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Green Home Technology in Residential Real Estate

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Paul College of Business and Economics

Honors Thesis

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Spring 2023

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Abstract:

This thesis paper explores green home technology in residential homes. The purpose of this research is to understand what green home technologies are, the extent to which they are being adopted, the factors that lead people to adoption, barriers to adoption, and if green home technology adds value to residential homes. The data methodology involves a literature review, and interviews with people who have adopted these technologies, people who have not adopted these technologies, and companies that sell these technologies. The results reveal that green home technology is something that is becoming more commonly adopted, due to factors like cost savings, energy efficiency, leaving less of a carbon footprint, and environmental awareness. These technologies include products like solar panels, smart meters, smart lights, geothermal heating, and smart plugs. Barriers that deter people from adopting green home technologies are cost, a lack of education on the subject, comfort with current systems, and a poor taste in green home technology companies. The results also reveal that green home technology adds value to residential homes. The findings of this research contribute to a better understanding of the value of green home technology in residential real estate, and what factors contribute to consumers decision making behaviors when it comes to adoption.

Introduction:

The topic of my thesis is green home technology in real estate industry on the homeowner side rather than the construction side. I think this topic is interesting due to the sustainability issues in the real estate industry that will need to be addressed in the future. I also think it is interesting because it can potentially save homeowners money, help us minimize our carbon footprint, and lead us to a more sustainable way of living everyday life. I am specifically investigating green home technology, which is technology added to a home with efficiency in mind. This technology reduces footprints left on the natural environment and causes us to be more energy efficient. In this paper, I will reflect on research that has already been done, conduct interviews with homeowners that have and have not adopted these technologies, and speak with people at companies that sell these kinds of products.

Methodology:

- Researching peer-reviewed literature on green home technology.
- Conducting interviews with homeowners and people that work in the industry.

Literature Review

The questions I was aiming to find answers to are as follows.

- What are examples of green home technology?
- To what extent are these technologies being adopted?
- What are adoption factors/non adoption factors?
- Does green home technology add value to residential homes?

In the first article that I read called “The Value of “Green” in Resale Residential Real Estate: Premium by Neighborhood Value Quintile, Homestead Status and Year” (authors & Anjelita Cadena & Thomas A. Thomson, 2021) in the Journal of Sustainable Real Estate, it is

stated that green home technologies do in fact add value to residential properties. A quote from the article that I think is relevant to my research question is,

“Houses with green characteristics include energy and water savings, enhanced comfort, and potentially increase an owner’s sense of environmental responsibility—all of which should add value to a home. The analysis presented here finds a statistically significant increase in the sale price for properties with green characteristics.”

In this article, the authors conducted a study on 146,000 home sales from the Multiple Listing Service in San Antonio Texas from 2009-2019. They found an average of 4.2% increase in sales prices of homes with green home technology compared to otherwise identical properties. The article argues that green home technology value in a home can fluctuate over time, this makes sense because sometimes value can only be defined by the person that owns the product. Green home technology can be seen as “hype” and have a high value originally when it is brand new, but the price can decrease over time depending on the value it adds. However, the authors found that overall, the value of green home technology increased over the ten-year period of the study.

In another article titled, “AI and the Future of Smart Homes” (Saber & Menes, 2020), a list is provided of various green home technologies that can be put in homes that make the home more energy efficient and sustainable. See Figure 1 below.



Figure 1

The chart lists technologies that can go on your rooftop, in your bedroom, bathroom, kitchen, living room, and garage. All the technologies listed are different price ranges and provide various benefits to a home.

Some of the authors in the articles I read did not see the benefit of green home technology (Horn, 2011). Horn discusses how refurbishment of existing homes and buildings can drastically improve energy use and is a faster and cheaper alternative to building something new. Horn also lists why homeowners could be uninterested in making their homes better for the environment. In this paper, Horn talks about how smart meters, which are an electronic device that records information such as consumption of electronic energy, voltage levels, current, and power factor, are not always as beneficial as they may sound, which I found interesting because of the opposing views of the other articles I have cited. Quotes that stood out in this paper include,

“Smart Home technology looks set to become a feature of people’s lives, whether it is wanted or not” and, “the success of using technology to promote sustainability in the home depends not only on the advancing technological development towards enhanced functionalities

and energy management, but also the needs and demands of households in the complex places that are homes.”

In the process of researching the extent to which green home technology is being adopted, I looked for information in three articles: “Review of Adoption Status of Sustainable Energy Technologies in the US Residential Building Sector” (Schwartz & Krarti, 2022), “Social Barriers to the adoption of smart homes” (Balta-Ozkana 2013), and “The role of human influences on adoption and rejection of energy technology: A systematized critical review of the literature on household energy transitions” (Chadwick 2021). Some key information I learned was that green home technology adaptation relies heavily on how drastically it would change the homeowner’s day to day life and the price of the technology. For adaptation by homeowners, beneficial statistics of these technologies need to be proven before adaptation. This makes sense because if technology were to change day to day life in a drastic way, people would be less likely to want to purchase that kind of technology for their home. Obviously, the factor of cost playing a role in adaptation is a factor in any sort of purchase made.

While doing more research I found that early adopters get the technology for their love of technology or environmental factors while late adopters get the technology due to the cost benefits. This makes sense because these technologies can be very beneficial for people that care about the environment; they can also seem very innovative for people that enjoy new technologies. A person of average middle-class income would become an adopter later than other people because they would want to see proof of cost saving before making an investment in these green home technologies. In another article I read, the influences of adoption were broken down into five major categories including cognitive influences, social influences, affective influences,

behavioral influences, and contextual influences. Below is a detailed table that is informative about the many different factors that lead to adoption or rejection of green home technology.

Refined influences	Descriptions of refined influences	Individual factors found to influence adoption and rejection
Financial	Technology costs, potential savings, and financial incentives	Financial support, feed-in tariff, cost, subsidy, rebate, electricity tariff design, savings, payback period
Knowledge	Skills to weigh up the financial influences and extent to which households understand the technology	Skills, awareness, experience, familiarity, confidence, tech-savvy, tech-friendly, energy literacy, interest in technology, maturity of market, complexity, disinterest, misunderstanding
Performance	Attitudes towards and perceptions of the technology's ability to perform as expected	Expectations of tech, perceived performance, better, attitude towards the technology, belief, fault liability
Health	Householders suffering from poor health	Physical vulnerabilities
Pro-environment	Attitudes towards the environment	Sustainability, environmental concern, environmental preferences
Norms	Perceived expectations of the community's households live in	Subjective, personal, cultural, organizational norms, peer effects, family, social desirability
Social harm	Negative perceptions of receiving financial assistance	Stigma
Responsibility	Ethical considerations and beliefs about where responsibility for the energy system lies	Ethics, someone else's responsibility
Uncertainty	Attitudes towards risk, concerns about rising costs, and desire for certainty and safety	Risk aversion, loss aversion, risk tolerance, risk seeking, certainty, concern with rising electricity bills, future price rises, risk coping, safety
Control	Fear of losing or need for control over own energy use	Loss of control, perceived behavioral control, override option, disenfranchisement
Trust	Perceived trustworthiness of governments and energy companies	Perceptions of government, reputation of energy companies, distrust, disenchantment, trustworthy information
Lifestyle	Desire for independence, attitudes towards energy conservation, and responses to life events	Autarky, identity, frugality, life events, high use, replaced old equipment, independence, self-sufficiency, household energy conservation practices, peak period of lifecycle consumption curve, political

Refined influences	Descriptions of refined influences	Individual factors found to influence adoption and rejection
Practical	How well households think the technology fits in with how they are accustomed to living	Comfort, convenience, reliability, time, form/level of energy consumption, routines, habits, context, technology preferences, flexibility, useful, durability, support, facilitating conditions, selling home, existing energy efficiency level, competing commitments, low usability, perceived ease/difficulty of use, effort, real not ideal consumers, apathy
Adopter category	Adopter categories from Rogers' Diffusion of Innovation theory	Innovator, early adopter, laggard, pioneer, early mainstream
Behavioral biases	Systematic deviations from expected utility theory identified by behavioral science, which favor decisions that maintain current living conditions	Present bias, procrastination, inertia, status quo bias, inattention
Dwelling	Characteristics of the building a household lives in	Age, type and quality of building
Socioeconomic	Statistics about the people comprising a household	Income, age, education, gender, savings, household size
Tenure	Relating to household occupancy of their home	Own, rent, duration
Geographic	Aspects of household location	Urban, suburban, regional, remote, climate, population density, vicinity
Access	Conditions facilitating access to technology	Infrastructure, ease of access, policy

Table 1

Table 1 shows 20 different influences that can affect a consumer's decision on adopting or rejecting green home technology (Chadwick 2021). This is important to consider when investigating the extent of these technologies being adopted.

Data Methodology:

Interviews were the main instrument for collecting qualitative data from respondents. The goal of these interviews was to get more information to help me answer the questions I have

been aiming to answer. The interviews were recorded and transcribed over Zoom, lasting between 5 and 20 minutes each. Listed below is the questionnaire I utilized while doing interviews, and the sample of people I interviewed.

Questions for Homeowners:

Which green home technologies come to your mind when I bring up the subject?

What kind of green home technology do you have in your home?

Why did you adopt these technologies?

What benefits did you expect? Did you receive them?

What does the product do?

How does it provide benefits to the home, environmentally and financially?

To what extent are these technologies adopted in your community?

What is the biggest benefit of adopting this technology has provided?

What stops you from adopting more of these technologies?

What do you think stops others from adopting these kinds of technologies?

How much have you spent on these technologies in the past 5 years?

When did you buy the home? Did it come with this technology?

Questions for Companies:

What green home technologies do you sell?

What do these technologies do?

How do these technologies benefit the people who purchase them?

How long does it take for these products to provide a financial benefit for the homeowner?

How do these technologies make the average home more sustainable?

How does the product benefit the environment as a whole?

What is the adoption rate of these technologies?

What prevents people from adopting these technologies?

What is the “life span” of a product like this? Cost of repair?

What do you think the future of these technologies will look like?

Sample

Respondent	Description	Adopted Green Home Technology
Respondent 1	Male in mid 50s	Solar Panels
Respondent 2	Male in upper 20s	Solar Panels, Power Meter
Respondent 3	Female in mid 50s	Solar Panels
Respondent 4	Male in mid 20s	Smart Thermostat, Smart Lights
Respondent 5	Male in low 60s	Solar Panels
Respondent 6	Male in mid 20s	Non Adopter
Respondent 7	Male in mid 40s	Non Adopter
Respondent 8	Male in upper 40s	Non Adopter
Respondent 9	Male in mid 20s	Non Adopter
Respondent 10	Male in low 30s	Non Adopter
Respondent 11	Company	Sells Smart thermostats
Respondent 12	Company	Sells Solar Panels
Respondent 13	Company	Sells Solar Panels
Respondent 14	Company	Sells Heat Pumps and Solar Thermal Heating

Figure 2

I interviewed five people who have adopted green home technology, five people who have not adopted green home technology, and representatives of four green home technology companies. The respondents were located mainly in New England, the green home technology companies being an exception. The respondents were picked through a contact that I knew prior to the study and through research that I had done on the companies. Although most respondents were male, I meant to speak with both homeowners, but in most cases the male homeowners were the ones that wanted to participate in the study.

Data Analysis

The Interviews were recorded and transcribed on Zoom. When I started the process of analyzing the data I received from the interviews and working off the transcripts, I referred to a YouTube video that was very helpful (Löfgren, K. 2013). The video demonstrated a good process that was very well explained on how to properly conduct qualitative data analysis. First, I separated my interviews out into three groups: adopters, non-adopters, and companies. Next, I combined the interviews in each group and listed out what the data was telling me for each group. The questions I aimed to answer are as follows:

- What are examples of green home technologies?
- To what extent are these technologies being adopted?
- What are the factors that lead to adoption/non-adoption?
- Does green home technology add value to residential homes?

Results

What are examples of Green Home Technologies?

When answering this question, I referred to the interviews I conducted and found similarities between them and *Figure 1* in my literature review. I found that the most common example of green home technology was solar panels; it was the most well-known example across all my interviews. I found that non adopters to green home technology brought up solar panels when asked what comes to mind when you hear the words green home technology. Other examples that were less commonly stated that I heard in my interviews were smart meters, smart lights, geothermal heating, and smart plugs. These examples were less known by nonadopters, and more known amongst the group of people that had adopted these technologies.

To what extent are Green Home Technologies being adopted?

Aligning with the secondary research I did, all three samples of respondents commonly agreed that green home technologies are becoming more adopted as time goes on. When interviewing people that work at companies that sell green home technology, it was apparent that these technologies were becoming more popular, especially solar panels. Most of the company workers said that they saw people around the town they live in adopting solar panels and mentioned that they think these technologies will become increasingly common in the future.

- Respondent 12 said the company they work for is putting up about 70 solar panel units per day.
- Respondent 2 said they have seen more green home technology around their community and close circle of friends.
- Respondent 5 said green home technology is becoming increasingly popular where they live.
- Respondent 3 said they see more people in their neighborhood adopting solar.
- Respondent 4 said their friends got smart thermostats after hearing about the benefits.
- Respondent 6 said they notice a lot more people putting solar panels on their houses.
- Respondent 7 said they notice the town they live in adopting to solar along with other people in their neighborhood.

What are the factors that lead people to adopt, or not adopt Green Home Technology?

Listed below are results from the interviews I conducted indicating the factors most often mentioned.

Adoption Factors

- Saving money
- Leaving less of a carbon footprint
- Feeling more energy efficient
- Awareness of the environment

Non-Adoption Factors

- Upfront cost
- Lack of education about green home technology
- Comfort with current system
- Negative perception of solar companies

When comparing the results of my interviews with the secondary research of my literature review, I found a strong correlation between the two. Referring to *Table 1*, the number one influence that leads to adoption or rejection of green home technology was financial influences. I found this to be the top reason people adopted or rejected green home technology in my interviews. The adopters biggest influence on purchasing the products was saving money on costs (electric bill, heating, etc.), while non-adaptors biggest influence was the upfront cost of the technology. Referring to *Table 1*, the second influence on the chart is knowledge. I found that the second biggest factor for non-adopters was the lack of education about green home technology. Knowledge was also a factor for adopters because they knew about the cost savings and energy efficiency they would receive when they purchased these technologies. Another influence on *Table 1* was practicality, or how well households think the technology fits in with how they are accustomed to living. In my interviews, I found this influence to be a factor as to why people did not want to adapt to these technologies.

- Respondent 3 said the biggest reason for adoption was to save money.
- Respondent 6 said the main reason for not adopting solar was they are not able to afford the investment.
- Respondent 10 said the main reason they have not adopted green home technology is the lack of knowledge they have on it.
- Respondent 2 said they have a better peace of mind knowing they get their energy from a renewable energy source.
- Respondent 8 said their eclectic bill is not bad, and they are comfortable with the way things are.
- Respondent 1 said their family is big on getting rid of fossil fuels.
- Respondent 4 said they adopted green home technology because it is better for the environment and wanted to lower their electric bill.
- Respondent 7 said pricing was the reason that leads them not adopt green home technology

Does Green Home Technology add value to residential homes?

When analyzing the information I have gained through my research, it appears that green home technology does add value to residential homes. I found that solar panels add the most value to a home, while other examples of green home technology add value in cost savings and energy efficiency. Individuals who are not adopters of green home technology commonly agree that they think green home technology would add value to the home.

- Respondent 1 said solar added \$50,000 in value to their home when they sold it.
- A 10-year study done in Texas showed an average of 4.2% increase in sales prices of homes with green home technology compared to otherwise identical properties.

(authors & Anjelita Cadena & Thomas A. Thomson, 2021)

Implications for Homeowners

Due to the numerous benefits it can provide, I believe adopting some kind of green home technology is an excellent choice for the consumer. Although some examples such as solar panels can be an expensive initial investment, they pay for themselves overtime and add value to the home. More affordable options of green home technology also add value to the home by saving on general costs and making the home more energy efficient. Green home technology helps reduce personal carbon footprint, benefits the environment, and potentially stimulates communities to go greener.

Implications for Green Home Technology Companies

Marketing and advertising for green home technology products need to be provided in a more educational tone rather than a sales tone. Some people have negative perceptions on green home technology products due to the aggressiveness of salespeople. Most people who have not adopted green home technology said they were uneducated about these products. I think companies that sell green home technology should explain the value and benefits of their products better to consumers. If advertisements were to be more educational, I believe people would be more inclined to adopt these technologies. I recommend that companies advertise at places like Home Depot or Lowes and target homeowners older than 35 who may not be educated on the benefits of green home technology. The advertisement can be something basic like a sign that explains the benefits of green home technology in a simple, easy to understand, and visually appealing way.

Conclusions

- The most adopted green home technology I found when conducting interviews was solar panels. Other technologies that were adopted by respondents include smart plugs, smart meters, smart lights, smart thermostats, and geothermal heating.
- Green home technology is becoming increasingly popular.
- Factors that lead to the adoption of green home technology are cost savings, reduction of a personal carbon footprint, and an increase in property value. Barriers to adoption include lack of knowledge, comfort in current systems, and costs.
- Green home technology does add value to residential homes. The amount of value depends on what kind of technology it is, how much it originally cost, and how long it takes to have a return on the original investment.

Outlook

Now that I have conducted research on this subject, I believe additional research would be beneficial to help further define the financial benefits that green home technology adds to residential homes. Further research would also be beneficial to understand the future of green home technologies and if they will continue to be beneficial to consumers.

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Appendix

Figure 1



Table 1

Refined influences	Descriptions of refined influences	Individual factors found to influence adoption and rejection
Financial	Technology costs, potential savings, and financial incentives	Financial support, feed-in tariff, cost, subsidy, rebate, electricity tariff design, savings, payback period
Knowledge	Skills to weigh up the financial influences and extent to which households understand the technology	Skills, awareness, experience, familiarity, confidence, tech-savvy, tech-friendly, energy literacy, interest in technology, maturity of market, complexity, disinterest, misunderstanding
Performance	Attitudes towards and perceptions of the technology's ability to perform as expected	Expectations of tech, perceived performance, better, attitude towards the technology, belief, fault liability
Health	Householders suffering from poor health	Physical vulnerabilities
Pro-environment	Attitudes towards the environment	Sustainability, environmental concern, environmental preferences
Norms	Perceived expectations of the community's households live in	Subjective, personal, cultural, organizational norms, peer effects, family, social desirability
Social harm	Negative perceptions of receiving financial assistance	Stigma
Responsibility	Ethical considerations and beliefs about where	Ethics, someone else's responsibility

Refined influences	Descriptions of refined influences	Individual factors found to influence adoption and rejection
	responsibility for the energy system lies	
Uncertainty	Attitudes towards risk, concerns about rising costs, and desire for certainty and safety	Risk aversion, loss aversion, risk tolerance, risk seeking, certainty, concern with rising electricity bills, future price rises, risk coping, safety
Control	Fear of losing or need for control over own energy use	Loss of control, perceived behavioral control, override option, disenfranchisement
Trust	Perceived trustworthiness of governments and energy companies	Perceptions of government, reputation of energy companies, distrust, disenchantment, trustworthy information
Lifestyle	Desire for independence, attitudes towards energy conservation, and responses to life events	Autarky, identity, frugality, life events, high use, replaced old equipment, independence, self-sufficiency, household energy conservation practices, peak period of lifecycle consumption curve, political
Practical	How well households think the technology fits in with how they are accustomed to living	Comfort, convenience, reliability, time, form/level of energy consumption, routines, habits, context, technology preferences, flexibility, useful, durability, support, facilitating conditions, selling home, existing energy efficiency level, competing commitments, low usability, perceived ease/difficulty of use, effort, real not ideal consumers, apathy
Adopter category	Adopter categories from Rogers' Diffusion of Innovation theory	Innovator, early adopter, laggard, pioneer, early mainstream
Behavioral biases	Systematic deviations from expected utility theory identified by behavioral science, which favor decisions that maintain current living conditions	Present bias, procrastination, inertia, status quo bias, inattention
Dwelling	Characteristics of the building a household lives in	Age, type and quality of building
Socioeconomic	Statistics about the people comprising a household	Income, age, education, gender, savings, household size
Tenure	Relating to household occupancy of their home	Own, rent, duration
Geographic	Aspects of household location	Urban, suburban, regional, remote, climate, population density, vicinity
Access	Conditions facilitating access to technology	Infrastructure, ease of access, policy

Figure 2

Respondent	Description	Adopted Green Home Technology
Respondent 1	Male in mid 50s	Solar Panels
Respondent 2	Male in upper 20s	Solar Panels, Power Meter
Respondent 3	Female in mid 50s	Solar Panels
Respondent 4	Male in mid 20s	Smart Thermostat, Smart Lights
Respondent 5	Male in low 60s	Solar Panels
Respondent 6	Male in mid 20s	Non Adopter
Respondent 7	Male in mid 40s	Non Adopter
Respondent 8	Male in upper 40s	Non Adopter
Respondent 9	Male in mid 20s	Non Adopter
Respondent 10	Male in low 30s	Non Adopter
Respondent 11	Company	Sells Smart thermostats
Respondent 12	Company	Sells Solar Panels
Respondent 13	Company	Sells Solar Panels
Respondent 14	Company	Sells Heat Pumps and Solar Thermal Heating

Interviews

Respondent 1

Were basically had insulation up about 3 feet from the ground, and everything else was hollow.

16:52:51

So they came and popped a few cloud boards off, and build the walls with installation for free, which was great and then, while they were there, they asked, You know, have we ever considered Solar?

16:53:03

So we're big on getting rid of fossil fuels in our family.

16:53:09

So we said we'd love it if we, if it works so they did the whole thing took the aerial photos and sun, you know.

16:53:17

They did. It's pretty intensive and scientific, you know, with all the you know, the path of the sun over the year, and how much you know Southern exposure and all that stuff and pretty cool information, and they said, yeah, if we put up a 23 panels on your house

16:53:37

we should be able to give you 89 90%.

16:53:40

The electricity you need for the year from it, and we said, Sure, so I think this is May 2,015.

16:53:53

We were looking at doing this, and there were programs with the Federal Government was given like a 30% rebate on whatever you paid in Massachusetts had another 7 or 8 10%, or whatever it was.

16:54:05

So I think our total cost is 51,000.

16:54:09

We ended up paying 35,000 out of pocket for it.

16:54:13

Rest was, you know, came back from the Government, and we just at the time we just kind of line item, budget did that for the year, and made it part of the value of the House, and the best thing was the fact that we had no electric bill for the next 5

16:54:34

years we lived there. I mean, basically from March to. So January, the energy produced by the solar panels covered everything we used.

16:54:35

Uhhuh.

16:54:51

And we started, course, as the weather got better in April, May, June, into July.

16:54:55

We started getting credits that built up, and they carried through through January.

16:55:01

I think that we had like we would get a bill in February or for January, and one in March for February.

16:55:08

I think our total electrical expenses for the year were under \$300.

16:55:14

Plus. We were getting the, you know, the S. Rex, the solar residential energy crew, so that was paying us close to \$5,000 a year.

16:55:22

Which helped offset, you know the initial cost covered the \$300 in electric bills, and my wife even bought a hybrid Plugin Prius.

16:55:35

And so you know, we're basically charging the car with the sun her commute to work back and forth.

16:55:41

Never use more than electric power. So she would run her car for a year without filling gas, and it was pretty incredible, all of which made me feel good about doing like my part to say, I know that, you know, in the wintertime, when I'm not generating enough, electricity

16:55:54

Hmm!

16:55:59

that I'm using. That it's coming from, you know, and Star.

16:56:02

Whoever, however, they're generating it with coal, or or whatever fuels that are used, and I know I'm still not off the grid, as it were.

16:56:11

But at least you know, throughout most of the year I'm doing the best I can to generate my own power and use it, you know, from the sun, which was it can be feel pretty good, and then you know, when we sold the house we incorporated that as part, of the value too, so you know we

16:56:29

we not only did it kind of pay for itself over the 7 years we lived there with the and all.

16:56:37

Included, you know, a \$50,000 increase in the value of the home, because it's we told the people you don't have \$3,000 a year. Energy costs.

16:56:47

You have 300, so you're getting a deal when you buy the house.

16:56:50

So like, I said, where I'm living now, contemplating it.

16:56:56

We're possibly gonna remodel the house so the roof might change.

16:57:00

So, but if it once we make the determination, we'll throw solar panels wherever we go.

16:57:06

No. Do you have any other kind of other than the car?

16:57:11

Any other kind of technology in your home or prev home that you would consider energy saving or sustainable technology.

16:57:21

Not really. I mean, you know, we've considered like a switch into heat pumps as opposed to oil furnaces, you know, I've I've been reading about it.

16:57:34

We actually, at 1 point, we're about to buy out a house that was new construction.

16:57:37

And I was talking to the builders, they said, You know what kind of heating are you planning to use?

16:57:44

And oh, we're just gonna put an oil tank.

16:57:45

And I said not a heat pump, I mean, they're much more efficient, and they don't suck up fossil fuels.

16:57:54

But they weren't doing that. This was on Nantucket, so we ended up not buying the house and if we had, we probably would have pushed for heat pump kind of stuff.

16:58:03

But we don't currently have anything like that at the moment.

16:58:07

But you know we're here. We're living on Cape Cod.

16:58:15

They use a lot of the splits that we can do both A/C.

16:58:22

And any their electric, I think, and a little bit more efficient.

16:58:30

So, of course there the house has oil heat. So we're still using that.

16:58:36

But yeah, the Mini splits seem to do a good job of cooling things off in the summer time without using terrible amount of energy.

16:58:44

But you know, I guess it's, you know, a conscious thing.

16:58:49

You have to kind of be willing to look into it and explore it and make decisions because people aren't like, especially with existing housing and all that.

16:59:02

It's all based on 19 sixtys technologies. Still.

16:59:07

So, you know, to get away from that. You kinda have to be willing to layout a few dollars to change over if it's important, which I think it is so.

16:59:16

Yes, when you put up those solar panels, do you notice, or did you have any of your friends?

16:59:21

Asked you about it, or anyone in your neighborhood around surrounding adopt to those technologies, or were interested in them. Maybe.

16:59:29

You know, I had a lot of people ask me about it, and you know I gave them the same spiel I just gave you about how you know I have no electric bill I know it's a you know, an issue outlay with expensive but you know I have no electric bill and i'm

16:59:45

generating my electricity from the sun, and it's great, you know.

16:59:48

Everybody should do it. I don't think anybody ever ever did.

16:59:52

You know. Unfortunately, I like, I said. It's it requires a bit of effort, I think, in that, and I think that's probably the biggest stumbling block for most people.

16:59:57

Yup!

17:00:02

It's like you've got to.

17:00:07

Put out a few dollars, make few changes, you know. They took them like a month to put them on.

17:00:14

They had to go re check the roof and make sure it was.

17:00:16

You know, structured enough to support them, and all that stuff.

17:00:20

So they were up in the attic climbing around for a week or 2, banging on May so it's you know.

17:00:25

It's a little thing that you have to be willing to make the effort to have it happen, and like yes, for a lot of people, they just start willing to, you know, yeah, we're looking for.

17:00:38

We're on the Cape right now, and we're living in with a my wife changed jobs, and we're living in a rental house we own here, and we're looking for permanent house, and anytime I see a house listed. Then they see Solar.

17:00:52

Panel on the roof. It's always the selling point for me, because, you know, I know the benefit of it, you know, and if I've been through that process, and you know, if I'm looking at a house, it doesn't have it.

17:01:04

One of the first things on my mind is, what's the orientation on the roofs here?

17:01:08

It's kind of good Southern exposure, because one of the first things I'll probably do is call somebody and say, Hey, I like to get solar panels put up.

17:01:18

I know the benefits they you know they have so.

17:01:21

But again, like I said it, I think, for most people there's an effort involved, and I don't. I get the sense.

17:01:31

Most people aren't willing yet to make that effort which is unfortunate, because I think it's it's needed, and I think it would drive.

17:01:39

You know, the the new energy technology. If more people were pushing for it, you know, and asking for it.

17:01:45

Yeah, I I don't know like I said, but I would talk to friends about how.

17:02:22

Yeah, you know. Cost me a few dollars upfront.

17:02:26

But I'm getting these checks, and I'm not sending in \$300 checks a month to the electric company.

17:02:32

So you know, and of course I look. We did this in top spilled where the people I knew could afford it if if they wanted to make the effort.

17:02:43

You know, it wasn't like a big expense, for most of the people who lived in that area, but it's just, you know.

17:02:51

I guess you know the oils pumping out of the basement.

17:02:56

So why do I need to change? You know it? Just it baffled me in a way, because it seemed like, you know, I I should see I should see houses, you know, down the street with solar panels.

17:03:10

Everybody should be switching over, you know, in the end we'd all have I guess, hard for people to grasp if I said, Well, it's going to cost me 35,000 but I know I'm saving \$3,000 a year plus I'm getting \$5,000 a year so in

17:03:28

4 years I'll get my investment back. I can now put that into the sale of my house as a feature, and increase the value of my house, so what's the downside on this?

17:03:41

I'm not seeing one, you know, and I I it always baffled me that more people weren't jumping on it.

17:03:42

Exactly.

17:04:52

4 year turnaround is really impressive. I didn't.

17:04:55

I didn't expect it to be that close.

17:04:57

Yeah, I mean, like, I said, Demeter. I think that was 35,000 and a new.

17:05:04

Our annual energy cost was about 3,000 a year.

17:05:07

I was, you know the S. Wreck.

17:05:11

Some of those summer months when the sun was beaten down, we'd get a check for like \$2,500.

17:05:18

After a quarter like what the exit from? Oh, yeah, it was a really really bright, bright August, you know, and it's the Esthrax were based on on power produced by kilowatts.

17:05:29

Pretty. So so, yeah, over the course of the year, you know.

17:05:33

\$5,000 in checks, \$3,000, less, 8,000 bucks for 4 and a half years paid for it.

Respondent 2

19:35:45

So when I say the words green home technologies, what comes to your mind?

19:35:55

I mean, sounds like a company that's that talks about like some sort of renewable energy sources supplying energy to your house.

19:36:05

Alright. So what kinds of greenhome technology do you or did you have in your home?

19:36:11

We had a solar panels on the roof.

19:36:15

We had those installed once, ever sort trade their rates, because we figured the rate.

19:36:20

The difference with me paying and the electrical bill versus property taxes would be a lot better.

19:36:26

Alright. So you kind of told me why you adopted those technologies.

19:36:31

But what benefits did you expect?

19:36:34

The main benefit was costs, and the other slight benefit is just like, I guess, a better piece of mind, knowing that getting energy from a renewable energy source.

19:36:45

Oh, yeah, cost and reliability. I don't have to worry about rates getting raised on me again.

19:36:51

Alright. And then, did you have any other technologies that you would dive into that?

19:36:54

I do. Yes, so I got this. It's like this power meter.

19:36:58

You can plug into the wall it will tell you, with the sort of energy is being read from how much energy is being used by whatever.

19:37:06

So you can go through it. I went through and checked everything around the house and got to see a lot of different like.

19:37:11

How much stuff energy draws that can see what draws things, even when it's on or off.

19:37:16

So I know, like a phone charger has been plugged in and not being used, it's still drawing power, so I can just unplug it when not being used.

19:37:24

It'll save me. Energy!

19:37:25

So what's the biggest benefit of adopting these technologies that you've seen?

19:37:29

Definitely, my cost for my electric bill. That was where I see the biggest benefits, and it's like using it with like like, license here, like I learned to having them on like different colors will use less electricity.

19:37:43

So I'd say the overall benefit I got from all this was having a like a lower electric bill.

19:37:48

And what do you think stops others from adopting these kind of technologies?

19:37:53

I mean, I would say, like a lack of information if like, if they don't if they don't know what's available, then that's that could be why, I know most of this I have, because I'm taking a renewable energy's course.

19:38:04

So I did that with college. So, but yeah, that's that.

19:38:11

Probably my main reason, I would guess.

19:38:13

And to circle back around. What extent are these technologies adopted like in your community?

19:38:20

Well, I mean I've had other of my friends use this as well, so they can.

19:38:25

They went through, and you, and like went through their house, and he was where the electricity they drawing is.

19:38:30

So I've had it's just like my immediate circle of friends throughout my community.

19:38:35

They've been benefiting from it as well.

19:38:37

Awesome and just to wrap it up here. How much do you think you spent on these technologies in the past 5 years? And do you think it provided value to your home?

19:38:48

This was \$12, and absolutely provided value to my home. We did the solar a while ago, probably 6 years ago. That has completely paid for itself.

19:38:53

I I know a lot better now about how how much money, about where I'm spending the most money on electricity, and I can be more mindful of that.

19:39:02

I've already seen my electricity bill drop from the past couple of months after I've used the power meter it so definitely been helpful.

19:39:09

Respondent 3

18:17:56

And so I guess we'll start off with when I say the term like green home technology is generally what comes to your mind.

18:18:05

Well, you know. So really, that's basically it.

18:18:12

I mean, you know there's other things for the home that would make it, you know, more green.

18:18:17

But, as far as I know, as far as we've done, we've really just gone solar what's just saying what comes to mind when you hear that word is what it's so.

18:18:26

Yeah, no, that's fair. So what was what was the decision making that went towards going for Solar?

18:18:27

Yeah, okay.

18:18:34

8 9 \$800 summer electric bills.

18:18:39

Yeah, I'd like to fill in a pond. And and we have. I work from home. And so I get some motors and lot of lights and stuff like that.

18:18:56

In the basement. Just kind of made sense, I think, and plus we got the equivalent of planting so far 375 trees.

18:19:02

Yeah.

18:19:12

There you go!

18:19:13

So far. So yeah, the Co 2 emissions.

18:19:21

So we get to do both, save them, save some money, and save the plan.

18:19:24

There we go, and so were those the only benefits you expected when when you initially did that? Or did you expect any other benefits?

18:19:30

No, no, it was mostly to try to save money, because I knew that electric was going up again, and the electric companies they keep going up.

18:19:39

That was our main concern was to try to knock down our electric bill a bit.

18:19:42

Did it meet your expectations like providing the financial?

18:19:47

Yeah, yeah. So far it's been good. It's it's saved us some money.

18:19:49

Has that met your expectations?

18:19:54

Yeah, yeah, yeah, I mean.

18:19:54

You see anybody else in like your neighborhood, or like, or your friends that have adopted to that kind of technology after you or before you.

18:19:57

Yeah.

18:20:03

Before and after several People.

18:20:14

A lot of people. A lot of people see us getting it, and they ask a lot of questions, and they talk about it.

18:20:19

And they think about getting it. But a lot of them are, you know, yet to pull the trigger, a lot of people aren't educated enough on it to make the investment.

18:20:22

My thing, my biggest thing, which is probably mine, into a lot of people, was that if we were gonna get solar I didn't want panels on the front of the house, and luckily the way that our house is we get full sun in the back, so we need to have any panels, on the front of the

18:20:34

Yup!

18:20:36

house which worked out because aesthetically, I just don't like that.

18:20:39

Look. I know it saves money, but I just didn't like that look, and luckily it didn't have to be that way.

18:20:44

So that was another factor involved in it.

18:20:49

When you said that people will talk to you about and stuff, but not pulled trigger.

18:20:55

What do you think is the the biggest thing that's stopping people from going for it?

18:20:59

Not enough knowledge on how everything works. The initial cost is, you know, they were a little vary of the of the cost of the system in a lot of we get a lot of people knocking on our door, and it's like you get overwhelmed with different companies.

18:21:15

It's like then it's like you don't know what to do.

18:21:18

And so I know, like our next door neighbor, they had them first, and then the neighbor on the other side of them.

18:21:24

They were talking to both of us, asking what our experiences, because they're thinking of getting it.

18:21:27

I don't know if they pulled the trigger yet, because there's so many companies out there, and everyone's reaching out. And, you know, like gets over overwhelming. Yeah.

18:21:29

Yup!

18:21:34

Yeah, that's what I've heard from other people, too.

18:21:36

Yeah, yeah, there's always, you know, there's several ways to purchase it.

18:21:42

So you know, people go. They do get a little bit confused. And which way to, you know which is the best way to go about it and stuff like that. So?

18:21:50

How much did you spend on it? You said.

18:21:52

I wanna say, it was around 35 38.

18:21:57

And how long ago did you? You get them?

18:22:01

In 2,021.

18:22:02

Okay, what's just the average rate, like, what kind of financial benefit have you seen?

18:22:04

Well, I mean, for instance, over the winter we don't.

18:22:09

If and you could go specific numbers or just general.

18:22:16

We don't have an electric phone. Well, I shouldn't say that we do technically have an electric bill because we pay a monthly payment on the electric itself for the system itself.

18:22:26

But that's minimal compared to what we you know, what we would have been paying.

18:22:32

They might be \$80 a year. Yeah, but you have to.

18:22:38

That's an \$800 difference.

18:22:43

You have to. Yeah, factor in the \$203 monthly payment for the solar system itself.

18:22:51

Okay, and.

18:22:52

So we. So that's part of the that's part of the payment.

18:22:55

We pay a monthly bill for the solar. The system itself, and we got like a 20 year plan.

18:23:03

So I mean, we keep the same payment for 20 years, and then, whatever the electric bill is that's on top of that solar payment.

18:23:11

Now for the winter we get a credit because we haven't used as much so as much electric.

18:23:16

So we get a creditor in the winter, and in the summer time, you know, the bills are much smaller.

18:23:22

You know we can.

18:23:22

Do you get? Do you get a tax break, or anything?

18:23:26

Or does the State give you that?

18:23:26

Yeah, we get it. You get a one time tax break 50, 15.

18:23:34

I forget the percentage. But you get a percentage the first year on your State and Federal taxes.

18:23:40

I think the State was a \$1,000 straight, and the battle was 15 no, 15,000 yeah. Well, it came out to about 15 grand.

18:23:54

Yeah, I figure I may get the percentage. Yeah, I don't remember the percentage of that. But yeah, there was a tax break. The Federal and State and the Federal one was the big one.

18:24:00

And then last question that I have on my my questions.

18:24:03

Here is what? When did you buy your home?

18:24:05

That was so. Yeah, we had a long time before we put solar on.

18:24:07

Okay.

18:24:12

And then overall just kind of going back to it.

18:24:16

Do you see any other benefits coming from a down the line, potentially or just the ones you've already seen?

18:24:21

Kind of.

18:24:22

Yeah, no like I say, I I think I'm hoping, and I think it will make the homework a little more in the end, because, as I say, you know, Solar.

18:24:32

It's becoming more prevalent. Everybody's gonna I think more people are gonna want it.

18:24:37

And so I think it will make the host a little more valuable.

18:24:40

So that's why I wasn't that afraid to do it?

18:24:42

Also, and you know I mean we'd sell the house probably.

18:24:49

I mean, you know, it's we have a 20 year agreement with with with the solo.

18:24:54

So I mean, you know it'll be we can pay it off, and it'll be scott free for the people who buy it, you know, other than what we might be able to add to the value of the house.

18:25:05

But because you could just transfer the payments over also, if you wanted to.

18:25:10

But you know they they could continue to pay that monthly bill. On this whole, too.

18:25:17

But we probably just paying off for them, and with the house.

18:25:22

Awesome.

Respondent 4

But Hi ready, which great home technologies comes to your mind when I bring up the subject of green home technologies.

17:00:17

Solar panels, a smart thermostat, maybe a like a battery for for the solar panels to keep energy charged.

17:00:33

Yeah.

17:00:38

Geothermal like hot water heater the things that go on your roof and heat your water.

17:00:46

The like, the smart outlets that turn off.

17:00:51

If you're not home, or your lights, that'll turn off. If you're not home.

17:00:53

The light bulbs. Yeah, that's what I got.

17:00:58

Awesome. So what kind of green on technology do you have in your home?

17:01:02

I have a I have a smart thermostat, and there's there's light bulbs that turn off when you we can leave for the connected by Alexa.

17:01:13

So so when when I'm out of the house, it connects to the thermostat and the light bulbs end it all, it'll turn the temperature or turn the air conditioning off, and then it'll make sure all the lights are off in the house.

17:01:25

Case. I forgot to turn them off when I leave.

17:01:28

Alright. And why did you choose to adopt these kind of technologies?

17:01:32

I chose to adopt these technologies, because I guess it.

17:01:37

Was one that sits better for the environment to hope save on my electric bill at the end of the month.

17:01:46

Energy rates here start to increase, and it's getting kind of sick of it and figured I could just put a little extra money into saving the environment, saving on my bill.

17:01:55

Alright, and with would that be the only kind of benefit it provides to the home or environment?

17:02:03

Or does. Do you get any kind of financial benefit from it?

17:02:05

Yeah, I'd say, definitely, a financial benefit. I've noticed that, like, you know, my bill's gone down a couple of dollars a month being able to keep the air conditioner keeping it off when I'm not home and and kind of keeping that a higher temperature and also being able to like change it on

17:02:22

the go on my phone like, yes, I'll be all these sorts of things that I can kinda fine or tune it to to make sure that I have you know I'm not using energy.

17:02:32

What I don't need to be.

17:02:34

Okay? And do you see these kinds of technologies adopted in your community?

17:02:39

Yeah, couple of my couple of my friends. I got onto this this way.

17:02:45

I have in the thermostats and stuff, because it wasn't that much of an initial investment, and you know I showed them how to work on the app, and and they liked it a lot.

17:02:53

So if a few of my friends got the thermostat too, and the light bulbs to get hooked up, cause it's just so easy, and you know it's real nice to have.

17:03:02

What would you say? The biggest benefit of adopting your you're smart.

17:03:08

Thermostats was.

17:03:12

I'd say the personal, the biggest benefit. I don't think it was really financial, but I think it came down to like ease of use like being able to control it from my phone is really nice to be able to, you know, if I'm online in bed.

17:03:29

I don't wanna turn down this turn down the A/C. I I don't have to get up.

17:03:34

But I'd say that's like the biggest benefit is convenience, you know, not having to work like if the light turns off or if the lights on across the house, and I gotta I gotta run out the door.

17:03:43

I don't have to worry about running upstairs and turn off the light like I know it'll just turn off if I'm leaving the house so that convenience factor.

17:03:47

Yeah.

17:03:52

And then, just like a secondary bonus, is the monetary from that.

17:03:56

What do you think stops other people from adopting these kinds of technologies?

17:04:02

I think it might be.

17:04:05

Well, one people. So people that don't know about it.

17:04:08

They don't know. It exists, and people are reluctant to try new things like, Oh, my! Thermostat works great!

17:04:16

Like. I don't wanna try something else, even though it's you know.

17:04:19

It's a quick install. You unplug it.

17:04:20

You plug the new one in, or a light Bulbia, you screw it in, and then it it just connects, which is real easy.

17:04:29

Do you have an idea on how much you've spent on these technologies in the past years past 5 years?

17:04:34

Hmm! Be hard to put an exact number on it. Couple of \$100.

17:04:42

Okay? And you recently bought your home right? And I'm assuming it did not come with the technology.

17:04:46

Yeah.

17:04:49

It did not. No, I added myself.

17:04:50

Okay. Awesome.

17:04:59

Respondent 5

Alright. So my first question is when I say that the term you know greenhome technologies.

What comes to your mind when I just bring up the subject?

18:02:02

Most of that solar panels to me, I mean, that's you know the bulk of it.

18:02:07

Okay? And you have solar panels on your home. And do you have any other sort of greenhome technologies?

18:02:10

We do!

18:02:14

No!

18:02:15

Okay, why did you dot this?

18:02:19

Well, at the time we thought it might be a good idea right now.

18:02:26

Really all we've done is offset our electric bill in the sense that we we have a loan for the solar panel.

18:02:35

So until we pay that off, we're not really seeing any benefit.

18:02:37

I haven't gone, and neither one of us have gone and bought an electric car.

18:02:43

We haven't swapped out you know. We haven't put in like heat pumps for air conditioning and stuff like that.

18:02:49

Or even a swapped out like a water heater to do something like.

18:02:53

You know, take more advantage of that power that we're generating.

18:02:57

So until the loans paid off. We really aren't to me are not seeing any sort of revenue from that.

18:03:03

We've just sort of installed the electric company.

18:03:05

We're paying the bank.

18:03:05

Okay. And so what benefits do you expect to receive once that loans paid off?

18:03:11

Once, if if we don't do anything.

18:03:14

Once the loans paid off, I mean, we'll we'll basically be offsetting the electric bill, which probably was about 160 bucks a month or so 170 bucks a month or so.

18:03:24

I've you know I've thought a little bit about putting in heat pumps.

18:03:30

You know, to get some central air because our house doesn't have central air.

18:03:33

Hmm!

18:03:35

So I I could utilize the heat pumps for that for that purpose, you know. It'd be easier to put those in than duct work and everything else that would sort of offset that electrical cost.

18:03:46

We've talked about potentially swapping out like this house right now is 21 years old.

18:03:53

So eventually, I'm gonna need a new water heater, you might be on borrowed time now, I think when that time comes, then what I'll do is I'll get a hybrid one, you know.

18:04:02

That would better utilize that. You know that solar power.

18:04:06

So I'd see some savings there because I'd move, you know.

18:04:10

Eventually, if I swapped over the hot water heater, I save save save on oils, you know, cause that would be running in the summer to heat the hot water.

18:04:20

Okay, what extent are you seeing the solar panels adopted in your community?

18:04:20

Things like that. Yeah.

18:04:29

It's how quite a bit, I mean.

18:04:31

There. There's a small folks farm up at the top of our hill.

18:04:35

We're in a pretty rural area as far as land goes.

18:04:36

Hmm!

18:04:38

I mean, we have 4 acres. There's like a 52 acre field across the street from us.

18:04:44

There's another 50 acre farm. Or used to be a farm on our hillside.

18:04:50

And then across the street from that is the small Solar farm that they've put in.

18:04:57

We did just last all. I guess there was a company that was looking to purchase the farm on the hillside and put in a I'm gonna say it was gonna take up 20 acres.

18:05:10

It was big. They want to put a solar farm in their pretty much.

18:05:15

Everybody sort of started questioning it pretty hard, and they wanted more time to sort of evaluate the placement so that they could sort of adopt some of the things the community would as far as hiding those panels from view for the most part, and I guess the from what

18:05:33

we heard the owners of the land didn't want to give them an extension.

18:05:38

They just wanted to sell and go. So they backed out of the deal.

18:05:41

But there's several solar farms in our area, you know, within probably 10 or 15 min of us.

18:05:49

They're becoming pretty common. A lot of people around here, you know.

18:05:53

There's several houses that have it on their house right in this neighborhood.

18:05:58

Okay.

18:05:58

That seems to be the bigger thing is putting it on the house there's a guy at the top of the hill from us that just put up one of the ones on the ground which looks like sort of a bunker wall that he put up between his house and the next door neighbors

18:06:11

but so it's fairly common.

18:06:15

Okay, what stops you from adopting, like other kinds of technologies, that you would, you would define as a greenhome technology, like, I say, a smart meter or something like that.

18:06:28

Not wanting, not wanting our power company to be able to control our power.

18:06:31

Okay.

18:06:32

Shut down when they want to. I haven't.

18:06:36

I've looked at the the Tesla walls to cause.

18:06:39

It was a deal going through our electric company where you could.

18:06:43

They basically give you the power wall you had to pay to install it.

18:06:46

But the deal was is during storms, you know. They could draw off of that they could draw down before a storm, you know, when they need it, for peak hours, but if there was a storm, then they wouldn't draw off of it but there's no control of that, you know so like oh, we'll leave you the

18:07:03

full charge, for you know a storm that comes. But if you're drawing down at peak hours beforehand, how's it?

18:07:10

Gonna have time to charge back up. So it's stuff like that that.

18:07:12

Yeah.

18:07:15

I I just backed away from.

18:07:16

Okay. And what do you think stops others from going with solar or other kinds of technology like that?

18:07:24

I would say probably some of the unknowns or things that people might not know to ask about beforehand. Just not understanding it,

18:07:32

Good example is the fact that we are. We're 5 5 years into having the solar on our roof.

18:07:40

We need a new roof. Now. We need our shoes.

18:07:42

Oh!

18:07:43

Redone, and at the time it was like, Oh, yeah, you know, you just schedule it with us.

18:07:46

We come out we take it down. You get the roof done.

18:07:50

We put it back up. It's about 1,500 bucks.

18:07:52

Yeah. The quote that they didn't want to give me, because they're supposedly trying to come up with a new plan was almost 10 grand just to take it down and put it.

18:08:00

So!

18:08:02

It's a third of the cost of the solder system that I had put in enough so that I am more than likely looking at only having a front side of my house done, and just using the solar panels as the protection, because it's that to me at

18:08:16

Okay, that's interesting.

18:08:22

10 grand to take it down and put it back up is not a cost, effective solution, and that's and that's you know, they were hesitant to even give a quote.

18:08:24

Yeah, it doesn't sound like one.

18:08:30

And they built the solar system for me. So I am like.

18:08:33

If this thing that went back on their word Toe!

18:08:35

Yeah, I mean, you know, obviously, that's not something, you know.

18:08:39

Things change over over time. Obviously, stuff gets more expensive. But when you're told roughly 50, you know, roughly, 1,500 bucks to take it down and put it back up because, you know, you've already bought the panels and stuff it's just a labor essentially that you're paying for

18:08:54

10 grands, a pretty steep Pill.

18:08:56

Yeah. And you said you, you said that was a third. So you paid 30 for the Solar path.

18:08:59

Yeah, it's about 33 for the whole system.

18:09:02

Okay. And you said your home was 21 years old.

18:09:03

Install, yeah.

18:09:06

Yeah, yeah.

18:09:07

Okay.

Respondent 6

17:10:30

So what kind of green home technologies come to your mind when I bring up the subject?

17:10:40

Solar Panels, Geothermal Energy.

17:10:48

That's about it.

17:10:49

Okay? And what kind of green home technology do you have in your home?

17:10:56

None!

17:10:57

Okay, is there a specific reason why you don't have any green home technology in your home?

17:11:05

What holds you back from adopting these kind of things.

17:11:08

It's expensive. Upfront, definitely. Don't have the money for that yet.

17:11:14

That's definitely the main thing.

17:11:20

Do you see these technologies adopted in your community at all?

17:11:26

Yeah, I say, so. I see a lot more homes with solar panels frequently.

17:11:30

Now!

17:11:32

Okay, do you think other people not adopting this is due to the upfront cost, like your situation?

17:11:41

I think upfront costs probably also a little bit of laziness and confusion.

17:11:49

And a lot of people just don't know. Probably the benefits.

17:11:54

Okay, do you see yourself down the line? If you investing in these kinds of technologies?

17:12:01

Yeah, I think I definitely will. Event. Why, when I got the money.

17:12:05

What kind of benefits do you expect from putting in this kind of investment?

17:12:10

I expect home value to go up, I'd say definitely pay off in the long run for how much electricity I'm actually like paying for on like a month to month basis compared to now.

17:12:33

May, my home would run better. I don't know.

17:12:36

Uhhuh. Alright! Well, since you don't have these technologies, that's all I really have for you today.

17:12:42

Sweet, awesome.

Respondent 7

Alright. So when I say the term, or use the term green home technologies, what comes to your mind when I bring up the subject?

16:44:36

Okay.

16:44:46

I would say, typically solar panels. And then there's been like one mills in different different technology like that.

16:44:56

Okay? And what kind of green home technology do you currently have in your home?

16:45:01

We currently do not have any technology green technology in my home.

16:45:06

Okay, why is that? Look what barrier generally stops you? Or what's the barrier that prevents you from going for something like that?

16:45:09

So far it's just been.

16:45:16

So far, it's mainly just been the money aspects between pricing cause.

16:45:22

A lot of these companies have been offering it for free.

16:45:26

But then, Jack, up your electricity bills through that way a little bit, and then that's reasoning why we haven't done it yet. I don't know a whole lot about it.

16:45:35

But we feel like if there's an option where the companies do not end up kind of price, gouging a little bit and varying the energy level, we would be interested in getting these services.

16:45:48

Okay. And what extent do you see these technologies?

16:45:53

Adopted in your community.

16:45:56

Throughout the community. I've seen many home owners put the solar panels on their houses, and then the town as a whole is also put fields full of solar panels as well trying to capture that energy and then reduce electricity in the town as a whole.

16:46:17

Is that the only thing that you would just say price is the only thing that stops you.

16:46:21

Yeah, I'd say so. Cause I'm a very eco friendly person as a, and we definitely, I would definitely want to use these products.

16:46:32

And the only reason not it's just been the price.

16:46:33

Do you think price is the reason why other people don't adopt these technologies?

16:46:38

Or you think there's other reasons.

16:46:39

I'd have to imagine. That's the only reason because why I feel most a lot of people nowadays are very eco friendly and China be conscious about global warming and trying to reduce emissions as a whole.

16:46:52

And I can only see Price being the only reason not to getting one on these parts.

16:47:01

Do you think solar would add value to the home even with its expensive cost?

16:47:09

Yes I do, I just can't get around the upfront cost of it all. I know people that have paid theres fully off and are still receiving benefits from it, I would imagine it adds the cost of the panels to the overall value of your house.

16:47:23

Ok, do you have anything else to add?

16:47:28

No, sorry not really

16:47:32

OK! Thank you! For your time.

16:47:38

Respondent 8

Non-traditional.

15:05:02

So you're saying like solar wind energy saving technology stuff like that.

15:05:06

Yeah.

15:05:07

Okay. And so you already told me you don't have any greenhome technology in your home.

15:05:13

And you said that electricity is cheaper. Where do you see those benefits?

15:05:18

And why do you say that?

15:05:20

Yeah, I mean, I'm not opposed to solar energy.

15:05:24

I just think the cost of installing it would be more than just paying 200 something.

15:05:32

Bucks, a month for electricity. Right? So why would I go?

15:05:37

Paid 20,000, I mean, I know there's tax incentives and rebates, and so forth, and you can sell back some of the energy.

15:05:45

But I think the parents of it, and just the initial investment that is not worth it right now until it comes down a lot.

15:05:55

Okay, and what extent are you seeing these technologies adopted in your community?

15:06:03

I know you recently moved. I don't know if you see people using this technology or know people using this technology in your community.

15:06:10

Yeah, I don't see anybody on my street or neighborhoods. Sometimes I do see them, and they obviously don't look all that great on top of a house.

15:06:22

Okay. And you're referring to like solar panels.

15:06:25

I assume.

15:06:25

Yeah, I mean, I have not seen anything like the Tesla.

15:06:29

Solar roof those look pretty cool, but I haven't seen it real live.

15:06:34

Yeah, those look like tiles. Right? So I think that might be more of a aesthetically pleasing way to go.

15:06:41

And so you mentioned costs being what prevents you mainly from and walk.

15:06:50

But is there anything else that stops you from adopting more of these technologies?

15:06:55

I mean, I just think it's you need the for the solution.

15:07:00

You need the problem first. Right? So what am I trying to solve by getting solar?

15:07:03

Nothing really, unless I just wanted to reduce my use of fossil fuels.

15:07:09

So there's no real need for me to do it.

15:07:11

I mean. I have, you know, other things internally in the house, such as digital stats, schedules on everything.

15:07:20

So it's pretty efficient as far as when he comes on, or when the A/C.

15:07:24

Comes on all the lights LED lights, and those are also on timers. So is that from that aspect it's sort of green or more efficient than humanly controlled.

15:07:39

And do you think those same reasons are what stops others from adopting these kinds of technology?

15:07:46

Yeah, I think so. I think I don't think so much is off the street. It's gonna say, when we spend on this morning on soil.

15:07:53

My electricity bills low. So he's like trusting would have to be a lot more expensive, or the technology would have to be a lot more cheaper.

15:08:01

Alright, and on average you said, How much do you spend a month on electricity?

15:08:07

200 a month.

15:08:13

Okay. And this last question, wrap it up quick, because a lot of these questions that I have don't apply to someone in your situation.

15:08:17

I know you moved recently. But when did you? When did you move?

15:08:24

2 years ago.

15:08:24

Okay. Okay, well, that's all I got for official questions.

15:08:28

Do you have any questions for me?

15:08:31

No good luck.

15:08:36

Respondent 9

17:39:40

I'm ready whenever.

17:39:42

Alright. So what kind of greenhome technologies come to your mind when I bring up this subject?

17:39:48

Solar panels. The only thing I can think of.

17:39:52

Nothing else.

17:39:54

No, I don't think so.

17:39:56

Okay, what kind of green home technology do you have in your home?

17:40:00

I do not have any.

17:40:02

What are the what's the main reason why you don't have any kind of great home technology.

17:40:07

I know it's pretty expensive. I also don't know much about it.

17:40:13

Okay. So there's some sort of educational barrier you'd say.

17:40:17

Yeah, I'd say so.

17:40:19

Okay, do you see these kinds of technologies adopted in your community?

17:40:25

I see solar panels here and there, not super often, though.

17:40:30

What are what have you heard? Are are beneficial about solar panels.

17:40:35

It's a renewable energy.

17:40:39

Is that all you really know about it?

17:40:42

I believe once you own the solar panel, then the electricity's free. Obviously.

17:40:49

Okay. And that would be about all you know.

17:40:51

Yeah, yeah.

17:40:53

Okay, what do you think stops others from adopting these technologies?

17:40:58

Do you think it's similar to yours like you said financially and educationally?

17:41:02

I'd say so. I don't see what else could be a factor.

17:41:05

Okay. Alright. Well, I appreciate your time today.

17:41:09

Yeah, of course.

Respondent 10

Alright? So what comes to mind when I bring up the subject of green home technologies?

17:13:56

Yeah.

17:14:02

Solar panels, Tesla battery wall.

17:14:16

The smart devices in your house that can regulate the lights, and like kind of save your electricity on that, like the smart devices.

17:14:27

Alright. And do you have any kind of greenhome technology in your home?

17:14:31

Nope!

17:14:33

Alright. And what are the reasons why you don't have this kind of technology?

17:14:41

If there are any reasons.

17:14:41

Well over the summer I had about 6 different solar companies coming to my house trying to sell me on it.

17:14:47

It's pretty annoying. My dog would go crazy. Hi!

17:14:50

Oh, I really knew! Was the prices very expensive?

17:14:58

Okay? And do you see these kinds of technologies adopted in your community?

17:15:06

Yeah, I do. I do, too.

17:15:08

Alright. Then you see that in like solar panels, or instant that kind of way.

17:15:13

Yeah, it seems like every other house has solar panels on it.

17:15:17

Alright, and do you?

17:15:22

You already gave me the reasons as to why you, haven't adopted these technologies.

17:15:28

But what do you think stops other people from adopting them?

17:15:34

I probably say Price having to stay in your home like I'm pretty sure once you get them installed, you can't really get out of it.

17:15:44

It's harder to sell your house. Your most likely on a contract I'm assuming for it, paying it off.

17:15:51

So you gotta stay in your house longer. So if you try to move in the next couple of years you wouldn't wanna go and get solar panels.

17:15:57

Okay.

17:16:00

And when did you buy your home?

17:16:08

During covid.

17:16:09

Have you ever considered adopting any green home technology?

17:16:11

Not really, I don't have a lot of time to. Do research.

17:16:14

Ok, do you have anything else you want to add?

17:16:16

No. Thank you!

17:16:20

Respondent 11

Alright! So what company do you work for?

19:13:03

So I'm representing a Eco. B. .

19:13:09

We. We offer a large range of products from thermostats mostly. But we have a whole range of home security applications that you can actually use the thermostat to control.

19:13:20

Okay? And so specifically, this thermostat, what does the thermostat do?

19:13:26

So actually, on average, we are using average cost of electricity, average cost of natural gas.

19:13:33

The percent of energy used for heating and cooling, we are able to come up with an estimate of average savings of \$284 per year for most people.

19:13:45

That's certainly the biggest drop, but the savings that come with an entire security package that includes a thermostat that controls everything is certainly another very worthwhile factor.

19:14:00

In addition it can it constantly monitors the level of humidity in the home, and it can adjust the temperature according to occupancy in different rooms, so all of that will help with contributing to savings.

19:14:16

Okay? And does that benefit the environment as well?

19:14:19

Yup. All of the obviously.

19:14:25

By saving it.

19:14:34

So you would say, the way these technologies benefit the people who purchased them is financially and environmentally.

19:14:42

Yup definitely, all of the money that's being saved when, like I just mentioned, when the thermostat isn't working the full capacity, because maybe there's no one in the home or the humidity has risen or lowered the full capacity because maybe there's no one in the home, or the humidity has risen or lowered all

19:14:58

of that. All of that money that's being saved is because of the energy being saved.

19:15:02

So it'll a 100% contribute to your carbon footprint as a whole.

19:15:06

Okay. And that would explain how it makes the average home more sustainable as well.

19:15:14

Do these products have an immediate, immediate financial benefit to the home?

19:15:19

I would say partially, but most of it definitely comes over time.

19:15:25

The kits that you can get with the full security systems and thermostats offer more savings themselves as you purchase more technology.

19:15:38

But certainly the equation that I mentioned before the savings of 2, 84 per year, which is an estimated 26%.

19:15:50

Again, for the average American just stacks up as the years go by.

19:15:53

Okay? And so what would you say prevents people from adopting these technologies? Would you say it's the initial cost?

19:16:01

I would definitely say so. So I think most people not don't want to do their own research, but maybe don't have the time, and aren't able to look into all of the benefits of a company like Eco.

19:16:15

B. But I think if everyone took a minute to do a little bit of research about the thermat savings, the smart sensors and cameras that we offer, I think most people would see that it's a truly beneficial deal.

19:16:34

Okay.

Respondent 12

Alright, so tell me what kind of green home technologies do you?

17:02:45

What do you work with? What industry? Just give me a brief overview of that.

17:02:48

Gotcha. Yeah. So we are a solar distribution company.

17:02:52

So we take care of supplying material to installers so that they can get solar up on the roof.

17:03:01

So everything from solar panels to inverters to balance the systems to electrical material, basically anything under the sun that goes up onto the roof to install solar, we sell it to installers so that they can take care.

17:03:17

Alright. And what are what are the main benefits you see from these technologies?

17:03:23

I mean, the main benefits currently with the increasing electricity prices are really just helping people be able to afford that better.

17:03:37

I don't think we're ever gonna really see a decrease in those prices.

17:03:39

So the Roi in the long run of sol solar on the home is, gonna be there forever, and then there's also the current tax credit that you get back when you install solar on your home.

17:03:54

So I think right now it's about 30% of it.

17:03:57

You. You can take off your taxes, and I would assume, if things continue to go the way they are that will continue to get renewed every year.

17:04:06

Okay, that's interesting. I didn't know that. How does you know how long you said you were talking about the return on the investment for the average person, and you can tell me who the average person is.

17:04:20

If you want, how long does it take to provide a financial benefit to the homeowner?

17:04:25

I mean it. Kinda all depends on your electricity uses. But I would say for the typical home owner, you're probably seeing benefits within 3 to 5 years. I would say.

17:04:39

Okay? And do you have information on how these technologies make the home more sustainable other than saving money?

17:04:48

Of course, for the homeowner.

17:04:53

That's a deep question may be above my pay grade.

17:04:58

I mean at the end of the day everything!

17:05:04

Let's see, how can I say this? I mean, it costs a lot of money and a lot of space, and a lot of time to keep the electrical plants up and have everything connected to the grid and continue to have that running so having solar on your own and kind of being able

17:05:30

to acquire all that energy from something that's or the sun from something that isn't.

17:05:38

Gonna take up people's time or spaces, or space is really gonna make the home more sustainable because I'm gonna spend all that money on running the electrical companies, you know, having people go out and fix all the electrical components of the electrical wire stuff like that so it's

17:05:59

a really nice. It's basically like, it's a home powered system.

17:06:03

So, I mean, if you want to, you can get completely disconnected from that, and not have to rely on anything from the electrical companies.

17:06:13

So it's a lot more sustainable for people to go that route rather than just paying the outrageous electrical bills that they do now.

17:06:20

Got it I think that was a really good answer to the question.

17:06:25

Do you have any information on the adoption rate of the specifics? Solar panels?

17:06:31

What do you mean like? How much there like? How heavy the market is on the solar panels right now, like how much people?

17:06:39

Yeah, how many people do you see? Turning over to solar panels?

17:06:43

From former Electric.

17:06:47

I mean with the current costs energies, I would say a ton to put it blatantly.

17:06:55

I think if I said at the grand scheme of business, that we do I mean we're putting solar on about 70 houses a day.

17:07:05

Oh, wow!

17:07:06

So, you know. Multiply that by 365 and so heck of a lot of solar going on roofs so and it doesn't seem to be slowing down at all.

17:07:18

So I would say the adoption rate is very high, and it's going to continue to be that way.

17:07:21

And are you in sales? What? What do you see that generally prevents people from going for something like this?

17:07:23

Yes.

17:07:30

Sometimes I would say it's the cost.

17:07:35

It. Kinda all depends on the installer you're working with, and the pricing that they can get what they're going to charge the customer.

17:07:45

It's a huge investment, most, you know.

17:07:48

If you're looking at an average system, you're probably 40 grand, maybe to get that installed big investment.

17:07:54

And I think it just comes around to the sales point of it, and you know, making sure that it pencils for everyone.

17:08:00

Taking a look at the numbers, and be like hey, here's what you're paying now, here's what you're gonna be paying 5 years down the line 10 years down the line and that's just going to be the main selling point for.

17:08:12

Everyone, I don't think there's really anything you can say poorly about using.

17:08:21

So it makes sense, and if the price is right, you know it makes total sense.

17:08:27

What's the life span of? I guess I would say, unit of what you sell.

17:08:35

And then also onto that. Is there an average cost of repair or.

17:08:41

Yeah, so completely depends on the manufacturer for costs to repair on that.

17:08:47

Some of them are super good. They're super happy to replace any panels that either are under performance.

17:08:54

Damaged in some sort of way, and then there's other manufacturers that just once the sale is made hands off. That's it.

17:09:05

What was the first question? Again?

17:09:07

Just the general lifespan of a unit.

17:09:10

Gotcha, yeah. So typically the panel's that we sell have a 25 year production and product warranty.

17:09:20

So some I mean, they can last for much longer than that.

17:09:24

But the coverage you're gonna have from the manufacturers is typically up to 25 years.

17:09:28

Okay, that's a lot.

17:09:32

And that's just a I ended off here. What do you see coming down the line?

17:09:37

What do you think the future? These technologies look like?

17:09:39

Yeah, I mean, I think what we're gonna see in the future is, you're you're gonna see a lot higher wattage panels.

17:09:49

So what we have going out right now for residential stuff is around the 400 Watt range so this, this all ties in electrical.

17:09:59

And like, once you look at at your electrical bill, and you'll see terminology and stuff like that.

17:10:06

But what I think we're gonna see is panels that are producing a lot higher wattage at hopefully a lower cost, because the production on panels is going up right now.

17:10:14

So we're seeing a lot more supply. And with the continuing demands, we're gonna have a lot higher wage panels.

17:10:22

Electric bill under constraints

Respondent 13

Alright! So what company do you work for?

19:05:33

I'm working for Grant state solar.

19:05:38

We've been the business since 2,008.

19:05:42

What specifically do you do? You do? There!

19:05:46

I do sales.

19:05:51

We do solar panels and installations.

19:05:57

Just get people into a more sustainable electric system in their home.

19:06:01

Okay.

19:06:03

So we we know that not every house is gonna be the same.

19:06:06

So we make sure C cater to your specific needs as as a person in your home.

19:06:11

Your roof, size everything down to the smallest details.

19:06:14

Okay, what kind of technical? What like, what do these technologies do?

19:06:21

Well, generally we have solar panels, and that kind of that gives you, you know, your own power, and that gives you, you know, saves you a lot of money on power bills, certainly more sustainable.

19:06:35

The whole world was on solar. Then we have a lot less of a crisis going on right now.

19:06:39

So I think solar is definitely a great solution. And I think.

19:06:41

Okay, so it benefits the environment, too. Okay? And how do these benefit?

19:06:44

Yes, absolutely.

19:06:49

Like homeowners.

19:06:51

Well, I mean just generally you save a lot of money. Aside from the initial initial cost of installing,

19:06:59

It's just constant, you know. From then on you're just saving money on power.

19:07:04

Okay. And so a general timeline. I've been hearing from across the across the sector people I'm talking to is a general timeline is 5 to 10 years for a financial to start really providing benefit profit-wise, you could say, or paying off the solar itself.

19:07:27

Is that the same is, does that kind of explain your process to?

19:07:34

Yeah, it's the same for most. Just because it's you can only get so much energy from the sun.

19:07:40

Hmm!

19:07:41

Yeah, so pretty much across the board, you get the same, you know.

19:07:46

Financial return across at most companies.

19:07:48

Okay. And so you mentioned benefiting the environment, and that environmental benefit is directly from using sustainable energy. I'd assume.

19:08:01

Yeah, absolutely. You know, most energy either comes from nuclear plants just all around, not great stuff for the environment.

19:08:17

So I think harvesting from the sun's a better option.

19:08:21

Long run.

19:08:21

Okay. And do you see a high adoption rate among these technologies like, is that a trend?

19:08:28

Is there more people adopting to this kind of way?

19:08:31

Yeah, absolutely. I think, just generally as a society, we we keep just more and more people are looking to become, you know, more sustainable.

19:08:46

They wanna have more and more sustainable living things.

19:08:51

And also obviously the cost benefit is incredible for a lot of people, especially after the 10 years you're staying the same house.

19:08:58

You're making a lot of money back.

19:09:00

Okay. And so what do you think prevents people from adopting these technologies?

19:09:09

I definitely think it's a lot of people not understanding the benefits of solar. And then obviously the money aspects, you know, initially, most most people, they just see the money that you're putting in.

19:09:17

It's tough to justify that in your daily life many people don't have that option off the bat.

19:09:21

Yeah.

19:09:24

So I think that's probably big a stopping point for people.

19:09:27

Okay? And what's the average life span on a project like product like this?

19:09:34

Usually 20 years. Just about yeah. It's just they lost a good amount of time.

19:09:42

You've made your money back by then.

19:09:44

And does it cost a lot for repairs? Is there a lot of repairs you gotta do on it?

19:09:50

Not. Really. It's really self sufficient.

19:09:55

They stay for a very long time. Yeah, you don't really have to worry about me.

19:09:58

Put them in there they stay there.

19:10:00

Okay? And you told me earlier that your company does the repairs on the panels for the customer right?

19:10:07

Yeah. So if there's any problems that you ever have, we'll definitely come right over to you, and you'll we'll take care of that for ya.

19:10:13

Okay. And what do you think the future of these technologies look like?

19:10:20

What's the future of?

19:10:23

You know, it's I think it's tough to get past the initial barrier to entry.

19:10:29

But I think, as people continue to see people around them getting solar energy, it's going to become more and more normal.

19:10:36

They're going to see that benefit. You're making your money back, and I think I see a bright future for solar panels and solar energy.

Respondent 14

Alright. So what kind of what kind of greenhome technologies do you sell, or do you work with?

12:12:14

Well, I'm in the with the heat insights.

12:12:17

It's it's heat pumps that we.

12:12:21

Yeah, that's the main thing that we do with sustainable.

12:12:24

Right? Yeah, in terms of renewables. Heat pumps, and then solar thermal cause I'm on the plumbing side.

12:12:32

So, yeah, so that's a man. But I haven't done for a little while.

12:12:36

So I went for myself that I used to it, for, like a local authority, we fit quite a few of the but yes, haven't done as much just a big job, and you need to get all sorts like you to register with the governments. And stuff.

12:12:50

Yet different grants, and that kind of thing so it's tough on your own.

12:12:56

But yeah, so it's better than that. Higher end, higher end gas boilers and try help out.

12:13:04

People set up. If it's a lot of time in this country, it's really bad for where people get new boilers, they just put them like on the highest possible setting.

12:13:12

So basically using a lot more costs than an eater so I charge, since, like either smart controls or just use the existing things within the buyer to make it work a lot of it's designed to work really.

12:13:27

And people are more conscious of it with like gas prices, being so high, people are more worried about it than they used to be, which I suppose a good thing really about.

12:13:36

Yeah, so that's probably my connection to it.

12:13:39

Alright you mentioned alright. You mentioned something Solar.

12:13:46

What was it? The solar thing you mentioned? What does that?

12:13:48

Solar, thermal.

12:13:49

What's that?

12:13:51

So that's basically instead of having to solar panels which produce electricity, it's it's solar panels which get the heat directs.

12:14:00

And then it heats up your hot water. So we link to a cylinder, and then they the he'll.

12:14:07

He applied some I think it's like a kind of thing. Yeah.

12:14:14

And then that heat transfer as soon as 3 hot water.

12:14:17

So a lot of people like if it when it starts to get into summer and they won't, they won't use any fossil fuels all, so it'll just be all through all through that we're not a lot of people everyone who everyone who has this the attack.

12:14:30

Event, yeah. The solar panels we're sure that if you got that and you're laughing really, because things with the heat problems, the struggle to get the temperature is high enough to do the hot water when they were best of the temperatures.

12:14:32

Hey!

12:14:48

But if you have that supplemented by sol solutions, that's the best way to go.

12:14:53

You spend a little like next, and often on your eating stuff.

12:14:57

Alright. So you'd say the main benefit from these kinds of technologies would be saving money and helping the environment.

12:15:04

Yeah, for sure. But they're also they're also really reliable.

12:15:08

And especially so far as not much that can go wrong with that.

12:15:13

It's basically just this, the panels which you just essentially heat, others.

12:15:17

There's no moving parts, and then you got a pump.

12:15:18

That circular itself. But yes, they're really good as well.

12:15:27

Yeah. Not the not much goes wrong with them in fairness compared to like a comedy.

12:15:33

By the way, you've got loads of little parts are always moving.

12:15:38

They're a lot more reliable. So it's sort of cost savings like, say, to solve environmentally minded, it helps you that in that from that point of view, yeah, that are the biggest things.

12:15:56

Do you know how long it takes for one of those products to provide a financial benefit to the home?

12:16:04

It keeps changing because it changes. It depends on energy prices.

12:16:09

So at the moment that time will be shorter, because gas prices are so high.

12:16:14

And so you get your return pretty quick.

12:16:24

Checked, which was a while ago admittedly, I think it was 5 years.

12:16:27

If you had. So if you gone from like an oil boiler, which is the least efficient to a heat pump, and so I'm pretty sure it was about 5 years.

12:16:37

But again, it depends on the proper there's a lot of there's a lot of variables to be honest.

12:16:42

But yeah, it's it's not too long.

12:16:45

And so when you think of sustainability tied into this, I'd assume the sustainable factor is saving energy and being less harmful to the environment.

12:16:56

Yeah, pretty much. Just yeah. Carbon emissions. Basically, that's the biggest thing.

12:16:59

Yeah, what do you see? The adoption rate of these kinds of technologies?

12:17:05

Is it becoming more popular?

12:17:08

Definitely more popular and people are looking for it. But there's still there's still a bit of a price barrier and so here that they had a really good scheme which stopped in 23, which was like home insulation cause.

12:17:24

I said the heat pumps work on low temperature. So if you if you got really killed half which a lot of them are over here, then it won't give you enough heat.

12:17:32

So that dwindled down since 2010, and then the grants that they gave for the heat pumps.

12:17:41

I think they're only I think they were 500,000 that they announced for last year.

12:17:45

But the tech up's been really slow. I can't remember exactly the figures, but I keep look in.

12:17:50

And yeah, because it's still expensive. I literally just fit a boiler yesterday for someone who asked me I'll show that heap yeah, definitely for sure, I said, I won't be able to do it.

12:17:59

Yeah.

12:18:02

And then they should be able to, and it was she was looking at 10,000 pound outlay like straight up top, which is, and she's on in.

12:18:11

I think it was a. It's just a 2 bedroom house like it's not a big house that needs to end so yeah, there's still a a big price barrier.

12:18:21

But people are definitely trying to. I think they'd like to. It's it's just that's where it boils down to.

12:18:31

So you said, Price is a big factor in preventing people from going, for do you see anything else being a factor?

12:18:41

There's a lot of the misconceptions. Stick around, heap bumps.

12:18:48

People think people think that they're not working properly, or but the technology is pretty advanced.

12:18:55

So, for example, I work. I do a lot of work for a student housing company, and then we like a big bucket block of flats, and I keep getting a call this time.

12:19:03

Yeah, I get a call saying, the heating stopped working when we like the heating's working perfectly well, because the temperatures outside a lot warmer.

12:19:13

It doesn't need to be warm. So then it's all under 4 heat in there.

12:19:16

Thing you know. My feet aren't getting warm, so it's not working.

12:19:20

But actually the temperature of the room is exactly the same. So it's people that really understand how they're supposed to work.

12:19:27

And and that they used to syncing. All the radio is on.

12:19:32

I should not be. It should be too hot to touch that's how I know it's working when really it should this is everything's first.

12:19:38

The design to work a lot slower, and it's so I could trickle.

12:19:42

He almost it's supposed to be on for longer but lower temperatures.

12:19:45

But people people are used to just thinking, or he ends on. Now I'm warm.

12:19:50

If I make sense rather than having it on constant, what might be just be for a few hours at a time, like in the middle of the night, to keep your warm kind of thing yeah, yeah.

12:19:59

Yeah.

12:20:01

People are used to it.

12:20:03

What's the what's the life span of a product like this?

12:20:10

Hmm!

12:20:11

Hey? Get it easy? Yeah. 10 to 50 years at least, probably more.

12:20:17

If they look after all the systems designed right?

12:20:20

What about the yeah, what about what about the solar thermal?

12:20:27

So thermal it can last, and the system is all can last forever.

12:20:29

Really, it's just you might have to change the pump every 10 years, depending on how long it lasts.

12:20:33

You know what the customer repair looks like for that?

12:20:41

For a pump that'll be like a few 100 quid.

12:20:41

Yeah, it's not. That's exactly the only moving part.

12:20:45

There's not much else that can go wrong as long as the panels themselves don't break.

12:20:50

Yeah, you laughing.

12:20:51

There you go. What do you think of the future? What do you think? The future of these kinds of technologies looks like?

12:20:58

I think it needs more adoption. It needs government to legislate properly with things like new builds.

12:21:06

I for me all new builds should be fed with this kind of thing, or a minimum should be fitted with, for with Pv solar panels, with electric solar panels.

12:21:15

I've seen no reason why not cause they're all insular to pretty high standard, so they you can easily fit.

12:21:21

A heat pump, and that kind of thing, because, another thing within he comes into old homes is quite a lot of you's quite disruptive. The work that you need. You've got a room like new parts and stuff, you've got to upsize the radio as well as if you do that in