

The image features a magnifying glass with a silver handle and frame, positioned over a detailed architectural site plan of a residential area. The plan shows various building footprints, streets, and parking spaces. The magnifying glass is focused on a specific area where a lush green lawn is visible, contrasting with the technical drawing. The text 'Energy Master Plan for Inishturk' is overlaid in a large, bold, black font across the center of the image.

Energy Master Plan for Inishturk

July 2023

Thanks to

- Mary Helena O'Toole, Inishturk Development Officer, Inishturk SEC;
- Mr Bernard Heaney;
- Dr Orla Nic Shuibhne, Regional Mayo SEC Mentor for the SEAI SEC programme;
- Laura Dixon. Mayo County Council Climate Action Officer;
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- St. Columba's School, Inishturk;
- The people of Inishturk who supported and participated in the energy survey and BER assessments, and data provision for the study.
- 2eva Energy Domestic BER Assessor Seán and Ivan Sproule Non-Domestic BER Assessor

Overall Aims

- An Energy Master Plan (EMP) aims to help the SEC to understand the energy demand and supply in the entire community. The EMP focusses on energy efficiency opportunities in the first instance.
- Reducing energy consumption
- Producing local energy from wind and/or PV,
- Develop an energy efficiency blueprint for existing buildings, how to best insulate and become energy independent.
- Community designs, develops and focusses its own Energy Master Plan in line with the aims of the Community SEC Charter



EMP

- Energy Use Data Collection
- Energy Saving Opportunities
- Registry of Opportunities (RoO) for energy savings and fossil fuel replacement
 - Individual Homeowners
 - SMEs
 - Community Organisations
- Collective Community Projects

Island Energy Sources

- ESB Generators
- Home Heating Oil Delivery
- Gas
- Coal
- Diesel



Energy Use Homes

7 Homes Surveyed representing cross section of ages and types

HEATING AND LIGHTING

MPRN	Total kWh	Oil Total	Oil%	Coal Total	Coal %	Electricity Total	Electricity %	Gas	Gas %
10011498615	46,207	39,449	85.4%	3,201	6.9%	3,557	7.7%	0	0.0%
10011498630	63,930	56,260	88.0%	6,577	10.3%	1,093	1.7%	0	0.0%
10019838121	24,628	21,165	85.9%	2,445	9.9%	1,018	4.1%	0	0.0%
10011498473	39,275	35,289	89.9%	3,986	10.1%	0	0.0%	0	0.0%
10011498672	27,704	22,853	82.5%	3,308	11.9%	1,543	5.6%	0	0.0%
10011498656	46,740	32,541	69.6%	0	0.0%	3,568	7.6%	10,631	22.7%
10011498455	79,198	0	0.0%	75,643	95.5%	3,555	4.5%	0	0.0%
Total	327,682	207,557	63.3%	95,160	29.0%	14,334	4.4%	10,631	3.2%

Energy Use Homes Baseline Approach

28 dwellings on Inishturk, 7 are holiday homes

21 permanently occupied homes.

Our energy audit survey examined 33%.

Inishturk comprises only *part* of a CSO Small Area with Clare Island as the remainder.

No disaggregated CSO or SEAI BER data available for Inishturk

Statistical workaround required.

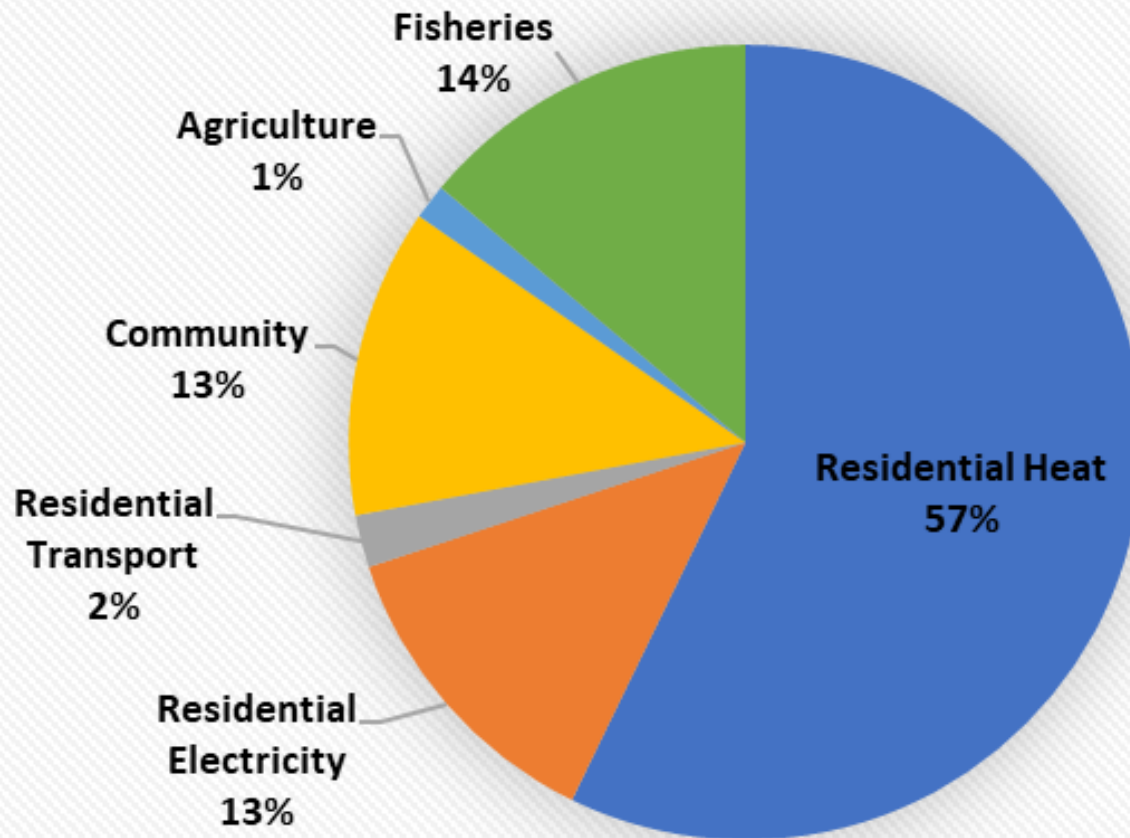
We balanced the survey data with the existing Small Area data. The number of homes not in the survey was 14. We applied an assumed BER for these homes based on the SEAI SA data and then combined these estimates with the known BERs for the survey

Energy Use Data Collection Homes

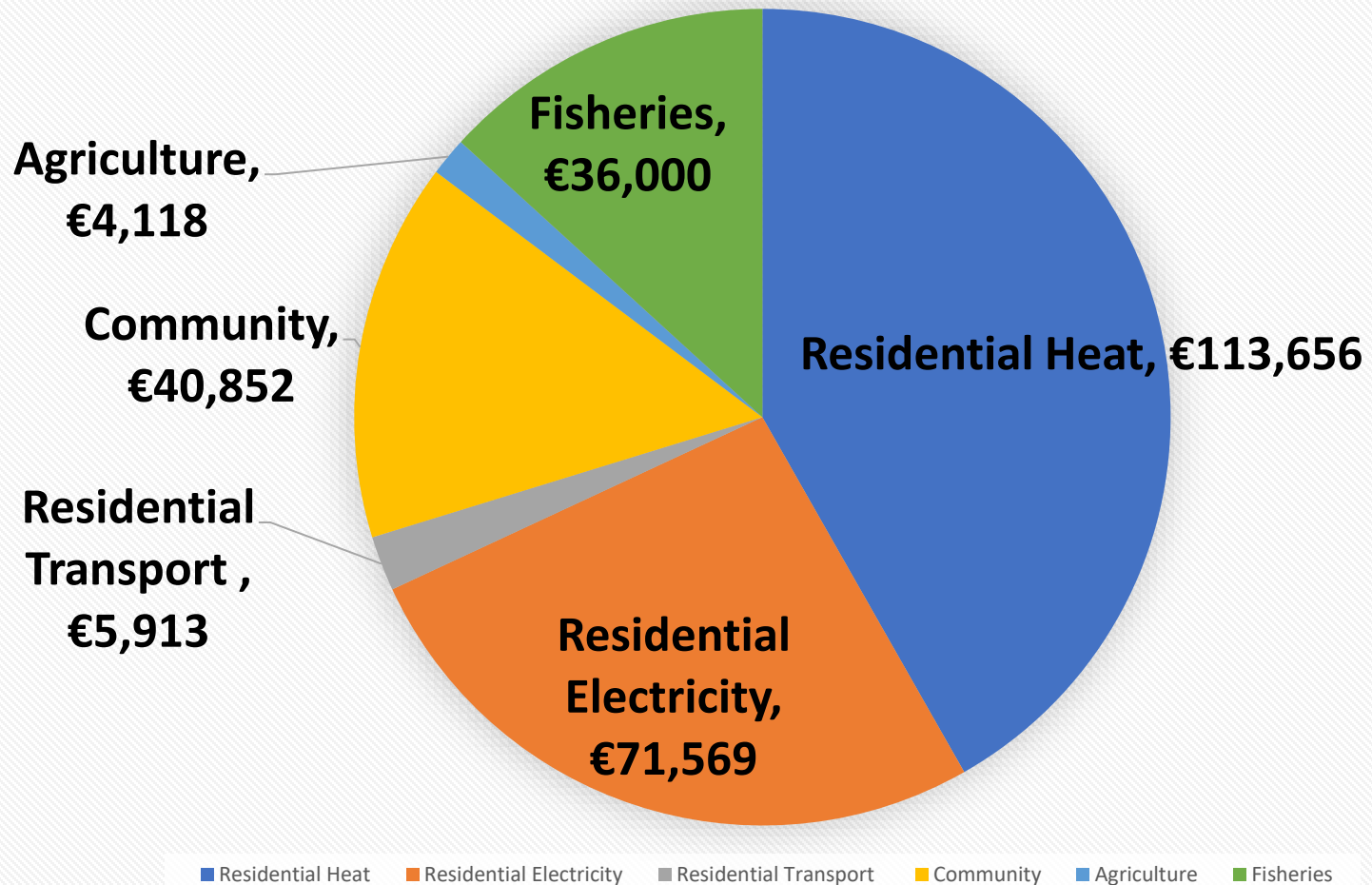
Energy Source	Cost per kWh	Percentage Energy Use	kwh from total island use	Cost	kg CO2/yr
Home Heating Oil	€0.139	51.31%	579,657	€80,572.30	148,972
Coal	€0.099	23.52%	265,759	€26,394.91	90,518
Gas	€0.225	2.63%	29,690	€6,688.71	6,808
Electricity	€0.281	22.54%	254,693	€71,568.79	165,041
Total		100.00%	1,129,799	€185,224.71	411,338

29,381 Trees

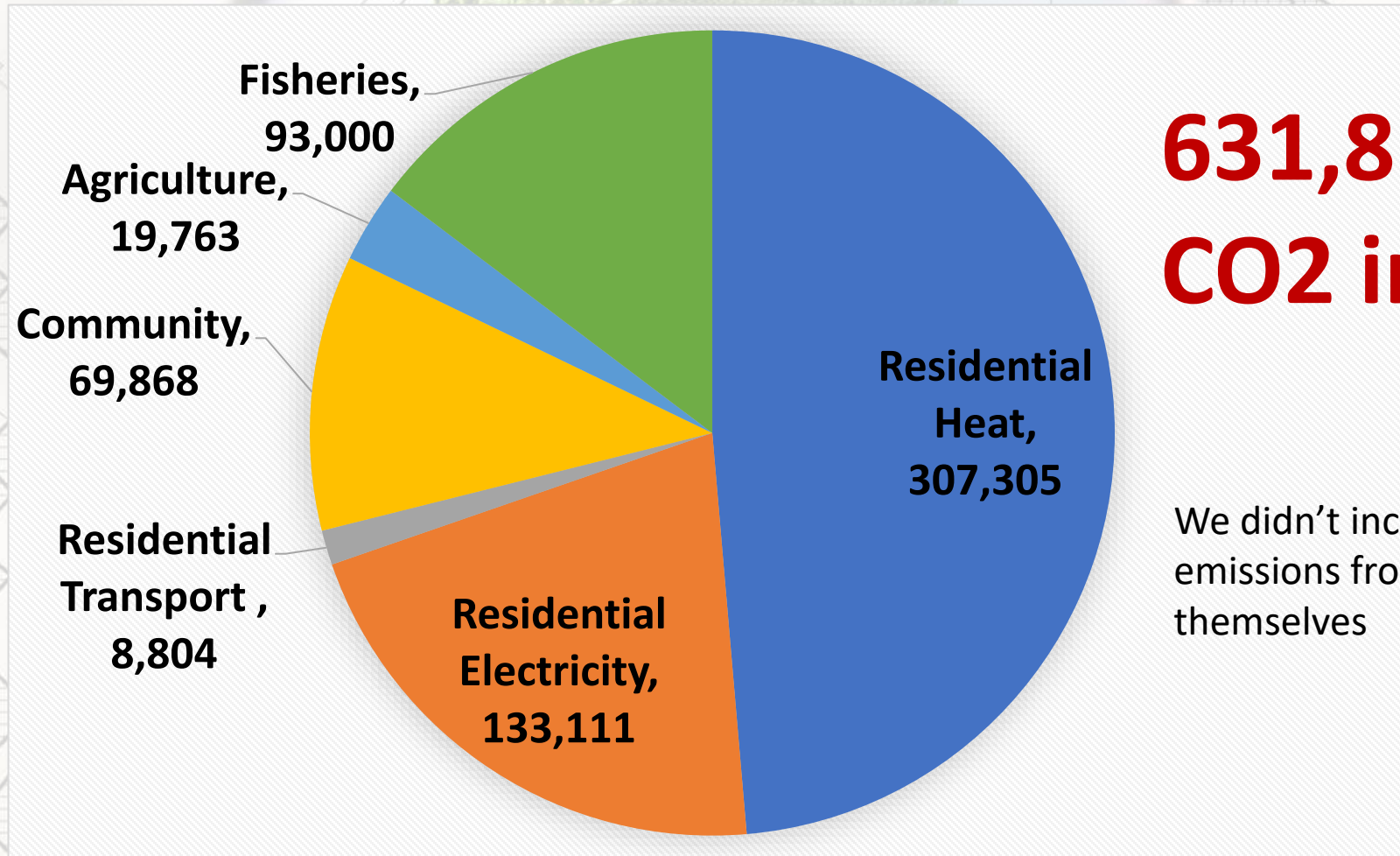
Inishturk Energy Balance



Inishturk Energy Balance Cost



Inishturk Energy kg CO2




**631,850 kg
CO2 in total**

We didn't include the 30,000 kg emissions from the sheep themselves

Total CO2 Emissions

631,850 kg CO2 in total



1 Mature
Coniferous
Tree Absorbs
14 kg of CO2
in a year



631,850 kg CO2
requires

45,132 trees to
absorb

Ní neart go cur le chéile



Individual behaviour creates the foundation for action in social, economic, and environmental sustainability, and potentially guides our ability to work with one another to make life-affirming decisions. In short, it is a matter of aligning our day-to-day behaviours with our well-stated values that will result in greater sustainable community action.

Direct Behaviour Measures

Cost reduction measures:

Change your energy provider

Consume less electricity and bottled gas, and more oil to heat your home and water

Home Improvement Measures:

Track down and eliminate draughts: check windows, external doors, vents, floor spaces, fireplaces, and stoves.

Check insulation levels in attic, basement, walls (including the meter box), and floor spaces.

Check your boiler and stove

Direct Behaviour Measures

Energy Reduction Measures:

Switch to more efficient appliances and lower temperature settings

Don't use standby on devices and turn off lights when possible.

Home Energy Upgrades

'Fabric First': Upgrade Building before installing new plant

**Insulate - Air Tightness
& Insulate - Air Tightness**



Energy Upgrades

Sample Home: Single storey 1940's bungalow - Detached Dwelling



Leetherm Case Study
Cashel

NOT THE INISHTURK HOME SURVEYED

CURRENT BER	G
Energy 'Efficiency' (kWh/m ² /yr)	527.34
CO ₂ kg/yr	20,854
Heat Loss Indicator (lower the better)	4.97
<u>Energy Cost yr</u>	<u>€11,279.44</u>

Energy Upgrades



Before

Leetherm Case Study
Cashel
NOT THE INISHTURK HOME SURVEYED

Attic	Upgrade Insulation to 300mm+	F
Roof Insulation	Upgrade Attic Insulation to > 300mm	E2
Internal Insulation	92.5mm PIR Insulated Plasterboard internally on original stone walls	E1
External Insulation	Insulated Block	D1
Change Single Glazed Windows	Install Controlled Ventilation System	D1
Secondary Heating System	Remove Range Cooker & Draught Stripping attic hatch	D1
Savings	€4,560.18/yr	D1

Energy Upgrades



Leetherm Case Study
Cashel

NOT THE INISHTURK HOME SURVEYED

Heating	Install Air to Water Heat Pump for heating and hot water (zoned full time & temperature controls)	B1
Electrical	Add 6 PV Panels to South facing roof 2.19 Kwp (assuming 365 watts per panel)	A2
Total Cost Savings	€7,570.07	
Total Carbon Savings	15,000 kgs	1077 Trees
Est Cost (nett grant)	~€40,000-50,000	
Est Payback	7yrs	

Energy Upgrades Samples

- Available at energyco-ops.ie/resources/energy-audits-10-examples-from-galway-county/
- Inishturk homeowners have their own Upgrade reports

Energy Upgrades

Current BER	Total Current Average Energy Use kWh/y	Emissions kgCO2/y	Current Energy Costs €/y	Potential Cost Savings €/y	Potential Emissions Savings kgCO2/y
G-F	261,339	124,513	€52,645.20	€48,982.73	120,233
E1-E2	108,514	51,701	€21,859.60	€19,906.28	49,418
D2-C3	433,705	206,637	€87,367.56	€76,135.98	193,510
C2-B3	110,273	52,539	€22,213.81	€17,696.76	47,260
Total	913,831	435,390	€184,086.17	€162,721.75	410,421

Average cost for energy (€/m²) for all homes post retrofit at €6.08/m². We applied this value to the total areas of the homes for each BER type.

The average CO₂/m² for the upgraded homes on Inishturk was 7.1kg Co₂/m²/yr. We applied this value to the total areas of the homes for each BER type.

That's nearly 30,000 conifers

Cost saving approach to retrofits needed

Retrofitting the homes on an individual basis may be problematic

Contractor specialist may not be very quick to tender for an individual home upgrade on Inishturk given its logistical challenges

We recommend grouped or batched applications.

Transport Efficiencies

Active Travel Inishturk

The terrain on the island is rugged and elevated. Cycling is challenging. However, electric bikes have been trialled elsewhere (see Rathlin Island) where conditions are similar.

A trial of electric bikes may be valuable in bringing about a reduction in the level of car use.

SEC committee reach out to the local authority and tourist bicycle hire companies for a six-month trial scheme that would be cost effective as a proof (or disproof) of concept.

The Rathlin Island project was directed at tourist use, but the island is similar in its geography (although bigger – Rathlin has 12km of road network, Inishturk 5km)

Second hand or end of season cycles would be cost effective. Many companies change their stock frequently.

Transport Emissions - cars

- The specifics of the vehicles on Inishturk means that a focussed solution must be proposed.
- For smaller diesel saloon type cars (approximately 50% of the fleet), there are clear BEV alternatives.
- Distances driven are very short, second-hand options are available. While these will not qualify for grant assistance, at much lower costs than new cars, they will be still cost effective.

Transport Emissions - cars

- For SUV-type rough road vehicles, these are not yet widely available on the second-hand market. Their adoption will be pushed to the end of the 2030 strategy period.
- Switch from Diesel to HVO on trial basis using percentage of current SUV fleet

What is HVO?

- Hydrotreated Vegetable Oil (HVO)
- Renewable diesel fuel produced by hydro-treating vegetable oil.
- High-quality, lower-emission fuel that can be used as a direct replacement for fossil diesel in diesel engines.
- HVO can be stored and used longer than diesel.
- Approximately 40% of diesel emissions

lassoil

Inverenergy

Certa Ireland

Euro Oil

Should be seen as a stop gap towards Electric SUVs



Circle K using milesBIO HVO100

Transport Emissions - cars

- For SUV-type rough road vehicles, these are not yet widely available on the second-hand market. Their adoption will be pushed to the end of the 2030 strategy period.
- Diesel to HVO.
- While more expensive than diesel produces far fewer emissions and as it is an organic product has a very low carbon intensity.
- Cost of switching fuels could be minimised by a collective arrangement between drivers and mainland HVO supplier.

Micro PV

A 2kWp solar PV system would require 7 or 8 solar panels on your roof (about 15m²)

In the SEC area, 2kWp installed south facing will generate approximately 1848 kWh of electricity per annum.

If a consumer pays €0.28 per kWh to their electricity provider, a 2kWp PV panel (if half the energy is consumed by the home-owner) will save the homeowner **€258.72 per year**.

With a €0.21 payment for each kWh (**€194.04**) sold to the grid by the homeowner reclaimable from your energy provider

There are grants up to a maximum of €2,400 through the SEAI

Payback would be: €6,000 Cost - €2,400 (grant)

= 7.9 years

€258.72 savings + €124.74 rebate

Community Sector

Action	Energy saving per yr (€)	Emissions reduction per yr (t CO ₂ e)	Cost of action (€)	Payback period (years)	First step
Install heat pump	€ 1,325	2.68	€ 12,000	9.06	Own funds a will not qualify for grant
Timers on bottle beer/drinks cabinets	€ 60	0.06	€ 70	1.17	Communities grant application
Building Fabric Upgrades	€ 1,422	2.49		Long	Communities grant application
Heating Controls on space heating	€ 829	1.69	€ 70	0.08	Communities grant application
Lighting upgrades	€ 328	0.33	€ 1,800	5.48	Communities grant application
Occupancy sensors in toilets and stores	€ 141	0.14	€ 500	3.55	Communities grant application
Energy Monitoring and Staff Engagement	€ 2,339	3.77	€ 5,000	2.14	Communities grant application
Total	€ 6,444	11.16	€ 19,440		



Community Sector



Fisheries Opportunities

Overall, the seafood sector in general can be considered a low-carbon industry and food source,

BIM suggests the drive to decarbonise the Irish seafood sector will intensify. The main contributors towards emission reductions will be:

- (i) international obligations to achieve Net Zero emissions by 2050,
- (ii) maintaining ecosystem biodiversity and sustainability,
- (iii) consumer demand for low-carbon products, and
- (iv) increasing fuel costs

Fisheries Opportunity

Zero emission BE Vessels (powered by electricity) or FCE V (powered by Hydrogen) not ready yet.

Short-term options we can recommend here.

Biodiesel has moderate carbon emissions and is a reduction for Inishturk fishing boats as an additive to diesel.

HVO has been seen as a 100% drop-in option for some boats : it requires no engine modifications and is seen as achieving a >40% level of carbon emissions.

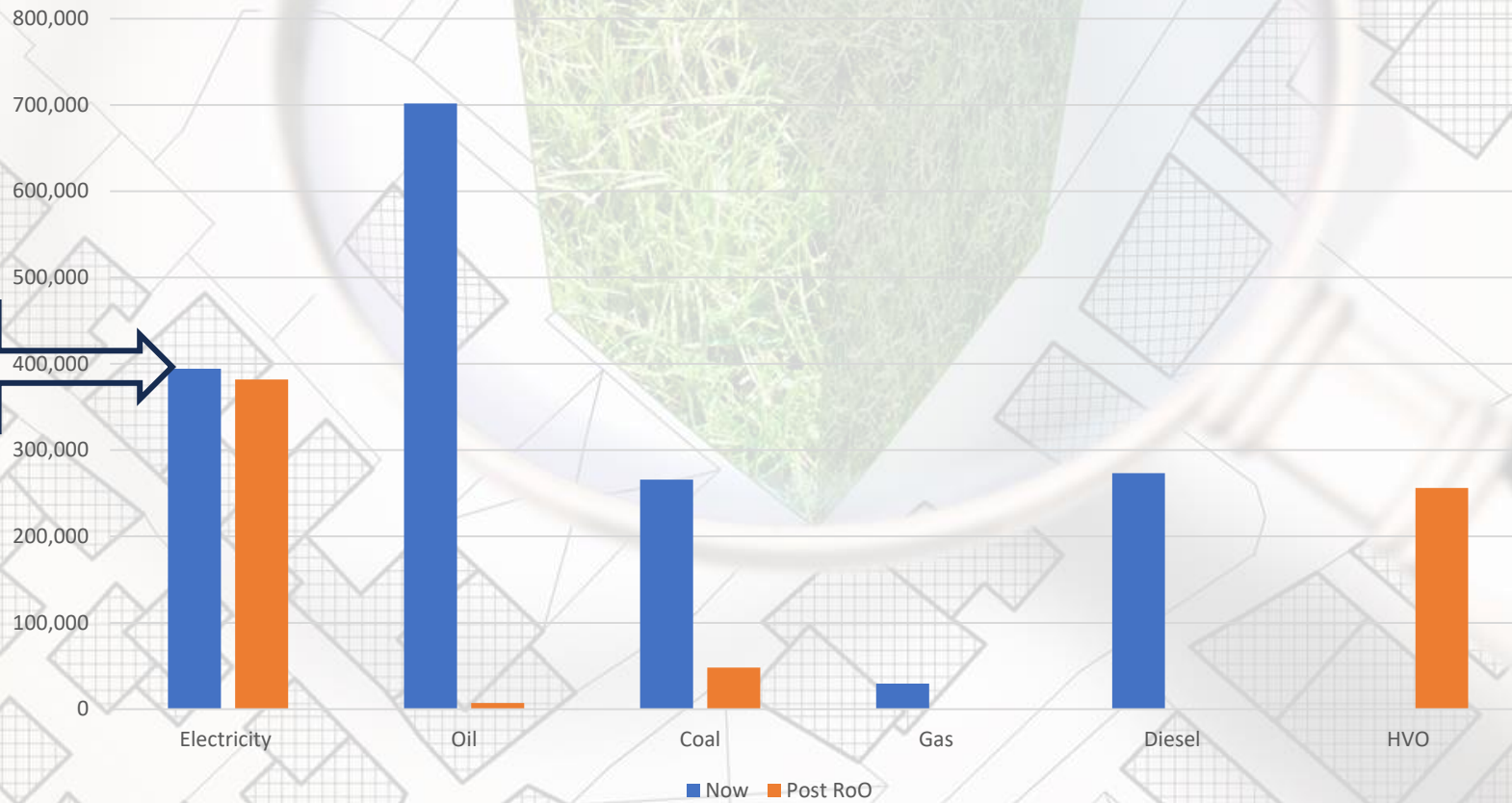
It is sold in Ireland.

engage with current suppliers as intermediaries with HVO suppliers

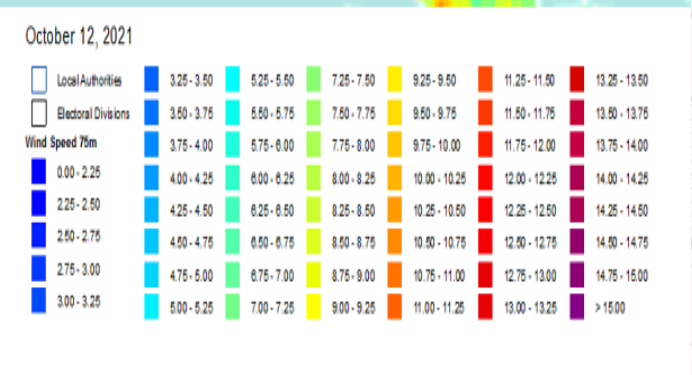
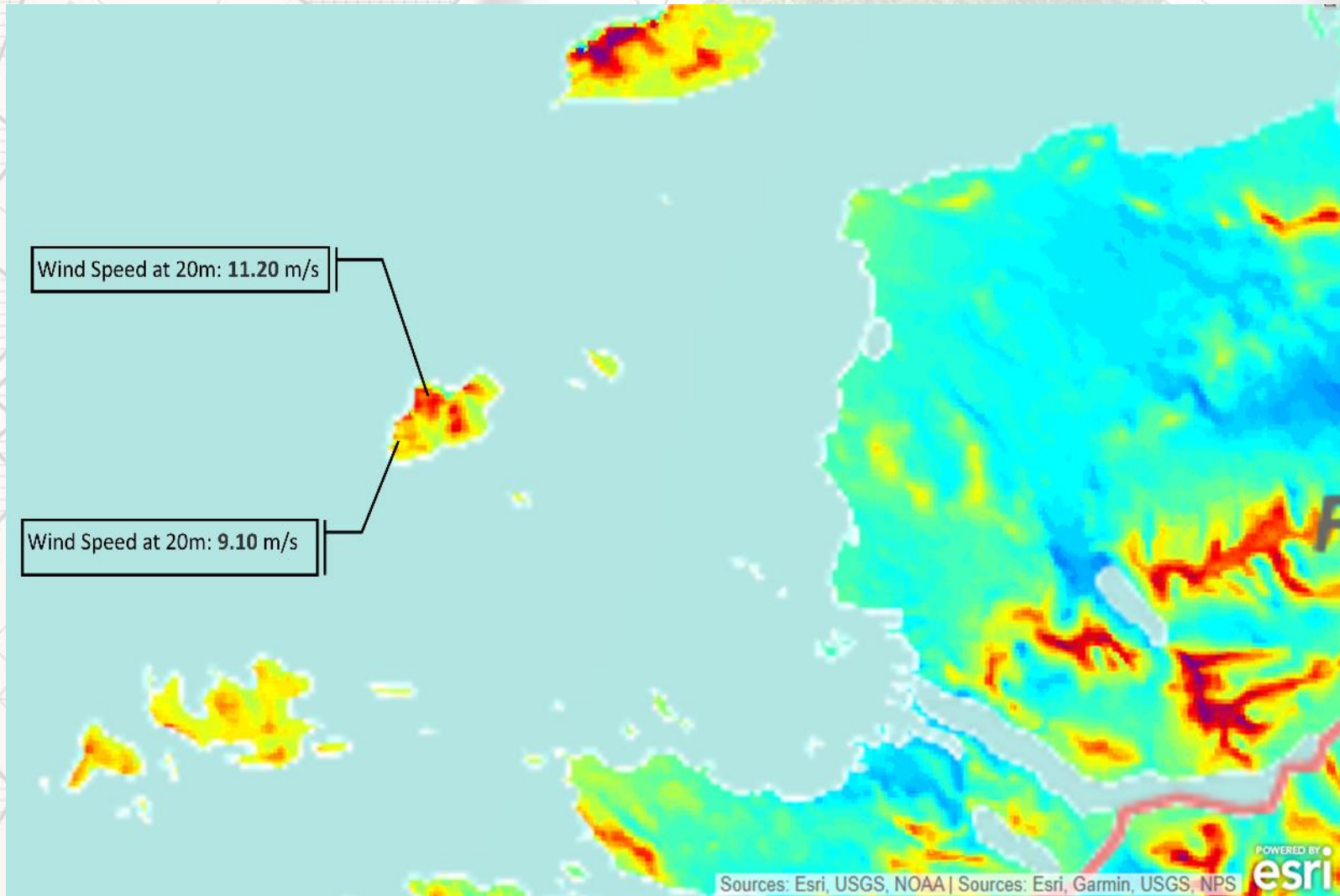


Energy consumption post works

HP will use up additional PV



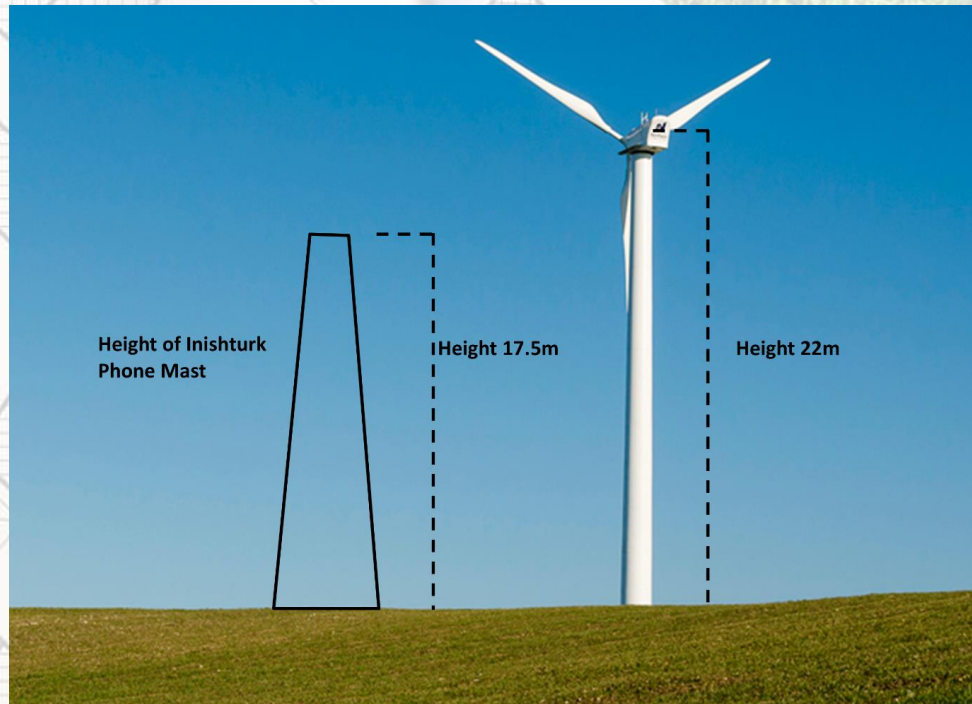
Energy Generation: Wind



Community Level Energy Generation: Wind

100kW turbine on Inishturk (average wind speed of 9-11 m/s) would produce approximately 350,000 kWh/yr.

It could provide electricity at much lower price than diesel LCOE of less than €0.192/kWh



No off-island grid connection

Would require partnership with ESB

ESB are looking at EVs as backup storage for grid.

Not in County Plan

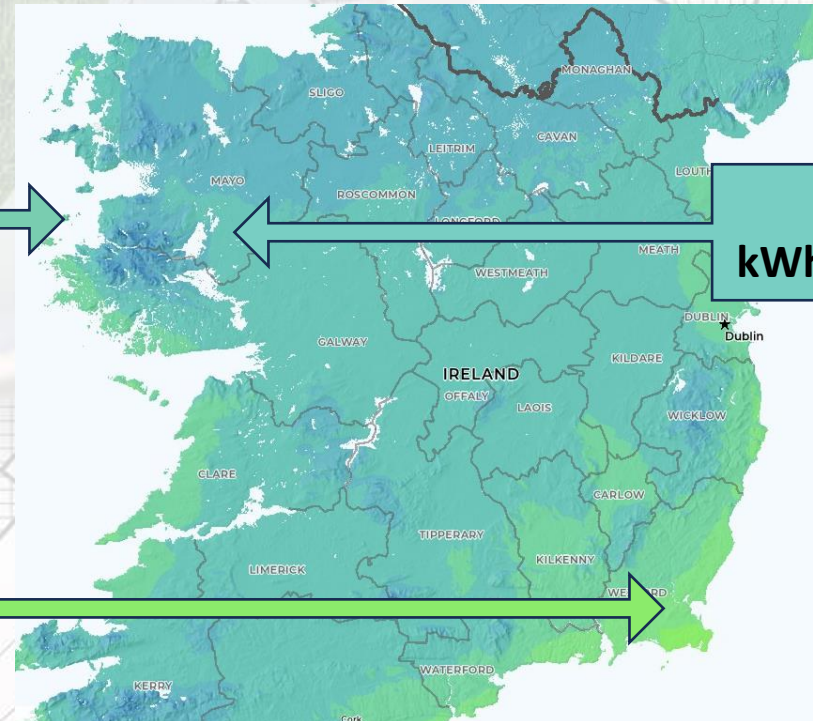
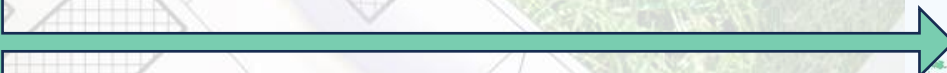
Communications mast passed with community support

Community Level Energy Generation: PV

Solar PV = electricity produced from solar panels

Resource in Inishturk is reasonably good

914
kWh/kWp/yr



894
kWh/m2/yr

1096
kWh/kWp/yr



Community Level Energy Generation: PV

Solar PV = electricity produced from solar panels

Resource in Inishturk is reasonably good

500 kW power solar PV farm at a suitable site on Inishturk would produce 457,000 kWk/yr. (100% of predicted electricity demand post work)

A 500kW installation would need about 1 hectare of even south facing land not over-exposed to the elements

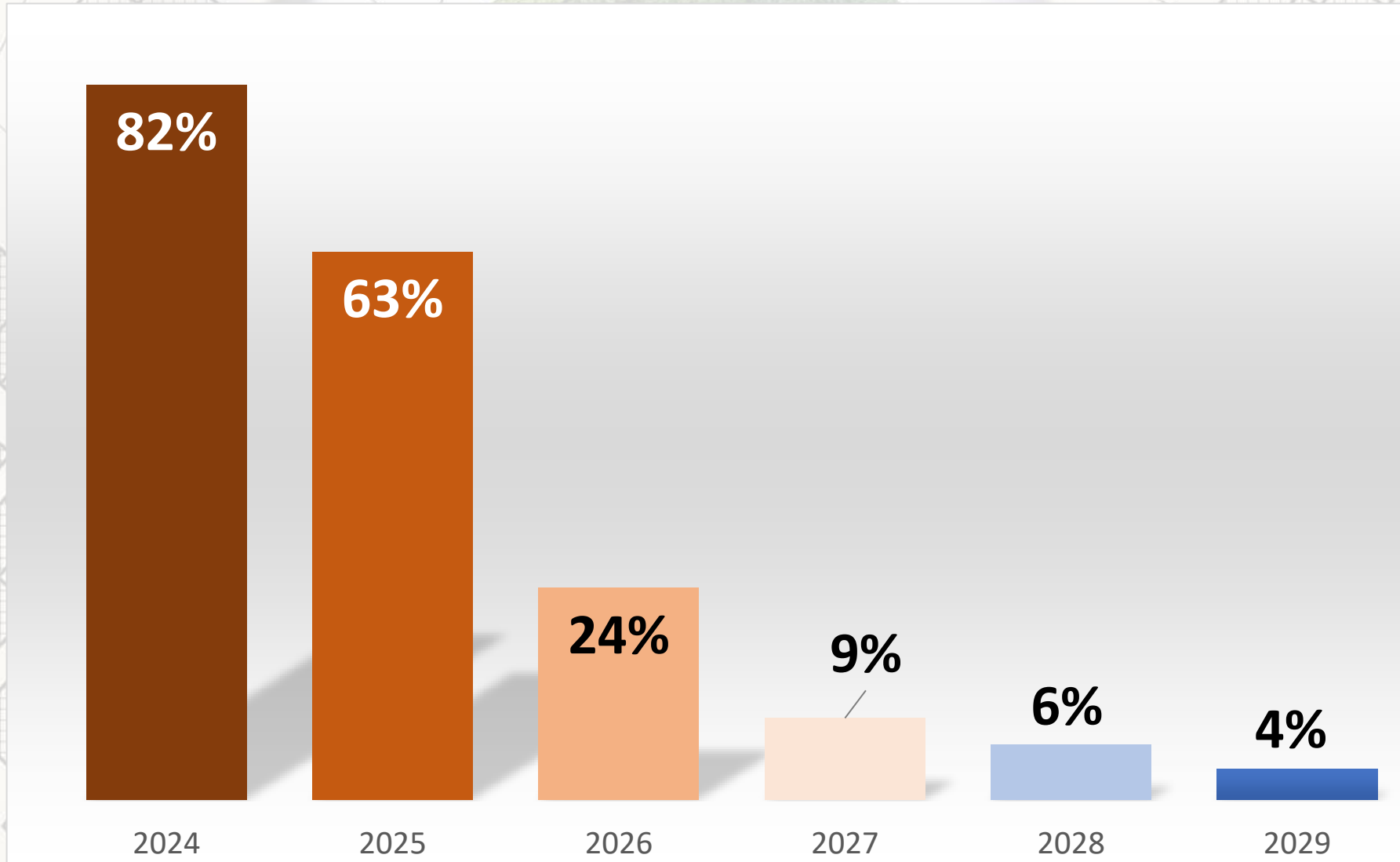
LCOE approximately €0.154/kWh

Again, ESNB would have to be involved

Strategy 2024-2029

		Emissions Reductions Each Year in kg Co2						
	Action	2024	2025	2026	2027	2028	2029	TOTAL
1.1	Retrofit 25% of G-C3 homes each year	76,826	76,826	76,826	76,826			307,305
1.2	2 Community Buildings upgraded each year achieving >50% energy reduction overall	41,611	28,257					69,868
2	5 homes with 2kWp installations with 5 additional homes recruited each year until a maximum of 21	2,722	2,722	2,722	2,722	544		11,431
3	Community/ESB/Mayo Co Co Partnership 100kW-500kW electricity generation project			130,312				130,312
4	20% replacement of Diesel saloon cars with BEVs annually n=3	880	880	880	880	880		4,402
5	Replacement of Diesel by HVO in 20% of the SUV fleet n=3	352	352	352	352	352		1,761
6	Replacement of Diesel by HVO in 20% boats per year		18,600	18,600	18,600	18,600	18,600	93,000
	Total Emissions Reduction	122,391	127,637	229,692	99,380	20,377	18,600	618,079

Strategy 2024-2029 CO2 emissions decline





Many Thanks

All documents at:

<https://www.energyco-ops.ie/inishturk-emp>

Contact

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