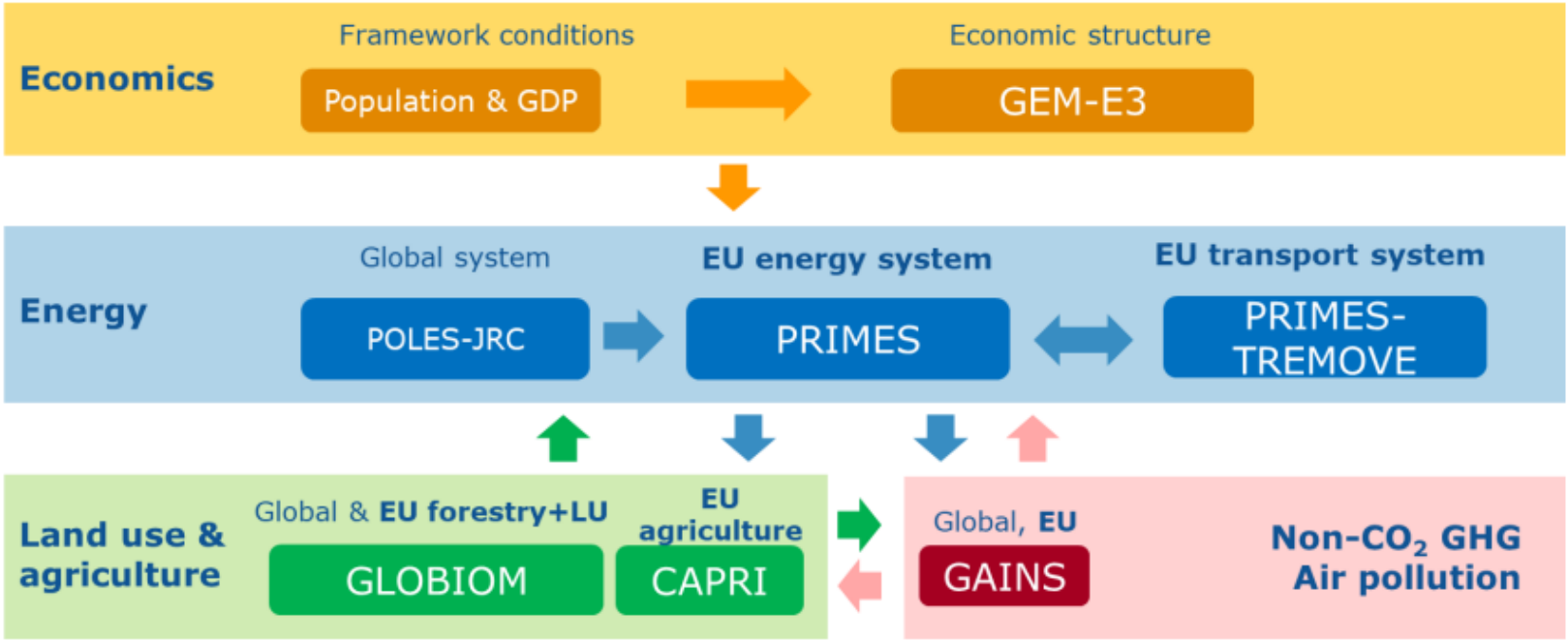
Mt GWP100 AR5	2021-2025 All gases CB1	2026-2030 All gases CB2	2021-2030 All gases Total	2031- 2035 All gases CB3	2021-2035 All gases Total
Scenario 1: E51-A51	295	200	495	148	643
Scenario 2: E57-A40	296	200	496	150	646
Scenario 3: E61-A33	296	200	496	151	647
Scenario 4: E65-A25	297	202	499	152	652
Scenario 5: E69-A19	292	202	494	152	646
Average	**295**	**200**	**496**	**151**	647

Each scenario represents different sharing across sectors with Exx-Ayy representing a scenario where the Energy (heat, transport, electricity) reduces emissions by xx%, while the Agriculture sector reduces by yy%, and LULUCF sectors reduce emissions by 51% (across all scenarios)

Table 2-2, Carbon Budgets Technical Report (2021)


CARSTOCK
ArDEM
IPTEM
TIM
LEAP
PLEXOS (Power)
Cost Benefit Analysis module
Energy Efficiency/ HEAT module
NEMF
Infrastructure module
Transport Module
ESRI Switch
I3E
COSMOS
UCD Agent Based Model
CAPRI (EU)
FAPRI
FERS (Forestry)
NFCS (Met)
Teagasc MACC
McKinsey MACC
GOBLIN LULUCF
NTA Framework
National Energy and Climate Plan
EPA Projection
Carbon Budgets
Sectoral Emissions Ceilings
EPA Inventory
Climate Action Plans
National Climate Modelling Assets

4. Scoping of Modelling Work



EU reference scenario 2020 Figure 1: Modelling suite for the EU Reference Scenario 2020

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AOB

Contact:

[redacted]

NETWORKS

Dingle Project

Presentation to Carbon Budgets Working Group

Fergal Egan

April 2023

Agenda

- Introduction & Objectives
- Why Dingle?
- People, Community, Technologies
- Active Energy Citizen
- EV Trial
- Flexibility Trial
- Reports & Information

Dingle Project – Introduction & Objectives

- 3-year project, started in 2018
- Climate Action Plan 2019 & 2021 outlined the 2030 targets and scale of electrification

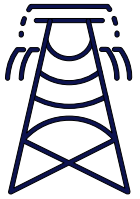
1M

Electric Vehicles on our roads

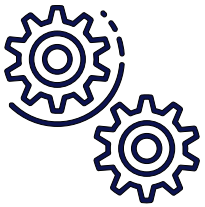
600,000

Homes with Electrified Heating

- Dingle Project trial area provided a location to evaluate clean energy enabling technologies and understand their impact on the electricity grid
- Potential solutions to the challenge of accommodating additional demand from the electrification of heat and transport were explored

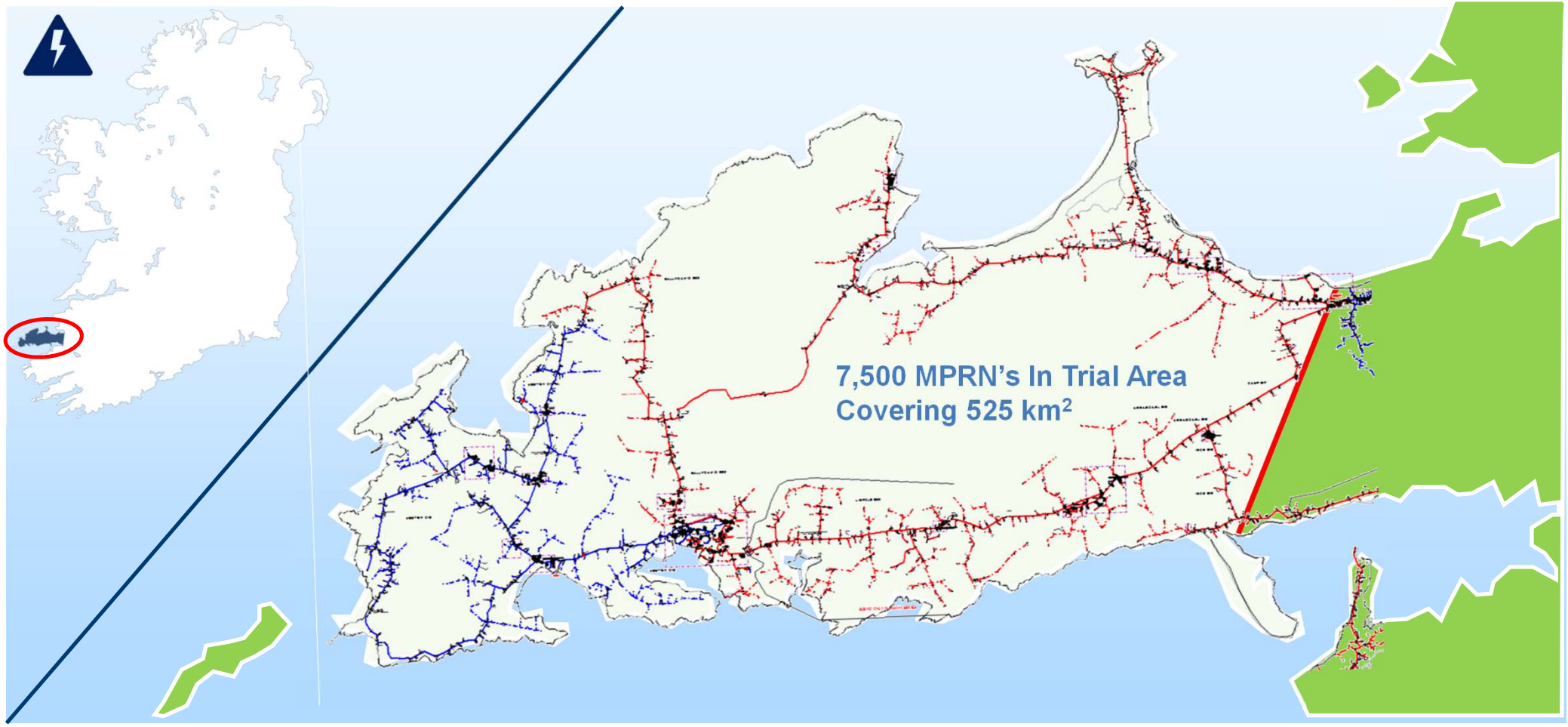
Increased Reliability


Peer-to-Peer Services


Customer Flexibility


Active Energy Citizen


Why Dingle?



People, Community & Technologies

10 Electric Vehicles

5 Air Source Heat Pumps incl. 3 deep retrofits

20 Solar PV

5 Battery Energy Storage Systems with Solar PV

32 Homes with Live Energy Monitoring

5 V2G Chargers & Compatible Electric Vehicles

2 Shared Electric Vehicles

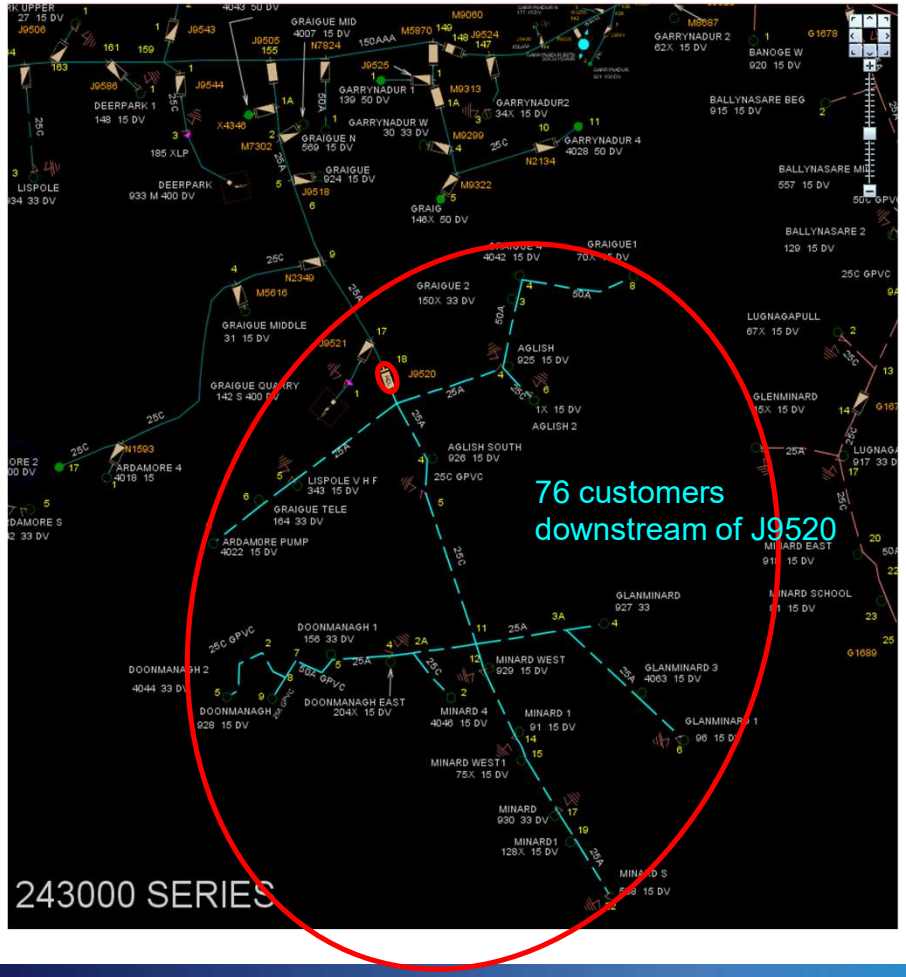
Increased Network Reliability

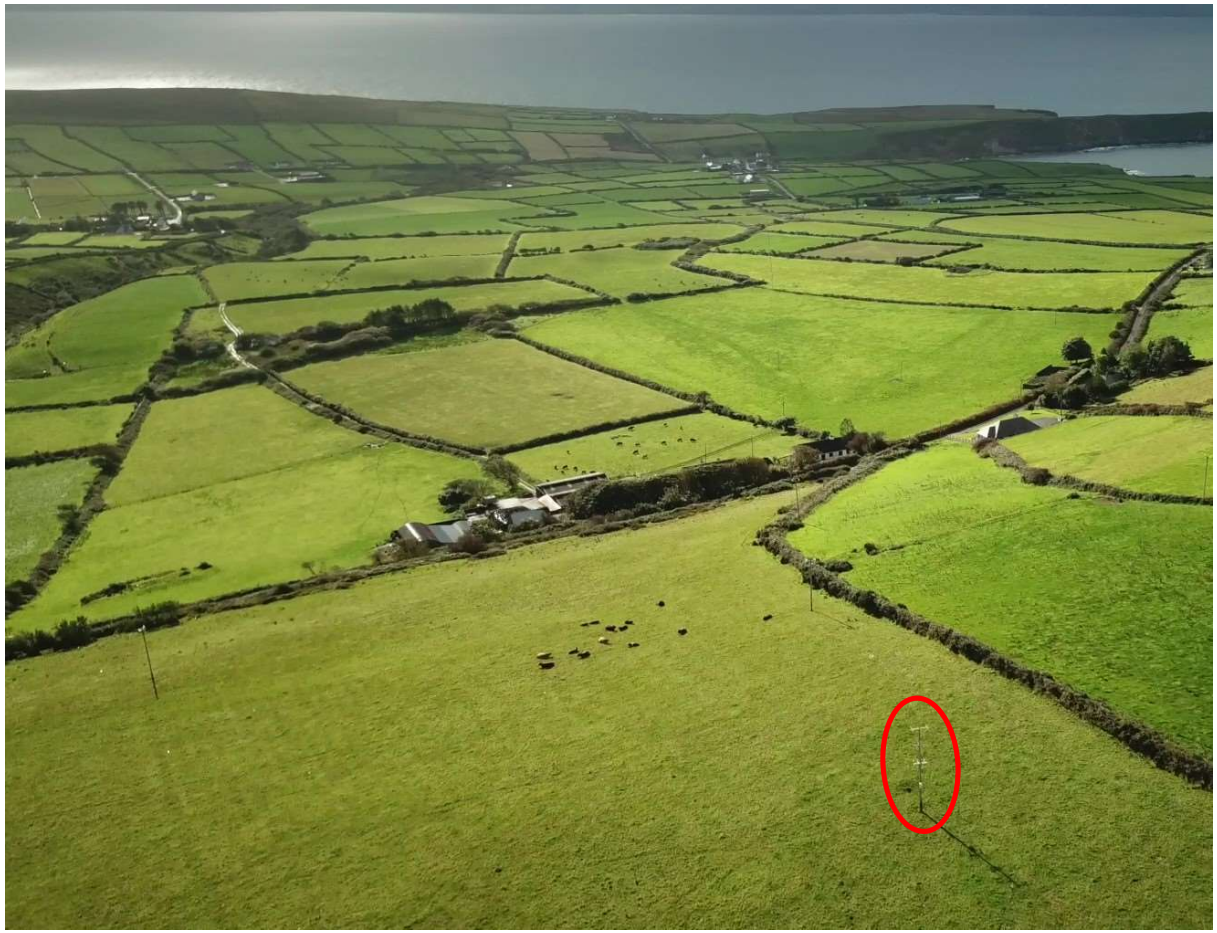
ESB NETWORKS

Minimising Supply Interruptions

Helping locate where faults have occurred

Automatically restoring power





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Time	H	Message		
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	21:46:05	FS03	FUSESAVER OPEN (PHASE R)	ON
	21:46:05	FS03	ALL PHASES OPEN/CLOSE GANGED	OPEN
	21:46:05	FS03	FUSESAVER CLOSE PENDING (R PHASE)	ON
	21:46:05	FS03	FUSESAVER CLOSED (PHASE T)	OFF
	21:46:06	FS03	LINE CURRENT ON (T PHASE)	OFF
	21:46:07	FS03	FUSESAVER CLOSED (PHASE R)	OFF
	21:46:08	FS03	LINE CURRENT ON (T PHASE)	OFF
	21:46:08	FS03	FUSESAVER CLOSE PENDING (T PHASE)	ON
	21:46:13	FS03	FUSESAVER OPEN (PHASE T)	OFF
	21:46:13	FS03	ALL PHASES OPEN/CLOSE GANGED	CLOSED
	21:46:13	FS03	FUSESAVER CLOSE PENDING (T PHASE)	OFF
	21:46:14	FS03	FUSESAVER OPEN (PHASE R)	OFF
	21:46:14	FS03	FUSESAVER CLOSE PENDING (R PHASE)	OFF
	21:46:15	FS03	FUSESAVER CLOSED (PHASE T)	ON
	21:46:16	FS03	CLEARED FAULT OCCURRED (PHASE T)	ON
	21:46:16	FS03	LINE CURRENT ON (T PHASE)	ON
	21:46:18	FS03	FUSESAVER CLOSED (PHASE R)	ON
	21:46:19	FS03	CLEARED FAULT OCCURRED (PHASE R)	ON
	21:46:19	FS03	LINE CURRENT ON (T PHASE)	ON
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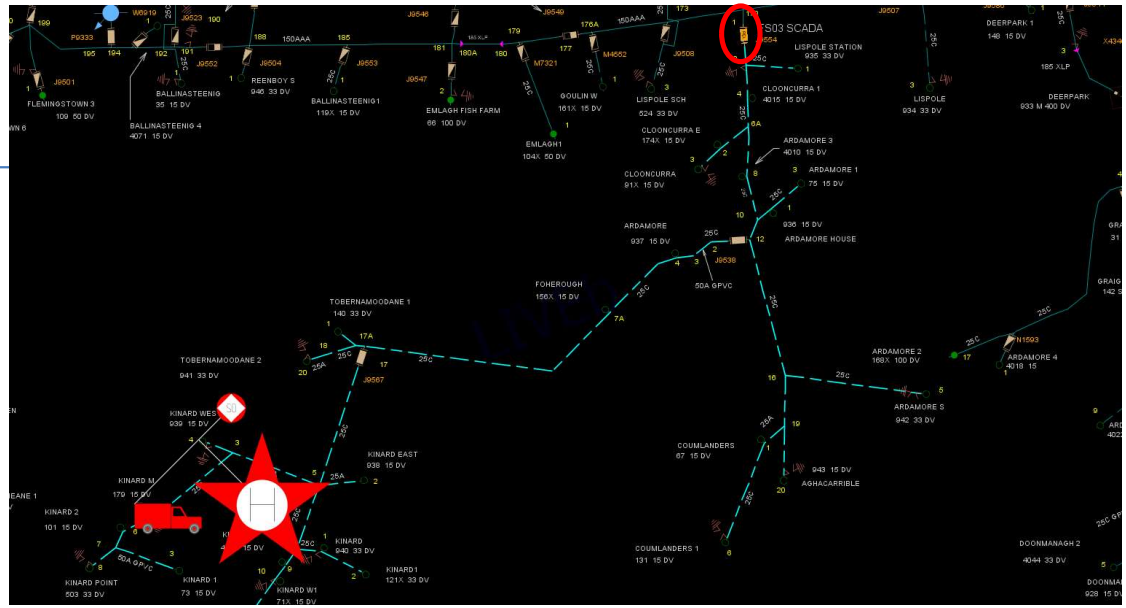
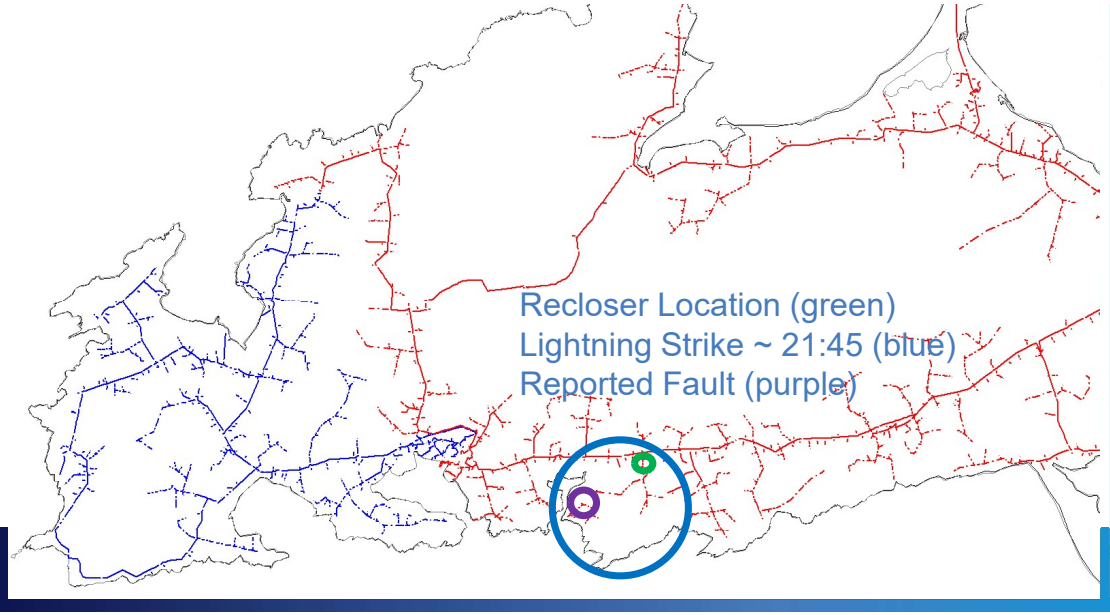
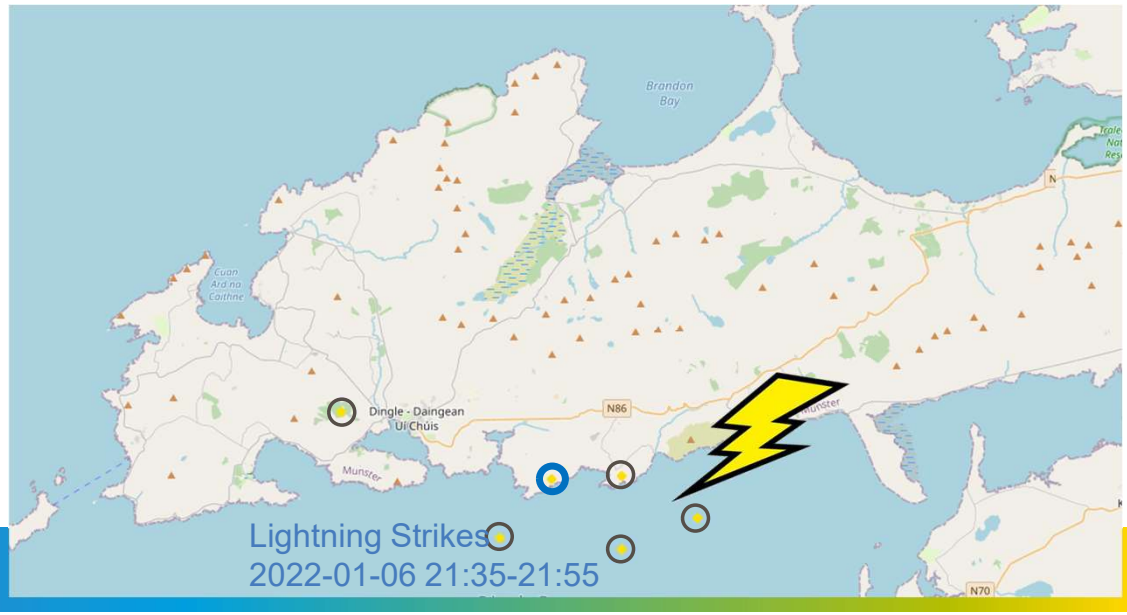
	21:48:18	FS03	CLEARED FAULT OCCURRED (PHASE R)	OFF



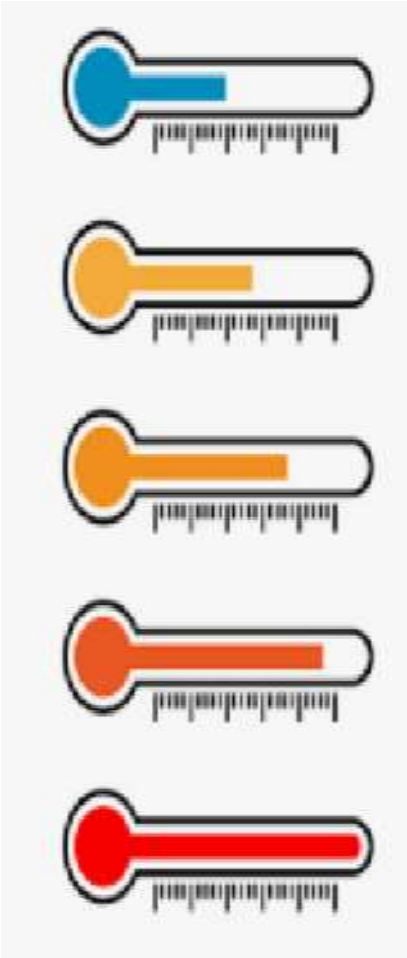




Active Energy Citizen

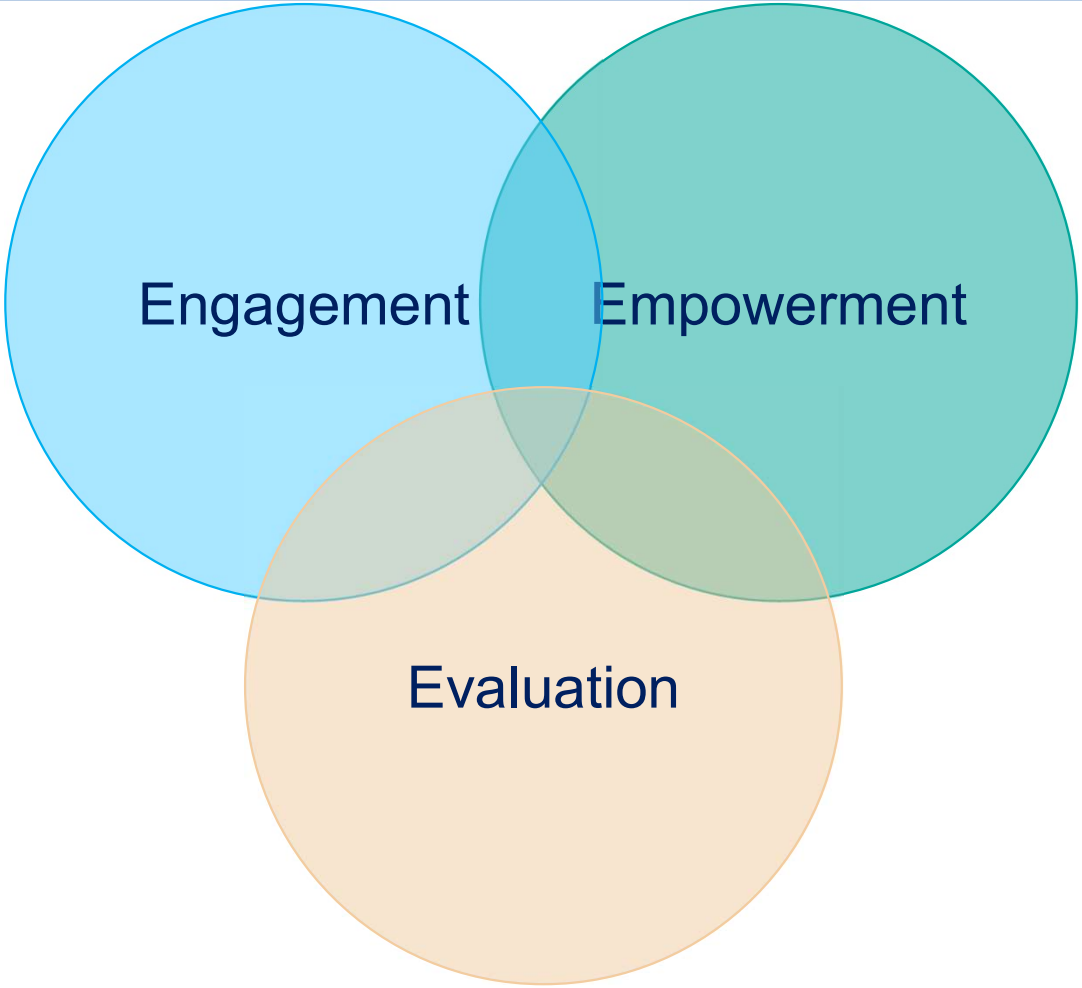
ESB NETWORKS

Degrees of Energy Citizenship

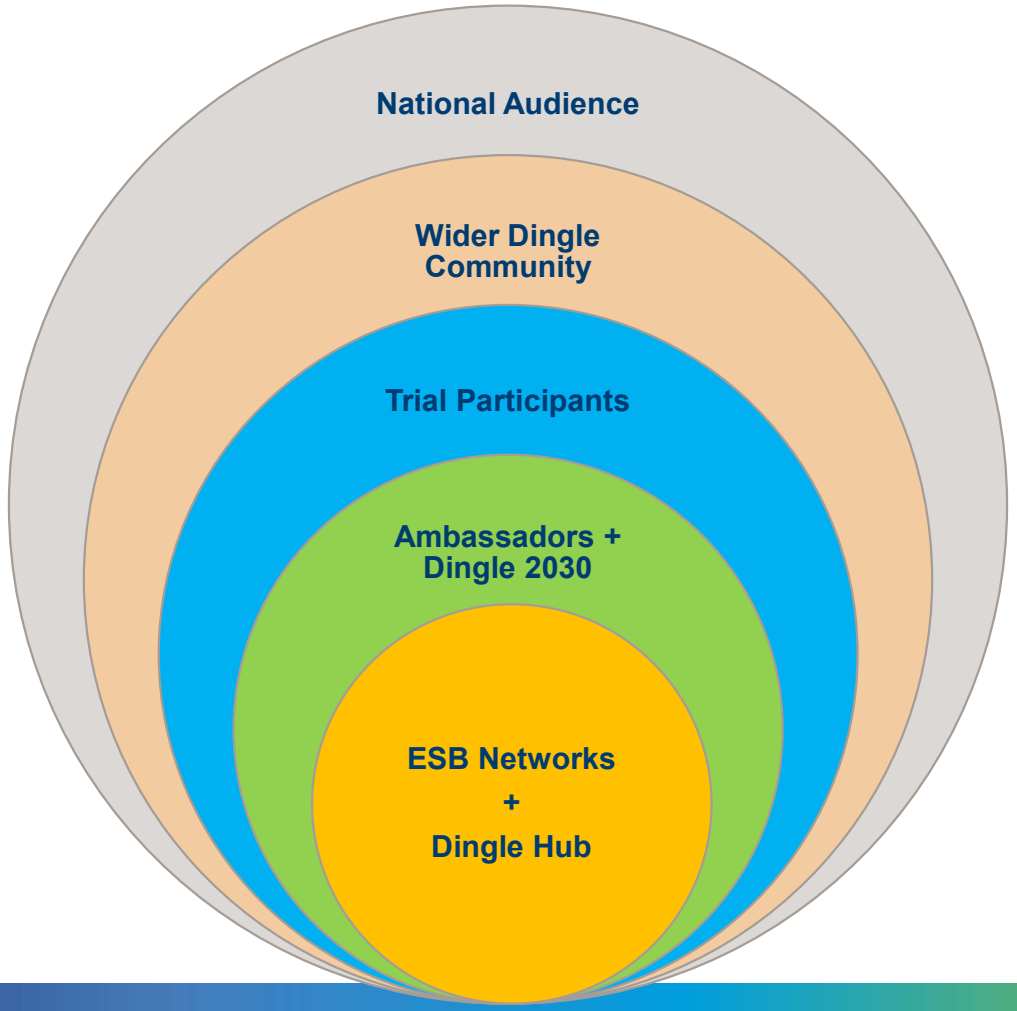


- **Engaging** — Energy Efficiency in the home
- **Exploring** — Investment in technologies
- **Activating** — Sharing experience / advocacy
- **Leading** — Active participation in schemes

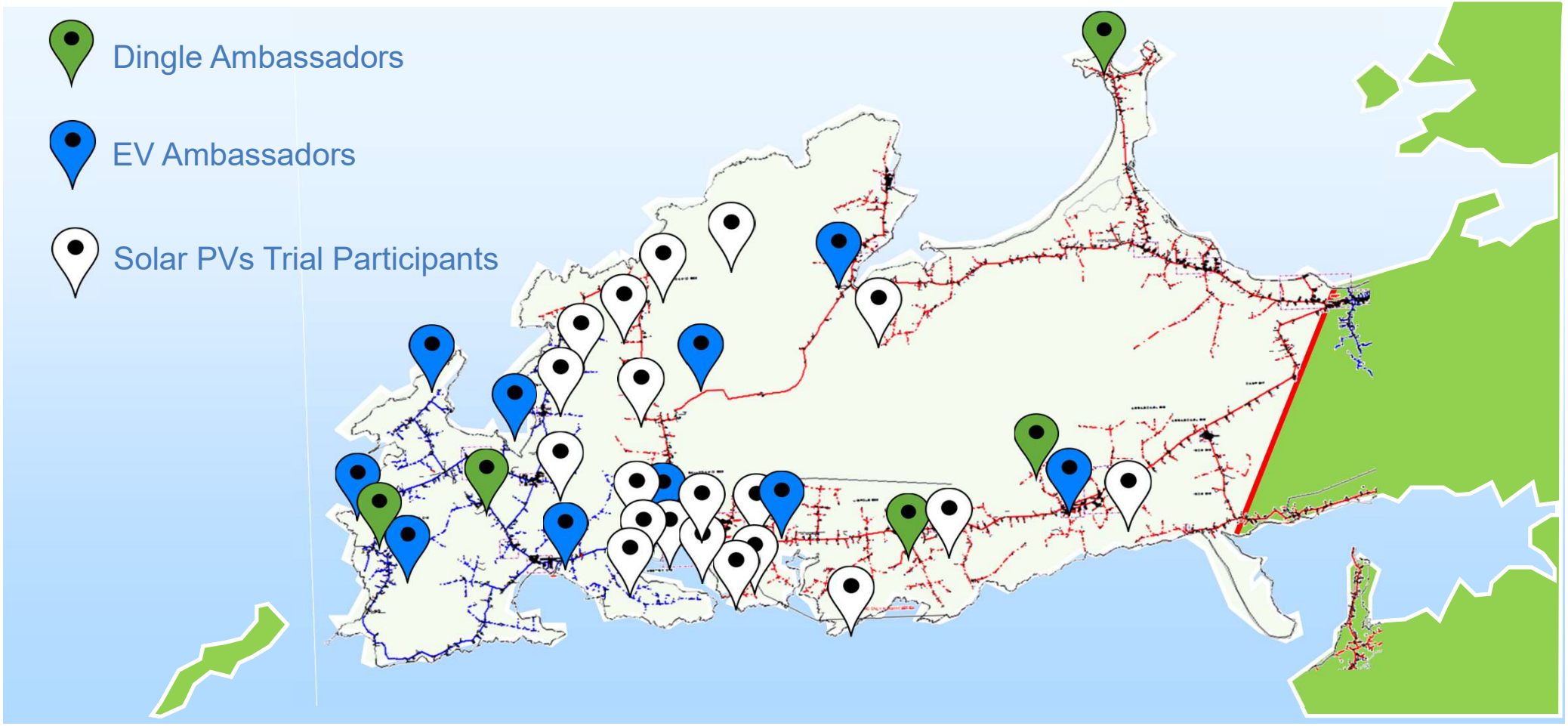
Energy Citizenship Development Strategy



Spread of Engagement



Real Trials, Real People, Real Learnings – Community Centric



Community Engagement Strategy

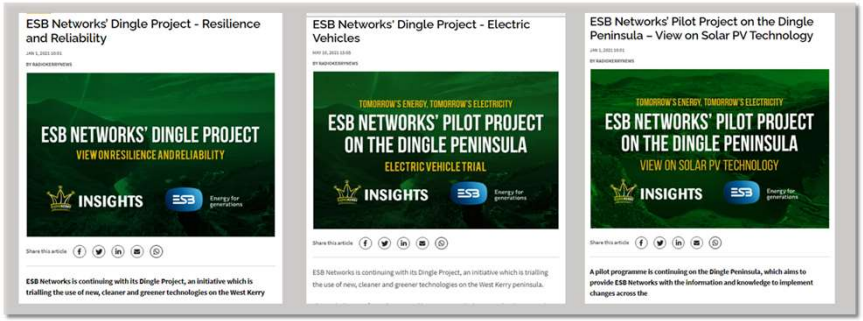
we engaged

- Full Time Community Engagement Manager
- Dingle Creativity & Innovation Hub Partnership
- Incentivised Trials
- Ambassador Programmes
- Local Steering Groups – Corca Dhuibhne 2030
- Presence at local events
- Competitions
- Local Press/Media
- Addressing concerns

Community Engagement Strategy

we empowered

- Information Sessions
- Networking Events
- Ambassadors & trial participants
- Webinars/Online Series
- KETB & Energy Mentors
- Energy Clinics
- Hub Community Engagement Manager
- Local Press interviews/Radio Podcast
- Stakeholder Visits

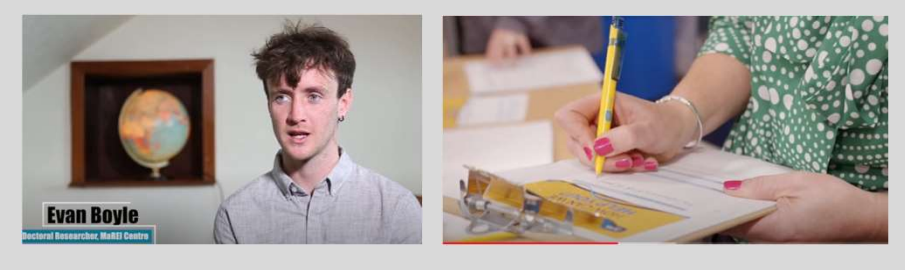


Real people, sharing real experiences

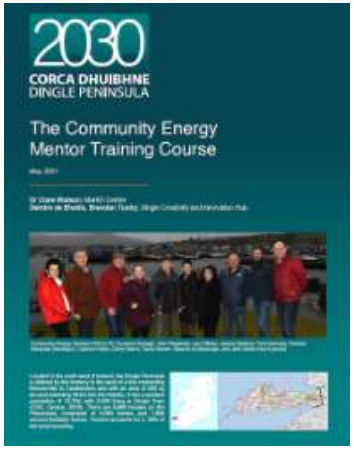
Community Engagement Strategy

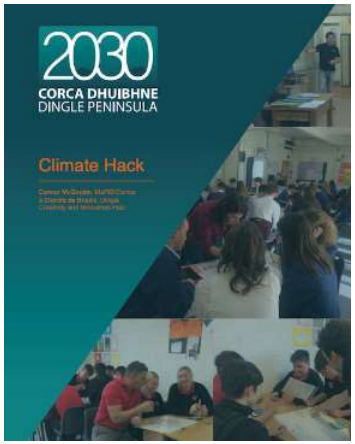
we evaluated

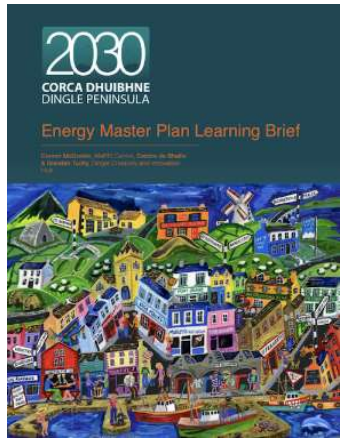
- Partnership with MaREI
  - Engaged Research
    - Participant Surveys
    - Community Surveys
    - Vox Pops
    - Learning Briefs
  - Academic Papers
- Final Report

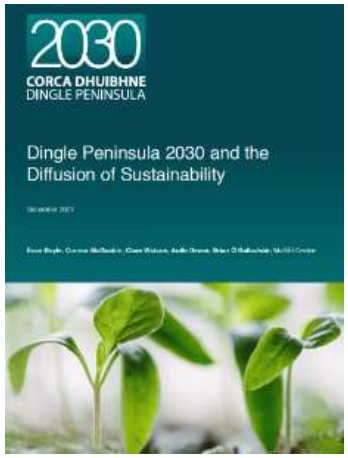


Evaluation of Project Initiatives & Diffusion Potential

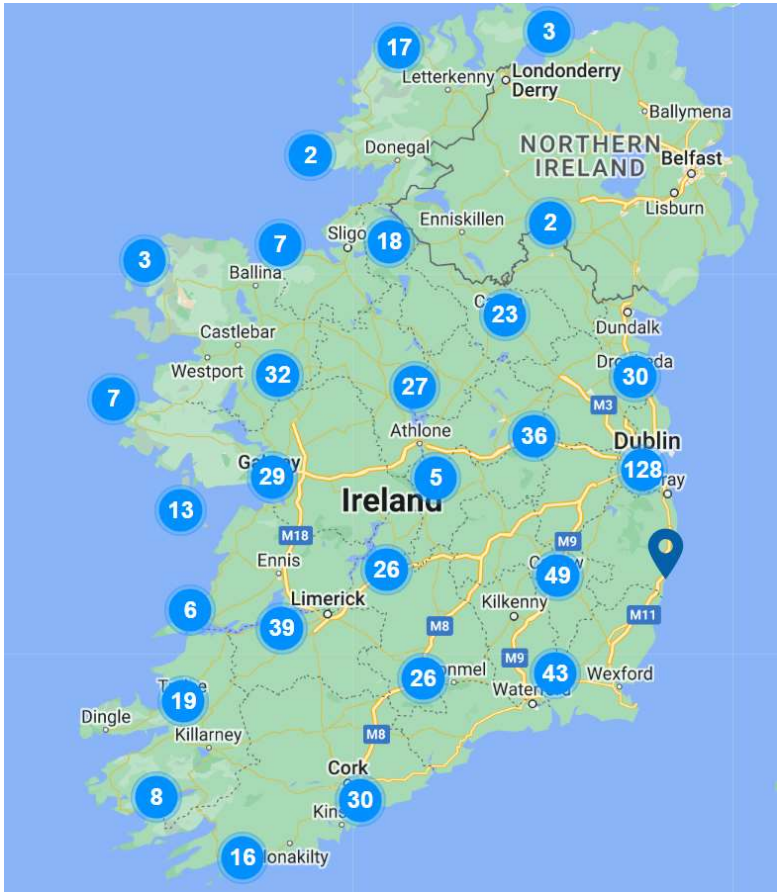




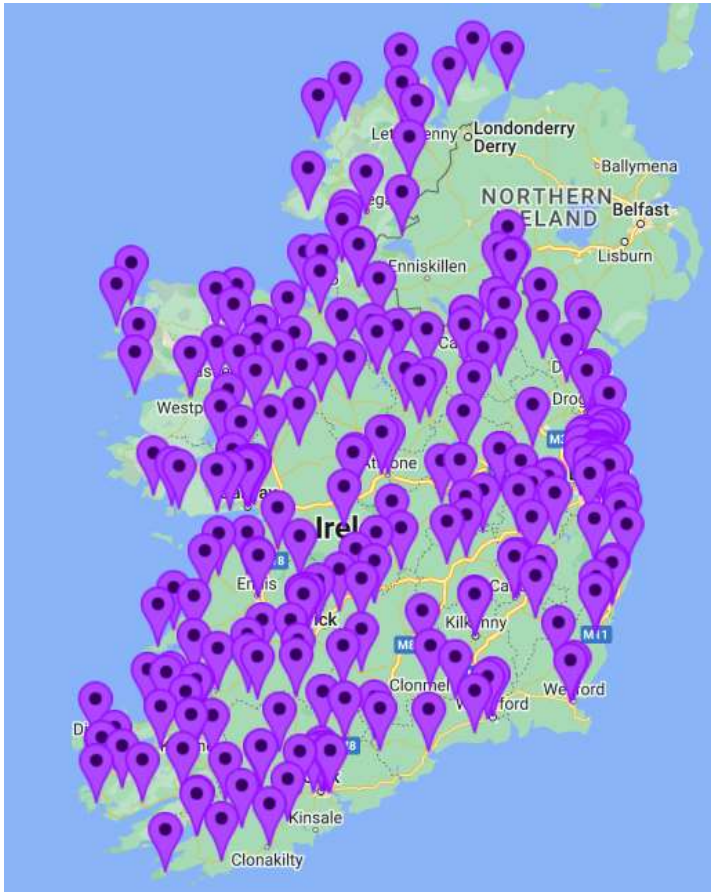




Recommendations for Other Communities

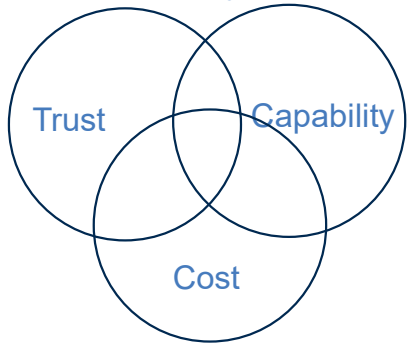


500+ SEAI Energy Communities



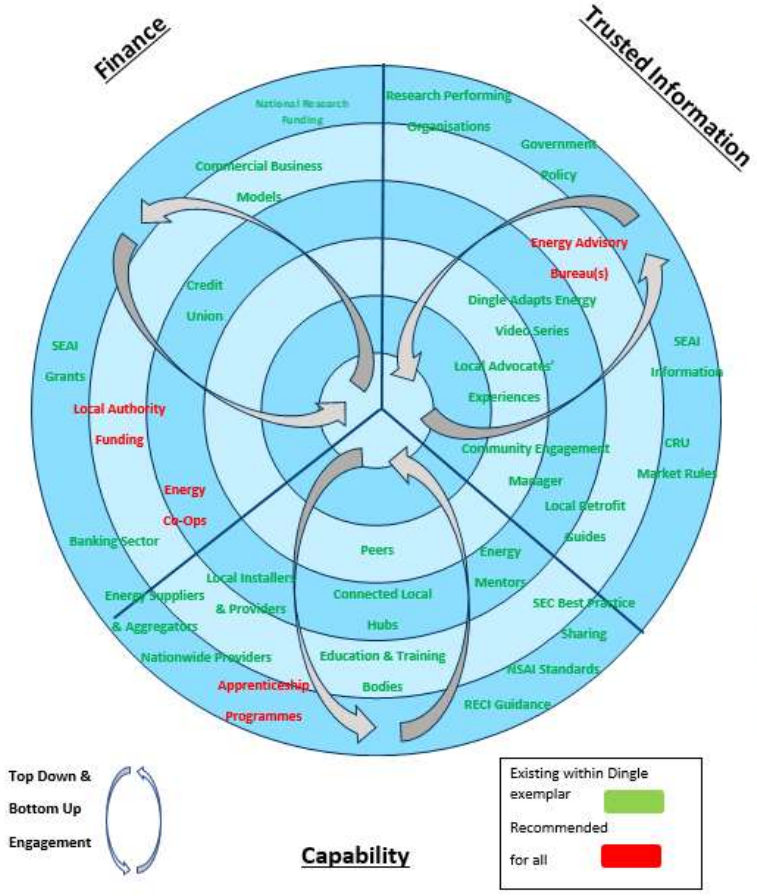
250 + Digital Hubs / Connected Hubs

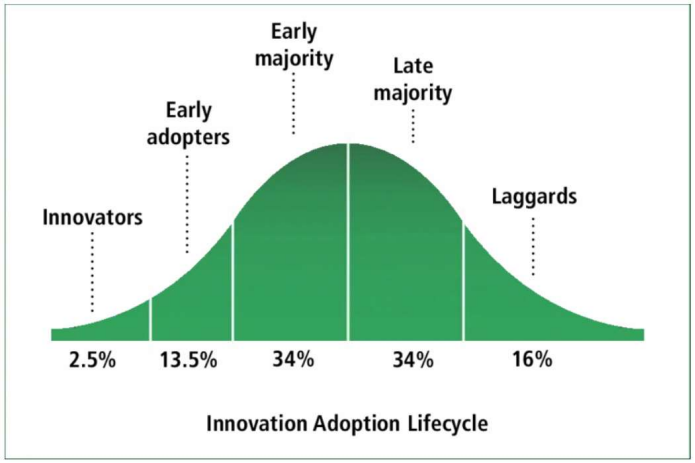
Local Authority – D. Zones

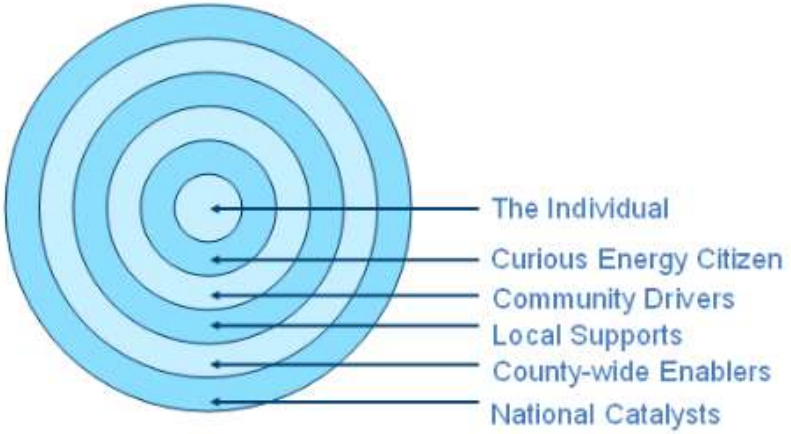


Lived Experience Storytelling

Activating Communities not just Individuals







Electric Vehicle Trial

EV Trial Results

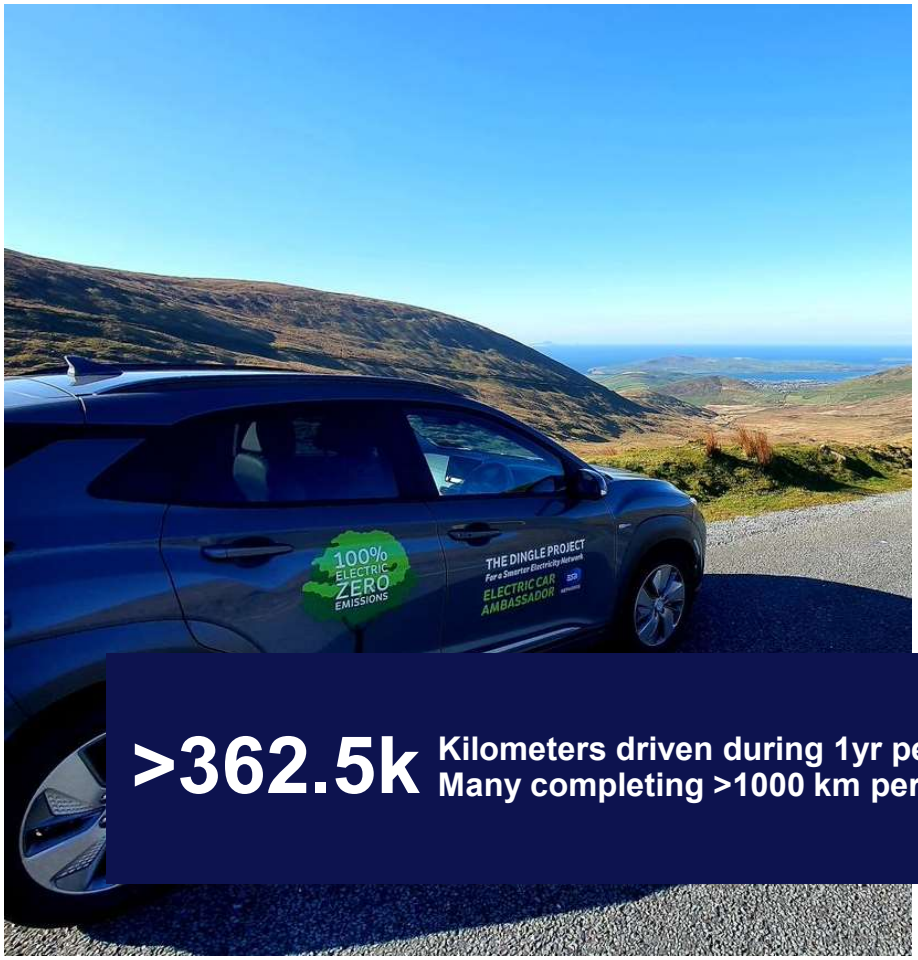
Electric Vehicles can work for rural communities and users

- Confidence grew throughout the trial
- Several users completed >3000 km per month, some even >1000 km per week
- Greatest daily / weekly / monthly distances of 786 / 1921 / 4588 km
- Impact of home EV charging was significant, but demand reduction schemes and vehicle-to-grid capability demonstrated potential for flexibility services

17
Electric Vehicles

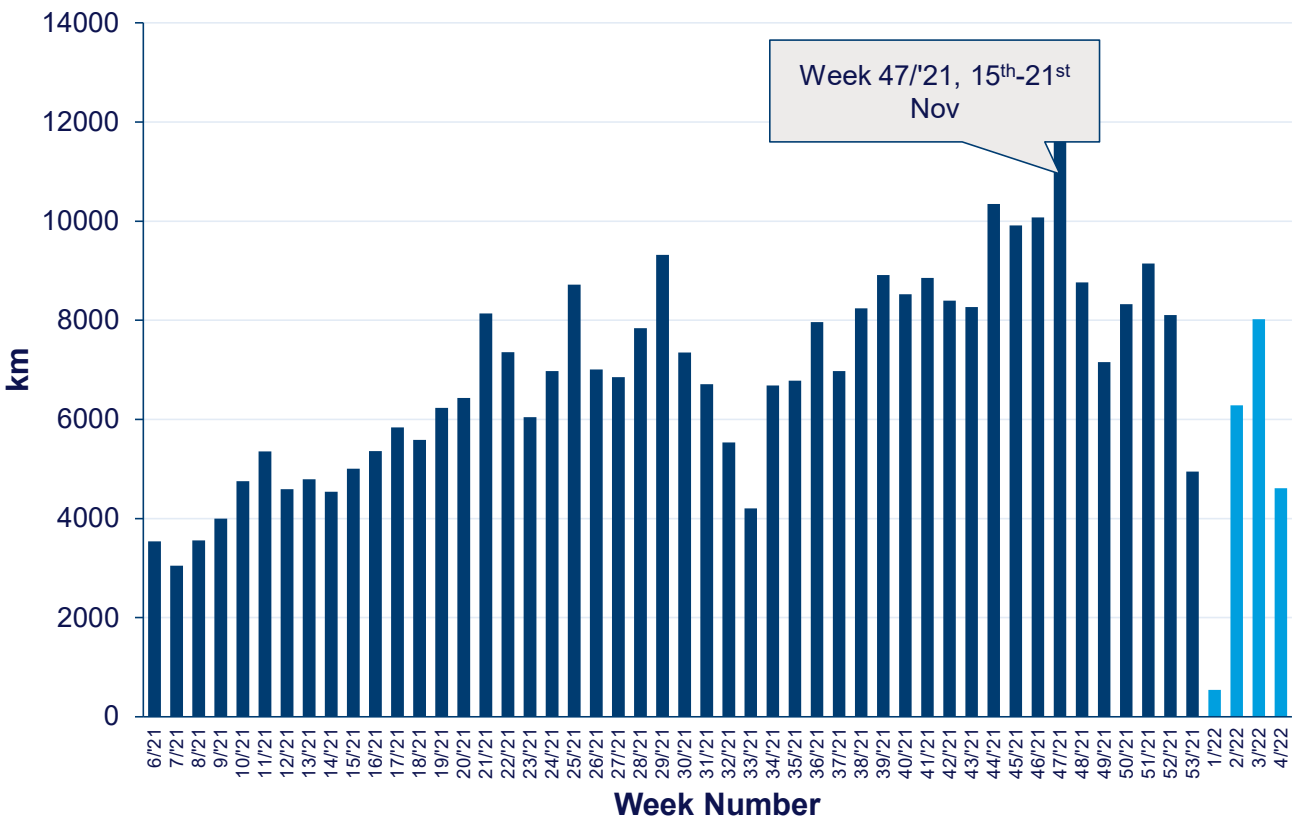
>59.3 MWh
Charging Completed at Home

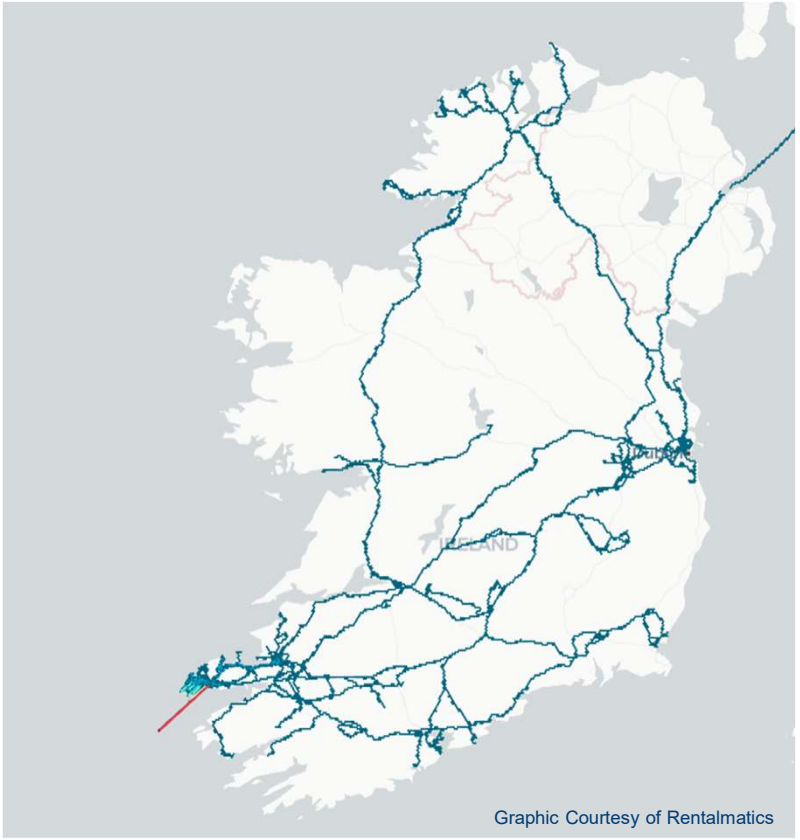
>2100
Charging Sessions



>362.5k **Kilometers driven during 1yr period. Many completing >1000 km per week**

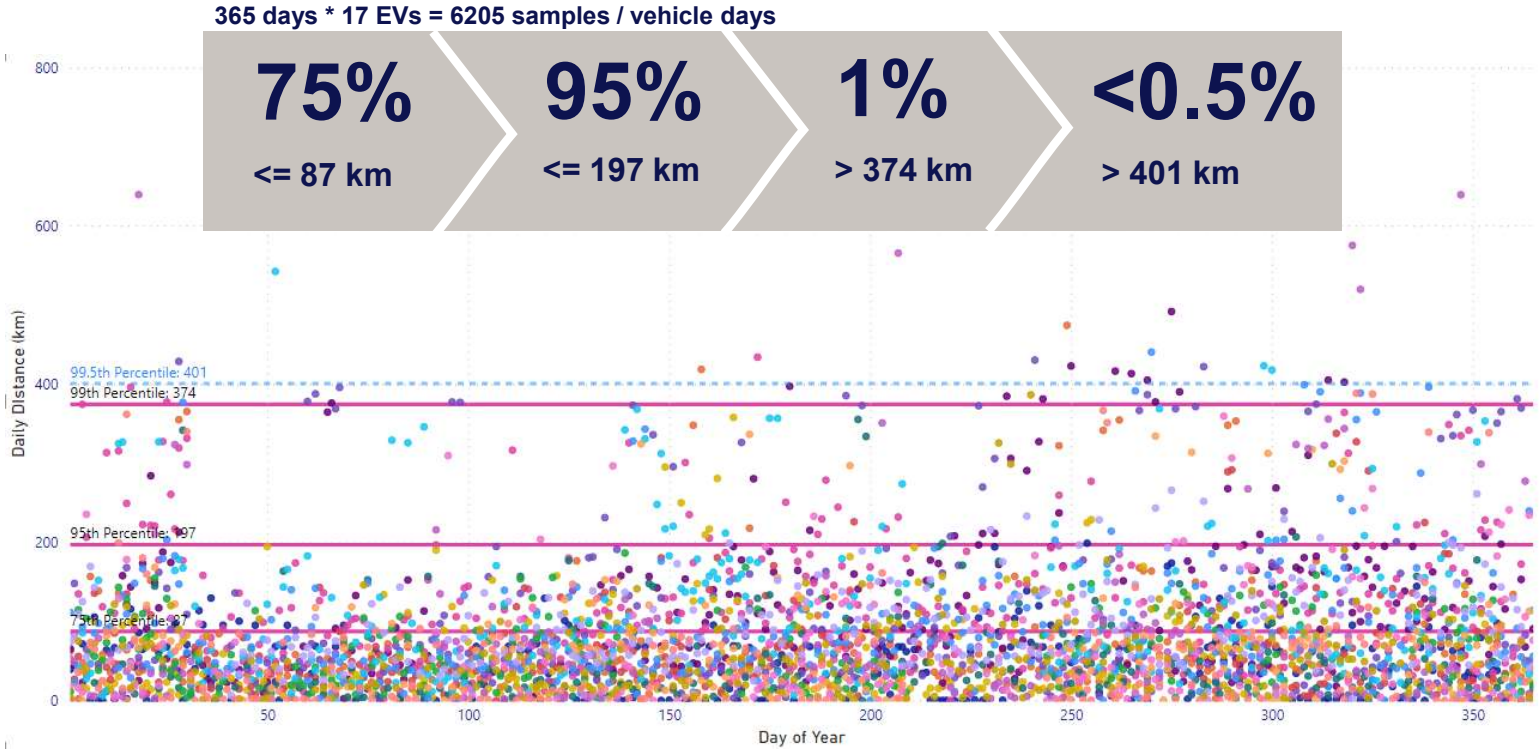
Weekly Distance Driven





EV Suitability to Rural Communities

- EVs with a range of > 350 km proved suitable for rural Dingle peninsula
- Majority of charging completed at home chargers
- > 0.5% of the year did cars travel more than 400 km in single day
- 95% of the time, vehicles travelled less than 200 km in a single day



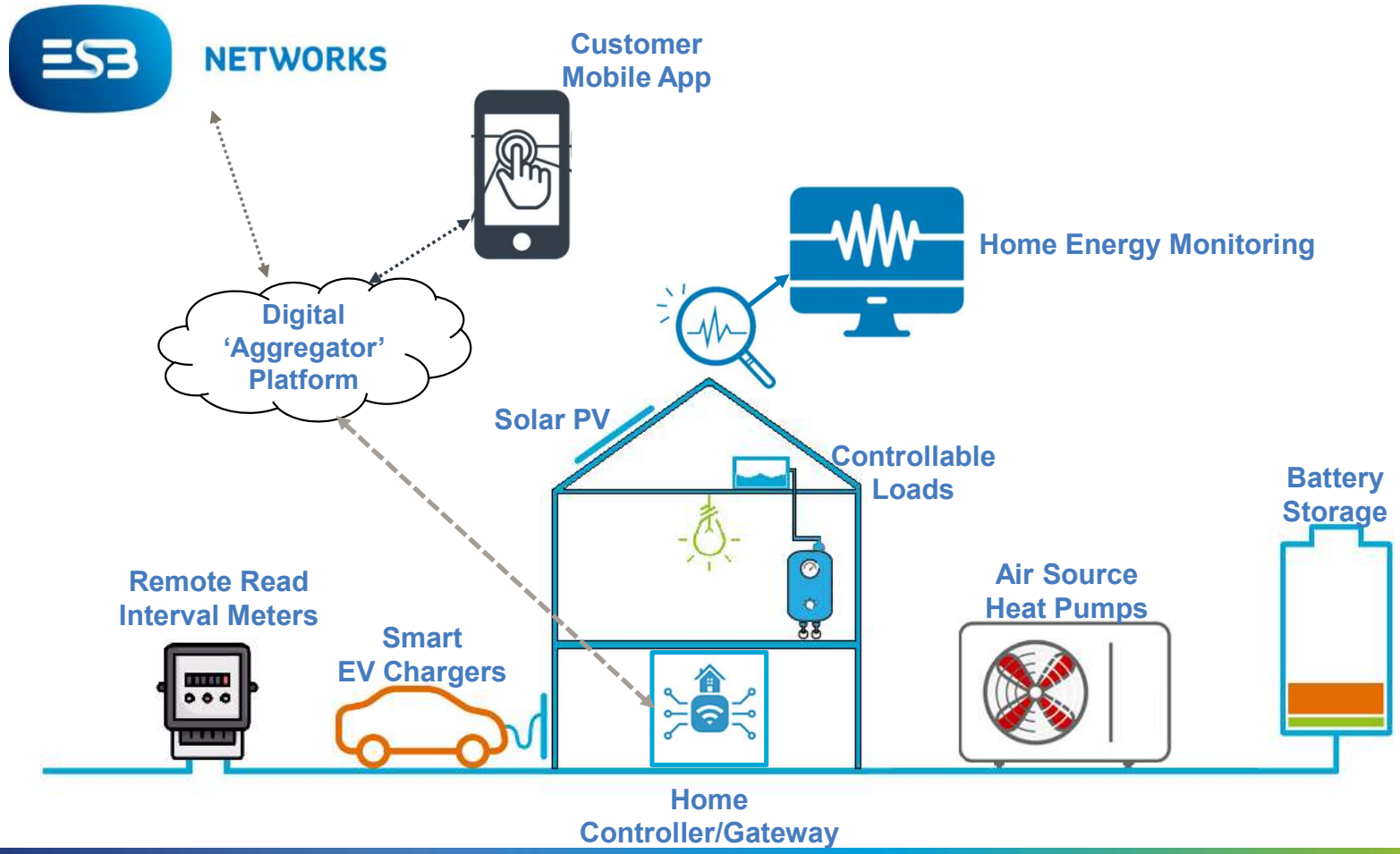
Flexibility Trial

What Is Customer Flexibility?

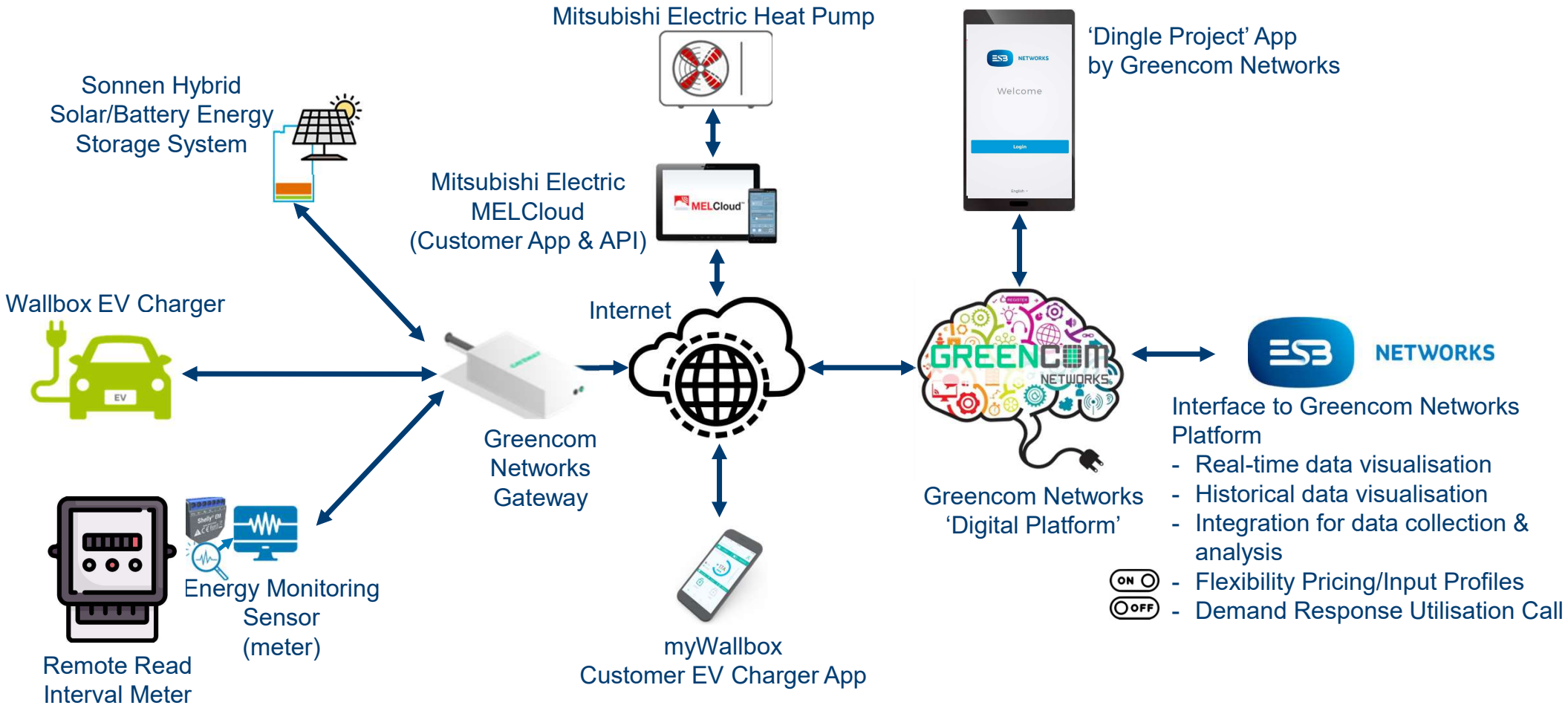
“Customer Flexibility is about reducing demand on the network by using customers’ ability to change their usage patterns by reducing consumption or switching on generation.

Several technologies on the Dingle Project can be controlled to provide this type of service.”

Behind-the-Meter Technologies - Ambassador Properties



ICT Overview – Project Ambassadors



Demand Response Schemes - Overview

- Time-scheduled demand response to move demand away from peak times.

  If specific loads can be managed at peak times when the electricity network is most under pressure, then it may allow additional demand to be accommodated without immediate need for physical network reinforcements.

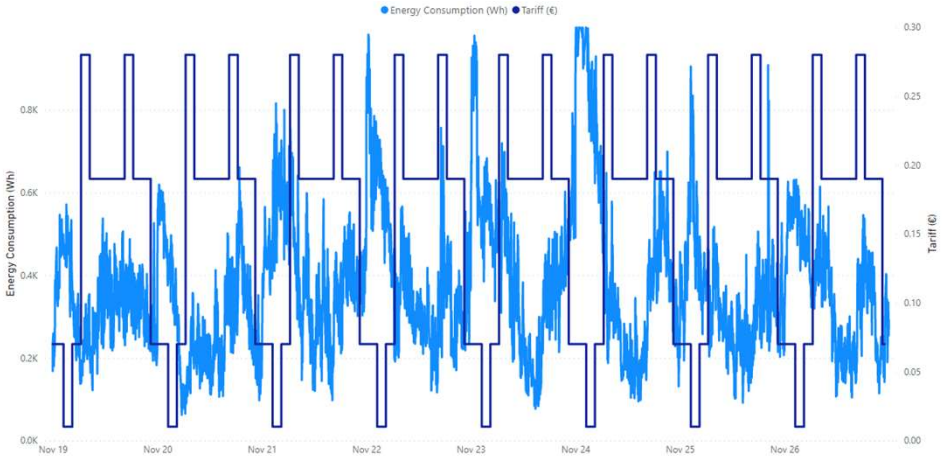
- Price-scheduled demand response to control demand based on forecasted pricing input.

  Modern, clean energy enabling technologies can be controlled in line with input signals such as supplier tariffs, forecasted market pricing, carbon intensity etc. The results of these tests will assist ESB Networks in understanding the impact on the electricity network when this smart capability is common in customer properties and how it may be leveraged to manage peak network loadings in a more dynamic, agile way.

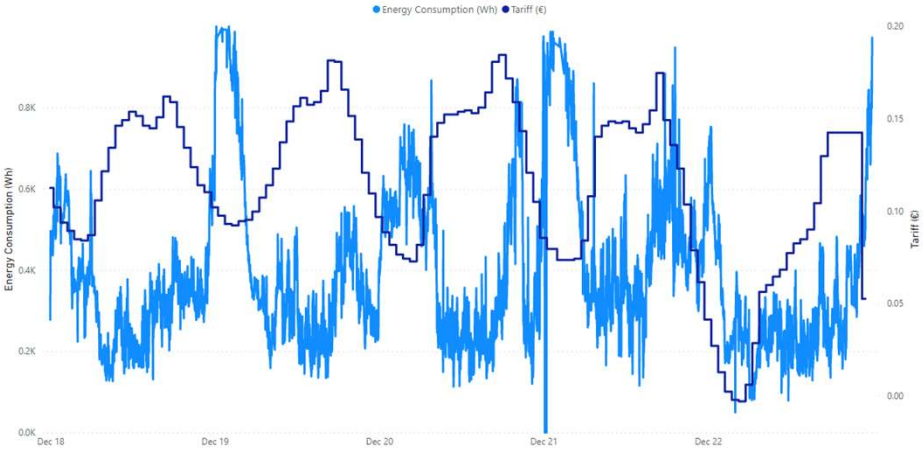
- Short-term manual demand response to reduce power consumption on command and leverage energy storage technologies where available.

  This test will demonstrate the capability of clean energy enabling technologies to provide demand reduction, and active power support from energy storage, when required by the grid operators while having minimal impact on the customer.

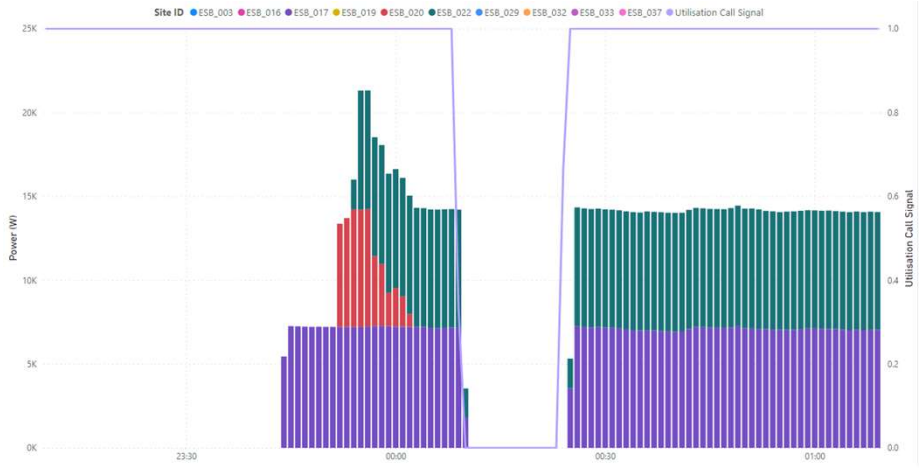
Demand Response Schemes



Scenario 1 / Sustain
Time-Based Scheduling



Scenario 2 / Secure
Price-Based Scheduling



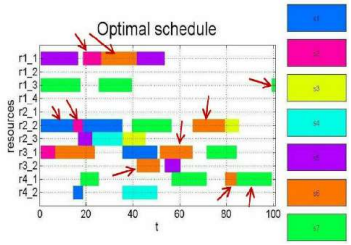
Scenario 3 / Dynamic
Manual Utilisation Calls

Automated Control & Optimisation Sequence

Home Energy
Monitoring Data

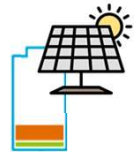
Mitsubishi Electric Heat Pump

Greencom Networks
'Digital Platform'



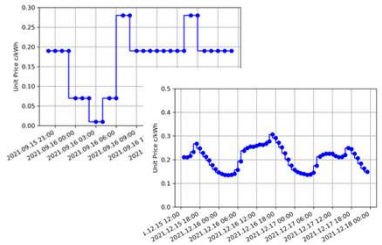
Optimal 24h Scheduling
of LCT Assets

Greencom Networks
Gateway



Sonnen Hybrid
Solar/Battery Energy
Storage System

Wallbox EV Charger



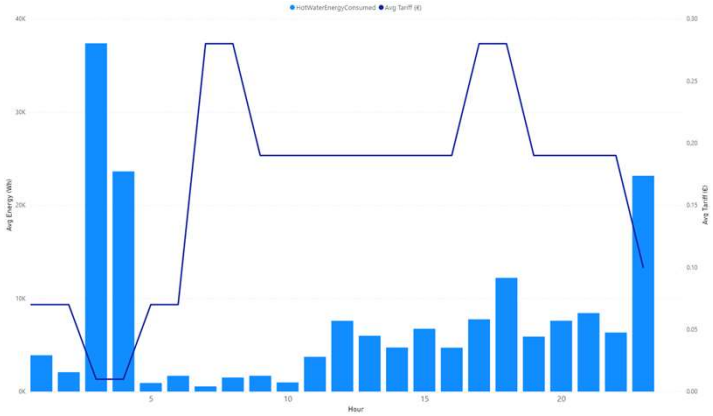
Notional Tariff Data

Scenario 1 / Time-Based Scheduling

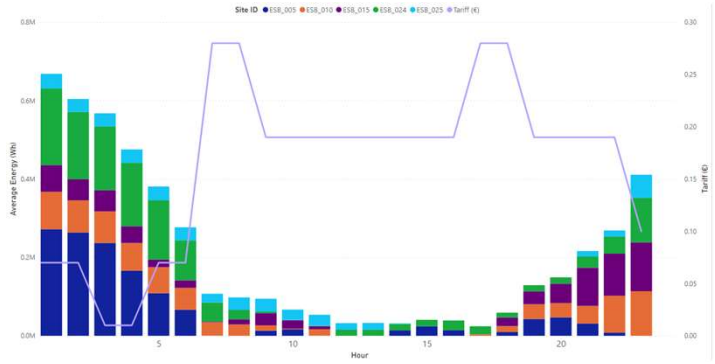
- Tariff provided to all sites with day/night pricing, Additional high price periods for morning and evening peaks with a Low price period included during night period
- Optimisation successfully aligned controllable loads with lowest price periods but minimal demand reduction achieved during peak times
- Battery energy storage system charged at lowest price period and discharged during evening peaks
- Heat pump water heating utilised low price period
- EV charging aligned with real supplier tariff and not fully driven by ESBN tests

BESS

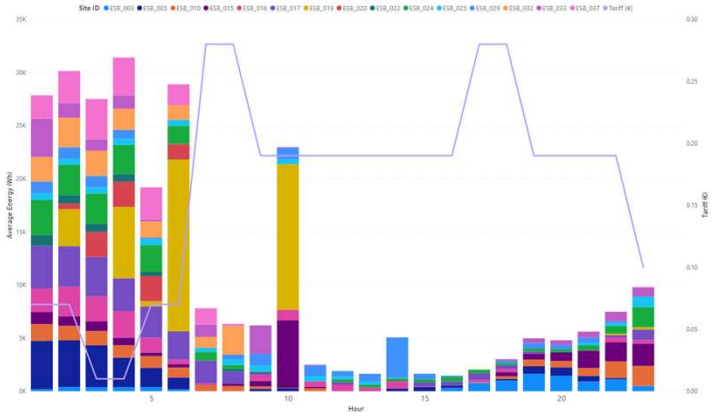
HP



V2G



EV

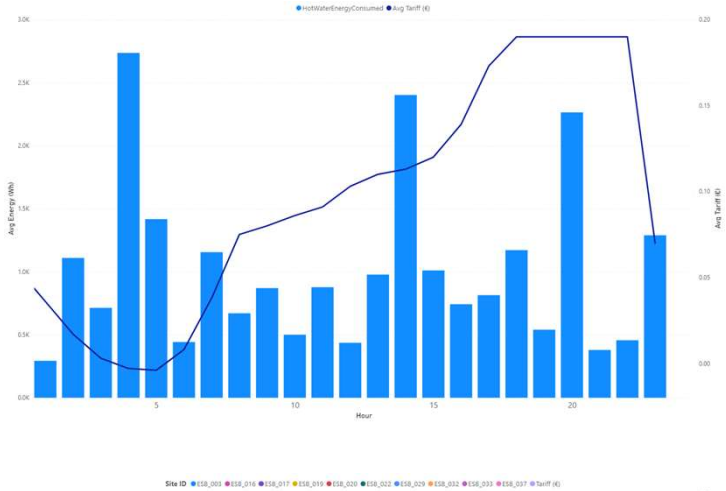


Scenario 2 / Price-Based Scheduling

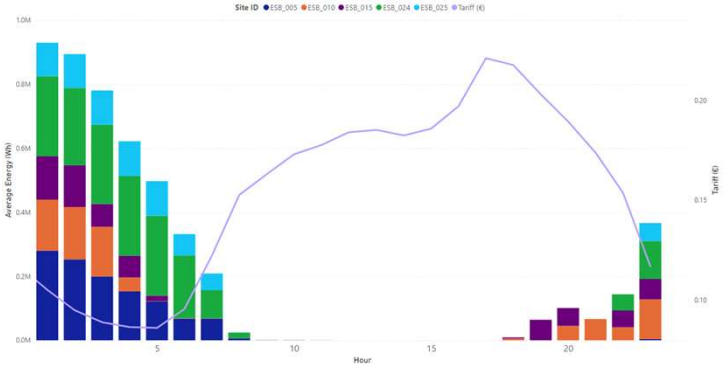
- Dynamic tariff provided to each site based on day ahead forecasted wind and grid demand
- Optimisation successfully aligned controllable loads with lowest price periods
- Battery energy storage system charged at lowest price period and discharged during highest price period.
- Heat pump water heating utilised lowest price period
- EV charging aligned with real supplier tariff and not fully driven by ESBN tests

BESS

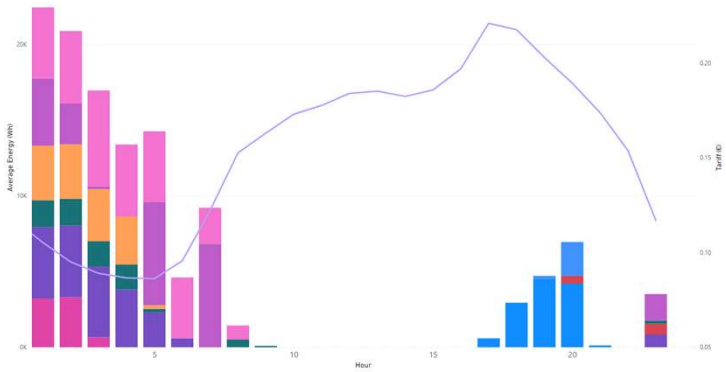
HP



V2G



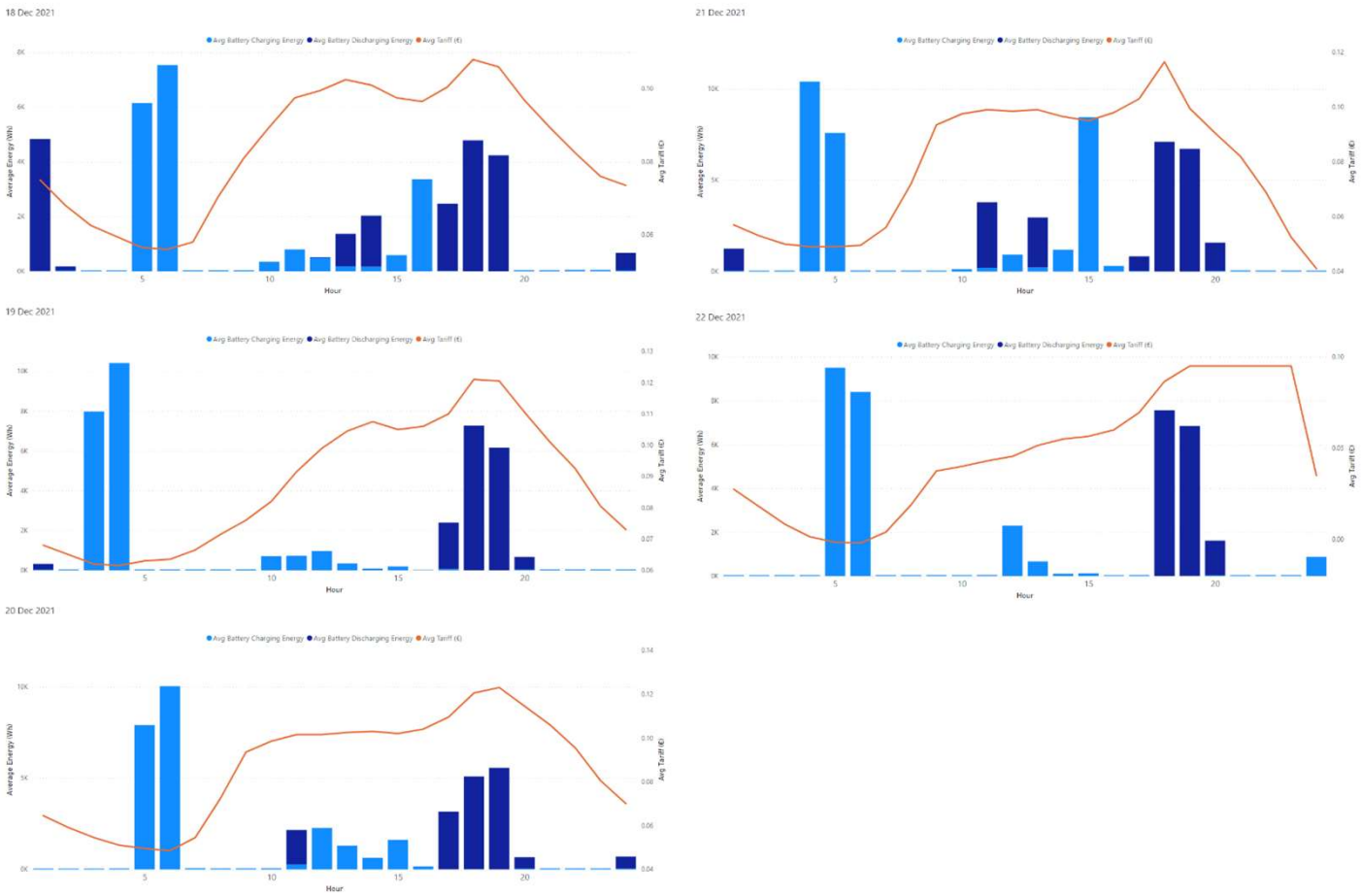
EV



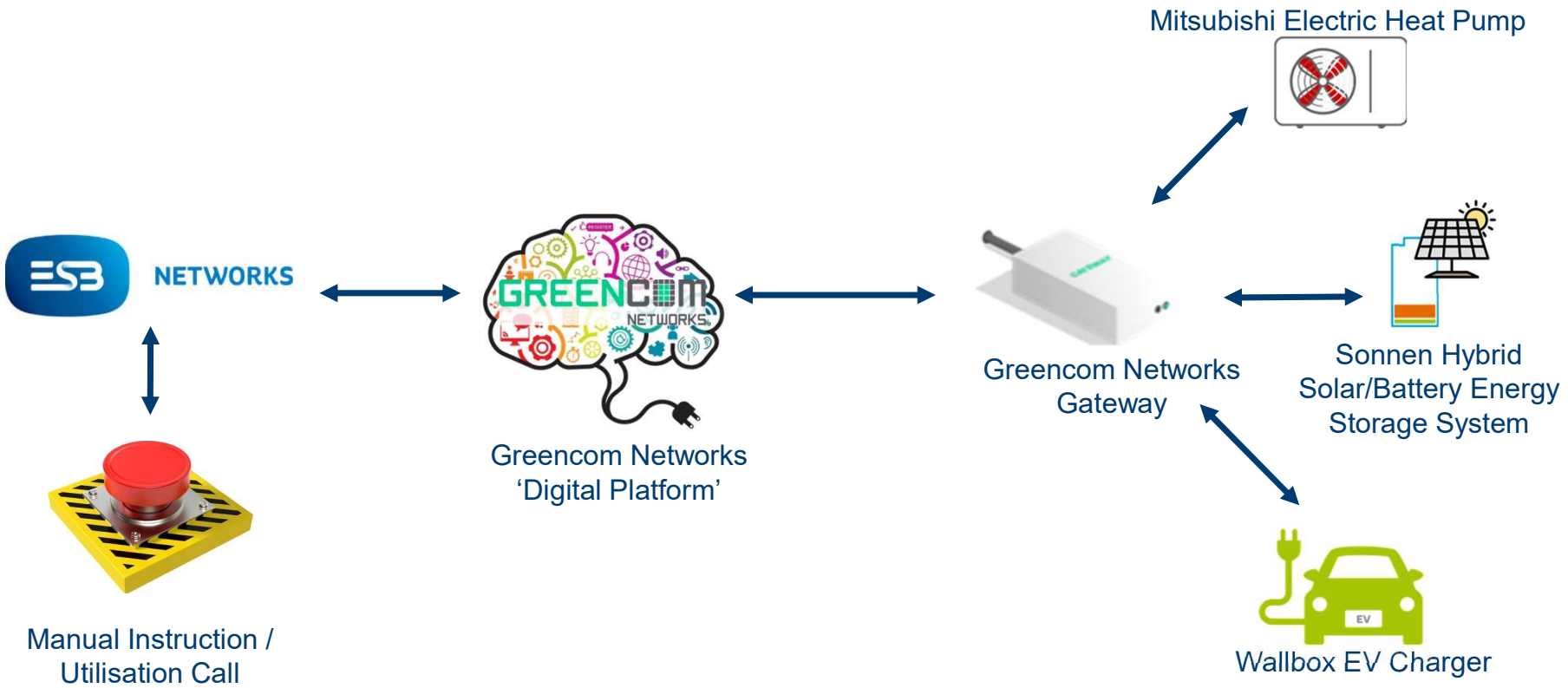
Scenario 2 / Price-Based Scheduling – Battery Response

- GreenCom Networks control of the Battery energy storage system adjusted day on day to the different pricing information
- Charging moved to the lowest price period which varied slightly each night
- Discharging changed based on magnitude of the pricing peak and the expected duration of the peak
- System accounted for recharging during the day during lower price periods or from Solar PV

BESS



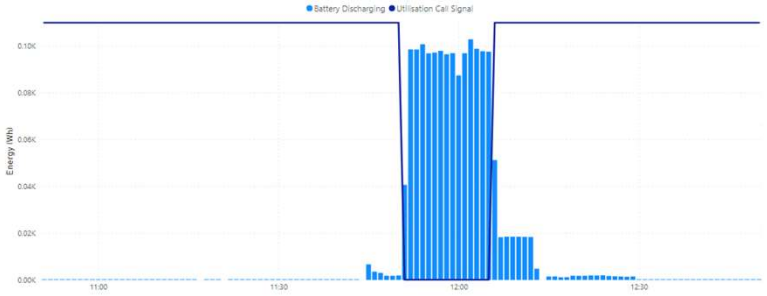
Manual Utilisation Call Control Sequence



Scenario 3 / Manual Utilisation Calls

- All controllable technologies demonstrated capability to respond to manual utilisation calls
- Battery energy storage systems proved very responsive but level of response depended on solar PV production, customer energy behaviours and lifestyle and consequent battery state of charge.
- EV and V2G charging ceased promptly with V2G discharging subject to a ramp rate that takes circa. 5min to reach max discharge
- Heat pumps were powered off with Mitsubishi Electric API polling rate limiting response times to 1-2 mins.

BESS



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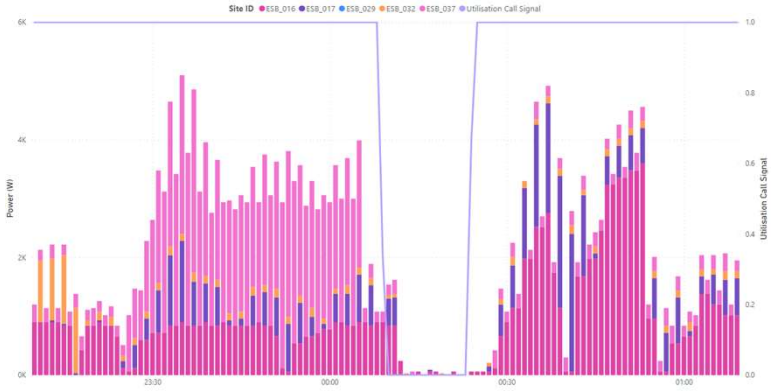
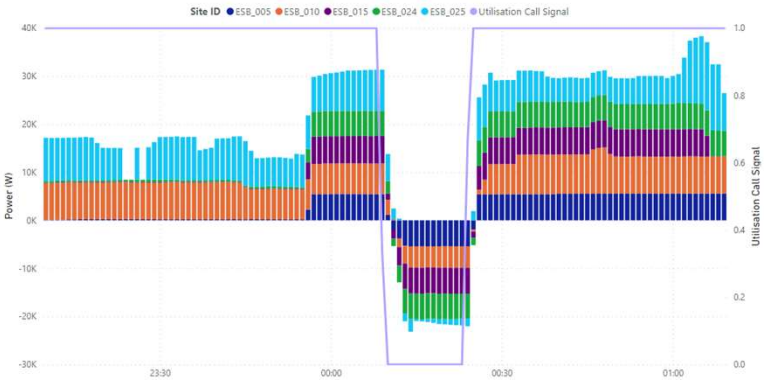
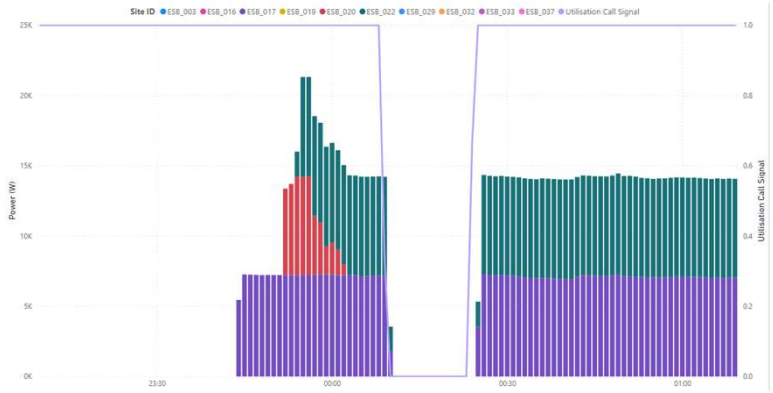




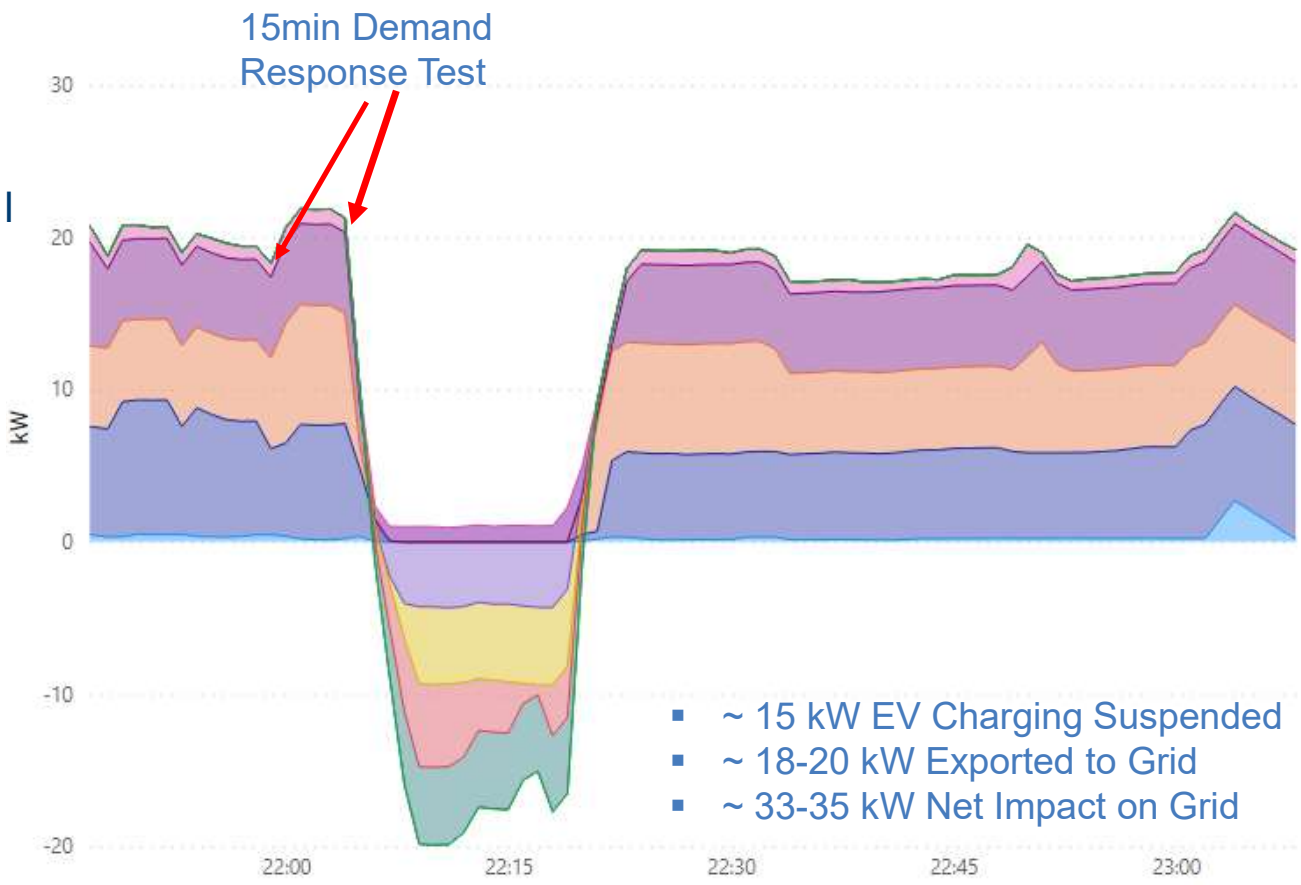
V2G



EV

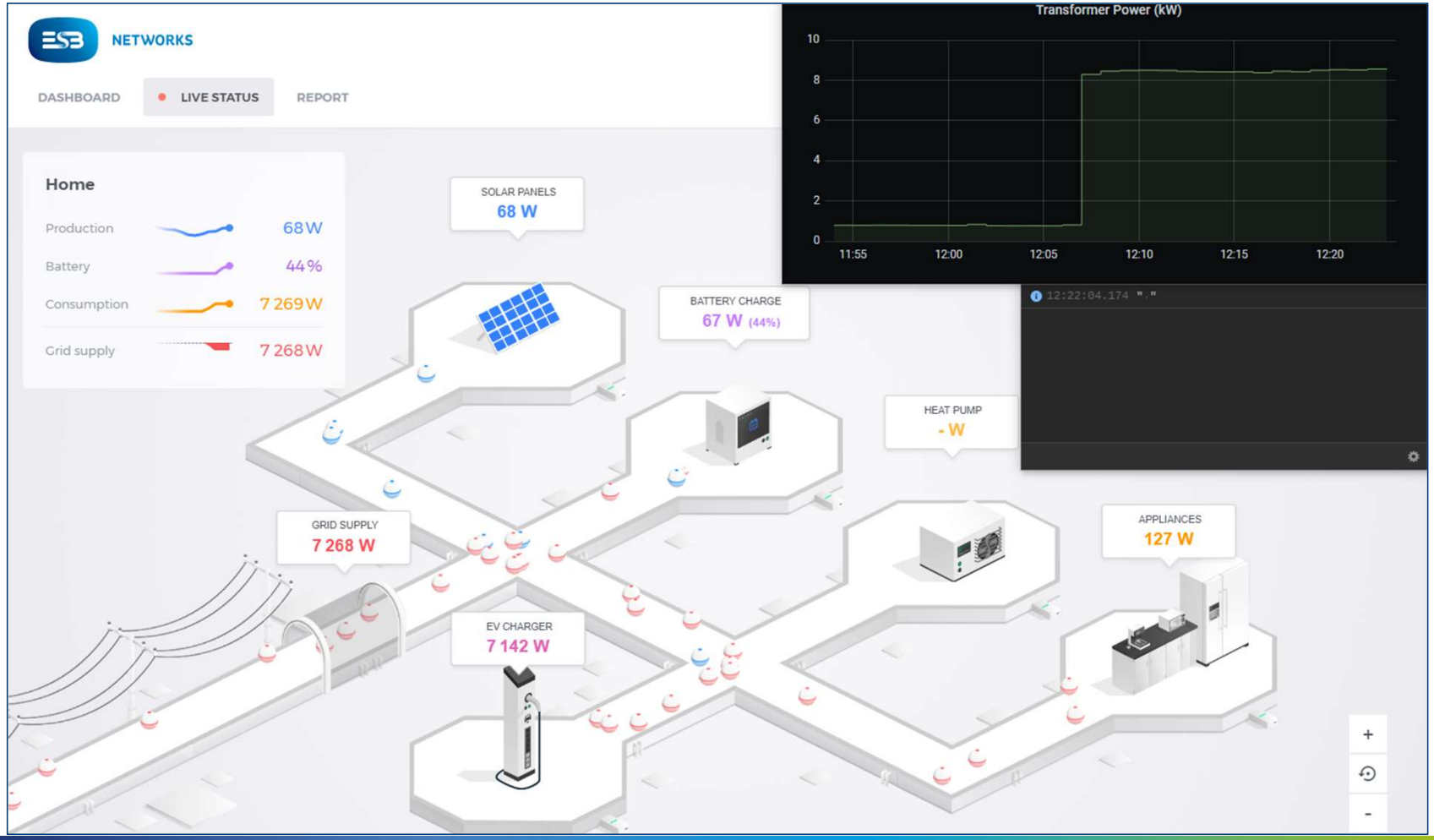
Manual Demand Response: Test 1

- 22:05
  - 15min Demand Response Command Issued
- 22:06
  - 1/5 Site – No EV Connected/Present
  - 1/5 Site – EV Connected Not Charging, Discharge Starts
  - 3/5 Sites – EV Charging Stops & Discharge Starts
- 22:10
  - All Sites Reach Max Power Discharge
- 22:10 – 22:20
  - Power export varies based on changes in household demand
- 22:21
  - Demand Response Instruction Expires, EV Charging Resumes at 3/5 Sites



- ~ 15 kW EV Charging Suspended
- ~ 18-20 kW Exported to Grid
- ~ 33-35 kW Net Impact on Grid

Manual Demand Response: Test 2

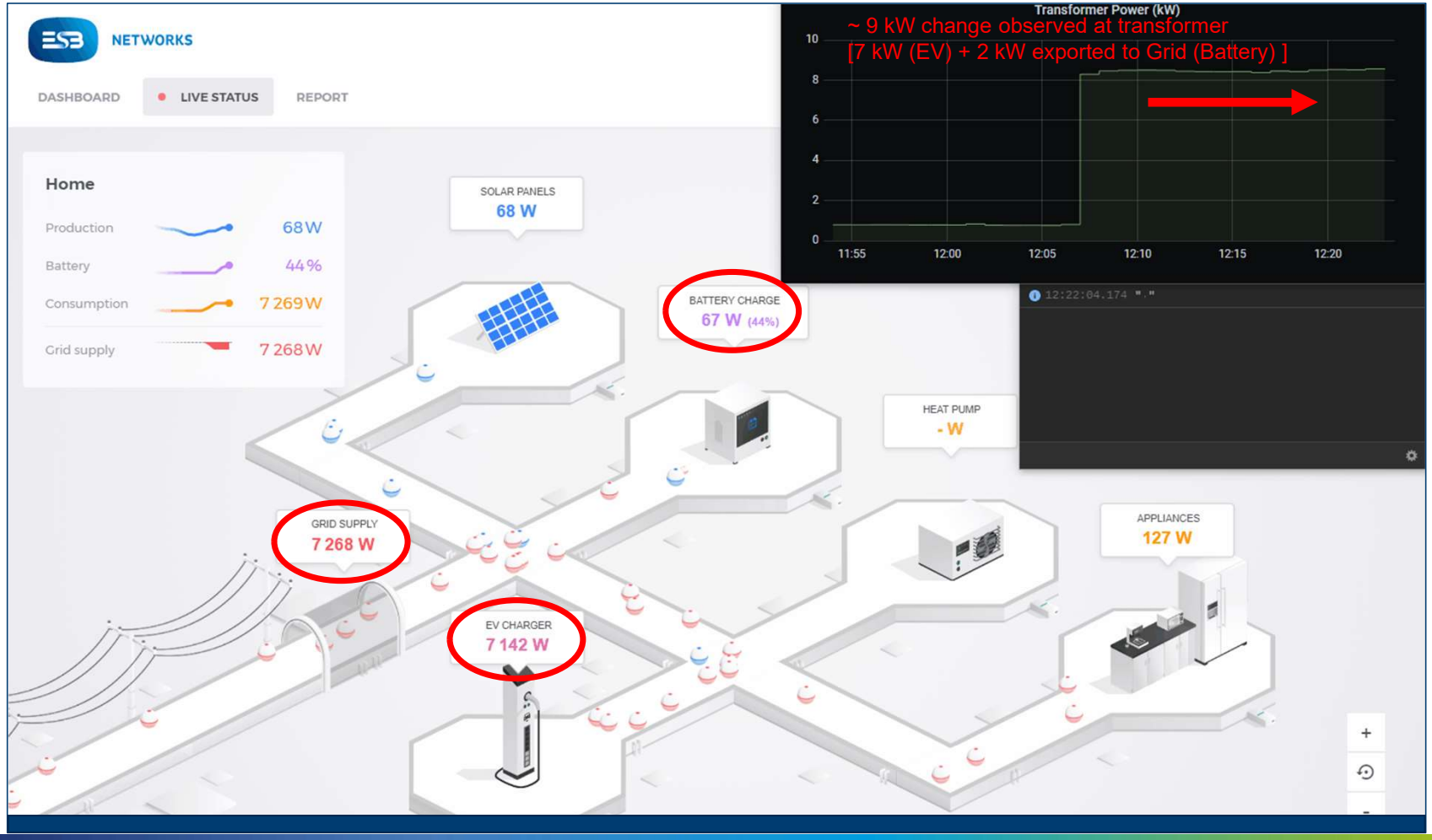


Transformer Power (kW)

Test Logging

Representation of Power Values and Flows

Manual Demand Response: Test 2



Published Project Reports

- **P2P Learnings Report**

  Link: DOC-181220-DNG

- **Active Energy Citizenship & Customer Engagement**

  Link: DOC-130622-HLZ

- **Customer Flexibility**

  Link: DOC-130622-HLY

Questions?

Thank you

Please direct any questions to me at [redacted]