

# Home Energy Savings

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## SPEAKERS

Speaker 3, Shawn Shouse, Christa Hartsook

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Christa Hartsook 00:15

Hello, and welcome to the small farms podcast, a production of the small farms program at Iowa State University Extension and Outreach. Our podcast covers the opportunities and challenges associated with rural life. In this episode, I visit with Shawn Shouse, agricultural engineering specialist for Iowa State University Extension and Outreach on Home Energy Savings beyond insulation during the winter months. I'm Krista Hartsook, small farms program coordinator, and we hope you enjoy the show. Shawn, welcome. Thanks for being here.



Shawn Shouse 00:48

Hey, thanks. It's good to be here. I like doing things like this.



Christa Hartsook 00:52

Awesome. Shawn, we're coming into some of our colder months in Iowa and we know insulating our home in an Iowa winter is very important. But are there considerations for adding that insulation to our home?



01:05

Yeah, a couple of things to keep in mind, if you're thinking about more insulation, where you add first might make a difference on the return per dollar for adding insulation. So think about where we tend to lose the most energy through walls and ceilings and floors, things like that. The first place generally to look for insulation shortage would be in the attic of a home. Because we've got a lot of square feet to ceiling in the home, a lot of heat can go up through the attic. So that's the first place and it's also usually the easiest place to add insulation. So if you're looking for a big return on your insulation dollar, that would be the first place to look and make sure you've got adequate levels there where it's easy to add and relatively low cost. So they would start there. The other thing to keep in mind though, is there are other places that might

be short of insulation that are harder to see than the attic, most folks can get access to the attic and take a quick look and measure and it's fairly easy. But if there are spots in the walls that are missing insulation or short on insulation, that's a lot harder to notice. So you might need some help to see that, in the way of measuring the temperature of the wall in the wintertime it's easy to look for cold spots on the wall as an indicator that there's a shortage of insulation in that spot. In the summertime, that's a lot harder to do because the indoor and outdoor temperatures are almost the same. But this time of year, it's pretty easy to tell if there's a cold spot and and we can talk a little bit later on hear about some of the tools you can use for that but looking for cold spots now we'll help you. And then a place that a lot of people forget about is in the basement, we usually don't think of basements is a part of the home to insulate but we can lose a lot of heat out through the basement walls, especially in the upper part of the walls where they're exposed to the outside air. It's harder to insulate a basement wall if it's a cinderblock wall or a concrete wall. So a lot of times there's a shortage there and you can look there for a place that can return money fairly quickly and adding some insulation especially if you use the basement and try to keep it at a comfortable temperature year around that band to joists to they call it the wood joist around the edge of the floor of the house on rests right on top of the basement wall. That can be a place where it's easy to add some insulation and maybe even the walls themselves if they're uninsulated can get a pretty good return for adding some insulation there.

 Christa Hartsook 03:46

Okay, those are great points to consider around our home. Shawn. Thank you. I am assuming then that there are other problem areas around the house like your doors, your windows, other areas where we could see some kind of extra air exchange in the winter months.

 04:03

Yes, you're wise beyond your year. Exactly the next places to look, windows and doors can be huge leaks of energy in and out of the home. So look at those. A lot of times the energy loss through a window or a door may have more to do with air leakage than it does with the insulation value of the window or door itself. And the air leakage fortunately, we can feel pretty easily you can tell if there's a cold draft coming in, wait for a nice windy day and just see how much air is leaking in around windows and doors. If you're looking to solve some of those leakage problems, then weather stripping or sealing around those cracks can help considerably and you don't have to invest a lot of money there a tube of caulking and some stick on weather sealing can go a long ways to helping to reduce those leaks in and out of them. house around doors and windows. If you have to replace a door or window itself, that can get rather expensive, but it can pay back fairly well, especially if you've got really old windows single pane windows with maybe just a storm window on the outside, something like that. And a way to kind of tell that if you get frost on the inside of your windows in the wintertime, that's a good sign that you're way short on insulation value in the window, glazing the glass itself, and would be worthwhile to consider upgrading your windows. If you don't get frost, but you do get condensation on the windows, that's still a sign that either the humidity in the house is really high, or the window insulation value is fairly low if water is condensing on the windows, so there are a few fixes they're short of replacing the windows, you could try some of the stick on films to add a layer of plastic kind of like another window pane but plastic instead. Those are relatively inexpensive and easy to install, and can go a long ways towards helping to reduce

both air leakage and increase the insulation value the R value of the window itself. Those can be done either on the inside or the outside of the home whichever you prefer. So take a look at those options if you need to add some insulation to existing windows. When you do replace windows look very seriously at thermal pane windows multiple layers of glass sealed together, you can get either two or three layers of glass. Some of them have two layers of glass with a suspended film of plastic in between the two, you can get coatings on the glass that reduce the emissivity of how much energy gets emitted back reflected off of the glass. You can get coatings on the glass that helped to reduce fading of furniture and carpet inside the home from sunlight coming in. Lots and lots of options to look at as you're replacing windows. And you will be pleased with both the energy savings and the added comfort of not having the leaks coming in and out around the windows. Doors a lot of the same things you can get insulated doors, you can get insulated glass panels in the doors, you can get magnetic weather seals that stick to the door when it closes to get a really nice seal around the door. You can add storm doors on the outside of your your house door to help give another layer and reduce some of the leakage of air. Well, lots and lots of options to consider there. But that's the place to look next after insulation.

 Christa Hartsook 07:50

That sounds good. So I'm assuming there's still even other places where leaks could be found. Where else should we be looking

 07:59

any place that there's a possibility for air to leak in and out of the house you should watch for some places that people forget about any penetrations through the basement wall for pipes or, or wiring things like that, that go in and out through the wall of the house or the basement as an opportunity for air to leak in and out one disadvantage or a bad side of an air leak that's coming in below the ground surface into the basement is if air is leaking in there it can bring radon gas from the soil into the home as well. So there can be two benefits to sealing up leaks that come in below the soil surface through the wall but also watch for holes that go up through your ceiling that you don't think about as I'm standing here looking around my home as we're talking, I see at least a dozen light fixtures in my ceiling. And all of those are holes through that drywall ceiling up into the attic. So any recessed light fixtures that you have are opportunities for air to leak out of the room and up into the attic that has the disadvantage of taking heat energy with it when that air leaks up through. The other disadvantages it takes warm moist air from inside the house up into the cold attic and can cause condensation in the insulation or on the bottom side of the roof deck. Both of which can be problematic up in the attic. So any of those kinds of things openings, holes for light fixtures or any other openings through the ceiling can be a big air leak up into the attic. Look for where pipes go up through the ceiling where you've got the vent stack for the plumbing goes up through the ceiling into the attic space. Another spot to look and make sure it's sealed. If you've got flue pipes going up through the ceiling, make sure that those have seals and in that case they would have to be seals that are safe to be up against a hot metal pipe like a flue pipe. But all of those kinds of leaks, even an attic door, if you've got a door or a hatch that goes up into the attic space, make sure it's got a good seal around it so that when it's closed, it's not letting warm moist air leak up into the attic.



 Christa Hartsook 10:18

That sounds good. Shawn, is there an easy way other than, you know, being able to feel the cold spots on the wall holding our hand up to Windows, things like that? Are there tools that can help us find these leaks?

 10:31

You bet. And engineers love tools and toys. So yeah, we like playing with these one that I have used a lot over the years is just non contact thermometer and infrared thermometer. And they stole these appliance stores, big box stores, Home Stores, and even auto supply stores because you can use it to check temperatures under the hood. If you're looking for problem spot as a mechanic, then they started about \$20 and go up from there. So kind of looks like a little pistol that you point out and pull the trigger on it. That's your wall or hotspot and it'll tell you the temperature without actually touching it just by looking at the heat that's being emitted from that surface. They frequently have a laser also with them, so you can kind of pinpoint where you're pointing it on the wall. Those are easy and convenient. The only downside is you kind of have to scan the whole wall looking for that cold spot with a device like this. If you want an easier way to kind of map where a cold spot is on the wall, you could use a thermal camera. thermal cameras, if you buy a standalone camera unit, that's a thermal imaging cameras are kinda expensive. But you can get units now that you plug into your smartphone, it just plugs right into your USB port on the smartphone and turns your camera into a thermal camera on your phone that has the advantages, then you can take a snapshot of the entire wall and the color that shows up on the image will tell you the temperature of that part of the wall. So those are really handy for just taking a snapshot of the wall and say, gosh, there's there's a spot here that's blue, and the rest of the wall is is green and red, nice and warm, tells you where there's a cold spot. And that part of the wall would be a good place to look for some missing insulation or something like that, or an air leak that's coming in and making a really cold spot right there. So those start, I think at around 150 and go up depending on how precise and fancy you want them to be. But pretty handy. Also, for someone who's curious about energy leaks, and a home could use those from the inside or from the outside to the home. Sometimes you may even find that your energy supplier may have thermal images of your home taken from above that might be able to give you some hints as to I've got a warm spot on my roof in the wintertime here there might be a problem somewhere in the home that's leading to that. So those kinds of thermal imaging or non contact thermometers are really handy when you're searching for energy leaks at home.

 Christa Hartsook 13:23

That sounds really cool. And something that would be very interesting to walk around and kind of do on your walls. Sure. That's a great tip. Moving Beyond air leaks themselves Shawn, I'm assuming there are other ways to kind of save some energy. And then thinking along the lines of our appliances.

 13:41

Yes, exactly. Heating and cooling in a home in Iowa probably accounts for 50 to 60% of our energy bill for the home. But appliances would rank second, that around 20 to 25% of our energy use is through appliances. And the biggest user in most homes is the refrigerator. It's

energy use is through appliances. And the biggest user in most homes is the refrigerator. It's just it runs constantly 24/7 sitting there and if you've got a young family, the door may get opened hundreds of times a day. The older you get, maybe the more you can tend to keep that door shut. But with kids in the house that doors open a lot and that refrigerator is running a lot. So looking at the energy efficiency rating on the refrigerator as sometimes you may decide looking at the energy rating on your old fridge compared to a new one might be worth upgrading to a newer, better insulated more efficient compressor refrigerator and just encouraging people to decide what they're going to get out of the refrigerator before they open the door. It can be helpful just to minimize the amount of time the doors open. There are refrigerators now that have secondary doors where you can access certain parts of the fridge without opening the big door Things like that can help on energy savings, and icemakers are fairly heavy energy users for the refrigerator. If you don't feel like you need an icemaker, you can have the fridge run more efficiently. Without that kind of a device added to it, the location of the freezer makes a little bit of difference on the fridge. top freezer refrigerators run a little bit more efficiently than bottom freezer refrigerators are side by sides, I happen to really love my bottom freezer on my fridge, but it is less efficient than a top freezer would have been when I purchased it. So that's a good place to look. Second biggest user for most homes on the appliances would be the clothes dryer. That's just because there's a huge heating element, there's a lot of heat that gets used there. So it's it's not as easy to change the efficiency on a dryer except for a few management things that you can do. Cleaning the lint filter more frequently will let more air move through the dryer. And so for the amount of time the dryer is running, you'll remove more moisture from the clothes because you've got more air moving through the dryer. I know it's fun to peel that nice thick layer of lint off of the lint filter. But the more frequently you clean it, it's a little harder to get the lint off when it's a really thin layer, but it will help with the efficiency of the dryer. And also drying similar types of fabrics together can help the dryer to turn off sooner. If you've got a mixture of fabrics in there, some of them dry a lot faster, and then you've just wasting time with those dry clothes still tumbling in there waiting for that heavy towel to get dry. So being a little careful about how you load the dryer, similar types of fabrics together can improve the efficiency a little bit on operating the dryer, after the refrigerator and the dryer, the washer would be the next biggest user for most homes. And there, it's primarily the amount of hot water that you're using that makes the big difference. The actual tumbling or churning of the washer doesn't take a lot of power. But the hot water is a big draw there. So think about when you need hot water. I'm an engineer, not home energy or home economics, they used to call it Consumer Sciences now it would be the term expert, but they tell me that the vast majority of our clothes do not need hot water for washing the cold water washes just as efficiently for most fabrics and clothes. So using cold water whenever you can save a lot of water heating costs, you just use the hot water when you have to. And they say always rinse with cold water that there's absolutely no benefit to using warm or hot water for a rinse. So use cold water rinse. So that cuts down on the amount of energy you spend heating up that water. And that's the big user on that type of appliance

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Shawn Shouse 14:10

makes a lot of sense, Shawn and I know switching to cold water in our own washer helped tremendously on our bill. So along those same kind of lines, then how about other appliances or even our lighting, you know, that may be plugged in all the time?



18:22

Yeah, you look at other appliances in the house other than those big users and the freezer

mean, you look at other appliances in the house other than those big users and the freezer would be another one like, like the refrigerator in there. That can be a fairly big user, because it's run on a compressor and such but a lot of the other appliances, televisions, lights, radios, game consoles, computers, printers, all of those kinds of miscellaneous appliances tend to be relatively small users of energy. These days, the manufacturers have worked hard at making those more efficient. And just some of the technology has changed televisions, for example, or flat screen TVs use a lot less energy than the old tube type TVs did. So those are typically like five to 10% of the total energy use in a home. Relatively small, but there's still some things you can do there. You mentioned phantom power, that term kind of got to be popular about 10-15 years ago, when you see a device sitting there not running a television, for example, you'll notice the little power light is still on, it's still plugged in and it's still using some power. It's sitting there on standby waiting for you to turn it on. They call that phantom power, the power that gets used when the device isn't actually operating, but it's in standby mode. And that power can add up to maybe in the neighborhood of \$5 per year per device that's sitting there waiting to be used. So that's not a huge number. But still, if you've got a device that just doesn't get used very often, you could consider putting a switch on the cord or unplugging it when you're not using it and save that little bit of phantom power might lead to blinking time on the device when you have to unplug it and plug it back in again. But still, if you're looking to squeeze every last bit out of your energy bill, all of those phantom power uses can add up and can be significant. Lighting is an area where people frequently think Well, that's what I need to upgrade to make my home more efficient is all of my lights. And you can do some things fairly easily there and gain some efficiencies. But it's not a very big user in a home or in an office for that matter. The lighting is a fairly small consumer percentage of energy usage, but simple to change. And there are some good options available. For a long time we look to compact fluorescents as the energy saving device there. And now we're on to LEDs. And at first I didn't like the quality of light from LEDs, they seem to really harsh to me. But now you can get LEDs and any color range on the light that you want to and the price has come down significantly. So yeah, any lights that are on for a significant amount of time each day, it's worth considering changing those to LEDs that fits your taste, you'll get the money back out of those probably in less than a year. If those lights are on for several hours a day. If the light is really hard to reach to replace, it is another reason to consider putting an LED bulb in because the life expectancy is much, much longer than an incandescent bulb. So you don't have to climb the ladder nearly as often to change it. So that's another place you might consider switching to an LED bulb. So those kinds of things, little things that you can look at not huge energy savers. But sometimes for convenience, it's worth doing, and makes you feel good to change to a more efficient bulb sometimes and say, Well, that's one less thing. The other part of that that I'll mention, we don't always think about it, but the electric bill that you're paying all that electricity that's coming into your home, almost all of that in the home ends up being converted into heat inside your home. Lights are a great example. Because even efficient lights still put out most of their energy as heat not as light. And so all of that extra energy that's coming into the house ends up as heat inside the house in the wintertime. Now, that's not a big concern. I don't mind if my water heater is spilling a little bit of heat out into the basement that helps keep the basement warm. But in the summer time, all that extra heat in the house then just means I have to run the air conditioning even more to keep the inside of the house cool. I'm paying for the electricity to dump it in the house. And then I'm paying for more electricity to pump it back out of the house with my air conditioner. So that can really get to be a double whammy the old term, giving away my age using a term like that. But that can really hurt in the summertime when you've got any efficient appliances, dumping a lot of extra heat into the home and then paying to run the air conditioner to get rid of that extra heat. So consider that as well that some of these things pay back twice in the summer time.

 Christa Hartsook 23:36

Sure, absolutely. Shawn are there are other things that we have not talked about today?

 Shawn Shouse 23:42

You know, the only other thing when we talk about energy savings, we talked about heating and cooling being the big ones in Iowa homes and appliances being big and, and lights and all these other things. But all of those things together are not the number one energy user for the average American. Can you guess what the biggest energy user is for Americans? It's your car.

 Christa Hartsook 24:06

I was just gonna say it has to be my car.

 24:09

Yes, yeah. So much as we spend on our home energy, we spend even more on fuel for our cars. So in the really big picture for energy use, you have to include your vehicle in there. And those can be difficult because those are expensive items and hard to justify trading a car to get better energy efficiency. But certainly when it is time to trade vehicles, think about energy efficiency there because that's where the biggest chunk of your energy dollar is probably going is in the fuel for the vehicle. So keep that in the back of your mind too along with your energy efficiency thoughts and concerns.

 Christa Hartsook 24:52

Yeah, that's a really good point. And and a good reminder for all of us too. As appliances and vehicles age they need to be replaced. So looking for more efficient options is never a bad thing. Shot is there a good spot where someone could go to find more information or a little bit more research information on some of the tools that you mentioned?

 25:13

Sure, if you'd like to dig through background information on this type of topic [energystar.gov](http://energystar.gov), the Department of Energy, and EPA work together on ENERGY STAR, that's a good place to go for lots and lots of background information. And especially if you're confused by the energy labels on devices, they have good explanations of what those mean and where to find energy efficient appliances and devices out there can also go to your electric or gas supplier, and talk to them, they have a lot of good background information available. And they may be able to get you a really good discount on an energy audit, perhaps even a free energy audit to have an expert walk through the home with you. And look for things that could be improved or upgraded, may be able to sit down with you and look through your energy bill compared to the average for your city and determine if you're doing better or worse than the average home of your size. Those kinds of things can be really helpful. So talk to those folks about possibilities

that they have available. And then experts in university extension services. The Ag engineers and our group in particular are pretty good about talking through energy efficiency in homes or on farms for that matter. So there are folks there who can start the conversation with you and steer you to other good printed resources or online resources.

**C** Christa Hartsook 26:50

That sounds great and it also sounds like we're gonna need a second podcast, Shawn, to help us save energy on our farm. So we'll look for that to come. Alright, thanks so much for being on today. We appreciate it.

**S** Shawn Shouse 27:02

It was fun. Thank you.

**S** Speaker 3 27:04

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