WEBVTT

1
00:00:05.990 --> 00:00:12.259
Laura Feinstein (SPUR): Hi, everyone! Welcome! We're just going to take a minute to let everybody sort of trickle in, and then we'll get started.

2
00:00:42.300 --> 00:00:47.769
Laura Feinstein (SPUR): Welcome, everyone. We're just giving people a minute to trickle into the Webinar, and then we'll get started

3
00:00:48.660 --> 00:01:06.919
Sean Armstrong: for any of you who are interested in the fireplace behind me. It's made by optimist, and with a Why, optimist, and it's a steam-based fireplace so it has little halogen lights inside that make it look like fire. And Then there's an ultrasound that makes mist. It's like a

4
00:01:07.420 --> 00:01:11.089
Sean Armstrong: you know, vaporizer for people who have like, for

5
00:01:11.100 --> 00:01:28.480
Sean Armstrong: just for adding moisture like those things are in theatrical effects. You see them in vaporizing people's homes that add vapor to the house all that. So, anyway, it's just like It's a really inexpensive way to get a fireplace. It cost me eight hundred bucks, and it looks like a real fire like Stick your hand like burn, but it's not hot.

6
00:01:28.710 --> 00:01:29.810
Sean Armstrong: It's very pleasant to.

7
00:01:31.760 --> 00:01:41.179
Laura Feinstein (SPUR): I need to find out more about that. My kids are on a heavy-duty campaign to get an electric fireplace. Oh, you should. They're nicer because the kids can stick their hands enough.

8
00:01:41.190 --> 00:01:42.470
Laura Feinstein (SPUR): And my

9
00:01:43.660 --> 00:01:51.290

Laura Feinstein (SPUR): Oh, I closed up our chimney because I was like no burning wood, no burning wood.

10
00:01:51.300 --> 00:01:53.750
Laura Feinstein (SPUR): Now they're on a heavy campaign for electric.

11
00:01:53.760 --> 00:02:01.089
Laura Feinstein (SPUR): All right. Well likes to come in like she just likes to stick her hands in there like during the winter time, because it feels like it's warm, even though it's not. Really.

12
00:02:02.070 --> 00:02:03.410
Sean Armstrong: It's very kid-friendly.

13
00:02:03.700 --> 00:02:05.679
Laura Feinstein (SPUR): It would be very exciting.

14
00:02:05.880 --> 00:02:17.889
Laura Feinstein (SPUR): All right. Let's go ahead and get started. I'm sure more. People are going to be joining us in a bit, but I imagine people are still getting off their last meetings. So let's get started. I think you already. Probably

15
00:02:22.120 --> 00:02:51.810
Laura Feinstein (SPUR): if any of you probably already know Sean from forgotten the vibe that you're going to learn a ton about how to decarbonize real home signal buildings for him. Um, i'm I'm Laura Einstein, I am for sustainability and resilience Policy Director. Thank you so much for joining us. Um! Many of you here today are spur members, and if so, thank you for your support, and if you're not already a member, I encourage you to join to support spurs, work to make our cities and region more prosperous and sustainable and equitable

16
00:02:51.820 --> 00:03:04.310
Laura Feinstein (SPUR): places to live. Your financial support enables us to continue our work, including hosting of programs like today's you can find more information about membership online at Spur org slash, join,

17
00:03:04.370 --> 00:03:11.790
Laura Feinstein (SPUR): and we'd also like to thank our partners

building green and the building decarbonization coalition for co-presenting. This event

18
00:03:12.990 --> 00:03:24.399
Laura Feinstein (SPUR): we, of course, offer many digital discourses here at spur. Our next one is scheduled for Monday, September the twelfth, at twelve, thirty Pm. And it's the risky business of transportation. Meta projects.

19
00:03:24.410 --> 00:03:49.290
Laura Feinstein (SPUR): Transportation mega projects cost too much, and they take too long, frequently surpassing their original budgets and deadlines, and falling short of their expected benefits. Moving faster through these projects, requires the confidence to go ahead, even with uncertain and partial information. But the only way to do that while ensuring public interest, goals are met are with a strong policy, foundation, and rigorous oversight of every step of the way

20
00:03:49.340 --> 00:04:01.249
Laura Feinstein (SPUR): to address. This the Metropolitan Transportation Commission is creating a regional mega-project advancement policy to identify and monitor cost and delivery risks while improving passengers experience

21
00:04:01.260 --> 00:04:10.860
Laura Feinstein (SPUR): join us to discuss the challenges, the bay area's, transportation project space, what the map actually does, and how to situate it in the context of other plans and policies.

22
00:04:11.530 --> 00:04:41.439
Laura Feinstein (SPUR): Now moving on to the topic of today. We'll be talking about streamlining, building, decarbonization for cleaner California, as many of you know, California plans to have seven million climate, ready homes by two thousand and thirty five. But for many buildings decarbonizing will require either a full electrical service upgrade, or at least a panel upgrade and reaching the state's. Targets on building deeper organization will be very difficult and less energy utilities and policymakers can make those electrical servers

23
00:04:41.450 --> 00:04:47.059
Laura Feinstein (SPUR): upgrades easy, affordable, and as infrequent as possible.

24
00:04:47.070 --> 00:05:03.549
Laura Feinstein (SPUR): So today we're going to learn about what trigger service upgrades, how much they cost in money and time, and how they can but be avoided, and how utilities and the public utilities, commission, and electrification incentive programs can all work together to make this process as painless as possible.

25
00:05:03.680 --> 00:05:19.370
Laura Feinstein (SPUR): And speaking on. This is Sean Armstrong. He is the managing principle of redwood energy. He's worked for twenty five years in building electrification. He designed the retrofit and new construction of more than ten thousand, all electric residents for disadvantaged populations.

26
00:05:19.380 --> 00:05:49.290
Laura Feinstein (SPUR): He has co-authored six practical guides to building electrification. He provided legal and technical support to dozens of municipal gas fans nationwide. He helped develop the title twenty, four California Energy code since two thousand and fifteen, and he received the grand prize World habitat award from the United Nations, the grand prize from the Pcbc. Awards to Us. Department of Energy Innovation Awards and the inaugural so-called Building Industry association Sustainability award. I will say he also has an amazing amount of time.

27
00:05:49.300 --> 00:05:59.689
Laura Feinstein (SPUR): Still, to answer everybody's questions that come at him via email. I want to mention that That is an outstanding accomplishment for Sean.

28
00:05:59.700 --> 00:06:01.710
Laura Feinstein (SPUR): Uh,

29
00:06:01.920 --> 00:06:21.289
Laura Feinstein (SPUR): and we're going to have sean present up front, and then we're going to have about fifteen minutes at the end for Q. And A. And we want this to be an interactive conversation. So please use the chat box to share your thoughts with each other and the speakers that of course you'll see that on the right-hand side.

30
00:06:21.300 --> 00:06:32.990
Laura Feinstein (SPUR): But we also, because this is a webinar you have a separate panel called the Q. And a panel. If you're on a

computer, you should see the button at the bottom of your screen, or if you're on a mobile,

31
00:06:33.010 --> 00:06:45.320
Laura Feinstein (SPUR): a phone or similar, you should see a button at the top of your screen. So please use the Q. And A. Window to to add your questions that you want answered by Shawn,

32
00:06:45.330 --> 00:06:55.970
Laura Feinstein (SPUR): and we will be uploading a copy of the Transcript and the chat, as well as a recording to the event page within the next. A few days, and so with that Take it away, Sean.

33
00:06:55.980 --> 00:07:06.400
Sean Armstrong: Thank you so much, Laura. Hey, everybody! Um, thanks for sharing your lunch. Break with me. I'm going to talk about how to electrify your house, the residence departments, et cetera, without upgrading the panel.

34
00:07:06.540 --> 00:07:08.080
Sean Armstrong: So

35
00:07:08.230 --> 00:07:31.040
Sean Armstrong: um, I I got my intro. Basically I've been at this for a long time, and I focused specifically in affordable housing, and as a side note I grew up on a farm, and I live on a farm, and I imported a very special kind of piglets in the United States, called Tony Kuny, which is, if you saw a Nicholas cage and a movie pig, and you saw the descendants of my creamy penny pigs, or if you saw Scarlett Johansson in the black widow you saw

36
00:07:31.050 --> 00:07:33.190
Sean Armstrong: on my pigs and a supposed Russian

37
00:07:33.200 --> 00:07:37.100
Sean Armstrong: somewhere. It's in La, of course. So

38
00:07:37.170 --> 00:07:56.290
Sean Armstrong: that's me. And ah! So I like to start off with the rural electrification administration. This is the last time that the government was involved in service upgrades it wasn't just adding electricity, but as well as significant bolstering electricity from

like single light bulbs up to a houses where the upshore is getting done,

39
00:07:56.400 --> 00:08:10.630
Sean Armstrong: and this was a dramatic part of Women's liberation in the United States. This has to be said, I mean So many of the chores that were electrified and made simple were women's work, quote, unquote, and really grueling women's work

40
00:08:10.640 --> 00:08:20.889
Sean Armstrong: so. Ah, just in all of the publications of that era. There was a heavy emphasis on how this reduced manual labor around the house. It didn't have equal benefits.

41
00:08:20.900 --> 00:08:22.599
Be honest it they Don't.

42
00:08:22.650 --> 00:08:25.439
Sean Armstrong: It was a part of getting women out of the house.

43
00:08:26.330 --> 00:08:41.179
Sean Armstrong: The nineteen fifty S. Um. The electric utilities started shipping in. There was almost two thousand two hundred of them. They started a number one television show encouraging people to electrify their homes. All the advertisements around the appliances that you could have that would simplify your life.

44
00:08:41.789 --> 00:08:54.680
Sean Armstrong: The lower left hand corner. You see, Ronald Reagan, this is how he became the great communicator. He opened up all the nuclear power plants when the goal was to have nuclear energy, the clean energy source for the United States, back in the one thousand nine hundred and fiftys and sixtys. Honestly,

45
00:08:54.690 --> 00:09:05.770
Sean Armstrong: even to today. People still kick around nuclear power, which is the most expensive kind of electricity we have. When you eat plant decommissioning just catastrophically expensive. We just did it up here.

46
00:09:06.100 --> 00:09:16.590
Sean Armstrong: So all the stars you see in the below. They are up

among the hundreds of stars that showed up on Sunday night to do theater in front of a Tv camera because they didn't really know how to do Tv in the fiftys

47
00:09:16.600 --> 00:09:18.190
Sean Armstrong: the theater

48
00:09:18.200 --> 00:09:32.740
Sean Armstrong: and um. And this was part of changing the world. So you can see in the back of the old days you have. You can live better electrically. That was, he became our Governor for Ronald Reagan, and then in California, I should say, and that, of course, is now our President.

49
00:09:33.070 --> 00:09:52.069
Sean Armstrong: Here we have another governor saying the biggest evils fossil fuels. It's coal, it's gasoline. It's the natural gas and then in front of here our current governor, who's standing in the all-electric adultery tower of which we helps advise on how that would get built all that great when we first quickly build this for robot specifically for adobe.

50
00:09:52.170 --> 00:10:02.989
Sean Armstrong: So Governor Newsom appeared in front of this last year, and he's been making a real push towards clean energy in the State. And you're seeing radical changes in policy now, because you know governors are stepping up

51
00:10:03.920 --> 00:10:11.920
Sean Armstrong: now. The Nec code I'm going to jump back for a moment. Here. Many C code was responding to this era.

52
00:10:11.930 --> 00:10:28.149
Sean Armstrong: The one thousand nine hundred and fiftys, in which all the utilities are saying, We need to have more power deliver to people's homes, so we can have all microphones and run homes on clean energy, and we'll live like the Jetsons, and we'll have flying saucers that get us to work, and robots that do our chores they really thought that

53
00:10:28.200 --> 00:10:38.980
Sean Armstrong: well, what they accomplished was, you know They they took the code for forty-seven to fifty-nine, which only required sixty

amps or two hundred and forty volts to a house, and they changed the code.

54
00:10:39.320 --> 00:10:56.409
Sean Armstrong: And this is, I think, an analogy for our own time, because we have changed the code. California is the first State of the United States to change electrical code, to go from the one hundred Amp. Two hundred and forty volt service that started to be required nationwide in one thousand nine hundred and sixty, two, as well as other countries that adopt the Nbc. Code like Canada,

55
00:10:56.530 --> 00:10:58.819
but essentially a very close equivalent.

56
00:10:59.230 --> 00:11:00.360
Sean Armstrong: So

57
00:11:00.390 --> 00:11:08.179
Sean Armstrong: we are now in California, since the two thousand and sixteen code putting in two hundred amp panels, and that was essentially to support larger solar rays. I'll get into that more.

58
00:11:08.560 --> 00:11:14.099
Sean Armstrong: I want you just to see like we've done it before we can do it again. We can change codes to make it so. It works for us.

59
00:11:15.220 --> 00:11:33.870
Sean Armstrong: So you can see here, these are all the homes that have in the Green Bar. These are homes that likely have one and one hundred amp services, darker blue. They definitely have one hundred amps and lighter blue. These are the homes that Don't. Necessarily we still find homes in Sacramento and Bay area that have thirty amp services.

60
00:11:33.880 --> 00:11:48.610
Sean Armstrong: Interestingly, there was a big fire in Berkeley, like in one thousand nine hundred and nineteen, and for about four years after that they had an all electric building code in Berkeley, which was the first city to adopt in all liquor code since then, but they did it for new construction, and everyone had thirty amp services,

61
00:11:48.620 --> 00:11:57.769
Sean Armstrong: and they had switches, transfer switches so they could

operate lots of different things on the same service, but not at the same time. I'll show you that strategy later on.

62
00:11:58.610 --> 00:11:59.630
Sean Armstrong: Okay,

63
00:11:59.800 --> 00:12:12.520
Sean Armstrong: We did a big study where Pg. And and Sd. Genie contacted every single electrician in Pigeon, Sdg. And territory of any significance or size. And we're able to get about thirty, four of them

64
00:12:12.690 --> 00:12:14.940
Sean Armstrong: Hundreds of calls

65
00:12:15.160 --> 00:12:19.120
Sean Armstrong: actually answer the questions of why we're service upgrades happening.

66
00:12:19.130 --> 00:12:33.400
Sean Armstrong: The top three are ev chargers, solar rays, and the h back equipment, the next one being just like the house is old. It means rewiring, or maybe they're adding stuff like a pool or an avu. But really it's mostly ed chargers, larger solar rays, and H. That

67
00:12:33.550 --> 00:12:40.329
Sean Armstrong: the good news about that is, all three of those have technical solutions that would allow you not to have to upgrade a service.

68
00:12:40.660 --> 00:12:42.199
If you do

69
00:12:42.630 --> 00:12:54.369
Sean Armstrong: It's going to take you no less than three months. It will take you no less than three thousand dollars, but it's a three thousand up a thirty thousand dollars cost for the averages in a range of like five to ten grand.

70
00:12:54.660 --> 00:13:03.469
Sean Armstrong: So what you're seeing here is a list of all the things

we found after interviewing all these electricians, and we we spent a whole year interviewing people. This is good data,

71
00:13:04.650 --> 00:13:11.289
Sean Armstrong: So you can see the homeowner equipment service upgrade fees. The breaker panel upgrades. If there's any new circuits that go in

72
00:13:11.300 --> 00:13:12.880
permit costs

73
00:13:12.910 --> 00:13:17.310
Sean Armstrong: trenching and conduit. Oh, boy, that can be expensive if you're taking it underground.

74
00:13:17.350 --> 00:13:22.090
This next page, If you have to do a transformer upgrade you're paying for it

75
00:13:22.190 --> 00:13:30.560
Sean Armstrong: like that is not something that it's passed on to the rate pairs. If this little transformer, the bucket transformer that's out there is that capacity,

76
00:13:30.600 --> 00:13:45.979
Sean Armstrong: and you're the one that makes it go over capacity six to eight thousand dollars. But you got to replace the poll because you have to put a bigger transformer on. So it's like a heavier bowl, or the maybe the full was old, but it was fine. But you're triggering, it being replaced nine to eleven grand,

77
00:13:46.210 --> 00:13:54.430
Sean Armstrong: and then these thirteen to eighteen grands in gray. It looks like the utility is paying the contractor, but you're paying utility personally with a check,

78
00:13:54.450 --> 00:14:11.890
Sean Armstrong: So it's just a different way that you personally pay with the check. So overhead to underground thirteen to eighteen grand trenching for the underground, one hundred and eighty to two hundred dollars for linear foot, as it's a type of there and double Ls. Maybe it's like Spanish in your foot. Um! It's a

79
00:14:12.320 --> 00:14:26.929
Sean Armstrong: that's it's on public property. The previous side I showed you is, if it's on the homeowner's property. It's five to fifteen bucks. But if you're doing it under a sidewalk or roads, or anything that's a public. Oh, boy, if they have a public contract or a public works contractor.

80
00:14:27.300 --> 00:14:41.589
Sean Armstrong: The only thing that you have as a credit is like two thousand eight hundred and fifty dollars to four thousand five hundred, and that's rate based utilities will pay up to that amount for your service. Upgrade without charging you personally. Everyone else pays, of course, but

81
00:14:41.710 --> 00:14:43.579
Sean Armstrong: it's the only break You get

82
00:14:43.810 --> 00:14:49.910
Sean Armstrong: It's going to take you at least three months. It's going to take you at least three thousand dollars. It's just impossible. Otherwise.

83
00:14:50.630 --> 00:14:53.210
Sean Armstrong: There's a lot of good reasons not to do it.

84
00:14:53.220 --> 00:15:04.209
Sean Armstrong: Sure do it. I did it. It cost me about four thousand dollars, and it took three months of my time, and it was way harder than I thought, and I had to do a bunch of work on the house to make it all code compliant,

85
00:15:04.290 --> 00:15:23.409
Sean Armstrong: and that's what happens is that the Green Book is this authoritative book. The utility is used in California. It changes like every year. But your house doesn't because they get only more restrictive, never less restrictive. So your house can be unchanged, but be out of compliance within like ten years with the current green book.

86
00:15:23.420 --> 00:15:26.090
Sean Armstrong: And if you actually do anything to your house,

87
00:15:26.170 --> 00:15:36.260
Sean Armstrong: you know you, you are gonna have some problems. Anything that happened near where the service is now dryer. Vents, additional windows, gutters, anything,

88
00:15:37.080 --> 00:15:45.749
Sean Armstrong: anything that's near that utility service is likely going to trigger you having to move something. So there's so many benefits. That is not opening that Pandora's box.

89
00:15:47.360 --> 00:15:49.830
Sean Armstrong: So consider avoiding it

90
00:15:49.840 --> 00:16:06.359
Sean Armstrong: on the left-hand side. You can see what a fifty amp circuit breaker looks like you see those commonly in trailer homes, the Pm. Circuit breakers of what they usually have at the pedestal, and A and the trailerone Park, which is like seven seven percent to thirty percent of the housing in any given State in the United States, including California.

91
00:16:06.630 --> 00:16:13.840
Sean Armstrong: Everyone pretty much has a one hundred and panel in single-family homes in apartments. It's usually a sixty or eighty in the

92
00:16:14.290 --> 00:16:15.810
that's unfortunate

93
00:16:16.010 --> 00:16:22.069
Sean Armstrong: because apartments are not required to have a hundred amp. Service for a apartment, they still get to do the

94
00:16:22.240 --> 00:16:34.319
Sean Armstrong: engineering calculations that we measure their actual power demand. So they're not delivered any more power than the bare necessities, whereas homes are delivered excess power by code. So you have room to grow in

95
00:16:34.500 --> 00:16:37.360

Sean Armstrong: apartments can be more challenging to retrofit as a consequence.

96
00:16:37.680 --> 00:16:43.569
Sean Armstrong: Okay, two Internet panels, I just think, is what most people should call a fair amount. Like It's a lot

97
00:16:44.210 --> 00:17:02.059
Sean Armstrong: going up to a four-hour amp panel. I consider that wasteful That that means you've done nothing to try to reduce any of your impact, and it's going to be really expensive, and it's going to be expensive on the grid. Also all these power demands that are being made by really large homes with really fast, needy chargers,

98
00:17:02.070 --> 00:17:09.900
Sean Armstrong: fifty and eighty amp evening chargers. This stuff is kind of crazy. No one needs it, and it's expensive, and it causes problems.

99
00:17:10.069 --> 00:17:14.650
Sean Armstrong: So just putting out there, i'm being a little judging. But that's my job I get to judge.

100
00:17:14.910 --> 00:17:26.830
Sean Armstrong: So as a technical, you know, reviewer of this. So just as you are going through your life like, try to stay on one hundred amps don't go past two hundred amps. Think of other strategies, and unless you're special,

101
00:17:27.470 --> 00:17:43.819
Sean Armstrong: so um! This is what high power I mean, like we use a lot. That's what high power appliances look like in bold. You see an electric dryer, electric resistance standard electrical Csis dryer. It's using seven thousand two hundred watts when it's on

102
00:17:44.240 --> 00:17:49.919
Sean Armstrong: your hair dryer at Max uses like one thousand eight hundred watts. That's what a blender might use.

103
00:17:50.790 --> 00:17:52.599
Sean Armstrong: I'm going to just quickly go

104
00:17:52.790 --> 00:17:56.269
Sean Armstrong: to chat. Oh, I see, Jackson just saying if anyone

105
00:17:56.490 --> 00:18:00.930
Sean Armstrong: i'm going to pause for a second. Does anyone have any questions before I just keep on running.

106
00:18:04.050 --> 00:18:08.970
Laura Feinstein (SPUR): There's one question in the Q. And a panel. Let me just take a quick look.

107
00:18:10.390 --> 00:18:13.290
Laura Feinstein (SPUR): Oh, no, Actually I don't see any questions in the Q. And a panel.

108
00:18:13.300 --> 00:18:16.430
Laura Feinstein (SPUR): No reason they're just going to break the flow. There, you're still with me.

109
00:18:16.500 --> 00:18:19.989
Sean Armstrong: So your your electric resistance dryer one thousand seven hundred Watts,

110
00:18:20.000 --> 00:18:25.649
Sean Armstrong: the old-fashioned he pump water heaters, which are being quickly replaced, but four thousand five hundred Watts

111
00:18:25.710 --> 00:18:43.289
Sean Armstrong: um The heat pump that you'd have outside. It will likely have this kind. It frequently is coming with an electric resistance element. So it's also using electricity in the winter time. It's like a toaster. Over these are all examples of standard stuff that's out there that people commonly put in.

112
00:18:43.450 --> 00:18:45.080
But it takes a lot of power

113
00:18:46.390 --> 00:18:48.170
Sean Armstrong: a different way to approach it

114
00:18:48.220 --> 00:18:58.759
Sean Armstrong: to go with power-efficient appliances. So instead of seven thousand two hundred watts, this dryer, it uses one thousand two hundred it takes about twice as long to dry the laundry this way.

115
00:18:59.410 --> 00:19:11.129
Sean Armstrong: It's a set and forget it kind of thing, because this is a washer and a dryer. This is the way that everyone else in the world drives a laundry. Everyone in Eurasia billions of people

116
00:19:11.140 --> 00:19:20.170
Sean Armstrong: use only condensing washer dryers, and it's pretty much only the United States in so degree. Mexico, where people are using these crappy electric resistance dryers,

117
00:19:20.650 --> 00:19:21.690
it's, like

118
00:19:21.710 --> 00:19:25.179
Sean Armstrong: most of the world, is like. This is a better way to go the condensing type.

119
00:19:25.250 --> 00:19:33.759
Sean Armstrong: It is one hundred and twenty bolt. You can plug it into any out in your house, and if you have an electric resistance dryer plug now you've got a plug for your ev charger with a lot of power in it.

120
00:19:33.920 --> 00:19:42.390
Sean Armstrong: So that's what we did in my house. But in this condensing washer dryer for Lg: four point five cubic feet, the biggest one in the Us.

121
00:19:42.800 --> 00:19:54.569
Sean Armstrong: Then I have one of these, a reem pro terra, which is a five hundred watt, not forty. Five hundred watt made by rain does the same job, Does it actually better? Turns out

122
00:19:54.970 --> 00:20:11.279
Sean Armstrong: the strategies are using here, which is to raise the temperature from one hundred and twenty to one hundred and forty to

store. More heat in the tank is better at providing longer showers and more service essentially better than using a lot of electric resistance trying to back you up. When you start running out of hot water

123
00:20:11.290 --> 00:20:16.380
it just provides better service if you have it on storage than if you try to make it in a moment.

124
00:20:16.460 --> 00:20:20.780
Sean Armstrong: So this is a better water heater that uses now five hundred Watts,

125
00:20:21.190 --> 00:20:29.259
Sean Armstrong: with these on the right hand side. These are both examples of heat pumps, he so air conditioner and a spacing system

126
00:20:29.740 --> 00:20:31.830
Sean Armstrong: that use computers

127
00:20:31.850 --> 00:20:48.189
Sean Armstrong: instead of electric resistance in order to function in the winter time. So they just operate the heat pump faster. So basically they turn the fan up faster. It's a he pump is a fan and liquid that's boiling. That's the two things. It's a liquid that's boiling because of fans blowing on it.

128
00:20:48.200 --> 00:20:56.409
So they the computer speeds up the fan and speeds up the pump that moves the boiling liquid inside the house, which is the heat going with it.

129
00:20:56.610 --> 00:21:05.340
Sean Armstrong: So these devices they use computers, not electric resistance. So instead of using four thousand three hundred Watts, seven thousand Watts are using one thousand four hundred and ninety.

130
00:21:05.990 --> 00:21:12.030
These are all examples of ways. You can avoid service upgrades while getting the same heating and cooling your house.

131

00:21:12.080 --> 00:21:17.979
I could go into more depth on this with questions and such, and if anyone's interested, I have them you

132
00:21:17.990 --> 00:21:26.590
Sean Armstrong: to ask Shawn show on the third Monday, and I go through Everyone's individual personal alms that help them figure out their how they're gonna like for fit their house.

133
00:21:28.080 --> 00:21:32.880
Sean Armstrong: Just let you know more than happy to help you. Any of you guys out with questions on this.

134
00:21:33.880 --> 00:21:36.009
Now, this is important.

135
00:21:36.060 --> 00:21:44.549
Sean Armstrong: The range of efficiency in H vacuum bumps shows you we're getting the same, a lot of work done using less energy less power. Now.

136
00:21:45.080 --> 00:21:52.619
Sean Armstrong: So the Federal minimum today is you can get a fourteen co recognition, but no lower, and it's heating. Efficiency is eight point two. The

137
00:21:52.630 --> 00:21:55.879
the heating seasonal performance Factor Hsp:

138
00:21:56.100 --> 00:21:58.259
Sean Armstrong: This is as low as it gets.

139
00:21:58.850 --> 00:22:04.120
Sean Armstrong: Then, like a middle efficiency, a ten hspf or an eighteen sear.

140
00:22:04.500 --> 00:22:16.670
Sean Armstrong: Once we get into eleven and twenty. This has a computer in it. Finally, these other two. These are single stage and dual stage respectively. So it's like having two gears in your car slow and fast,

141
00:22:16.920 --> 00:22:28.590
Sean Armstrong: and then you have these two thousand and eleven Hsps. Once you get to nineteen se you have a computer. So now you can go from zero to seventy of one mile increments, as opposed to

142
00:22:28.800 --> 00:22:36.480
Sean Armstrong: stopping on the breaks and going through the school zone, which is what these other products more or less do left. This has a computer with like an accelerator.

143
00:22:37.140 --> 00:22:53.719
Sean Armstrong: So then, the highest ducket systems now are about thirteen and twenty, twenty, four, c. Or thirteen H's. Pf. It's actually twenty, six, c. Or now, and fourteen Hs. Pf. But it's getting better every year, and the best is thirty, three point one actually thirty, four now

144
00:22:53.730 --> 00:22:59.359
Sean Armstrong: and fourteen point five is the best I've seen in the Us. Now, or is it fifteen? It's

145
00:23:00.190 --> 00:23:03.040
Sean Armstrong: so sorry this graph is a your tool.

146
00:23:03.300 --> 00:23:07.889
Sean Armstrong: But the basic idea is that you can go out and get a more efficient heat pump and use less power,

147
00:23:08.590 --> 00:23:15.579
which is the greater the efficiency, the more heating gets done for the same amount of electricity. So you can get

148
00:23:15.590 --> 00:23:20.590
yeah, just less power, less energy being used. That's the basics of how efficiency works.

149
00:23:21.530 --> 00:23:28.459
Sean Armstrong: Now, also, if you, if you seal up your house. So this was the heat pumps efficiency. This is your house's efficiency

150
00:23:29.060 --> 00:23:48.690
Sean Armstrong: in black That's normal leakage and negative. Five Fahrenheit, that normal leakage versus the yellow Bar, Which is you? You've done air tightening to your house like cocked the the duck boots for the duck to work up in the ceiling like cock stuff with foam around things and seal.

151
00:23:49.110 --> 00:23:59.909
Sean Armstrong: So, going from black to yellow, you can see at negative five Fahrenheit. The building heat needed from the heat pump goes from fifty thousand be views down to about thirty, five, or thirty four.

152
00:24:00.310 --> 00:24:12.959
Laura Feinstein (SPUR): The house warms up at zero degrees ten degrees twenty degrees thirty degrees Fahrenheit. The effect is still there. On the right hand side you can see how the heat pumps, running amps as power demand drops

153
00:24:13.160 --> 00:24:15.630
Sean Armstrong: We, as the heating need drops.

154
00:24:15.800 --> 00:24:22.569
Sean Armstrong: Okay, so air tightening can cut your amount of heating that your house needs by not quite a third, but maybe you

155
00:24:22.970 --> 00:24:26.199
thirty, twenty-five percent depending on the house

156
00:24:26.480 --> 00:24:28.120
Sean Armstrong: a third ish.

157
00:24:28.980 --> 00:24:30.619
But any questions there

158
00:24:33.330 --> 00:24:35.459
Sean Armstrong: all right, moving. On. Just interrupt me.

159
00:24:36.560 --> 00:24:39.460
Sean Armstrong: But now the one thing I haven't shown you before is

cooking.

160
00:24:39.660 --> 00:24:58.170
Sean Armstrong: I have been showing you water heaters and dryers and spacing systems, but you probably all care about cooking more than anything else. No one cares about their water here, so from left to right, if you have no money and lots of people I I work with have no money, so like I send this drink Pod. True induction as a gift to people,

161
00:24:58.180 --> 00:25:13.559
Sean Armstrong: and it's what I cook on at home. What? What my ex and the kids cook on. I live in a tiny house next to the big house. I'm recently divorced right. So anyway, we all use these two burner induction ranges, me and my tiny house by my family next door in the big house.

162
00:25:14.710 --> 00:25:28.520
Sean Armstrong: You can cook a whole meal on two burners, and this thing, like a blender just plugs into the wall, and any outlet in your wall in the kitchen, and you don't have to have a new wire developer, and doesn't need to show up on the service panels. And you, power demand.

163
00:25:28.950 --> 00:25:40.279
Sean Armstrong: So that's how we electrified our kitchen without actually going out and buying a brand new induction stove and getting a seven hundred dollars wire delivered over into our kitchen, and all that hard work, expensive stuff.

164
00:25:40.630 --> 00:25:50.419
Sean Armstrong: I've been doing this since two thousand and fifteen, but these two burner induction ranges are great. I've raised three kids. I've hosted huge parties. You can cook.

165
00:25:50.940 --> 00:25:54.980
Sean Armstrong: Then the auster on the right hand side. This is my oven

166
00:25:55.100 --> 00:25:58.049
Sean Armstrong: one hundred and sixty bucks. It can cook a whole turkey in it.

167
00:25:58.620 --> 00:26:04.280
Sean Armstrong: It's a you just plug in a dning outlet once it's a countertop. So if you're trying to rapidly electrify your kitchen, you

168
00:26:04.340 --> 00:26:11.529
Sean Armstrong: this is the fast, cheap way to do it. Spend three hundred dollars, and you're you're finished with burning gas in your kitchen.

169
00:26:12.000 --> 00:26:15.020
Sean Armstrong: Why would you do that? Well,

170
00:26:15.030 --> 00:26:33.850
Sean Armstrong: since one thousand nine hundred and ninety five. All the studies on the topic have shown that gas stoves caused just as much air pollution as a secondhand cigarette smoking in your house. So someone else in the living room. Smoking cigarettes all day is the same amount of air pollution as clicking on a gas stove normally in the day,

171
00:26:34.160 --> 00:26:52.499
Sean Armstrong: and it doesn't show up like it, just as the measured air pollution which it does. Like all the studies measuring air pollution say yes, same on air pollution. It also shows up in health. So the little ladies that they're studying in one thousand nine hundred and ninety five, with their husbands cooking. They were cooking over the gas stove. The husbands are in the other room, smoking cigarettes in one thousand nine hundred and ninety, five

172
00:26:52.510 --> 00:26:59.150
Sean Armstrong: bad old days right? They found that women were cooking and gas stoves without smokers. In the house.

173
00:26:59.620 --> 00:27:12.870
Sean Armstrong: You had just as much asthma, heart attack, medication, wheeze, or cardiopulmonary disease, as the women who were on electric stoves, but had a secondhand cigarette smoker in the house.

174
00:27:12.880 --> 00:27:15.690
Sean Armstrong: Gas equals secondhand cigarette smoke.

175

00:27:16.400 --> 00:27:35.889
Sean Armstrong: I could go deeper into the math like a burner is six thousand thinks you a gas burner, and Sig and a match is one B, two at work from end to end. So you're burning six thousand matches worth of air pollution in your house. When you have a gas burner on, just just turn it on high, so well water for ten minutes.

176
00:27:36.280 --> 00:27:39.890
Sean Armstrong: That's how crazy it is. It's just invisible to you.

177
00:27:39.900 --> 00:27:48.029
Sean Armstrong: But it is a huge amount of air pollution just burning gas in your house, and it doesn't get captured by by hoods does not go ahead. Turn your hood on

178
00:27:48.040 --> 00:27:50.630
Sean Armstrong: You won't capture more than thirty percent of the air pollution.

179
00:27:52.200 --> 00:28:01.429
Sean Armstrong: This is a way to fix the problem that is impacting everyone's health and your family. Just go get a tube burner, Drink a true induction. It's very quiet. It works well.

180
00:28:01.550 --> 00:28:05.409
Sean Armstrong: Auster is the best brand I found for countertop ovens.

181
00:28:05.940 --> 00:28:08.730
Sean Armstrong: Okay, Um,

182
00:28:08.760 --> 00:28:12.890
Sean Armstrong: Thomas Smith, you asked, Is the microwave a high efficiency device to the

183
00:28:12.900 --> 00:28:14.040
Sean Armstrong: Yes,

184
00:28:14.080 --> 00:28:17.510
Sean Armstrong: it's a very high efficiency device. It is

185

00:28:17.710 --> 00:28:32.150
Sean Armstrong: similar to the uses electric resistance. In essence. There's electricity in there and transfers the heat through microwaves into your food, so it is not less or more efficient than an electric resistance or an induction, for that matter.

186
00:28:32.880 --> 00:28:49.630
Sean Armstrong: But it is cooks differently. Of course it cooks some things faster because the way microwaves work on water molecules. So it's it's on the options list of it's a power-efficient and energy-efficient way to get energy in the food

187
00:28:49.640 --> 00:28:54.159
Sean Armstrong: as long as the food isn't spoiled by the microwaves. Some things are better cooked on stoves,

188
00:28:56.270 --> 00:29:04.609
Sean Armstrong: So this is sort of a summary table of these options, going from left to right. You only have a little bit of money. You can get an electric resistance Space theater, low power.

189
00:29:04.770 --> 00:29:20.819
Sean Armstrong: You can get a portable heat pump. Winter is not as good as the Medea, by the way, I should have shown them with Dia, but these are e pumps not very efficient, but they they get rid of the gas. Mr. Cool is a nice example, because it has the only one out there that you can install yourself.

190
00:29:20.830 --> 00:29:27.540
Sean Armstrong: The refrigerant lines come pre-charged, and they got really nice click and fit snap ons. So if you're handy, you

191
00:29:27.640 --> 00:29:41.820
Sean Armstrong: you can plug this into a one twenty bowl outlet and run a refrigerator line into your house to a a mini-split on like fan quality. You put on the wall and you can do it all personally, but only Mr. Cool offers that they're for sale through lows. They're a great product,

192
00:29:42.040 --> 00:29:45.970
Sean Armstrong: and I showed you the Nova, before which also just plugs in any outlet nearby

193
00:29:46.690 --> 00:29:56.030
Sean Armstrong: for water. Here's down below. This is my water heater, the seven gallon. Bosh! This is what I shower with in my tiny house shower, and I use like four gallons of hot water.

194
00:29:56.380 --> 00:30:09.479
Sean Armstrong: Um! This is a larger, also one hundred and twenty volts. This resistance tank they also come a one-time pool plugged into anywhere, and then you get the heat pump water heaters that's mentioning. They are now just five hundred watts plug it into any outlet, so you have.

195
00:30:09.920 --> 00:30:21.040
Sean Armstrong: If you don't have much space like things are tiny, you can use small electric resistance, water heaters, and if you've got enough space for forty gallon of water Here, Then you're going to keep up option It Doesn't. Trigger, a service upgrade.

196
00:30:23.400 --> 00:30:29.380
Sean Armstrong: Let's say that you did have electric resistance dryer, and you do want to charge a car pretty fast,

197
00:30:30.340 --> 00:30:35.710
Sean Armstrong: so these are circuit splitters. I call them plug strips for power strips,

198
00:30:35.730 --> 00:30:48.270
Sean Armstrong: but there are two forty bolt power stripes, So you have a two forty volt plug like for your electric resistance dryer, and you put one of these plugs over the existing plug. You plug it in to have one.

199
00:30:48.390 --> 00:30:54.039
Sean Armstrong: You have your video camera on, so you can see me. I'm holding in my hand an example of one.

200
00:30:54.440 --> 00:30:56.370
Sean Armstrong: This is this,

201
00:30:56.570 --> 00:31:08.340
Sean Armstrong: and you can see there's a plug on this side for one

outlet like there's one outlet, the other outlet is here, and then this plugs into the wall so you can plug an ed charger into one and a dryer into another.

202
00:31:08.530 --> 00:31:19.329
Sean Armstrong: You can plug an induction stove like a full range. The stove, the big thing and plug that into one side, and you can plug an old-fashioned heap of water heater on the other side of the thirty amp big models.

203
00:31:20.000 --> 00:31:22.670
Sean Armstrong: These are being used by smud

204
00:31:22.890 --> 00:31:40.500
Sean Armstrong: by the thousands. Now they're going into homes as they're electrifying in smud territory. And This is a successful code accepted strategy. It's just a plug-stroke um specifically designed for two hundred and forty volts. So you don't have to run new wires, and you don't have to have any power demands just

205
00:31:41.110 --> 00:31:42.999
Sean Armstrong: in. Yeah, just a plug strip.

206
00:31:43.350 --> 00:31:48.289
Sean Armstrong: Burt Hill. You asked. How about including a pressure cooker

207
00:31:48.300 --> 00:31:50.300
Sean Armstrong: on induction stove

208
00:31:52.430 --> 00:31:56.140
Sean Armstrong: With that that works,

209
00:31:56.580 --> 00:31:59.990
Sean Armstrong: You know, pressure cookers work great on induction stoves, and

210
00:32:00.440 --> 00:32:03.380
Sean Armstrong: the thing to understand is that you end up,

211

00:32:03.740 --> 00:32:05.150
Sean Armstrong: adding,

212
00:32:06.100 --> 00:32:17.960
Sean Armstrong: If you just put a pot with a lid on it, it'll cook slower, but take less energy pressure. Cookers don't save a lot of energy. It's what i'm trying to say. We've done a lot of research on this. They save some energy.

213
00:32:18.870 --> 00:32:36.879
Sean Armstrong: It's less about the pressure, and it's more about the fact that most pressure cookers the electric ones at least come with installation. That's the big efficiency move, and cooking is using insulated pots like the countertop pressure cookers that reduces energy by three force, but it's the insulation that's doing

214
00:32:36.940 --> 00:32:47.490
Sean Armstrong: and there are some insulated pots like for boiling water, and such a few of them out there. But it's mostly countertop pressure cookers that are efficient because of insulation.

215
00:32:48.640 --> 00:32:50.819
Sean Armstrong: Okay, So these examples here

216
00:32:50.850 --> 00:32:52.480
Sean Armstrong: for all it's like

217
00:32:52.520 --> 00:32:56.430
Sean Armstrong: four hundred, five hundred, two hundred. These are all examples of things that

218
00:32:56.460 --> 00:32:59.310
Sean Armstrong: make it So you can plug two devices into one plug.

219
00:33:01.770 --> 00:33:11.410
Sean Armstrong: This scrap is meant to. I don't have to read at all. It's meant to illustrate for space, seating water, heating, cooking laundry. You need chargers. The range of options,

220
00:33:11.460 --> 00:33:17.660
Sean Armstrong: you know. If you spend a little time reading in a book

on how to retrofit single-family homes you can examine as a basically we're saying,

221
00:33:18.000 --> 00:33:31.919
Sean Armstrong: there's you know, at least three different types of water heaters out there with different amounts of power. Same thing with cooking same thing with laundry. Just be aware of the options, so that you can choose low power options and not have to upsize your service.

222
00:33:33.390 --> 00:33:44.789
Sean Armstrong: Here's an example, it's a two thousand square foot home. This is how you'd wire it. So it worked on one hundred amps. One of many examples that we can show in blue are things that are just code required.

223
00:33:44.860 --> 00:33:53.829
Sean Armstrong: Green are things that we modified. So we put in a heat pump Trier uses less power.

224
00:33:54.030 --> 00:34:02.909
Sean Armstrong: We have one range not two ovens like on the wall that uses more power. So this is a combined oven and range we didn't realize that's a power-saving option.

225
00:34:03.340 --> 00:34:08.620
In this case we use sort of a mid efficiency power, efficiency, heat, pump, water, heater,

226
00:34:09.250 --> 00:34:22.999
Sean Armstrong: a thirty amp. One, but a fifteen amp one, and now they make ones that are seven. Point five am. But this is a mid-efficiency. Our solar ray is three point eight kilowatts. That's all that you can clip through a grid

227
00:34:23.440 --> 00:34:28.910
Sean Armstrong: a hundred amps. You can't use more than sixteen percent of your panel for solar. So

228
00:34:29.120 --> 00:34:35.699
Sean Armstrong: sixteen percent of one hundred amp panel equals up on the roof of three point eight kilowatt ac system. The

229
00:34:36.090 --> 00:34:41.940
Sean Armstrong: The average in California is five, and that's why the code pushed people up to two hundred panels.

230
00:34:42.010 --> 00:34:43.189
Sean Armstrong: But

231
00:34:43.360 --> 00:34:58.579
Sean Armstrong: you can put in clipping in burgers, using inverters that allow you to put in five or seven or eight kilowatts, but it won't. Allow more than three point eight kilowatts of power to go through. So at noon time it clips off the excess. But then, like at tune, the afternoon

232
00:34:58.590 --> 00:35:04.830
Sean Armstrong: that excess is actually allowed to go through because it's dropped down to three point eight kilowatts of power output.

233
00:35:05.480 --> 00:35:09.299
Sean Armstrong: So you can put less solar on, or you can put clipping inverters on.

234
00:35:09.370 --> 00:35:22.049
Sean Armstrong: This is a this ev charger. This is nineteen miles per hour of ev charging, as opposed to a fifty or seven year Of that matter? Three, I charge on three to four on miles per hour with my one playing world plug.

235
00:35:22.240 --> 00:35:23.959
Sean Armstrong: So these are examples.

236
00:35:24.410 --> 00:35:41.570
Sean Armstrong: This is the three thousand foot house on one hundred amps, and what we did here is we put those power strips, the two forty bowl plug strips that I was just showing you. We did two of them, one to balance the dryer and the water heater, one to balance the stove and the ed charger,

237
00:35:43.170 --> 00:35:57.409
Sean Armstrong: and you can see a little note Here a twenty amp

circuit will support a three point, eight kilowatt inverter, many, three point, eight kilowatts can support roughly a four point, six to Five Point nine Kw. Solar ray depending on the inverter load ratio.

238
00:35:57.570 --> 00:35:59.090
Sean Armstrong: It was me to stay in Gamut.

239
00:35:59.350 --> 00:36:07.079
Sean Armstrong: The three thousand square foot house can put a really big solar ray up. It just needs a special inverter. Just keep it on one hundred and service.

240
00:36:09.360 --> 00:36:12.620
Sean Armstrong: Now I see Q. Here, Martin Brewer asked,

241
00:36:12.630 --> 00:36:27.530
Sean Armstrong: How are the Resistance Water heater with title? Twenty. Four recently struggle to tank this electric water here to get title twenty four compliance. You can only put electric resistance. Water heaters into place that have existing lack of resistance. Water heaters.

242
00:36:27.920 --> 00:36:29.090
It's one

243
00:36:29.580 --> 00:36:49.349
Sean Armstrong: another. One is new, tiny houses like this. You can put somewhere between five hundred and one thousand square feet counts as a tiny house depending upon the climate zone. They've approved up to twenty gallon electric electric resistance tanks which i'm gonna brag for a second. I personally push that through as a tiny house expert, saying, If you're going to let

244
00:36:49.360 --> 00:36:53.720
electric resistance be used in tiny houses. It should be a storage tank. The

245
00:36:54.020 --> 00:36:56.890
Sean Armstrong: because on-demand means way, more power,

246
00:36:57.600 --> 00:37:00.909

Sean Armstrong: like sixty amps of power just for a water heater.

247
00:37:01.290 --> 00:37:07.689
Sean Armstrong: So instead, these tanks which use, you know, so little power. Tiny, tiny, Tiny!

248
00:37:07.700 --> 00:37:11.180
Sean Armstrong: My whole house here. This is a thirty amp house room living

249
00:37:11.290 --> 00:37:29.479
Sean Armstrong: and um! This is my stove right? There's my little oven. Actually, I got rid of this oven. I I don't like that one, but that's up, and I had There, there's my water heater. This is a two gallon, for underneath my kitchen sink, and then I use seven gallons for my bathroom, which is next door. You can see It's picture

250
00:37:29.490 --> 00:37:32.440
Sean Armstrong: that's house, and to the right of it is the the bathroom.

251
00:37:32.590 --> 00:37:38.819
Sean Armstrong: It's a little confusing, because there's another tiny house that is no longer there, and it's in between the two of them. That kind of makes it look like It's all one building

252
00:37:39.350 --> 00:37:40.399
Sean Armstrong: they were.

253
00:37:40.450 --> 00:37:42.389
Sean Armstrong: This was seven hundred dollars.

254
00:37:42.500 --> 00:37:45.619
Sean Armstrong: This is an inexpensive power-efficient solution.

255
00:37:47.120 --> 00:37:53.980
Sean Armstrong: Here are sixty Amp. Households. These are all tiny houses built for homeless veterans in Santa Rosa, fourteen of them in a row

256

00:37:55.200 --> 00:38:03.689
Sean Armstrong: this is what a hundred amps can look like. These are little tiny homes now. These are like six hundred square foot senior homes in Port Brag.

257
00:38:04.580 --> 00:38:06.270
Sean Armstrong: The stuff that's in there

258
00:38:06.380 --> 00:38:15.340
Sean Armstrong: a power-efficient, duckless mini-split. So it uses a computer not electric existence it's an old-fashioned heap of water heater and like a six hundred dollar electric stove.

259
00:38:16.240 --> 00:38:17.889
Sean Armstrong: How am I doing in time?

260
00:38:20.910 --> 00:38:25.790
Laura Feinstein (SPUR): It's one hundred and ten. So yeah, we should

261
00:38:26.010 --> 00:38:32.389
Laura Feinstein (SPUR): total flies. And you're talking about that many things. Give it maybe five more minutes, and then we'll have fifteen minutes for Q. And A.

262
00:38:32.400 --> 00:38:33.209
Sean Armstrong: Perfect

263
00:38:33.290 --> 00:38:47.069
Sean Armstrong: Another example. This is where Mr. Cool I mentioned They had those pre-charge refrigerant lines. So a friend of ours, Tom Cabot. He installed this in his own house, and he also installed his own induction range.

264
00:38:47.240 --> 00:38:56.220
Sean Armstrong: Here's his budget, and he did not increase his service. So this is a do it yourself, Example. He spent six thousand four hundred dollars total,

265
00:38:56.460 --> 00:38:57.810
Sean Armstrong: and he said

266
00:38:57.990 --> 00:39:03.729
Sean Armstrong: the incremental cost was only one thousand four hundred dollars if we subtract out the cost of new gas machines.

267
00:39:04.110 --> 00:39:12.490
Sean Armstrong: So you like your finest house for only six thousand four hundred dollars, and of that only one thousand four hundred dollars is necessary to be spent as we like. Replace other stuff with gas.

268
00:39:12.500 --> 00:39:13.630
You got that

269
00:39:13.670 --> 00:39:21.809
Sean Armstrong: so it's a water heater. He has a heat pump for the window. He's got a mini-split heat pump an induction cooked up a combined washer, and dryer

270
00:39:22.250 --> 00:39:25.429
so it doesn't have to be expensive, especially if you're handy.

271
00:39:27.110 --> 00:39:44.719
Sean Armstrong: And then the last thing i'm just going to say Tom Cabot and Redwood energy we develop what we call Watts. I calculator. It's on our website. We also have an instructional video on how to use it, but it's just an excel spreadsheet that tries to guide me through the choices, using the actual national electrical code. It looks like this.

272
00:39:44.730 --> 00:39:51.889
Sean Armstrong: The yellows are dropped down so you can select things. It does a bunch of auto-calculating to help you do just what an electrician would do,

273
00:39:52.010 --> 00:40:07.360
Sean Armstrong: which is well to do better than what electricians would usually do. Usually electricians won't Exactly. Calculate your power. Demand. So just say, please pay me an extra three to five thousand dollars, and i'm going to upsize your service, but they won't do the brain work to say whether or not you really mean it.

274

00:40:07.470 --> 00:40:13.549
If there's any options to avoid it. So I've told you It's expensive and heartbreaking sometimes,

275
00:40:13.690 --> 00:40:15.669
because you have to mess with your house

276
00:40:16.060 --> 00:40:19.489
Sean Armstrong: so um one. You know that we have that

277
00:40:19.580 --> 00:40:30.190
Sean Armstrong: first to do the heating estimates. Then we figure out more about the products. I'm not saying it's simple, but other people have picked it up. If they were kind of into this sort of thing,

278
00:40:31.250 --> 00:40:33.280
Sean Armstrong: we try to make it easy. But

279
00:40:33.350 --> 00:40:34.389
Sean Armstrong: there we go.

280
00:40:34.400 --> 00:40:36.310
Sean Armstrong: Get your whole panel wottage.

281
00:40:36.460 --> 00:40:37.800
That's it.

282
00:40:38.000 --> 00:40:57.270
Sean Armstrong: I want to show you like when we teach you how to fish. If you want to learn how to fish the wat-di calculator and let it through like it can totally be done. Examples of homes. How we think about it. The technologies that you might use efficiency options always think about efficiency. Also, of course, when you're like you buying this efficiency saves money,

283
00:40:57.660 --> 00:41:03.589
Sean Armstrong: the products versus like low power, high power. They're not different in important ways. They're just more efficient.

284
00:41:04.010 --> 00:41:05.349

Sean Armstrong: Lots of money

285
00:41:05.590 --> 00:41:13.089
Sean Armstrong: like I said the H back. You can avoid electric resistance. The solar You can get a clipping inverter, Ev. Chargers, just,

286
00:41:13.710 --> 00:41:15.729
Sean Armstrong: you know. Either calm down with it.

287
00:41:16.080 --> 00:41:25.840
Sean Armstrong: Get a thirty amp, one don't get an eighty M. Fees, or do some power balancing plugs to share it with your dryer. You know where your stove

288
00:41:26.830 --> 00:41:36.709
Sean Armstrong: and hey? There's some cool history. We've done it before we can do it again. Our efficiency has always been part of the thinking. It just has to be as we continue to electrify

289
00:41:39.600 --> 00:41:41.819
Sean Armstrong: for you and for me, summary

290
00:41:42.390 --> 00:41:43.990
for what I was trying to say.

291
00:41:45.990 --> 00:41:47.790
Laura Feinstein (SPUR): Can I kick it off as a question?

292
00:41:47.800 --> 00:41:48.819
Sean Armstrong: Yeah.

293
00:41:49.300 --> 00:42:01.280
Laura Feinstein (SPUR): So um. A lot of this information, which is fantastic is information that property owners themselves can use to avoid an electrical service upgrade, which is great.

294
00:42:01.750 --> 00:42:21.090
Laura Feinstein (SPUR): I was wondering if you could speak to the types of things that, for example, energy utilities, policymakers

could be doing. Um in terms of. You know, I have kind of a list here like in terms of making electrical service upgrades um easier and less expensive

295
00:42:21.830 --> 00:42:36.729
Laura Feinstein (SPUR): when they are necessary. And then, you know, kind of second question. Are there regulations and standards that should be changed because they are unnecessarily pushing people to have to make electrical service upgrades.

296
00:42:37.350 --> 00:42:38.379
Sean Armstrong: Okay,

297
00:42:38.390 --> 00:42:42.590
Sean Armstrong: sequentials The first one of what to be done at the policy side.

298
00:42:42.760 --> 00:42:43.389
Sean Armstrong: And so we we

299
00:42:43.400 --> 00:42:46.089
Laura Feinstein (SPUR): yeah make it easier and less expensive

300
00:42:46.100 --> 00:42:56.879
Laura Feinstein (SPUR): to you. Service upgrade. So San Diego, gas, electric and Pegony have two very different strategies for supporting service upgrades, and that's where the cost and the money. All the problems are

301
00:42:56.890 --> 00:42:59.510
Sean Armstrong: called the utility, Sdg. And E.

302
00:42:59.590 --> 00:43:07.190
Sean Armstrong: They do it the better way. They send someone to your house, their staff, and they talk through the the with you.

303
00:43:07.520 --> 00:43:20.759
Sean Armstrong: And the opposite way is Phd. Makes you fill out online information forms no person to help you, and they move you out. If you don't give them the information that you ask for within thirty days you get to start over.

304
00:43:20.930 --> 00:43:32.269
Sean Armstrong: Neither of these organizations are using automatic texting. So let you know that you have a question or a need, or they're going to come to you your house in a State, or

305
00:43:32.670 --> 00:43:37.799
Sean Armstrong: they haven't even automated their responses. So everyone's been making telephone calls

306
00:43:37.920 --> 00:43:39.610
to get this job done,

307
00:43:40.240 --> 00:43:44.390
Sean Armstrong: and then you have a problem with sunr and other companies

308
00:43:44.410 --> 00:43:54.289
Sean Armstrong: canvassing entire city blocks. Many se blocks at once and putting in service applications upgrade, have patients for people without their request or knowledge.

309
00:43:54.400 --> 00:43:59.370
Sean Armstrong: So there's hundreds that show up of service, upgrade applications,

310
00:43:59.380 --> 00:44:14.650
Sean Armstrong: and then Sunr and others will go to going door to door and say, hey? Would you like to have a solar array will help you out with financing, And as far as these solar companies are concerned, they've just saved themselves a bunch of time, because when someone says yes,

311
00:44:14.880 --> 00:44:17.679
Sean Armstrong: they've already got the service application in,

312
00:44:19.060 --> 00:44:22.489
and this is wasting a lot of staff capacity

313
00:44:22.500 --> 00:44:25.999

Sean Armstrong: he's dealing with his business practice and solar contractors.

314
00:44:26.980 --> 00:44:40.800
Sean Armstrong: There's a lot of capacity and lease that slows things down with not not using texting, and with making people start off from scratch as opposed to like smoothing it out with a staff person to start off with

315
00:44:41.850 --> 00:44:43.530
Sean Armstrong: all that said

316
00:44:44.460 --> 00:44:56.089
Sean Armstrong: it is, It is the nature of the physical task of upsizing the surface. Most of the costs are not because people are slowing things down or there isn't a good enough process. Most of the problem is that you just have to get the work done

317
00:44:57.200 --> 00:45:04.400
Sean Armstrong: difficult and expensive and muscular, and requires a big old truck and specialized equipment, and

318
00:45:04.890 --> 00:45:06.650
Sean Armstrong: we do it. So

319
00:45:07.020 --> 00:45:24.170
Sean Armstrong: instead, the emphasis needs to be on helping people avoid service upgrades, because if it's not a public advocate saying it, Utility makes money with service, upgrades it's core to their business. Eighty percent of their money is from infrastructure upgrades.

320
00:45:24.180 --> 00:45:34.410
Sean Armstrong: They don't, make money up of selling electricity. They make money up to selling infrastructure upgrades. So you're just not going to see them running a program to avoid service upgrades

321
00:45:35.020 --> 00:45:48.260
Sean Armstrong: that being seen like that that makes their Wall Street investors unhappy because they're just making money off of new electrical wires. So what you're doing is fundamentally avoiding the electrical wires. So it's not utilities that are going to give you the

solution.

322
00:45:49.240 --> 00:45:51.740
Sean Armstrong: I mean not really, not enthusiastically.

323
00:45:52.340 --> 00:46:11.449
Sean Armstrong: And you're not going to get it from the Hiv contractors because they make more money off of systems that are less efficient. That's actually just how it works. Usually the more power, efficient equipment. Also pick less infrastructure to install and etc. There's a relationship there with lower cost to also being lower power, and they sell for more money. So they just

324
00:46:11.460 --> 00:46:14.670
Sean Armstrong: they're not in it to win it to help you avoid service. Upgrades

325
00:46:14.780 --> 00:46:17.819
Sean Armstrong: not the H. Back, folks, not the plumbers,

326
00:46:18.550 --> 00:46:22.250
Sean Armstrong: not the solar contractors. No one is on your side

327
00:46:22.480 --> 00:46:24.910
Sean Armstrong: to to help you avoid these things.

328
00:46:24.930 --> 00:46:29.460
Sean Armstrong: And so that's why you need to have public advocates, the Cpu, c.

329
00:46:29.510 --> 00:46:31.090
The Cec.

330
00:46:31.110 --> 00:46:32.229
Um

331
00:46:32.350 --> 00:46:44.309
Sean Armstrong: non-profits. Those are people who are in it for the right reasons and essentially benefit. If you benefit where all the other people that is listed do not benefit. If you benefit by lowering

the cost.

332
00:46:45.080 --> 00:46:47.340
Sean Armstrong: So that that's a that's a quick

333
00:46:47.970 --> 00:46:56.449
who should do it, and what should they do? They should give advice, and how to avoid service upgrades, because once you're in it. There's no cheap and easy way out.

334
00:46:57.690 --> 00:46:59.350
Sean Armstrong: Your second question

335
00:47:00.110 --> 00:47:09.349
Laura Feinstein (SPUR): was, Ah, whether there's regulations or standards in place that are unnecessarily pushing people towards electrical service upgrades.

336
00:47:10.220 --> 00:47:11.609
Sean Armstrong: Yes,

337
00:47:11.730 --> 00:47:15.469
Sean Armstrong: but it's spitting into the wind to try to stop it.

338
00:47:15.530 --> 00:47:24.109
Sean Armstrong: So the Nec code, which started in like one thousand eight hundred and ninety six, was written to stop fires, and you can't argue as firefighters

339
00:47:24.520 --> 00:47:33.910
Sean Armstrong: just lose. So if you're going there saying like, why is it that solar panels are only allowed to have sixteen percent of the panel. Why is that?

340
00:47:34.250 --> 00:47:35.779
Sean Armstrong: They'll say,

341
00:47:35.910 --> 00:47:55.320
Sean Armstrong: because we have to assume one hundred percent of the panels being used, and you're only allowed an extra twenty percent,

more than one hundred percent, which still, within the safety thresholds you can respond and say that that never happens. People don't usually use more than thirty to fifty amps. Why would you use one hundred ants? Because it happens every once in a while, and it started a fire thirty years ago. So

342
00:47:55.450 --> 00:47:56.740
Sean Armstrong: that's the code.

343
00:47:57.360 --> 00:48:09.479
Sean Armstrong: And so it's any C code that has written into it very conservative assumptions, and it would take many years to stop and change that, and you might not even succeed. And maybe you shouldn't.

344
00:48:09.560 --> 00:48:23.129
Sean Armstrong: Maybe we should just figure out ways to not pull as much power through our wires, so that decrease the fire risk as opposed to going into power inefficient devices that heat up wires and then try to convince any c. That's really not that big of a deal.

345
00:48:25.030 --> 00:48:33.000
Sean Armstrong: People are asking what is the title of the book on on service on retrofits.

346
00:48:33.030 --> 00:48:48.359
Sean Armstrong: I'll put that into the chat in a moment where i'm not answering questions anymore, but it's our guide to single-family home retrofits and it goes into detail, and we try to write it and explain it, and illustrate everything, and make it easy on the brain. But that's where we have that information,

347
00:48:48.830 --> 00:49:01.530
Laura Feinstein (SPUR): and you also wrote a great report about electrical service upgrades with the cost. Um, We did the on your long survey, for example, and I can all the like that in chat as well.

348
00:49:01.540 --> 00:49:02.729
Thank you.

349
00:49:02.740 --> 00:49:05.829
Yeah, I reference that, setting a few of the slides.

350
00:49:06.310 --> 00:49:15.780
Sean Armstrong: And will he ask, Why do you think the Cpu C is helpful? They seem to go with every idea, Pg: and and keep wing to tax residential solar panels. Production?

351
00:49:15.790 --> 00:49:26.459
Sean Armstrong: Yeah. And you and I agree. Um. The Cpc. Is is unfortunately a closely held regulatory agency to the utilities, and they go along with what the utilities want. Diam. And again,

352
00:49:26.560 --> 00:49:33.230
Sean Armstrong: I've not proven to be a very good regulatory agency. We have the highest electricity prices in the nation, except Hawaii,

353
00:49:33.970 --> 00:49:35.259
Sean Armstrong: and

354
00:49:35.550 --> 00:49:41.509
Sean Armstrong: all I can say is, that if not the Cpu, c. Then the Cec.

355
00:49:41.760 --> 00:49:43.700
If not the Cec.

356
00:49:44.190 --> 00:49:51.380
Sean Armstrong: I don't know who in this state is supposed to advocate at the higher higher level for power efficiency. So the

357
00:49:52.640 --> 00:49:54.459
Sean Armstrong: all I can say is, Yeah,

358
00:49:55.300 --> 00:50:01.499
Sean Armstrong: it's the Cec. Who recently got legislation requiring them to educate people about power efficiency with the website.

359
00:50:01.520 --> 00:50:08.890
So I think the Cec. Is going to be the place where where this work gets done. Public policy, advocacy, advice, and things like that

360

00:50:12.080 --> 00:50:17.629
Sean Armstrong: anonymous attendee wanted to know off topic where in California our tiny house is legal to live in.

361
00:50:17.770 --> 00:50:31.789
Sean Armstrong: Um depends upon what the tiny house is. If it has a foundation, every single residential parcel is allowed to build at least one additional house. Now State law got passed. Everyone can go over Tiny House on a permanent foundation

362
00:50:32.120 --> 00:50:49.159
Sean Armstrong: if you're putting it on wheels which avoids all sorts of code issues, and you can build what you want. You're not allowed to live in it. It's a technically a camper if it's on wheels, and It is not a code compliant residence. It's temporary shelter. And so when you live in a temporary house like I am, you're technically violating the law.

363
00:50:49.780 --> 00:51:07.309
Sean Armstrong: It's not. It's a law. It's a code that's only driven by neighbor complaints. So my intending house is covered in beautiful cedar shingles, so that my neighbors went complaint. I did very deliberately, deliberately, knowing that living in a camper puts you in a a situation.

364
00:51:08.150 --> 00:51:20.789
Sean Armstrong: But it's a very common situation. A lot of people will look the other way if the tiny house on wheels is cute, and if it's not cute, that's when you trigger it. So i'm always like put it put cedar shingles on it

365
00:51:21.470 --> 00:51:23.520
Sean Armstrong: any better piece of advice?

366
00:51:23.740 --> 00:51:28.260
Sean Armstrong: Um, thank you, Laura, for putting the service. Upgrades report into the chat there.

367
00:51:29.240 --> 00:51:36.700
Sean Armstrong: Anonymous also asked, what are the roles of thumb for when you should really should upgrade a panel's? Electric service

368

00:51:37.360 --> 00:51:41.319
Sean Armstrong: service is the thick wire that comes to the building.

369
00:51:41.330 --> 00:51:46.850
Sean Armstrong: You ask zinc go panels, which is a famously fire-prone panel.

370
00:51:46.920 --> 00:51:53.450
Sean Armstrong: You should change on a bad panel the day you find out you have one that's a fire risk, but it doesn't Trigger. A service upgrade

371
00:51:53.480 --> 00:52:09.860
Sean Armstrong: panel is a place where a whole bunch of wires come for your house, and they're all sort of organized in one place, and then all those wires sort of feed into one big wire, and that's the service wire, so you can replace your panel without replacing the wires in your house or the service wire to your house. It's just a panel,

372
00:52:10.120 --> 00:52:17.470
Sean Armstrong: so panel should get replaced when they're old and spooky, and that depends upon

373
00:52:18.040 --> 00:52:23.670
know. Forty year old panels, probably a good time. You still have fuses. You should get rid of your fuses.

374
00:52:24.290 --> 00:52:25.500
Um,

375
00:52:27.020 --> 00:52:31.230
Sean Armstrong: but you don't have to upsize or replace the service. Kind of ever is my point.

376
00:52:31.560 --> 00:52:34.170
It's just if the panel is old and crumbling

377
00:52:34.450 --> 00:52:35.880
them like anything else.

378

00:52:37.510 --> 00:52:38.850
Sean Armstrong: Jessamine,

379
00:52:39.570 --> 00:52:53.140
Sean Armstrong: Jessman, Ellen of Sbc. Asks: Do your best, friend. Utilities have more stringent load calculations than in any seat, but also push people upwards towards service, Upgrade.

380
00:52:53.850 --> 00:52:54.959
Sean Armstrong: No,

381
00:52:56.200 --> 00:53:06.759
Sean Armstrong: Nope, that they are following any C code, and will be, as your electrician will say, you need a service upgrade, not the utility utility will respond to your electrician,

382
00:53:07.000 --> 00:53:09.669
Sean Armstrong: who says we need to get um

383
00:53:10.060 --> 00:53:19.960
Sean Armstrong: a new service upgrade here, because you're going to be demanding too much power, and the utility just comes out with their duty to serve, but they charge you an arm and a leg if anything goes wrong.

384
00:53:21.050 --> 00:53:23.730
Sean Armstrong: Um. So yeah, it's not the utilities forcing it.

385
00:53:25.180 --> 00:53:34.180
Sean Armstrong: You just asked. I just received a fluke energy analysis report that costs one thousand five hundred dollars and recorded after a month's analysis. That

386
00:53:34.340 --> 00:53:40.890
Sean Armstrong: is thirty, six point. Seven Amps b is fifty six point eight amps. I'm sure it and be me.

387
00:53:40.900 --> 00:53:44.380
Sean Armstrong: My electrician recommends staying with a one-on-one service. Good,

388
00:53:44.680 --> 00:53:49.690
Sean Armstrong: he advised, and not upgrade the service. Good idea! Are you familiar with this kind of analysis?

389
00:53:49.700 --> 00:53:52.619
Sean Armstrong: Yes, so what i'm seeing here

390
00:53:53.760 --> 00:54:00.429
Sean Armstrong: one of the ways that's allowed by the code which is to look at your peak energy demand.

391
00:54:00.510 --> 00:54:09.740
Sean Armstrong: In the last year, when you usually look at fifteen minute increments, you get your bill that you get a print out from utility. It's part of your green button

392
00:54:09.950 --> 00:54:13.979
Sean Armstrong: here. Do the green button. You can ask for. What was my peak power? Demand

393
00:54:14.770 --> 00:54:22.109
Sean Armstrong: your peak power. Demand. You take that you multiply it by one point, two, five, so twenty, five percent more.

394
00:54:22.120 --> 00:54:27.430
Sean Armstrong: So let's say that it was like forty amps, twenty, five percent more would be fifty amps.

395
00:54:27.910 --> 00:54:33.140
Sean Armstrong: Then you have a total of one hundred amps in your panel, and that fifty amps you're allowed to use the

396
00:54:33.320 --> 00:54:41.480
Sean Armstrong: but you have to put in things at their actual name plate. You can't multiply them by forty percent the way that things can doing it. The

397
00:54:41.580 --> 00:54:56.299
Sean Armstrong: I realize this is hard to follow a little bit, but there's two ways to do the code analysis. One is to add things up

according to the name place. This is a thirty Amp dryer, and then you multiply it by forty percent, and you only count the forty percent.

398
00:54:56.310 --> 00:55:01.829
Sean Armstrong: So a thirty Am. Dryer is now a twelve amp. Dryer when you're adding up to the hundred amp service.

399
00:55:02.850 --> 00:55:05.389
Sean Armstrong: That's one way of doing it, adding things up

400
00:55:05.400 --> 00:55:11.330
Sean Armstrong: The other way is to study as fluke energy did. What was your actual peak power demand?

401
00:55:11.720 --> 00:55:23.419
Sean Armstrong: Add twenty five percent to it, and then you can add electrical devices, but you can't multiply them by forty percent. You have to take their whole value. So thirty Amp. Dryer now equals thirty apps. If you

402
00:55:23.440 --> 00:55:35.089
Sean Armstrong: have fifty amps and you add thirty amps, you're still under one hundred. It still works. So it's two different ways to analyze. According to national electrical code. If you need a service upgrade,

403
00:55:35.290 --> 00:55:49.629
Sean Armstrong: adding them up, multiplying everything except the h back by forty percent, or studying the last year at fifteen minute increments, multiplying that, adding another twenty five percent on, and then adding things according to a nameplate value, is not

404
00:55:49.820 --> 00:55:51.129
not reduced.

405
00:55:54.180 --> 00:55:55.370
Sean Armstrong: Okay,

406
00:55:55.540 --> 00:56:04.589
Laura Feinstein (SPUR): It doesn't look like there's any more questions anyone else. I apologize. I talked quickly, and you're

welcome to reach out to me just like Laura said, via email and give me a week

407
00:56:04.600 --> 00:56:10.889
Laura Feinstein (SPUR): might respond the same day. But give me a week before you think i'm being rude. Okay, sometimes a lot of emails.

408
00:56:11.700 --> 00:56:29.390
Laura Feinstein (SPUR): Ah, well, that's great. Thank you for walking us through all of that. It was wonderful having you here. I have a lot of a lot of ideas. I'm sure not many of which my husband will actually like, because he he likes things to be sort of like large and convenient.

409
00:56:29.400 --> 00:56:30.089
Sean Armstrong: I

410
00:56:30.100 --> 00:56:48.889
Laura Feinstein (SPUR): yeah, I think. Ah, it's probably a subject for another time. But I would love to do like that whole kind of walkthrough of how you electrify home if you're trying to persuade someone who's really like, mainly motivated by convenience and the performance and costs

411
00:56:48.900 --> 00:56:57.689
Laura Feinstein (SPUR): because I feel like It's like a a slightly different set of arguments and solutions you'd be presenting to that that kind of customer, right?

412
00:56:57.700 --> 00:57:00.889
Everything's possible with money and time,

413
00:57:00.900 --> 00:57:14.290
Laura Feinstein (SPUR): so you can just tell like, hey? You know, we could use that five thousand dollars to go to Hawaii on vacation, or you can get an unnecessarily large evening charger. Because you're worried.

414
00:57:14.300 --> 00:57:33.370
Sean Armstrong: I I have um the ask sean show on the third Wednesday of the month, and I would love if you want to email me more photos of your house about, like all the like, your gas appliances, and get up

close to the nameplate, so I can see what's there, and I can make your house a feature. It's like once a month. I'll i'll give you a freebie

415
00:57:33.380 --> 00:57:36.069
Sean Armstrong: um analysis for everyone to see.

416
00:57:36.080 --> 00:57:38.590
Laura Feinstein (SPUR): Can you bring your hubby along?

417
00:57:38.600 --> 00:57:44.489
Laura Feinstein (SPUR): I'm going to like feature our house? This is the moment

418
00:57:44.500 --> 00:57:45.720
Laura Feinstein (SPUR): eleven.

419
00:57:46.120 --> 00:57:56.289
Laura Feinstein (SPUR): Yes, I have a recently remodeled home, into which they put nothing but brand new gas appliances.

420
00:57:56.300 --> 00:58:00.340
Laura Feinstein (SPUR): You heard of my whole cigarette smoke argument. So start with the stove.

421
00:58:00.350 --> 00:58:06.219
Laura Feinstein (SPUR): Now you wouldn't tolerate your husband smoking cigarettes in the living room all day long. So

422
00:58:06.300 --> 00:58:12.500
Sean Armstrong: what's going on here? You what you shouldn't tolerate, you guys, though it's just as nasty This doesn't smell as bad, but everything else is nasty.

423
00:58:12.510 --> 00:58:25.830
Laura Feinstein (SPUR): Yeah. Well, thanks for joining us today. So much thanks to the audience for all your great questions. We loved having you here, and thanks for all your insight. Oh, just to thank you and a compliment on your fireplace.

424
00:58:25.840 --> 00:58:28.740

Laura Feinstein (SPUR): Thank you.

425
00:58:28.750 --> 00:58:42.660
Laura Feinstein (SPUR): So it's not everybody. Stay cool and uh pay attention to the flex alerts, and my email address is in the chat. Now. I'm. From Pm. And Gmail dot Com. Get to me,

426
00:58:42.760 --> 00:58:45.439
Sean Armstrong: Shawn Armstrong Pm: There you go,

427
00:58:46.410 --> 00:58:48.159
Laura Feinstein (SPUR): really great

428
00:58:48.170 --> 00:58:49.200
Laura Feinstein (SPUR): bye. Bye,