

Climate Mitigation Energy Efficiency & Carbon Reduction



Leo Strawbridge

Energy Manager

Derry City and Strabane District Council

12th March 2019

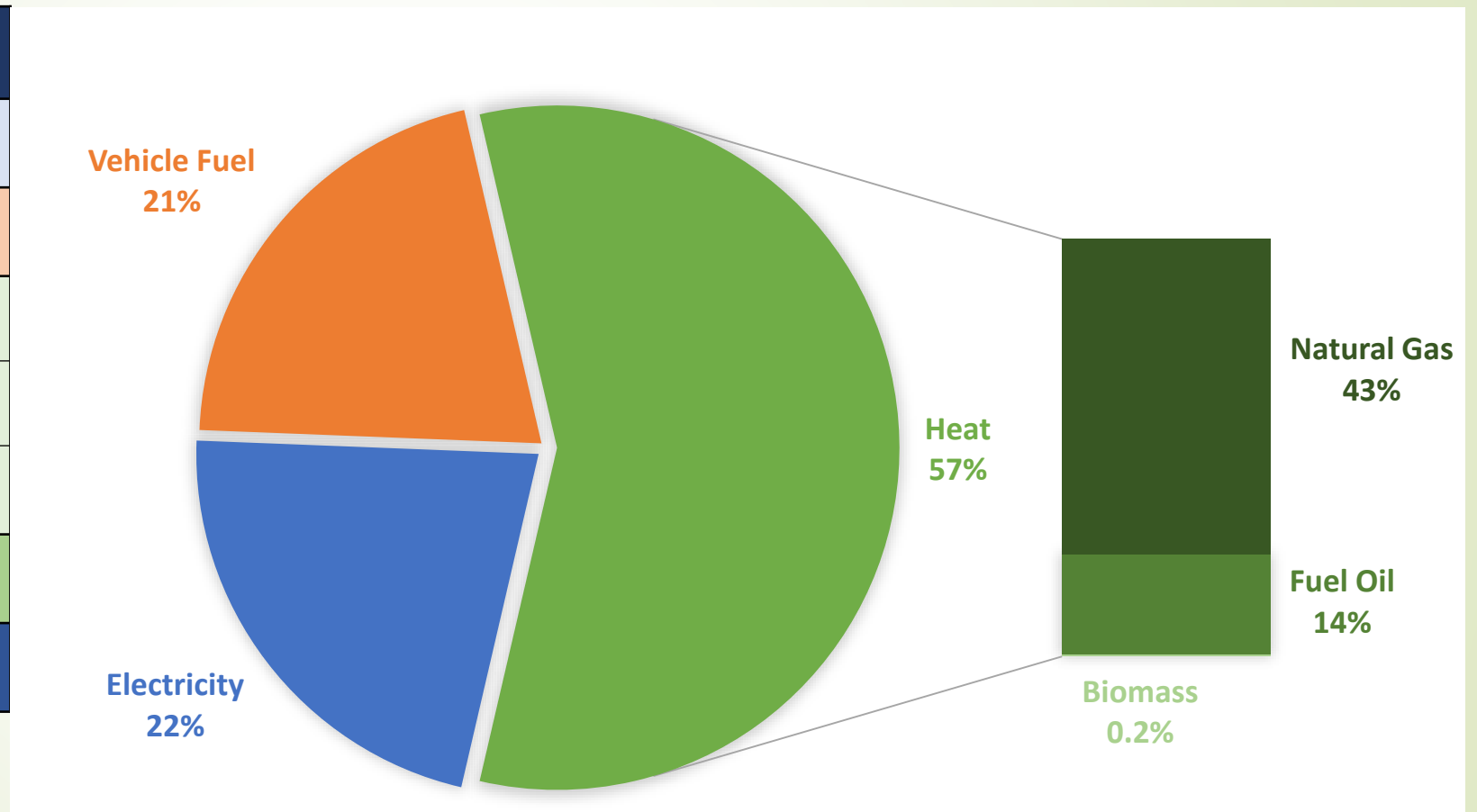
Energy Vision

By 2030 embrace the region's commitment to addressing the challenges of Climate Change by ensuring a sustainable, secure and affordable energy supply for all citizen's whilst maximising the region's opportunities for economic growth.

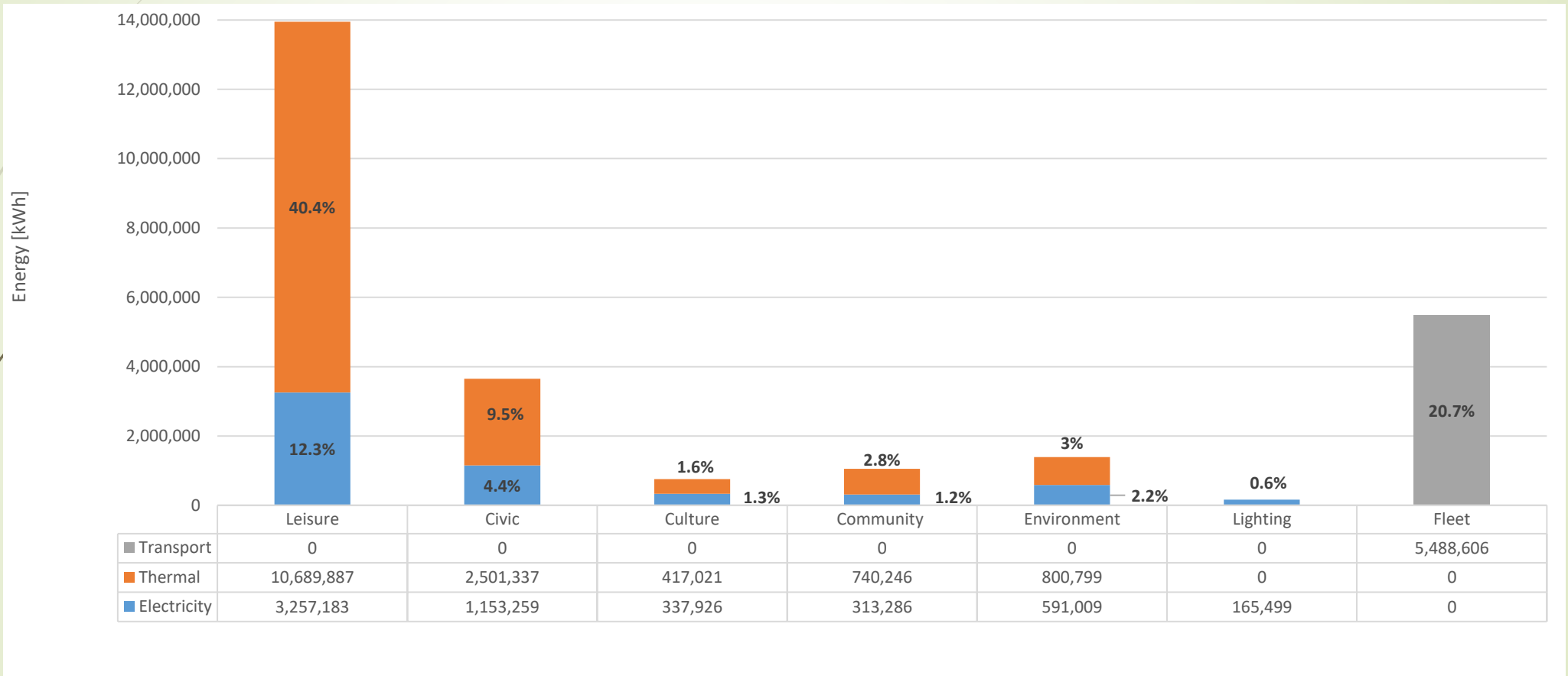
- Energy Consumption & Carbon Emissions
- SECURE
- SMARTrenew
- STARDUST
- Regional Energy Strategy

Distribution of Energy Consumption of 2018

Energy Consumption	[kWh]
Electricity	5,818,162.00
Vehicle Fuel	5,488,605.00
Natural Gas	11,443,258.00
Fuel Oil	3,658,032.00
Biomass	48,800.00
Heat	15,150,090.00
TOTAL	26,456,058.00



Council Energy Consumption



Breakdown of Energy Use by Type (KHR)

Council Energy Consumption

Type	Unit	2016	2017	2018
Electricity	kWh	6,071,340	6,003,867	5,818,162
Thermal	kWh	11,853,370	12,293,740	15,149,290
Transport	kWh	5,879,655	6,520,688	5,488,606
Total	kWh	23,804,365	24,818,295	26,456,058

Overall Energy Consumption by Use (KWH)

Council Energy Consumption

Use	Type	Unit	2016	2017	2018
Electricity	Electricity	kWh	6,071,340	6,003,867	5,818,162
Thermal	Natural Gas	kWh	8,903,738	10,011,888	11,443,258
Thermal	Kerosene	kWh	2,901,632	2,233,852	3,658,032
Thermal	Wood pellets	kWh	48,000	48,000	48,000
Transport	Diesel Fuel	kWh	5,762,060	6,390,281	5,372,445
Transport	Gas Oil	kWh	117,594	130,407	116,160
Total		kWh	23,804,365	24,818,295	26,456,058

Overall Energy Consumption by Use (KWH)

Energy Consumption Data 2016 - 2018

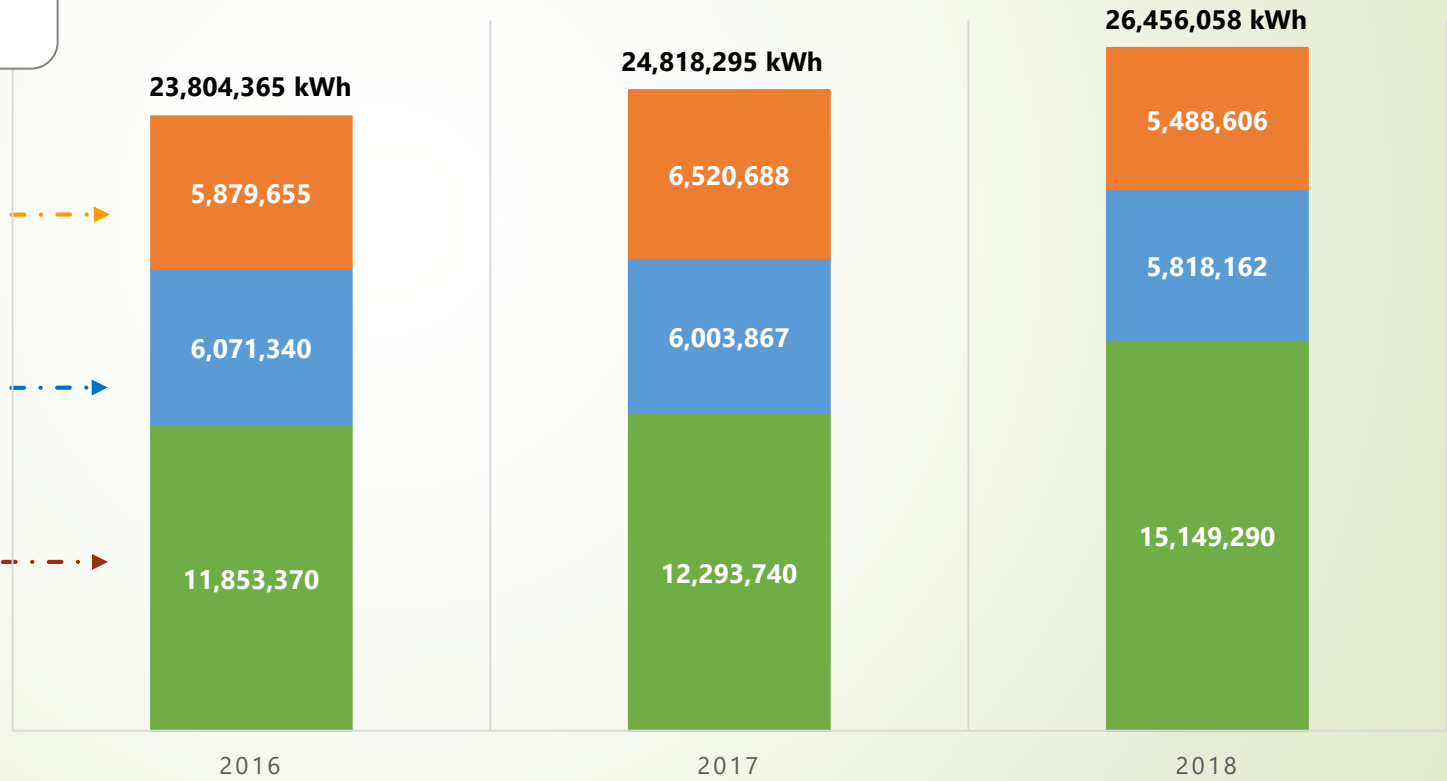


From 2016 the overall energy consumption has risen by 10%

Vehicle Fuel: Energy **reduction** of **6.7%**

Electricity: Energy **reduction** of **4.2%**

Heating Systems: Energy **increase** of **21.8%**



Carbon Emissions

SCOPE 1:

- Heating system:
 - Natural Gas
 - Fuel Oil
 - Biomass
- Vehicle Fuel

SCOPE 2:

- Electricity Consumption

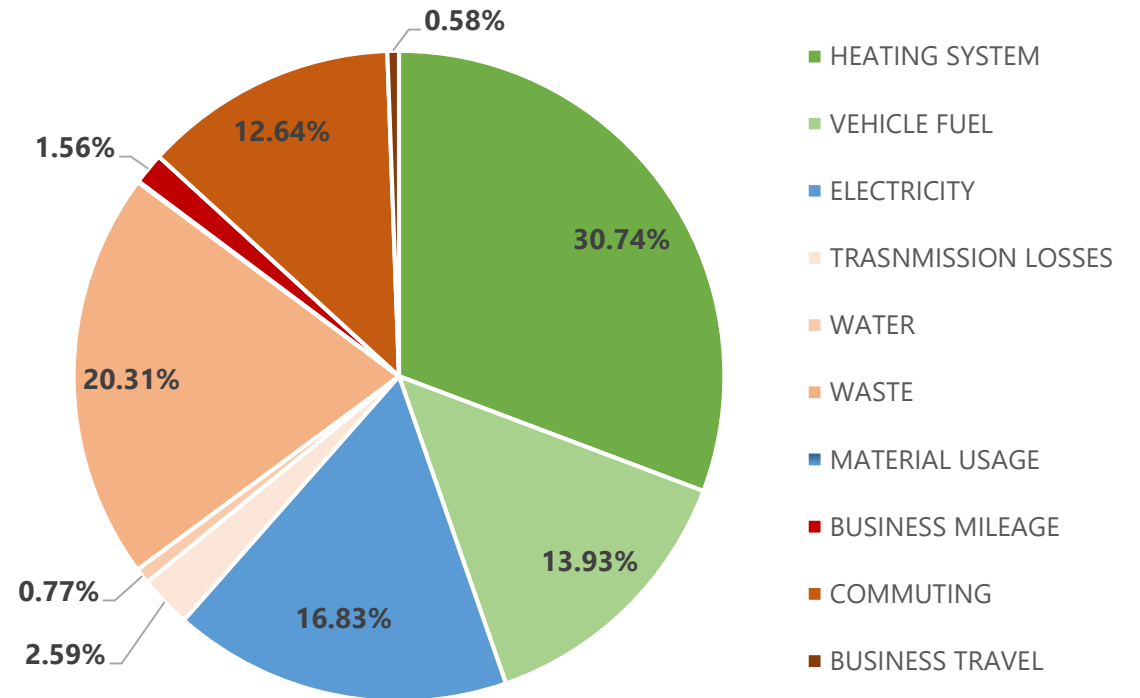
SCOPE 3:

- Transmission & distribution Losses
- Water supply and treatment
- Waste disposal
- Material usage
- Business mileage
- Business travel
- Staff commuting

CO₂e Emissions



ACTIVITIES		EMISSIONS [tCO ₂ e]	PERCENTAGE
SCOPE 1	HEATING SYSTEM	3,008.078	30.74%
	VEHICLE FUEL	1,362.768	13.93%
SCOPE 2	ELECTRICITY	1,646.947	16.83%
SCOPE 3	TRANSMISSION LOSSES	253.295	2.59%
	WATER	75.716	0.77%
	WASTE	1,986.979	20.31%
	MATERIAL USAGE	5.184	0.05%
	BUSINESS MILEAGE	152.865	1.56%
	COMMUTING	1,236.355	12.64%
	BUSINESS TRAVEL	56.313	0.58%
	TOTAL		9,784.50



In 2018 *Derry City & Strabane District Council's* Greenhouse Gas emissions were equivalent to 9,754.5 tCO₂e.

Council Energy Consumption

Use	Unit	2016	2017	2018	2018 % of total
Electricity	kg CO ₂ e	2,501,696	2,110,719	1,646,947	27.4%
Thermal	kg CO ₂ e	2,354,632	2,395,244	3,008,078	50.0%
Transport	kg CO ₂ e	1,449,498	1,603,065	1,362,768	22.6%
Total	kg CO₂e	6,305,826	6,109,029	6,017,793	100.0%

Overall Energy Consumption – Carbon Dioxide Equivalent Emissions

Council Energy Consumption

Use	Type	Unit	2016	2017	2018
Electricity	Electricity	kg CO ₂ e	2,501,696	2,110,719	1,646,947
Thermal	Natural Gas	kg CO ₂ e	1,638,288	1,843,789	2,105,102
Thermal	Kerosene	kg CO ₂ e	715,717	550,846	902,254
Thermal	Wood pellets	kg CO ₂ e	627	610	723
Transport	Diesel Fuel	kg CO ₂ e	1,417,006	1,567,089	1,330,647
Transport	Gas Oil	kg CO ₂ e	32,492	35,977	32,121
Total		kg CO₂e	6,305,826	6,109,029	6,017,793

Overall Energy Consumption – Carbon Dioxide Equivalent Emissions

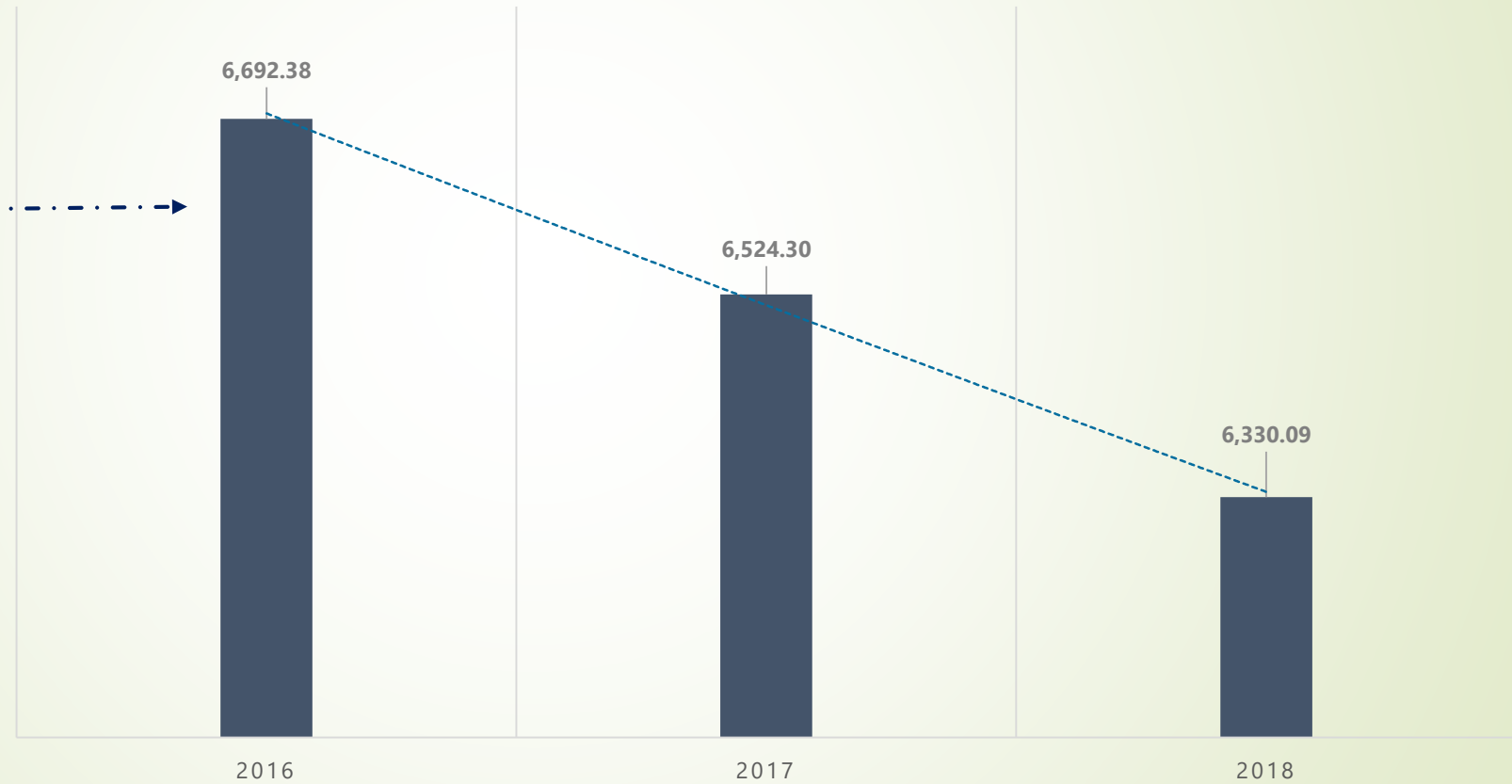
CO₂e Emissions of Scope 1 & 2 – 2016/18

Scope 1 & 2 cover the **63.2%** of the total emissions of 2017/18

Scope 1 & 2 emissions were reduce in a **5.4%**

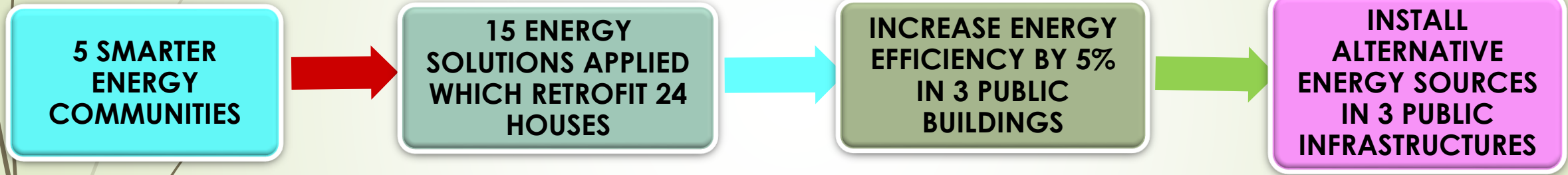
Conclusion:

Although the Energy Consumption has risen, Scope 1 & 2 emissions have decreased because the consumption of Electricity and its Conversion Factor

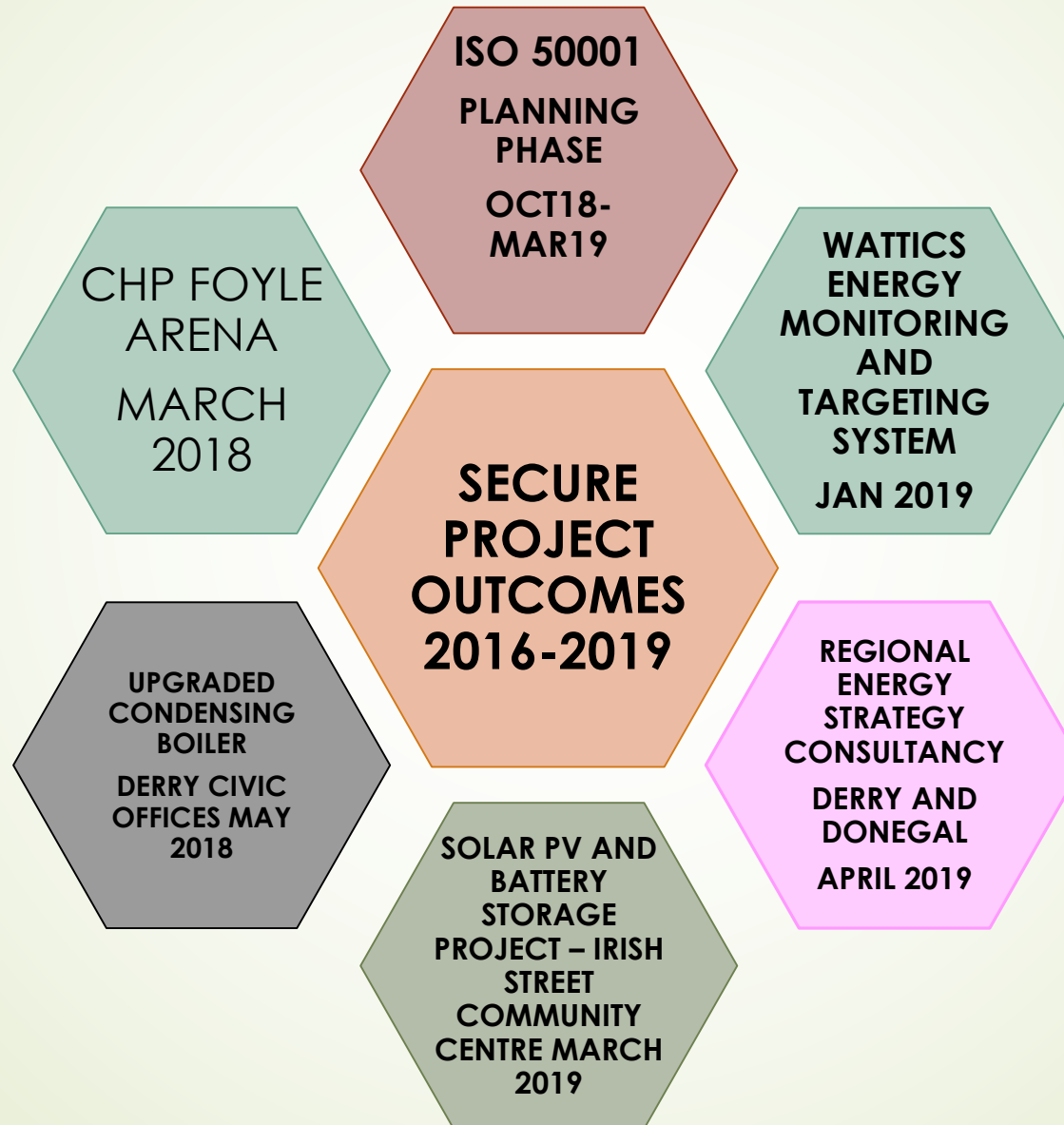




SECURE PROJECT OUTPUTS



SECURE PROJECT OVERVIEW



Energy Efficiency Projects 2014 -2019



Description of Action	Start Date	Status	Investment Cost [£]	Annual Savings			Simple Payback
				Financial [£]	Energy [kWh]	Emissions [tCO ₂ e]	
20 kW PV Installation in Alley Theatre	Sep-14	Completed (Aug-15)	£ 11,687.70	£ 1,753.16	18,000	5.1	6.67
Biomass Boiler Installation in Strahans Road Depot	Sep-14	Completed (Aug-15)	£ 9,350.16	£ 1,947.95	50,000	13.4	4.80
Intelligent Lighting System on one floor in Derry Office	Sep-14	Completed (Oct-15)	£ 10,908.52	£ 1,753.16	14,000	7.6	6.22
Hand Towel Replacement with High Speed Hand Dryer	Jun-16	Completed (Dec-17)	£ 5,460.00	£ 4,452.00	0	0.0	1.23
Foyle Arena L.C. Gas Fired CHP Installation	Nov-17	Completed (Feb-18)	£ 39,504.87	£ 13,168.29	197,862	36.4	3
Replace Existing Gas Boiler with Condensing Boiler in Derry Office	Dec-17	Completed (Mar-18)	£ 21,398.47	£ 3,831.97	115,000	21.2	5.58
Introduction of a Sustainable Transport - Enterprise Car Scheme	Jan-18	Completed (Dec-18)	£ 6,146.00	£ 12,621.25	2,850 litres	2.3	0.49
Implementation of Energy Monitoring and Targeting System	May-18	Completed (Feb-19)	£ 11,109.23	£ 12,018.17	617,500	144.2	0.92
Implement ISO 50001 Energy Management System	May-18	On going	£ 12,119.16	£ 16,158.88	250,000	58.4	0.75
Upgrade Car Park Lighting at Derry Office	Sep-18	Completed (Nov-18)	£ 5,021.91	£ 3,119.20	20,300	5.8	1.61
Convert oil heating to more efficient natural gas heating. Alley Theatre	Nov-18	Completed (Feb 19)	£ 11,500	£ 7,560.75	92,550	17.1	1.52

Energy Projects

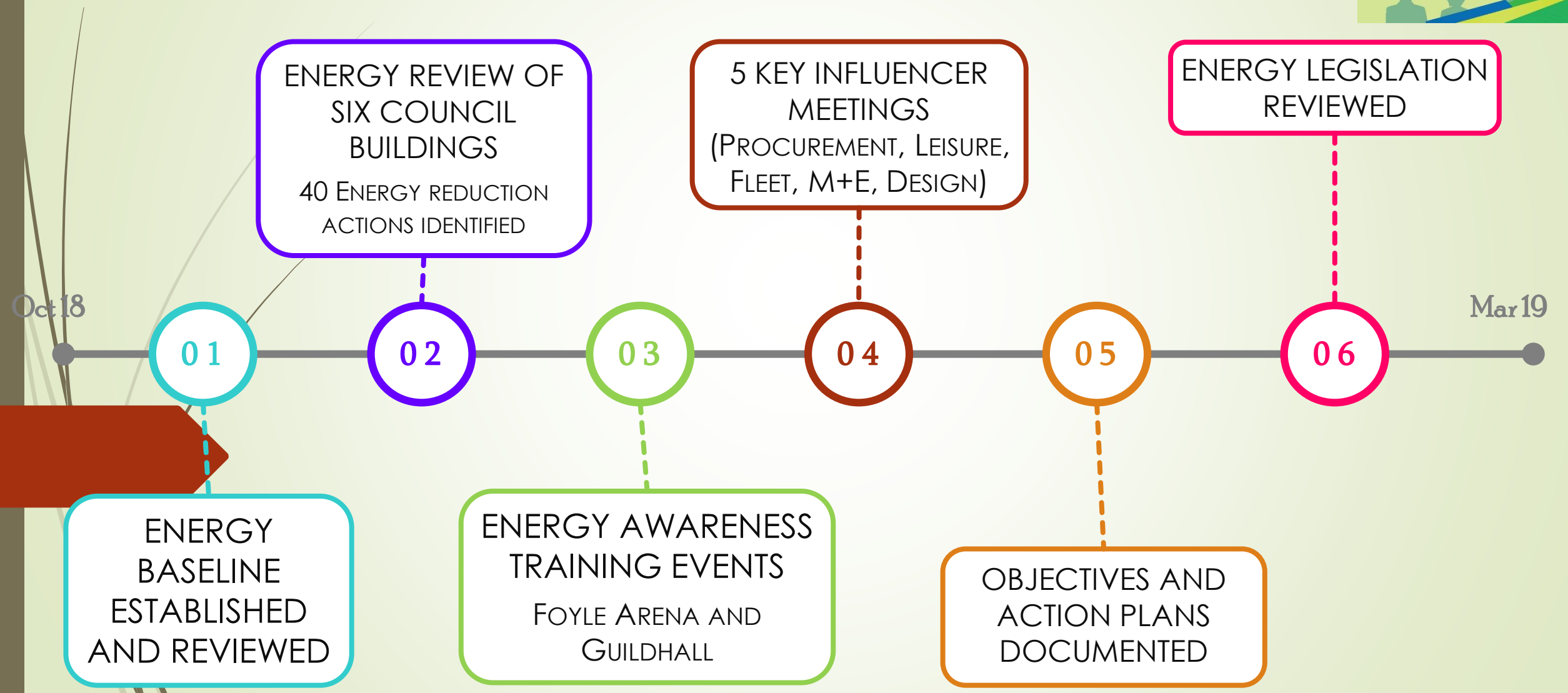


Projects Commenced

Renewable Energy Projects

Description of Action	Responsible Manager	Start Date	End Date	Investment Cost [£]	Annual Savings			Simple Payback
					Financial [£]	Energy [kWh]	Emissions [tCO ₂ e]	
Implement ISO 50001 Energy Management System	Leo Strawbridge	May-18	On going	£12,119.16	£16,158.88	250,000	58.4	0.75
Convert oil heating to more efficient natural gas heating. Alley Theatre	Leo Strawbridge	Nov-18	Mar-19	£11,500.00	£7,560.75	92,550	17.1	1.52
Fuel Efficiency Training and Awareness Programme targeted at all sections of Council Fleet Drivers	Leo Strawbridge	Apr-19	Unknown	£10,773.60	£14,140.35	13,000 litres	45.2	0.76
Upgrade outdoor lighting at Recycling and Fleet Depots	Leo Strawbridge	Mar-19	Unknown	£7,000.00	£2,684.65	26,100	7.4	2.61
12 kW PV Installation and Battery Storage in Irish Community Centre	Leo Strawbridge	Mar-18	Feb-19	£22,213.17	£1,587.60	10,450	3.2	14.0
12 kW PV Installation in Derg Leisure Centre	Leo Strawbridge	May-18	Feb-19	£9,700.00	£973.67	9,466	2.9	10.0
50 kW PV Installation in Waste Trasfer Station Strabane	Leo Strawbridge	May-18	Mar-19	£4,950.00	£2,895.20	28,147	8.6	1.7
12 kW PV Installation in Skeoge Operation Centre	Leo Strawbridge	May-18	Mar-19	£7,100.00	£1,019.96	9,916	3.0	7.0
12 kW PV Installation in Creggan Community Centre	Leo Strawbridge	May-18	Mar-19	£7,100.00	£1,028.91	10,003	3.1	6.9

ISO 50001 CERTIFICATION

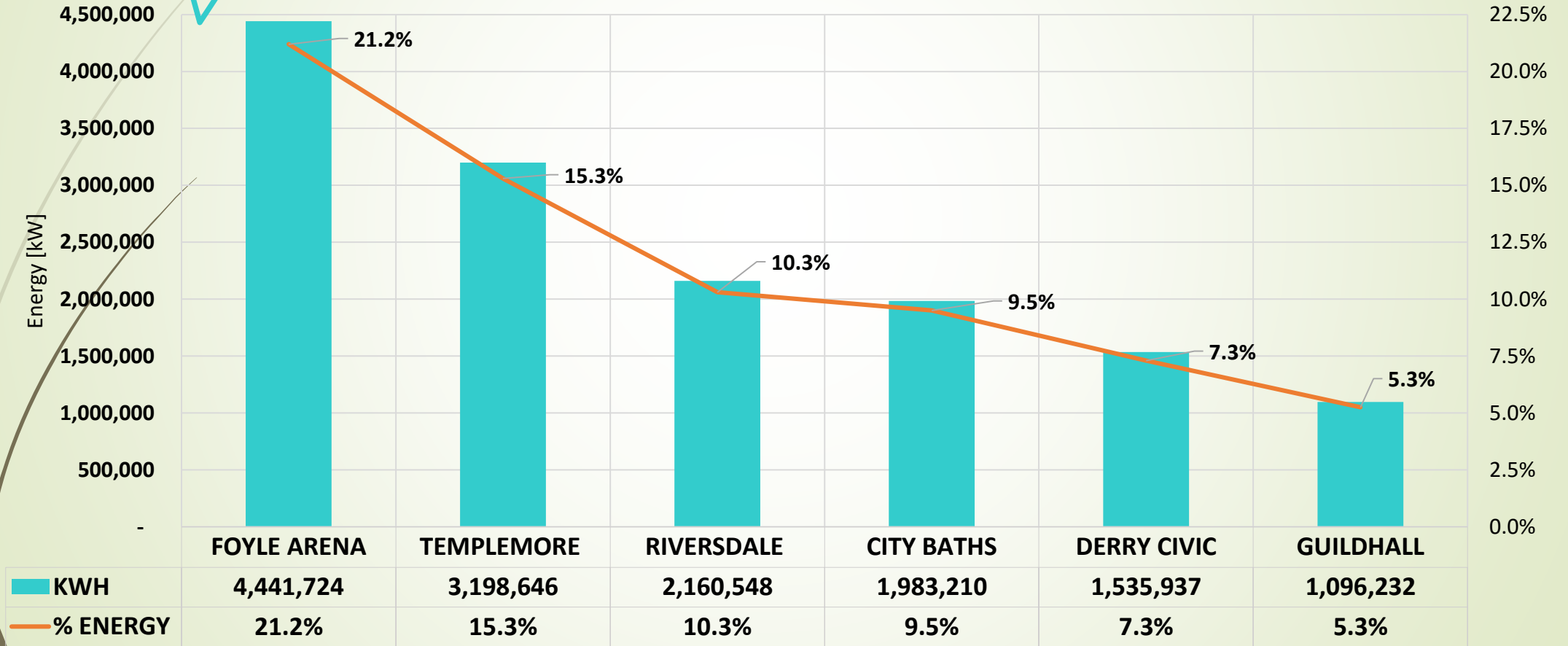




ENERGY
BASELINE
ESTABLISHED
AND REVIEWED



5% of COUNCIL ENERGY USE IS
CONSIDERED AS A SIGNIFICANT
ENERGY USER.



ENERGY
AWARENESS
TRAINING EVENTS
FOYLE ARENA AND
GUILDHALL



WATTICS SYSTEM – BUILDING METERING POINTS









**FOYLE
ARENA**



TEMPLEMORE



CITY BATHS








**CIVIC
OFFICES**





**GUILDHALL/
HARBOUR HOUSE**

-  FA - CHP Gas Supply
-  FA - Heat Meter Pool ...
-  FA - Mains Water
-  FA - Pool Water Meter
-  FA - Total Site Elec
-  FA - Total Site Gas

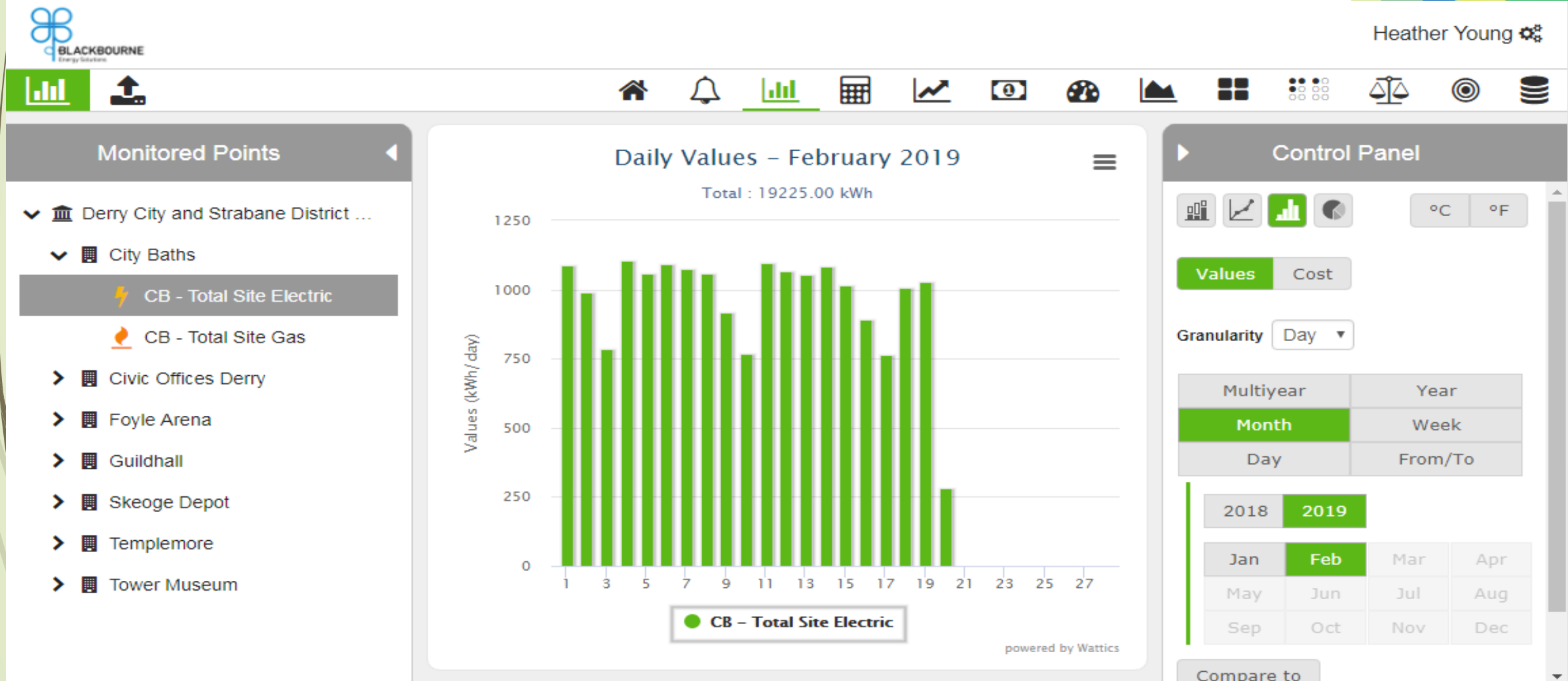
-  TLC - Total Site Electric
-  TLC - Total Site Gas

-  CB - Total Site Electric
-  CB - Total Site Gas

-  COD - Total Site Electric
-  COD - AHU Contro...
-  COD - Air Cooled ...
-  COD - Boiler Hous...
-  COD - Computer R...
-  COD - TP Chiller
-  COD - Total Site Gas

-  GH - Heat Meter Coun...
-  GH - Heat Meter Harb...
-  GH - Total Site Elec
-  GH - Total Site Gas

WATTICS ENERGY MANAGEMENT SYSTEM OVERVIEW



IRISH STREET CC SOLAR PV BATTERY STORAGE PROJECT



- **12 KW SOLAR PV INSTALLED ON COMMUNITY CENTRE ROOF MARCH 19**
- **3 X 5 KW SONNEN BATTERIES INSTALLED JAN 2019 WITHIN COMMUNITY CENTRE OFFICES**
- **FIELD “FIT AND TELL” STUDY TO COMMENCE APRIL 2019**



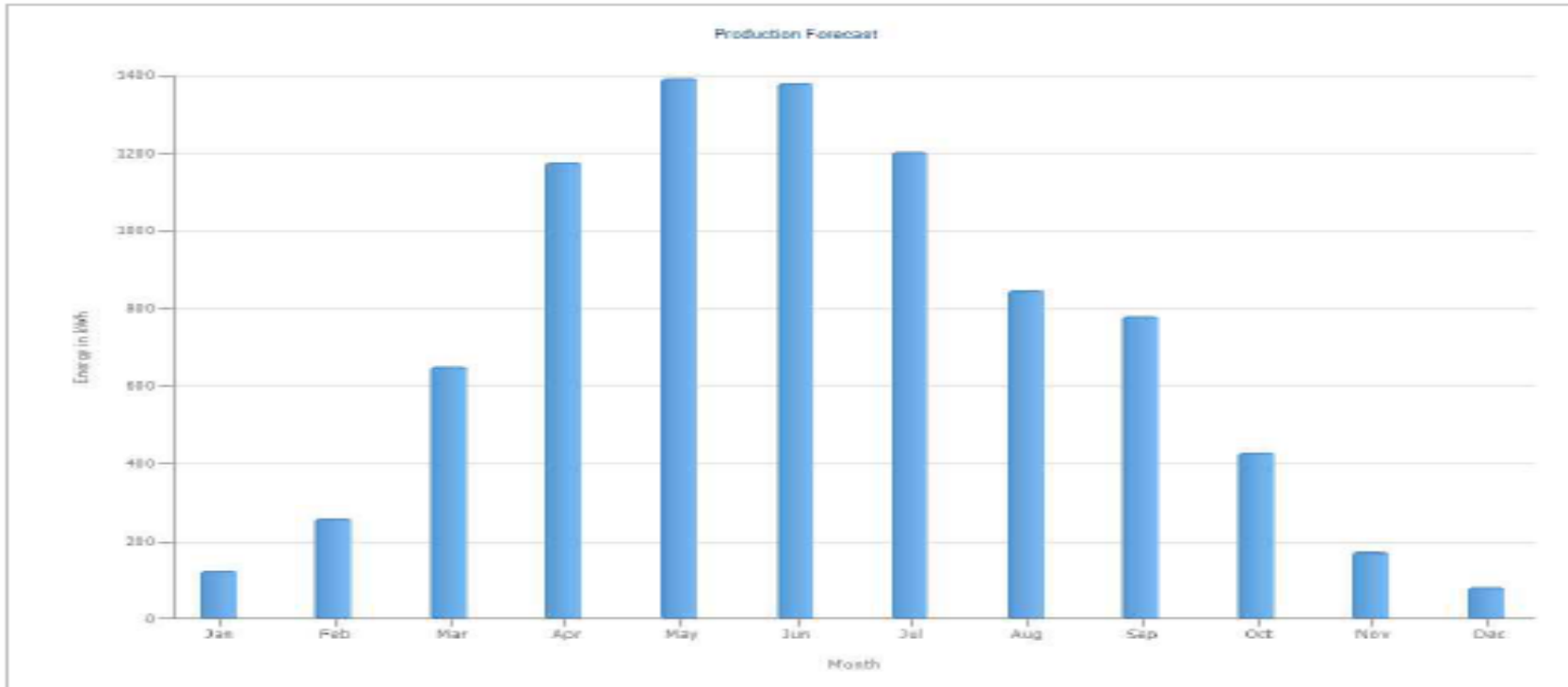
IRISH STREET CC SOLAR PV ENERGY OUTPUT SIMULATION



Simulation Results

PV System

PV Generator Output	11.9 kWp
Spec. Annual Yield	706.23 kWh/kWp
Performance Ratio (PR)	82.3 %
Grid Feed-in	8,425 kWh/year
Grid Feed-in in the first year (incl. module degradation)	8,425 kWh/year
Stand-by Consumption	14 kWh/year
CO ₂ Emissions avoided	5,047 kg / year



SMARTrenew – Smarter Renewable Energy & Heating Management for Arctic and Northern Rural Territories

- Building on the success of SECURE
- Transfer of Renewable energy and smart storage solutions to dispersed regions within the Northern Peripheral and Arctic Region
 - Greater awareness in Communities
 - Increased Energy Security
 - Reduced Energy Poverty
- Smarter Energy Rural Communities
- Integration of Renewable Energy and Storage Solutions
- Intelligent Control

STARDUST – Holistic and Integrated Urban Model for Smart Cities



- Low Carbon, Highly Efficient, Intelligent and Citizen Orientated Cities
- Urban Technical Solutions with Innovative Business Solutions
- Utilising Buildings, Mobility and Energy Efficiency through an ICT Platform
- 3 Lighthouse Cities
- 4 Follower Cities
- Carbon Management Strategy to Reduce Consumption by 20% by 2030
- Sustainable Energy Forum
- Replication Plan
- Sustainable Energy Action Plan (SEAP) – Reducing Carbon through a Better use of Energy

Regional Energy Strategy



Joint Initiative Between Derry City and Strabane District Council and Donegal County Council

Derry City & Strabane District Council (DCSDC) and Donegal County Council (DCC) both recognise the need for the region to transition towards a low carbon economy to bring prosperity for individuals, communities and businesses

Climate Change Mitigation & Decarbonisation



Regional Energy Strategy



Derry City & Strabane District Council and Donegal County Council regions imports the majority of their energy in the form of oil & gas from external sources and face similar problems associated with the volatility of wholesale energy costs caused by global pressures and at the same time do not capitalise on the benefits of local generated renewable energy sources.

Both council areas have similar problems with an aging electricity network, in conjunction with difficulties in electricity grid connections in a predominantly rural setting with large renewable energy source potential.



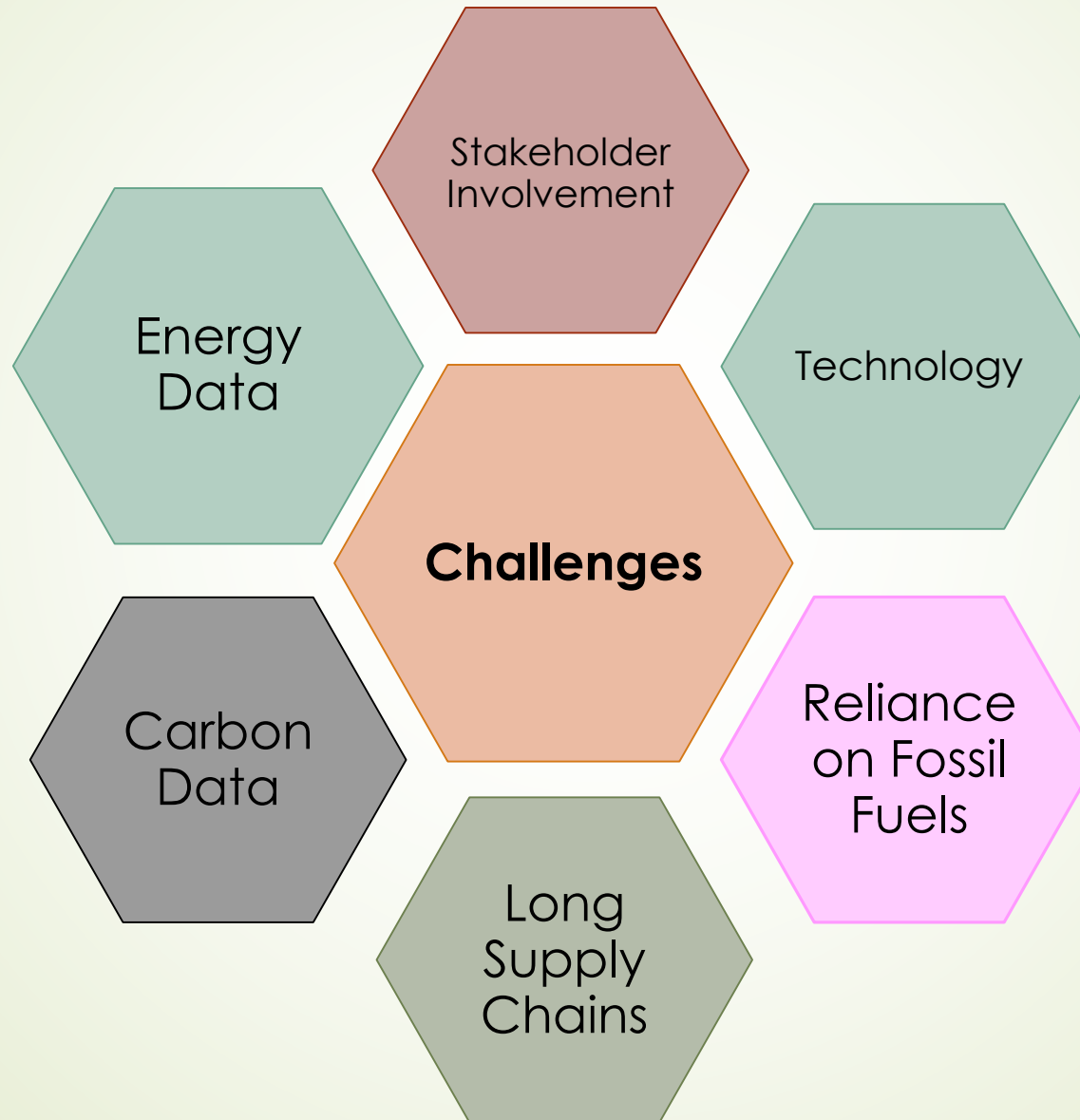
Regional Energy Strategy



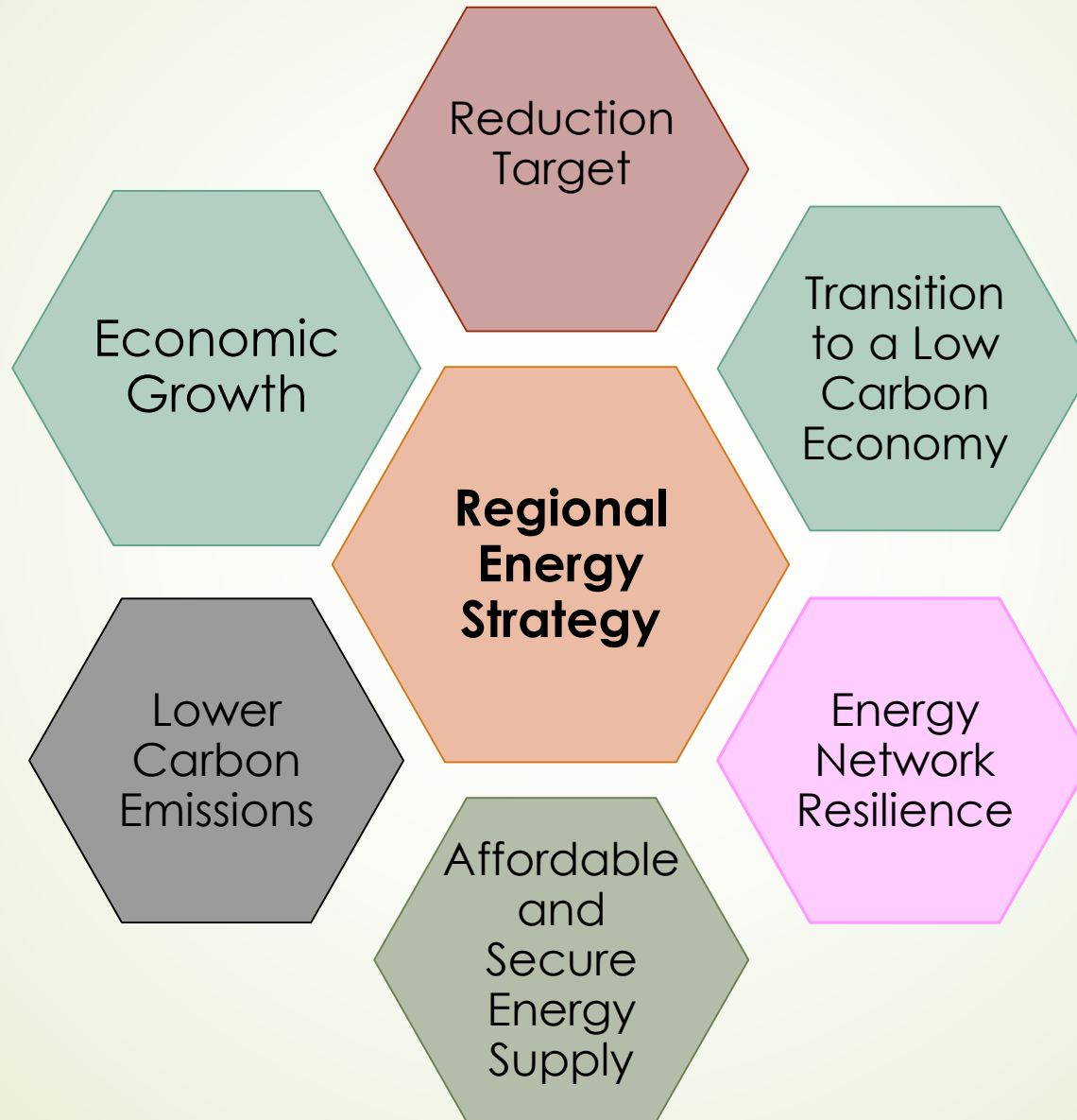
The project will correlate and analyse the cross border regions energy consumption to include the domestic sector (social/private rental/private owned), commercial and industrial sectors, including road, rail and develop a strategy to reduce combined energy consumption by 20% while balancing the uptake of installed renewable energy with traditional fossil fuels.



Regional Energy Strategy – Challenges



Regional Energy Strategy - Outcomes



Thank You

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