IHER Energy Services Ltd

Athboy SEC

Energy Master Plan (EMP)

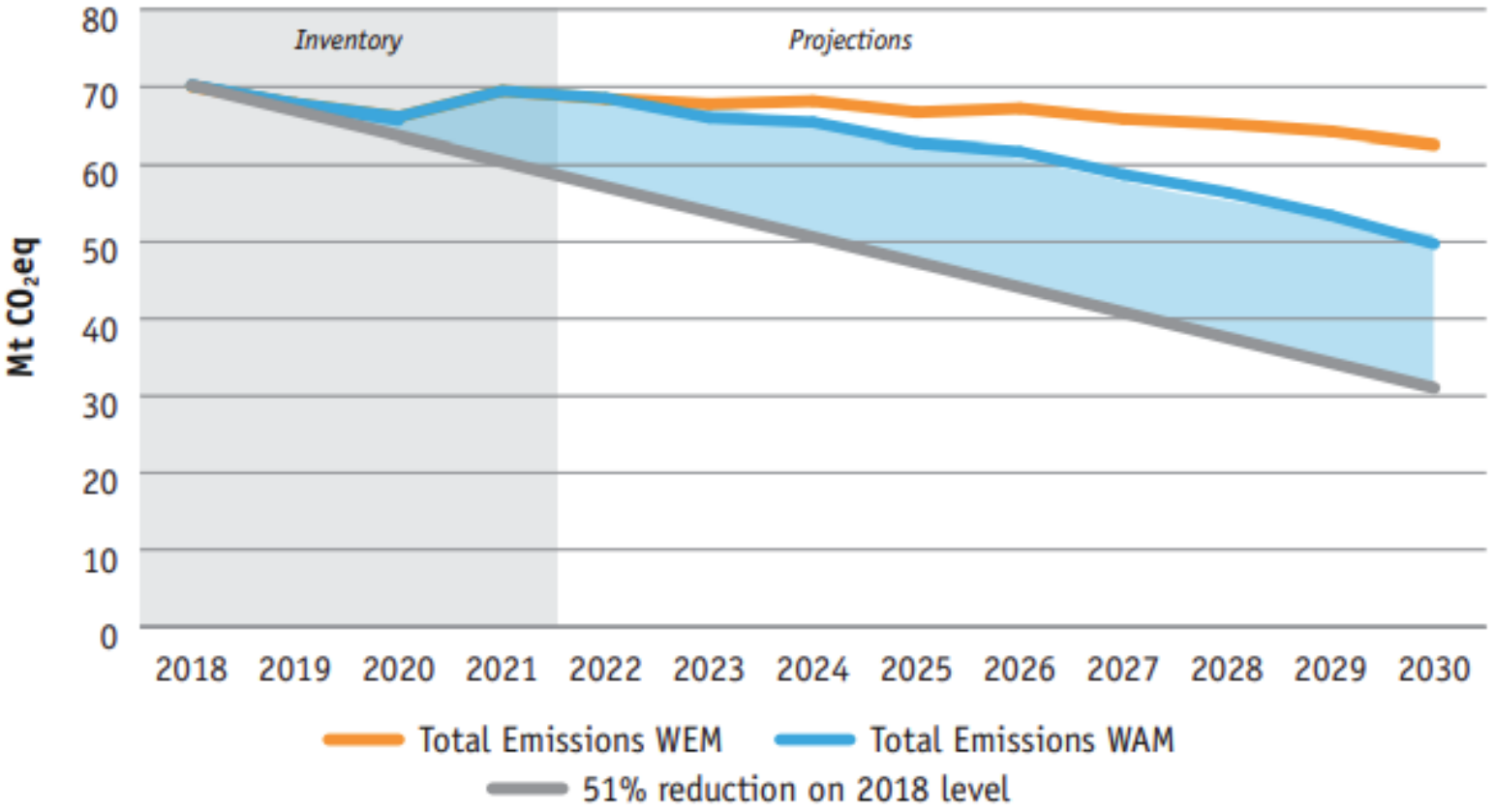
23rd November 2024

- **Michael Hanratty, Keer Xu & Jose Ramirez**
- **IHER Energy Services Ltd.**
- ***michael@iher.ie***

BERWoW

Total Greenhouse Gas Emissions With Existing Measures (WEM) and With Additional Measures (WAM) scenarios out to the year 2030

Ireland's Climate Action Plan set target of 51% reduction in Greenhouse Gas Emissions by 2030 from 2018 baseline



Gap exists between (With Additional Measures scenario) projections and the 51% target.

Source: Ireland's greenhouse gas emissions projections 2022-2040 (EPA, 2023**)**

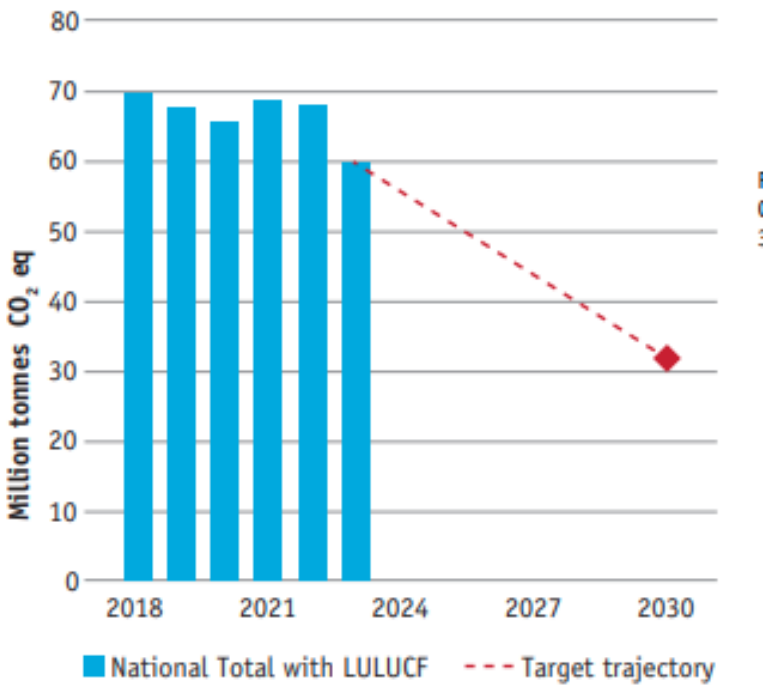
IHER Energy Services Ltd

Progress from 2018 - 2023

Table 2. Sectoral Emissions reduction targets and progress

Sector	2018 (Mt CO_2eq)	2023 (Mt CO_2eq)	% change 2018-2023
Electricity	10.24	7.56	-26.2%
Transport	12.31	11.79	-4.2%
Buildings (Residential)	7.00	5.35	-23.6%
Buildings (Commercial and Public)	1.55	1.41	-8.9%
Industry	6.95	6.29	-9.6%
Agriculture	21.39	20.78	-2.9%
Other	2.14	1.83	-14.6%
LULUCF	4.19	5.61	34.1%
National Total (incl LULUCF)	**65.77**	**60.62**	**-7.8%**

Figure 3. Climate Act Target and Carbon Budgets



By end of 2023, a 7.8% reduction had been achieved from the 2018 baseline.
So, a big gap must be bridged by 2030.
(Source: EPA-Provisional GHG Report-July 2024**)**

LULUCF: land use, land use change, and forestry

IHER Energy Services Ltd

Athboy EMP Study Objective

The Government's **Climate Action Plan** (2024) CAP 2024 re-establishes the target to achieve a **51% reduction in (GHG)** emissions by **2030** from the 2018 baseline.

Athboy EMP presents a local energy model and local emissions reduction target & plan.

Baseline Study

- current energy demand across residential, commercial, public buildings and transport

Energy Audits

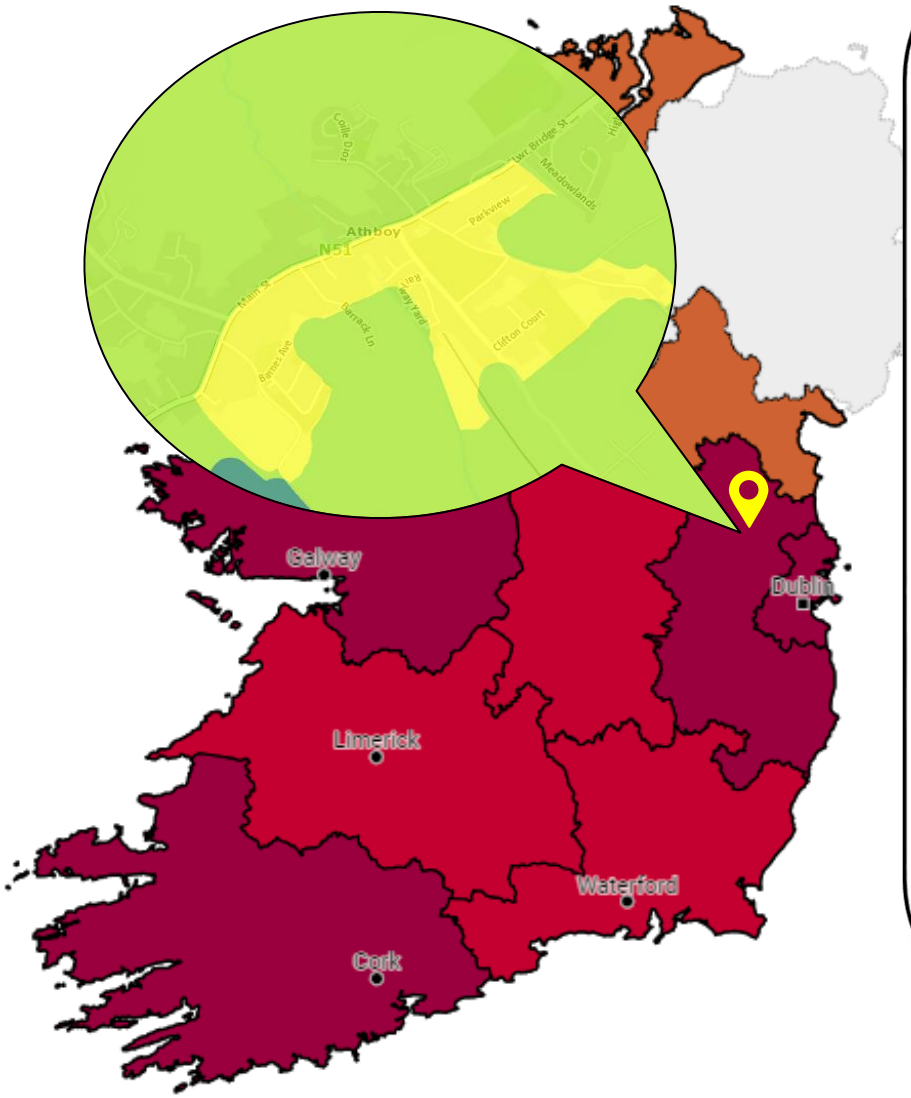
- 2 public buildings and 5 house types

2030 EMP

- Targets and Roadmap

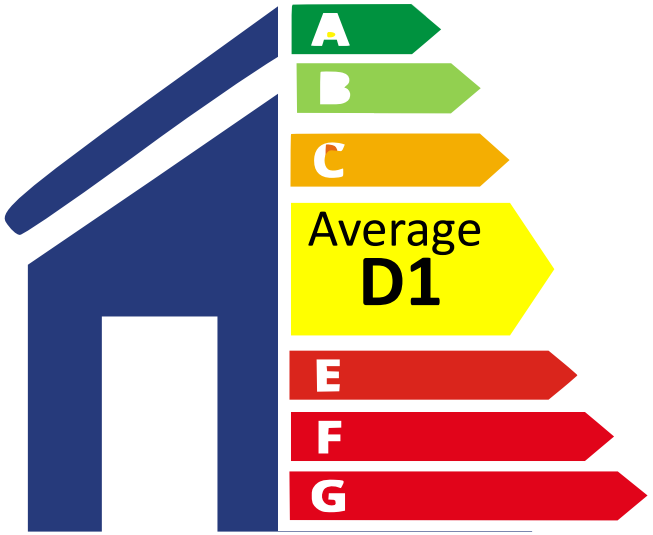
IHER Energy Services Ltd

Residential Emissions



Athboy

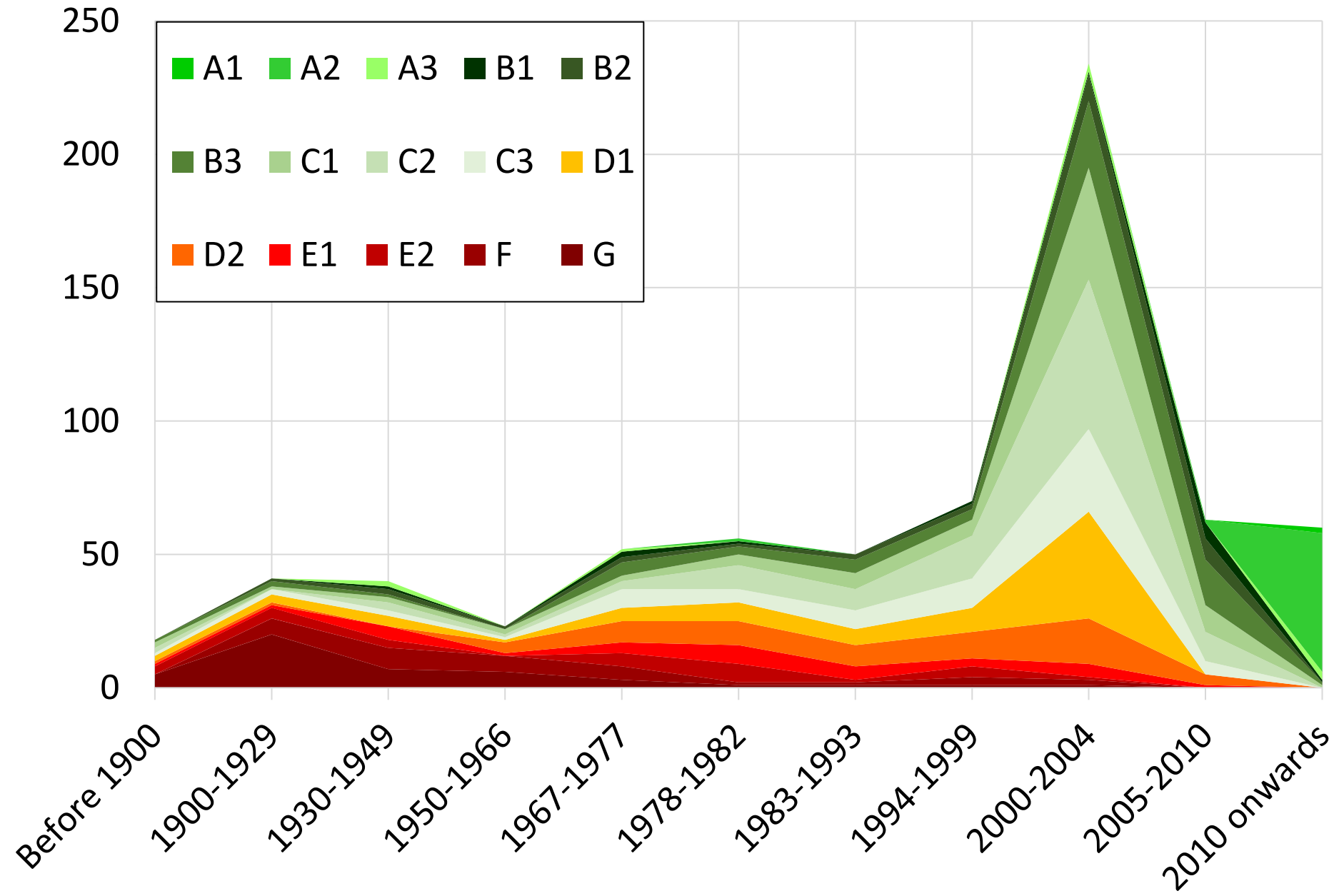
- 1965 dwellings & 36% (707) have BERs
- Over half are built from **1994 onwards**
- Average BER is **D1**



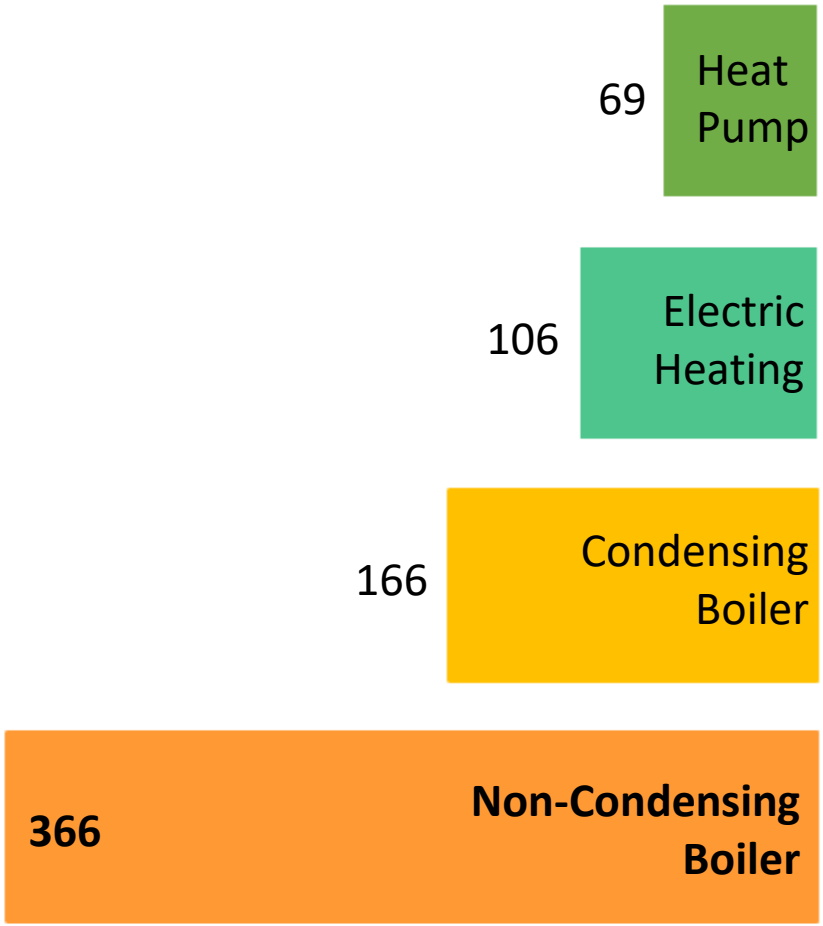
(Climate Opinion Maps, 2023)

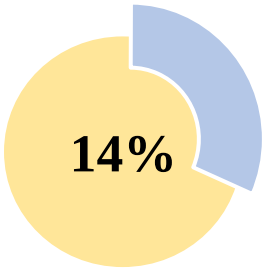
IHER Energy Services Ltd

Residential Baseline – Total Stock BER Scores

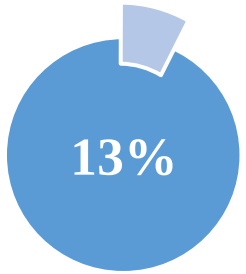


Residential Baseline – Residential Main Heating

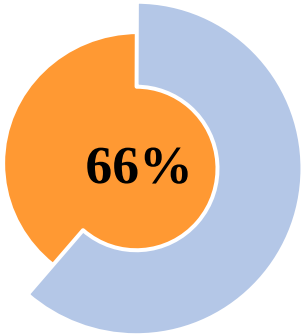




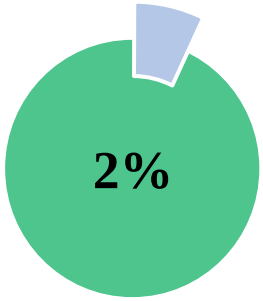
Electricity



Solid Fuels



Heating Oil



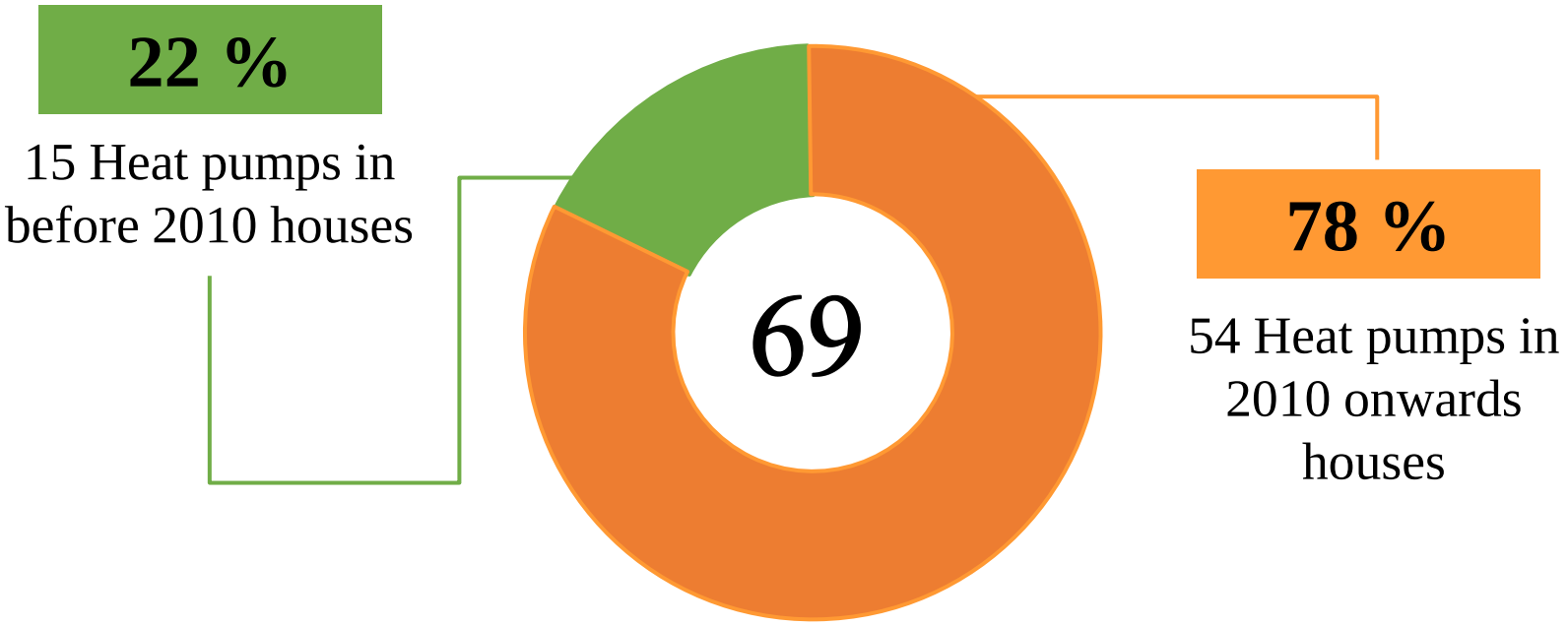
LPG

(BER Database, 2023)

(Census, 2022, other 5%)

IHER Energy Services Ltd

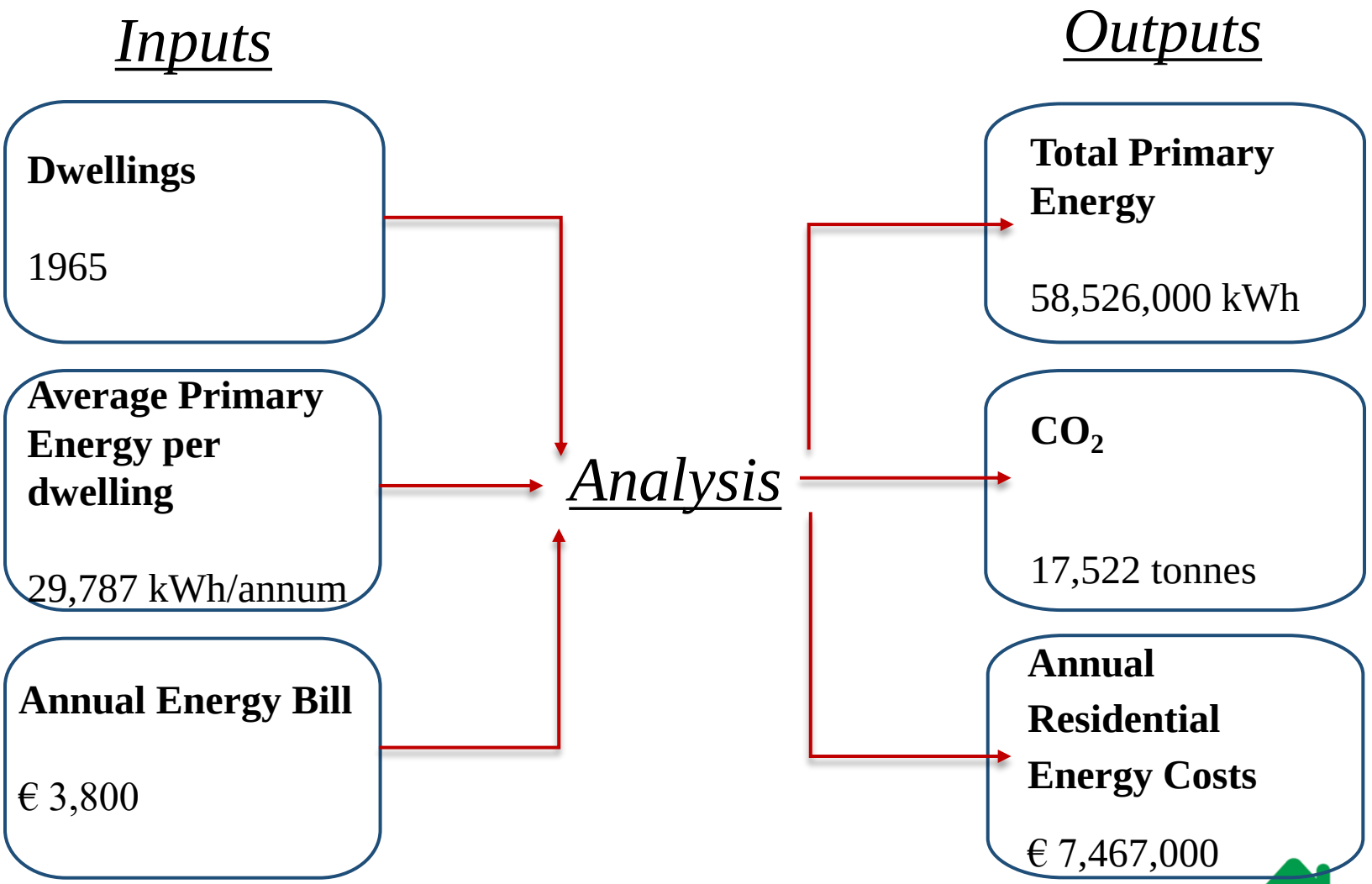
Residential Baseline – Heat Pump



Approx. 250 dwellings with BERs are "heat pump ready" (HLI below 2.3).

IHER Energy Services Ltd

Residential Baseline Results



IHER Energy Services Ltd

Commercial / Public Buildings Baseline Results

Inputs

66 Small businesses
4 Medium businesses
3 energy audits of business premises
(Ecological Building Systems, Darnley Lodge, Athboy EMTB)

Energy bills from audits & SEAI annual estimates

Analysis

Outputs

Total Primary Energy

82,166,000 kWh

CO_2

24,500 tonnes

Annual Business Energy Costs

€ 2,150,000

IHER Energy Services Ltd

Transport Baseline Results

Inputs

Car Split (Dept of Transport- 2022):
741 Petrol
1,168 Diesel
161 BEVs
2,070 Total

National Annual Average

12,113 km Petrol
19,681 km Diesel
12,958 km BEVs

Analysis

Outputs

Total Primary Energy

23,435,000 kWh

CO_2

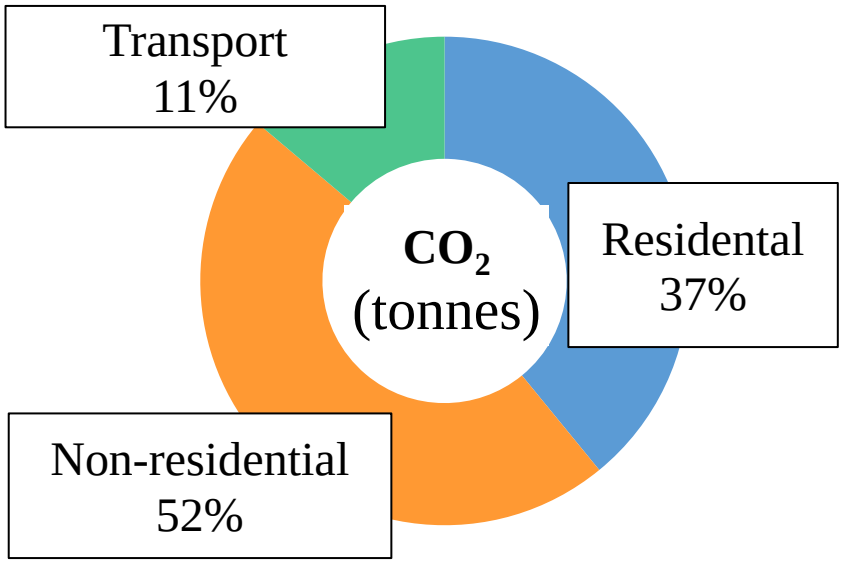
5,470 tonnes

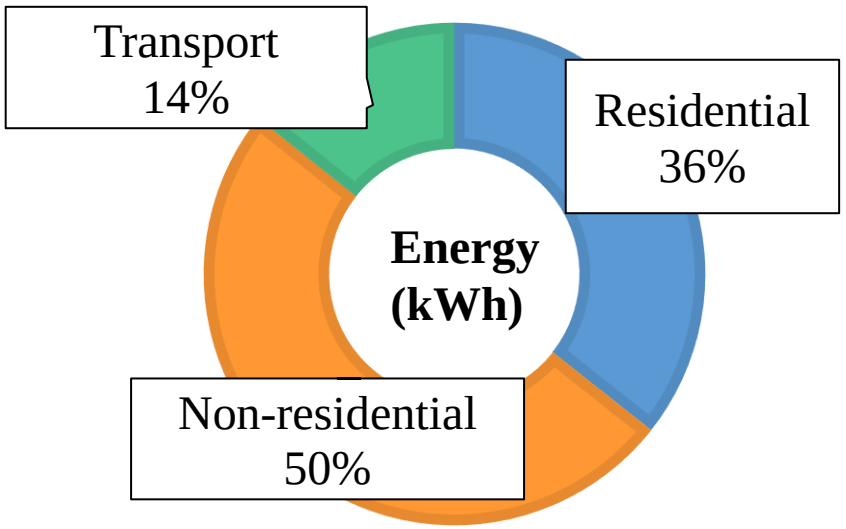
Annual Transport Costs

€ 4,700,000

Note: 1000 kg CO_2 = 1 Tonne CO_2
National statistics based on average distances travelled, kWh/km and gCO_2/km

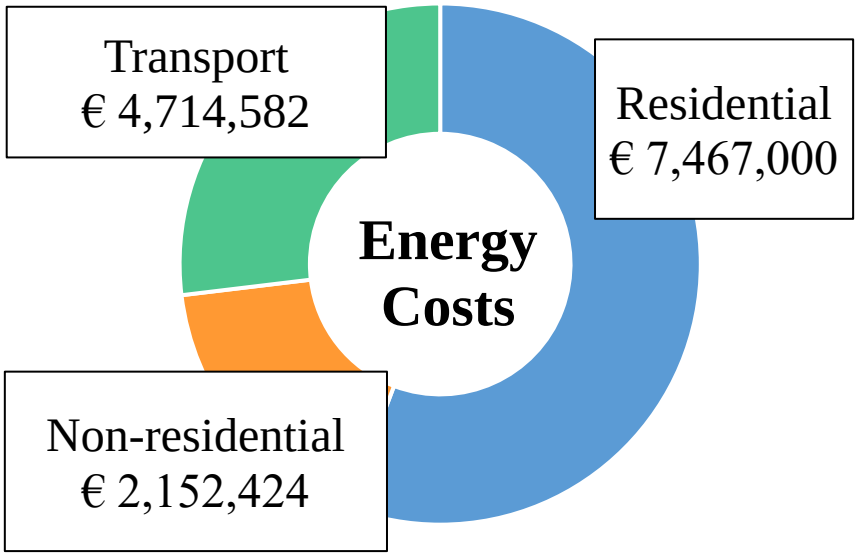
Athboy Summary Baseline - 2023





Baseline is 47,520 tonnes CO_2 and

164.21 GWh energy per annum in 2023



	CO2 (tonnes)	Total (kWh)
Residential	17,523	**58,526,142**
Non-residential	24,524	**82,166,258**
Transport	5,473	**23,435,837**
Total	**47,520**	**164,128,236**

IHER Energy Services Ltd

Audits - 5 x Residential Survey & Analysis

Note: Heat loss indicator (HLI) **must be <=2*** to qualify for SEAI Heat Pump grant

- **Starter**: roof insulation, heating controls
- **Standard**: + external/internal wall insulation, condensing boiler & stove
- **Advanced**: + external/ internal wall insulation, double glazed windows, heat pump, stove, whole house ventilation

IHER Energy Services Ltd

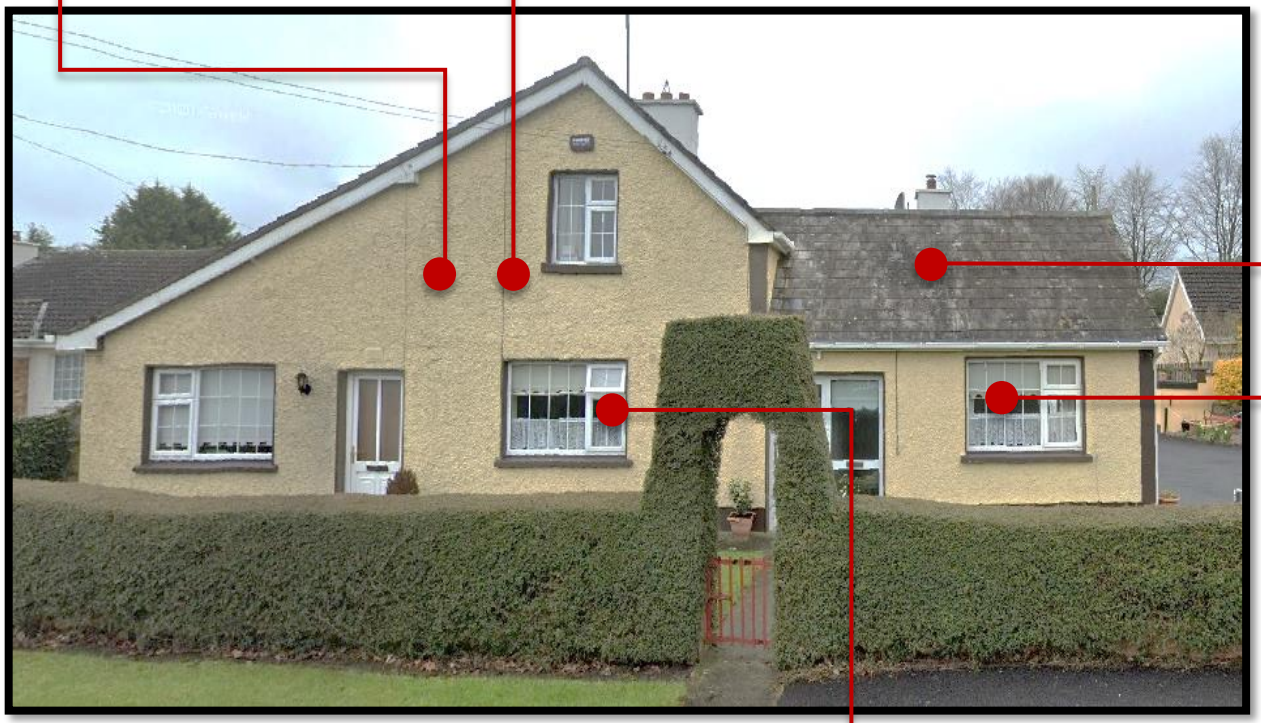
BERWoW

Variant	BER	Energy Cost	Savings	Investment Cost	SEAI Grants	Costs inc. grants	Payback (years)
Current state	G	€ 6,128	N/A	N/A	N/A	N/A	N/A
Starter package	E2	€ 4,835	€ 1,293	€ 5,700	€ 2,000	€ 3,700	2.9
Standard measures	B3	€ 2,525	€ 3,603	€ 61,900	€ 8,000	€ 53,900	15.0
Advanced measures	A3	€ 1,830	€ 4,299	€ 80,525	€ 15,600	€ 64,925	15.1

Residential Survey – Otterstown

Concrete block walls

100mm EPS external wall insulation (U=0.27)



300mm attic insulation, sloping roof insulation (U=0.20)

New double glazed low-e windows

Audits – Ecological Building System & Darnley Lodge Hotel

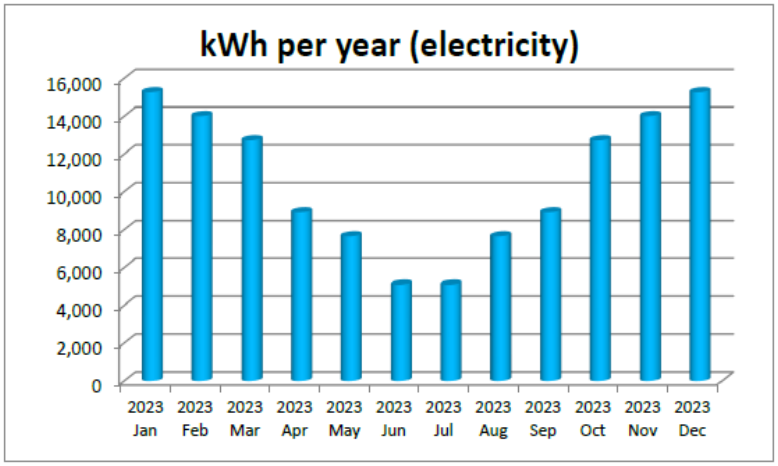


Figure 4.1 Electricity bills summary

Electricity Bill Summary

Date	kWh used	Total cost of bill
Jan 2023	15,288	€4,586
Feb 2023	14,014	€4,204
Mar 2023	12,740	€3,822
Apr 2023	8,918	€2,675
May 2023	7,644	€2,293
Jun 2023	5,096	€1,529
Jul 2023	5,096	€1,529
Aug 2023	7,644	€2,293
Sep 2023	8,918	€2,675
Oct 2023	12,740	€3,822
Nov 2023	14,014	€4,204
Dec 2023	15,288	€4,586
Total	**127,400**	**€38,220**

Table 4.1 Electricity bills summary

Residential Upgrade Scenario (2024-2028)

A2
- **Category 4A- Advanced measures** (Standard with heat pump and whole house ventilation) & **PV** – **75 homes**

A3
- **Category 4 - Advanced measures** (Standard with heat pump and whole house ventilation) – **100 homes**

B1
- **Category 3A - Standard measures** package (roof insulation, internal or external wall insulation, boiler and heating controls , wood stove) & **PV – 50 homes**

B2
- **Category 3 - Standard measures** package (roof insulation, internal or external wall insulation, boiler and heating controls , wood stove) – **25 homes**

C1
- **Category 2A** – Roof insulation, heating controls & **PV** – **25 homes**

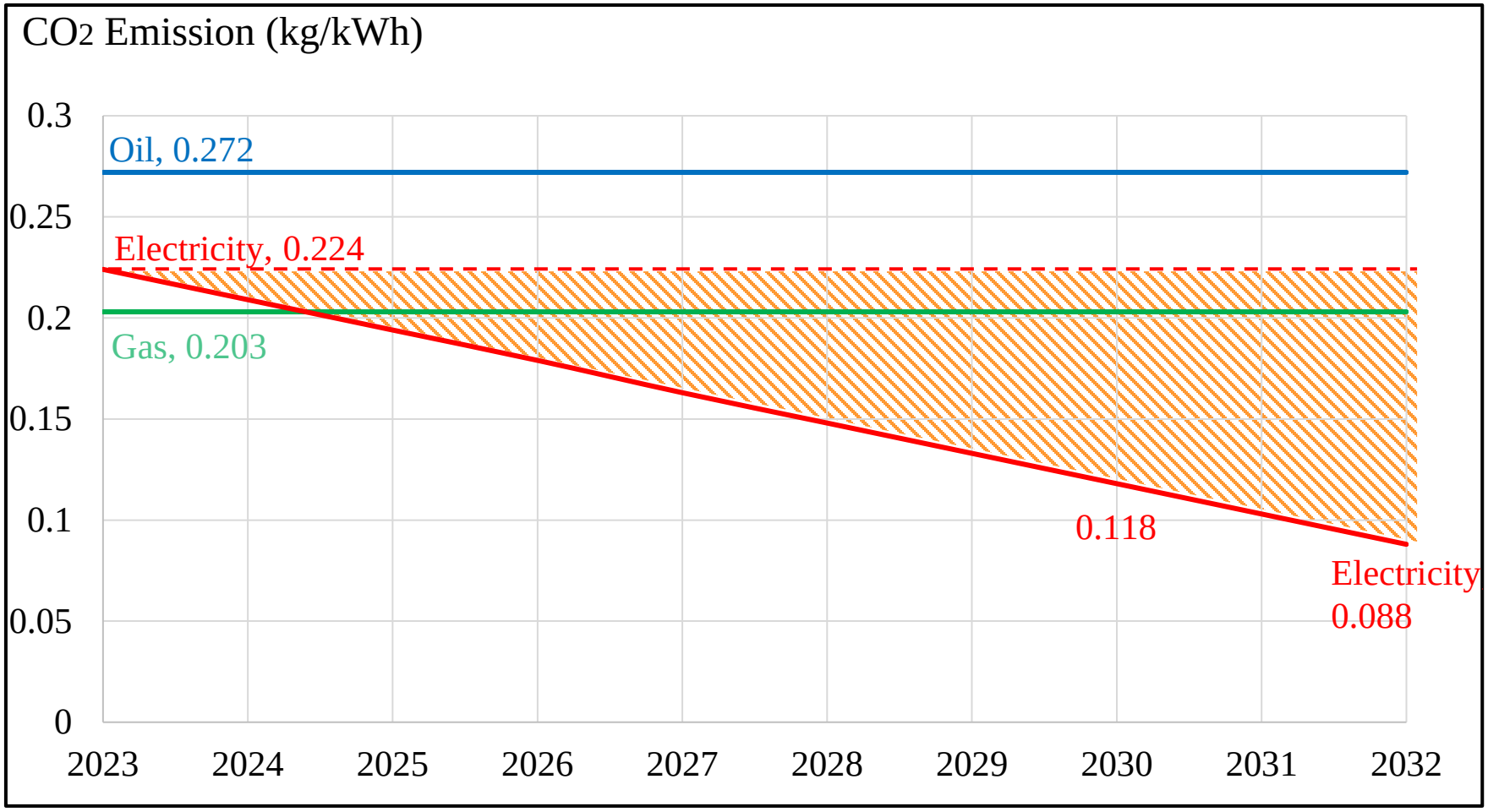
C2
- **Category 1 - PV** only– **100 homes**

C3
- **Category 2 -** Roof insulation and heating controls – **41 homes**

Assumption: 25% of dwellings will be upgraded in next 5 years

IHER Energy Services Ltd

Impact of De-carbonising Electricity in Ireland



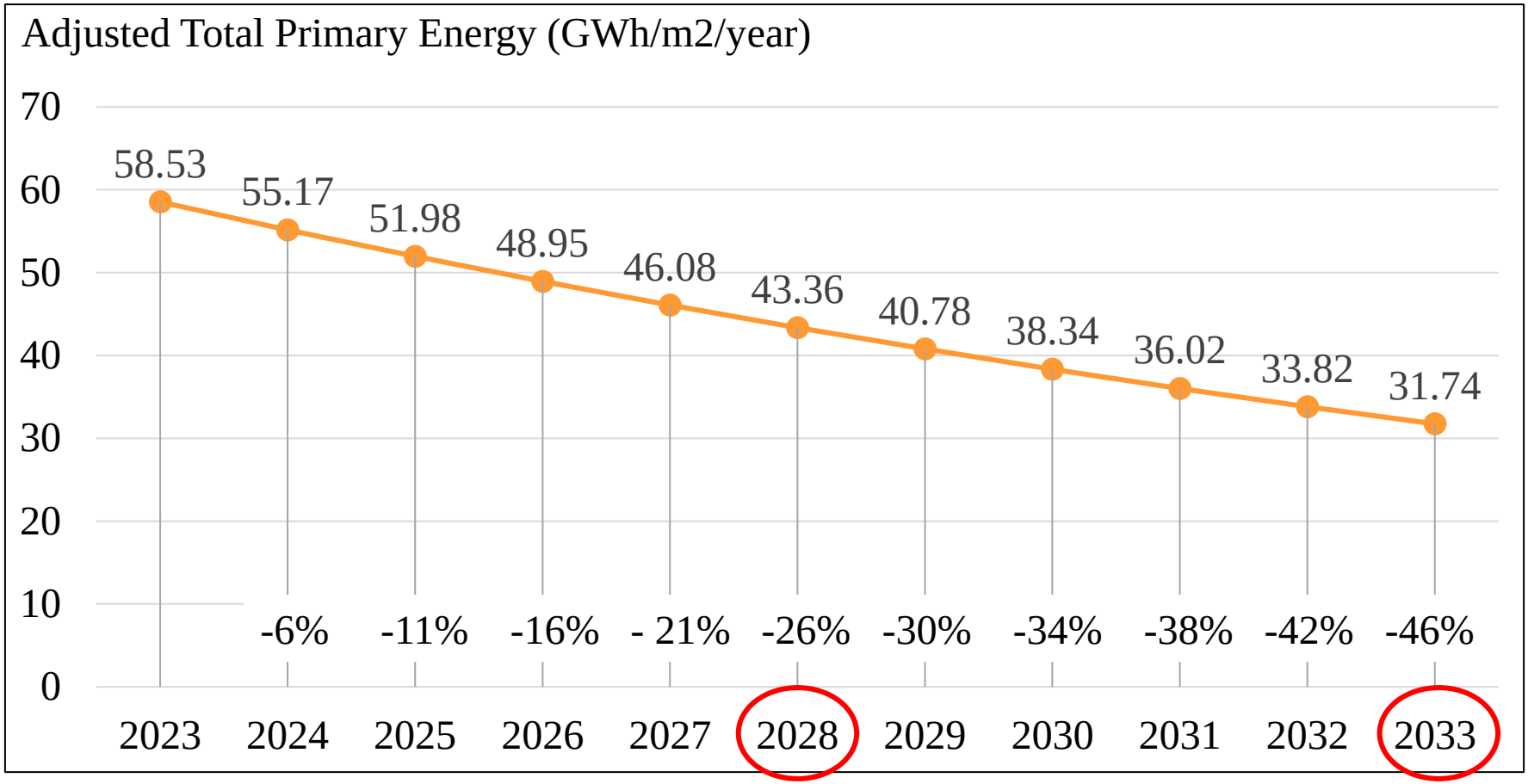
32% all electricity generated in 2019 was from wind and **avoided 3.9 million tonnes of CO2 emissions**. 4,332.5 MW Installed capacity in Ireland as of May 2022. (SEAI, 2023)

IHER Energy Services Ltd

Residential – Energy Reduction Model (2023-2033)

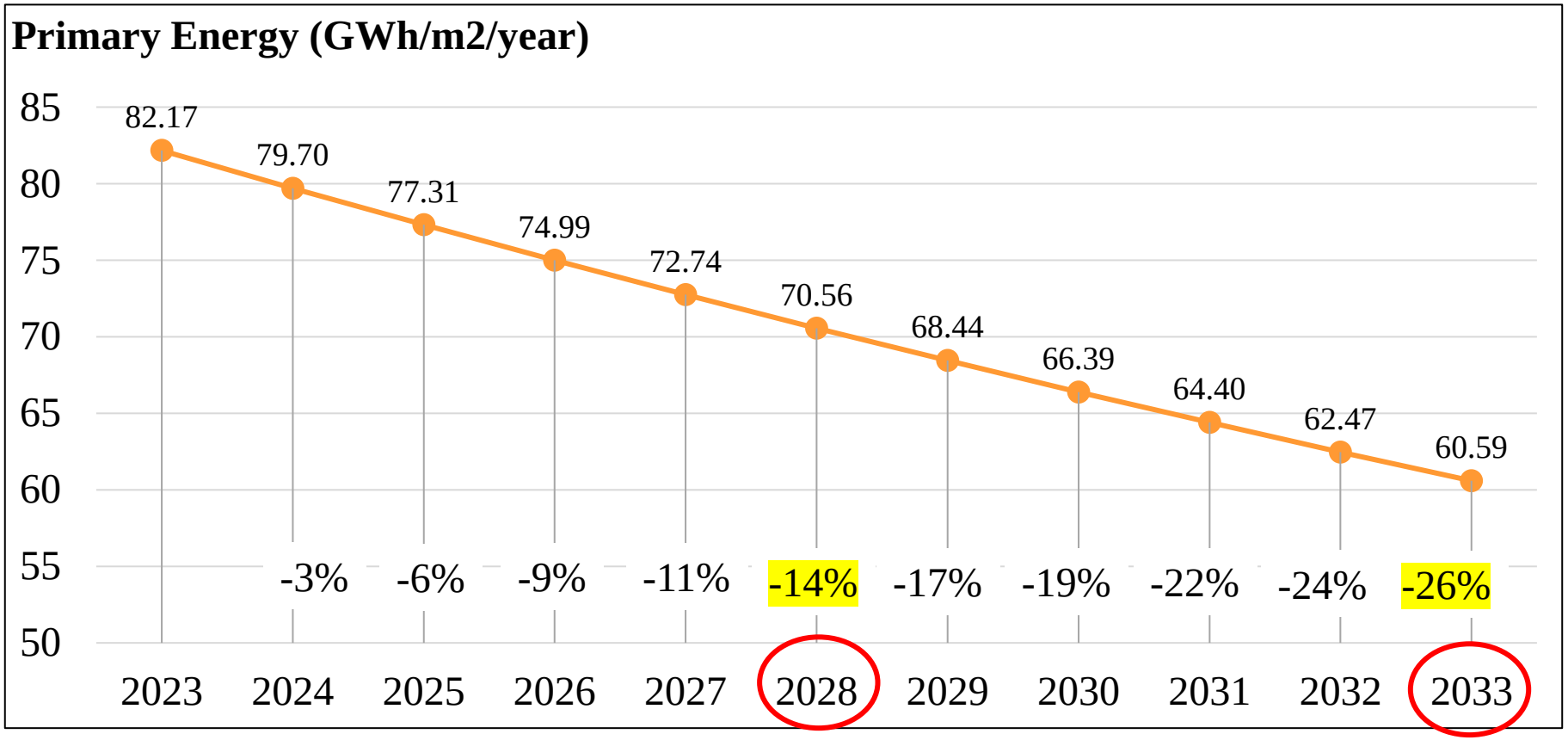
This upgrade plan is equivalent to a 3.85% annual reduction in energy usage.

When accounting for the ongoing decarbonisation of electricity, there will be a 26% reduction by 2028 & 44% by 2033.



Non-domestic Buildings Energy Model

3% reduction in Commercial/ Public Building Energy Usage



*** **All public buildings and businesses in Athboy need to develop energy and carbon reduction plans**

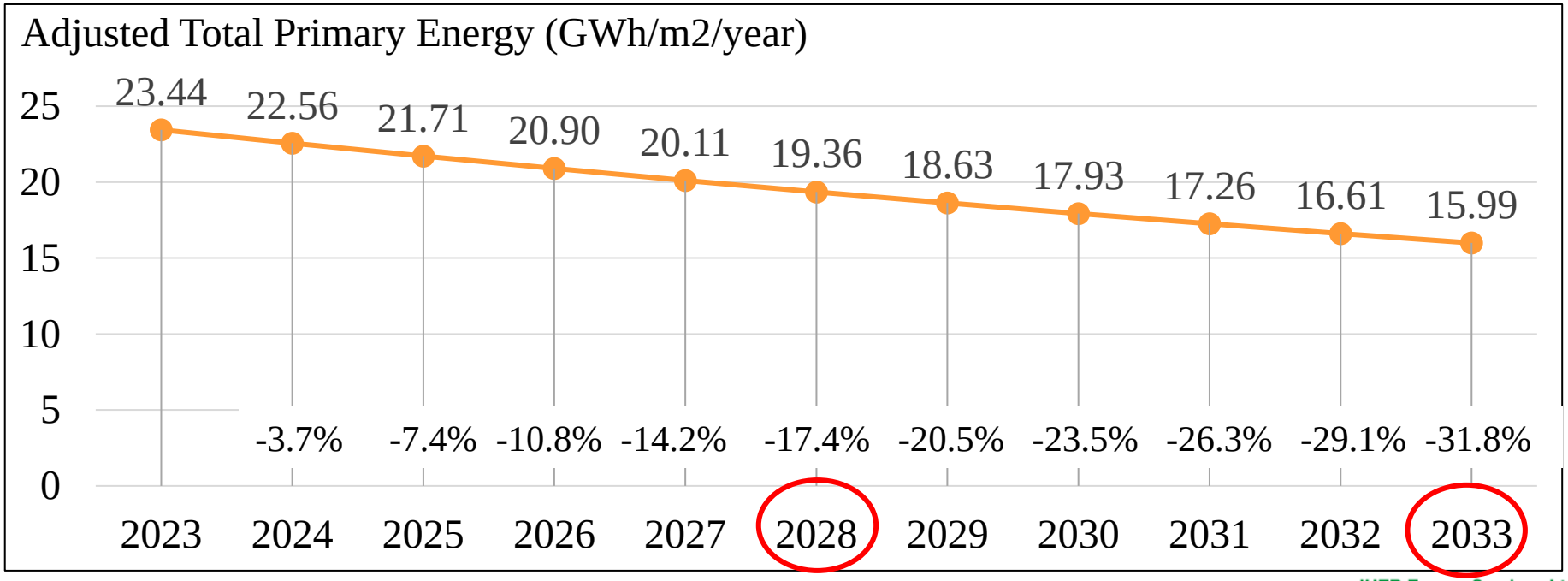
IHER Energy Services Ltd

Transport Projections to 2033

Assume 30% EV Market Share by 2030

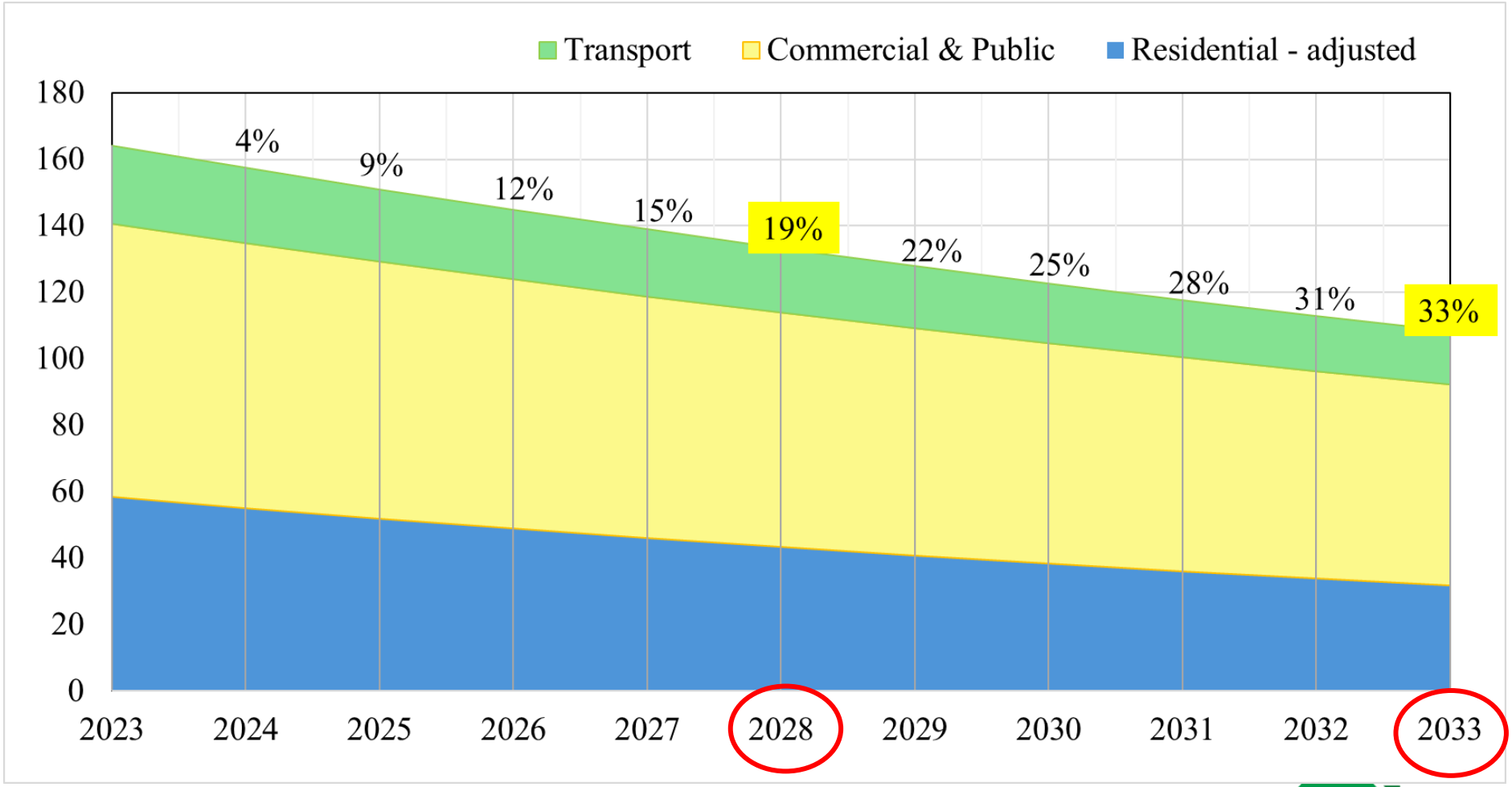
3.75% reduction in Car Transport Energy Usage

Athboy 2030	Petrol	Diesel	Battery EV	Totals
National annual average km	12,113	19,681	12,958	
kWh per car/annum	7,516.12	11,710.20	4,185.43	
kg CO2 per car/annum	1,719	2,794	716	
Total cars split	580	869	621	2070
kWh -all cars/a	4,356,341	10,180,844	2,599,155	17,136,339
kg CO2 - all cars/a	996,588	2,428,858	444,592	3,870,038



Athboy SEC Energy Reduction Projection – All Sectors (2023-2033)

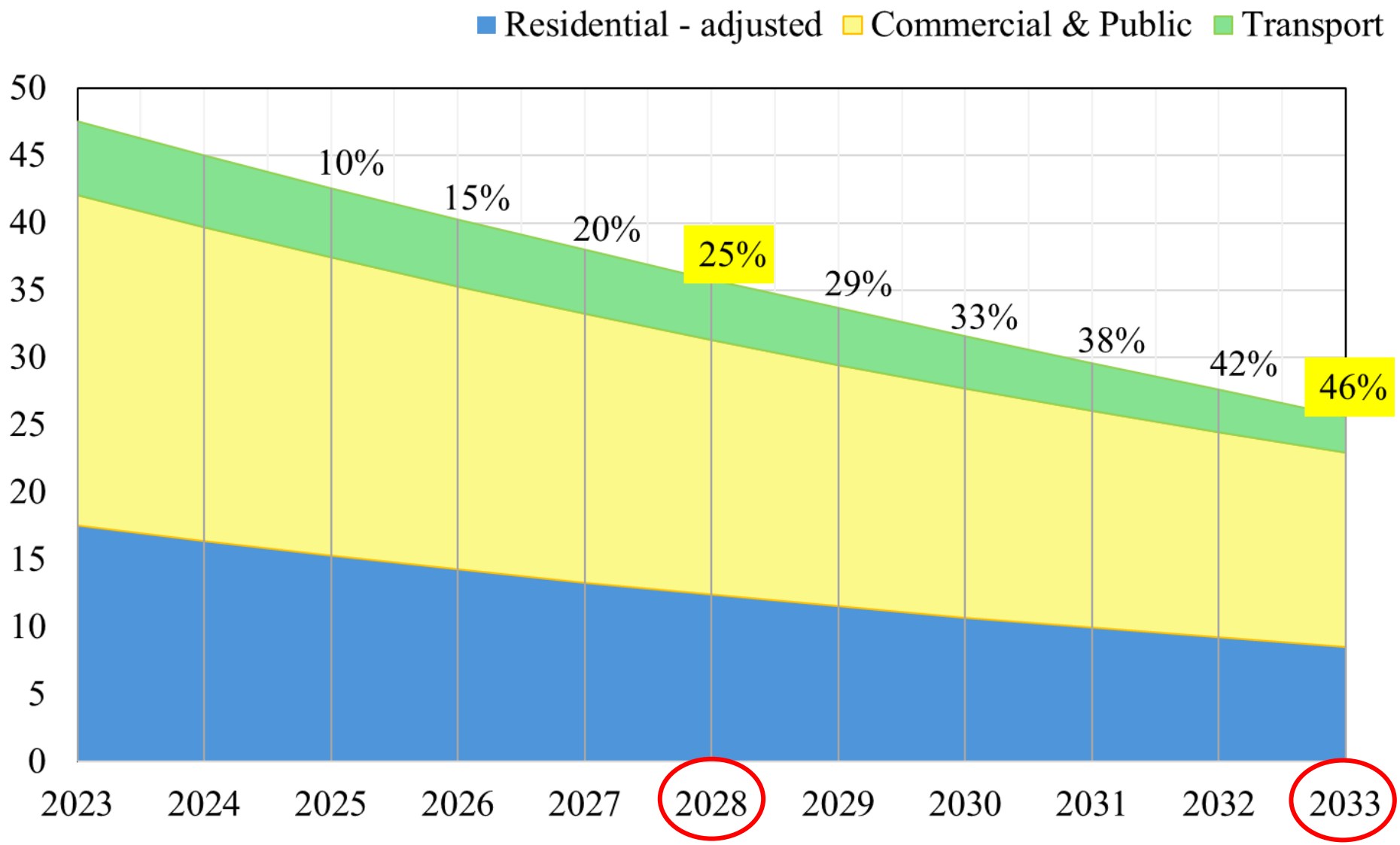
Athboy EMP - 2033 Energy Reduction Target



IHER Energy Services Ltd

Athboy SEC Carbon Reduction Projection – All Sectors (2023-2033)

Athboy EMP - 2033 CO_2 Reduction Target



IHER Energy Services Ltd

Key Takeaways

- **Every** energy saving & carbon reduction measure is valuable
- Encourage homeowners to consider developing their own 5 or 10-year plan to reduce energy and carbon for their home
- Business owners and public building managers need to buy into the Energy Master Plan goals for Athboy
- Encourage business owners and public building managers should report on annual energy use and conduct energy audits. Also develop a 5-year energy and CO_2 reduction plan for their businesses
- Engage directly with One Stop Shop providers if proceeding with deep retrofits

IHER Energy Services Ltd