Does the Rising Cost of Living Affect our Ability to Live Sustainably?

A Case Study of a Suburban Town in Co. Kildare

Project Summary

We set out to explore the impact of the rising cost of living on families and whether this affects their ability to live in an environmentally sustainable way. Our project was based on a Case Study of our town, Newbridge in Co. Kildare. Based on our feedback from our respondents we are proposing innovative and radical changes to ensure sustainable living at individual, local and national level which would lead the way for others to follow.

716 people responded to our survey in Newbridge in County Kildare. A mix of people with various incomes were surveyed, so we got a fair and balanced reflection of all sectors. We examined the increased costs households have had to incur in the last two years. We examined how the reduced discretionary money available in homes impacts people's ability to: buy electric cars, install solar panels, use renewable energy, reinsulate homes, etc.
Our survey is designed on Microsoft Forms and there are 14 questions on the survey.

Conclusions will be drawn from the surveys on the main factors associated with the cost of living which affect people living sustainably. **Recommendations will be put forward as to how to support, encourage and incentivise people to live more sustainably in Newbridge, Ireland and beyond and how people can make changes in this area at minimal/no cost also.**

We believe that this study is relevant, current, and applicable to the people that live in our town and further afield. The lessons we have learned can be used nationally. **Living more sustainably will improve the quality of our lives, protect our ecosystems, and preserve natural resources for future generations**.

Our Survey

Our survey was sent out to over 6000 people living in Newbridge in County Kildare. We received 716 responses. A mix of people with various incomes were surveyed, to ensure we got a fair and balanced reflection of all sectors. Our surveys were distributed to schools and local companies. A **Microsoft Forms** survey was emailed to participants to complete. We used probability sampling methods as this allowed us to make meaningful conclusions about the population being studied using statistical surveys.

Our survey is made up of 14 questions. We will focus on the most relevant questions for the purpose of this project. Other questions included but which are not analysed include the following: what bracket does your net income fall into annually?, which of the following do you live in?, what would encourage you to live more sustainably?, etc.

Why did we choose this project?

Our decision to study this area has been **influenced by the media attention** and global attention that has been focused on this area in the last number of years, as well as our own **moral obligation to influence change as young people** in this area. Most recently the COP28 outcomes can be used as a powerhouse for this change. This topic is **current and relevant**.

At national level the Government of Ireland's ***Climate Action Plan 2023*** – *Changing Ireland for the Better* describes how "every person matters, every place matters". We all have a role to play in ensuring no community, no sector and person gets left behind. **We believe our influence and our inspirational, innovative, and radical changes we are proposing as young people will encourage others to follow.** It is a **collective responsibility** and ownership that is required **to ensure real, meaningful, and sustainable reform** at **local, regional, and governmental level.**

County Kildare has a total population of 246,977, making it the fifth most populous local authority in the State (Census 2022). If we can influence young people, we can influence a generation and more in Newbridge, Co. Kildare.

Findings

Based on our survey:

- ⇒ 94% of respondents agree sustainability is important to them.
- ⇒ 86% feel they should be taking more action to live sustainably.
- ⇒ Cost (79% of respondents agreed) is the biggest obstacle impacting people's ability to live more sustainably.
- ⇒ 63% of respondents stated that the increased cost of living affects their ability to live sustainably.

Analysis and Discussion

On analysis of our survey results we can clearly see that living sustainably is important to the people of Newbridge. However significant rising costs of living impacts their ability to take steps to live more sustainably. To counteract these challenges we are putting forward 3 proposals that we believe the Newbridge community, together with local and national government can implement. In this way we can support the people of Newbridge in living more sustainably in spite of rising living costs.

713 people responded to our survey.
94% of respondents take action to live sustainably.

The top actions taken are as follows:
Recycling: 97%
Reducing food waste 82%
Reducing single use plastics 58%
Adapting their home to conserve energy 47%

Figure 5: Identify the actions you have taken to live sustainably.

63% agreed that the increased cost of living affected their ability to live sustainably.

Figure 4: Has the increased cost of living affected your ability to live sustainably?

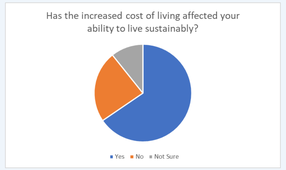
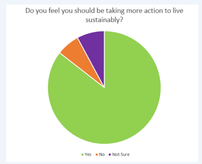


Figure 1: Do you feel you should be taking more action to live sustainably?



86% of respondents agree they should be taking action to live more sustainably.

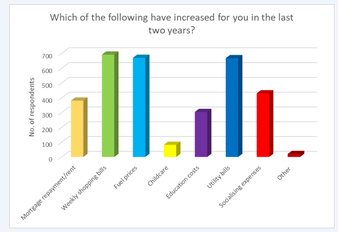
The following are the highest contributing factors impacting people's ability to put this into action:

Cost 79%
Challenges installing these in homes 42%
Grants are not sufficient 41%

Results

Figure 3: What impacts your ability to put this change into action?

Figure 2: Which of the following have increased for you in the last 2 years?



Respondents stated that the following have increased for them in the last 2 years:

97% Weekly Shopping Bills

94% utility bills and fuel

53% mortgage repayments

Proposal 1 – Cost Efficient Solar Panels

Chinese solar panels are 50% cheaper than those made in Europe and 65% cheaper than those made in the US (Yuri Erofeev 2023). We believe this is a viable option for the residents in Newbridge.

The table below indicates the household estimated annual spend on electricity in December 2023 for a 3 bedroomed home with normal electricity consumption levels is 4,200 kWh at a cost of €1,909.00 (electricity cost €0.3895 KWh. These figures are based on Electric Ireland's standard 24-hour tariff, standing charge of €272 and includes PSO and VAT at 9%. It also indicates the annual spend for a small business of 28 employees and a gastro pub in Newbridge, Kildare. If solar panels are installed on the above, then the following savings can be made per annum.

Table: Total Savings in Electricity with Solar Panels

(in a household, a business and a gastropub in Newbridge, Co. Kildare)

	ESB cost per unit of electricity €0.3718 KWh	Units used per month KWh	Total ESB bill per month (on average)	Total ESB bill per year (on average)	Total savings over 25 years with solar panels installed **
Household (3 bed house with normal ESB consumption)	€0.3718 KWh	4,200 KWh	€1,909	€22,908	**€22,500** (**€9000 saving over 10 years)**
Small Business (28 employees specialising in manufacturing of doors and windows)	€0.3718 KWh	18,350 KWh	€7,733	€85,772	€228,336 (**€91,334.40 saving over 10 years)**
Gastropub (Busy gastropub in the centre of town)	€0.3718 KWh	16,200 KWh	€6,843.24 (inc. standing charge of €201, trading charge of €810 and capacity charge of €354 p/m)	€82,123	€220,123 (**€88,049.20 saving over 10 years)**

* 10 of the recommended solar panels installed on the household, 80 solar panels on the business and 80 solar panels on the gastropub (34.4KW solar panels), as recommended (pipelyne.com).

The total savings over 25 years is as follows:

Household - €22,500

Small business - €228,336

Gastropub - €220,123

Proposal 2 - Magnetic Levitating Frictionless Vertical Windmill

One large maglev wind turbine could generate one gigawatt of clean power, enough to supply energy to 750,000 homes or 35% of all the homes in the whole of Ireland. It would also increase generation capacity by 20% over conventional wind turbines and decrease operational costs by 50%. If that isn't enough, the maglev wind turbines will be operational for about 500 years! (*International Journal of Research and Analytical Reviews 2019*)

Examples of this in China and Arizona, United States.

Power and Output of a Magnetic Levitating Frictionless Vertical Windmill

The power from turbine is related to the kinetic energy produced.
Kinetic Energy = 0.5MV2
The volume V' flowing in unit time through an area A, with wind speed V is denoted by AV and mass M is the product of Volume V' and density ρ so: M = ρAV
Putting the M in equation of kinetic energy we get:
Kinetic Energy = 0.5 ρAV3
But Power is nothing but the kinetic energy generated by the turbine.
Hence: Power=0.5 ρAV3 Where: Air Density (*ρ*) = 1.225 kg/m3 Area (A) = Swept Area of turbine blades Velocity (V) = wind speed in m/s

RESULT AND CONCLUSION:
By making this project we come to know that the output of wind turbine varies according to the wind speeds or wind velocities. If the wind velocity increases, then the output voltage also increase and vice versa. The voltage that can be generated is used to drive the loads like bulb, fan etc. Measurement of the angular speed of wind turbine is done by using the non-contact pipe tachometer to measure the rpm of wind turbine. With the help of this measurement we can measure output voltage by using a voltmeter.

Output power when loaded

Table.9.1- gives the output of the wind power

SR NO	SPEED OF THE TURBINE (IN RPM)	OUTPUT VOLTAGE (IN VOLT)	ANGULAR VELOCITY (RAD/SEC)	POWER IN WATTS
1	25	1.72	2.57	0.51
2	50	3.49	5.2	4.59
3	75	5.26	7.81	15.65
4	100	7.0	10.4	37.2
5	120	8.4	12.5	64

Proposal 3—The Archimedes Windmill

There is another energy source that could be used in Newbridge town also. It is a windmill that yields more energy (about 35% of all kinetic energy in the air), produces little noise (below 45dB), is bird friendly and also looks very good. It is the Archimedes Windmill. It outperforms all of its competitors. It is currently being used in Netherlands, Poland, Curacao and Spain.

The AWM comes in two sizes which are small scale in comparison to the Maglev but is being developed consistently:

A) The 1.5-meter diameter with a rated power of 550 w/h and a maximum of 700 w/hr.

B) The 0.75-meter diameter with a rated power of 100 w/h and a maximum of 150 w/hr.

Conclusion

94% of our respondents in Newbridge stated that sustainability is important to them. However, 63% of respondents are finding the increasing costs of living is an obstacle to living more sustainably. According to our survey spiralling costs in fuel prices, mortgage repayments, utility bills and shopping bills impacts respondents ability to put change into action in this area.

Based on our feedback we are proposing innovative and radical changes to ensure sustainable changes at individual, local and national level.

- To address respondents concerns about the cost of solar panels we are proposing importing cheaper Chinese solar panels which would result in a saving of €22,500 for an average household, €228,336 for a small business and €220,123 for a gastropub in Newbridge over 25 years.
- A magnetic levitating frictionless vertical windmill would harness wind energy in a far more efficient way in comparison to a conventional turbine resulting in 50% saving on operational costs and produce energy for 35% of all homes in Ireland.
- The proposed Archimedes Windmill (AWM) proves to be highly efficient, harnessing 35% of all kinetic energy in the air for our town.

At national level the Government of Ireland's Climate Action Plan 2023 describes how "every person matters, every place matters". We all have a role to play in ensuring no community, no sector and person gets left behind. We are happy to lead the way at ground level, but we will need top-down governmental support. It is a collective responsibility and ownership that is required to ensure real, meaningful, and sustainable reform starting in Newbridge and progressing to regional and governmental level.