Facilitator 1: I've met all of you coming there to your places. I am [Faciliator Name]. I work in human computer interaction and UCL and this project, beyond the research we're doing right here is looking on how to use sensing and visualizations can go beyond the visual persuasion when it comes to sustainability, research and policy. So what it tries is like we're making prototypes and we're making different kind of visualizations and IoT kind of devices that can kind of help bridge between the individuals that are in the houses to policy level ideas. So one of these projects that comes from this bigger framework is what we're working with here, so until now we ask you to track your own consumption of electricity data, and here we're going to talk about these fictional scenario where you are all neighbors and you have purchased a solar panel collectively. So we're trying to make this bridge between the individual and the and the collective. Uh, I mentioned who I am. I come from the human computer interaction side. This is an interdisciplinary project. So we have [Facilitator 2 name] also.

Facilitator 2: Yeah, I've met some of you have already. I worked at the UCL Energy Institute.

Facilitator 3: Hi everyone. I'm [Name] from [Partner Charity]. And I work in Community management and on this project we kind of help kind out with contacts. I don't know if people are familiar with it?

[Dialogue redacted for partner charity anonymity]

Facilitator 2: So I mean today we will explain as we go along what we're going to be doing, but essentially we're going to be, first of all, setting out your kind of reported usage on the charts and then thinking about what and how you might be able to move it around to make the couple of different days of generation with solar to think about that sort of faculty and then obviously. Umm, looking at how you might coordinate between each other because we were interested in some of the ways that could be done, and then we'll talk about some other sort of technical options a bit later, including batteries and so on.

Umm, so this is really like a focus group, so we're interested in your thoughts and what you know what you your opinions on different things. So it's fine if to disagree with each other and to discuss and sort of respond to other people's comments and so on. But you know you just try and keep it really kind of positive and constructive cause. Alternately, we're hoping to use the results of this to develop some solutions which we can test in the field.

And we're gonna be recording it like, I think I [Facilitator 1] mentioned already. OK, so I think that's basically everything are there any questions before we start.

H12: Some of my bigger consumption items aren't here. Is that on purpose or is something wrong with my data?

F1: Uh, I will explain how it how it works. So what I did. OK. So what you have in front of you is one day of the days that you have actually documented. And I chose one of the busiest days not in terms of how many items you have, but in terms of consumption, total consumption. What we are going to be simulating here is how the busiest day in terms of consumption of you would work together. How do you combine each other?

H12: So that answers. This is the sample of you're busy day. Yes, fine.

F2: Perhaps we could just go around and maybe doesn't mean you could just say your first name and perhaps briefly, how you heard about the study.

[Redacted for anonymity]

F1: So this is the busiest day of your consumption. And what you see here are your individual annotations. So this is actually a data physicalization, which means that the X axis, the bottom part, how wide it is is actually the duration and the Y axis, which is like how high it is is actually the actual power. It's not the actual power, but it's the average power of that device. So that the area of each of the blocks you have here is actually the consumption.

H12: I don't know how everybody else found, but I found the tool did not help me create data in the chunks of what you're trying to hope they are. So my computer array would be on all day. That's this long no. So yeah, but I didn't annotate said. Well this is my base state running my house during the daytime and so I don't know how we'll figure that out.

F1: We can probably manipulate things, but we can kind of assume some of the things and I think what I tried to do is bring some of the bigger elements you have. So laundry is dishwashers that are more confined in time because of course everybody's going to have some kind of base state that are things are happening at the same time.

Yeah, and the graph here that you see in front of you is a graph from a solar solar panel. So how it works is that this is time. So this is from 1:00 AM up to 12, the full 24 hours, let's say, OK, with noon in the middle. And this is power. So up to five kilowatt. And this is a a real well, this is modified data from Repowering installation from one day in June. So what you see here is how much how many kilowatt hours are being produced. So it starts at 4:00 AM because the sun comes up at 4:00 AM and then it's kind of a sunny day and then around 9:00 AM, you see that there's a few clouds. That's why it falls.

And then at noon at peaks, because it's like the moment and then slowly until 8:00 PM, where the sun kind of sets and that's it. So that's how much electricity is being produced from that panel. This is modified data because.

[H6 arrives]

F2: We just, we literally just kind of kicked off. We just had some very brief introductions, all right?

[Redacted for anonymity]

F1: And what we are I just described is that this graph is a solar generation graph from one of the Repowering installations, but it's a bit modified where you have time here at the bottom and power at the top so that at 4:00 AM, when the sun comes up, then you generate some, it generates some electricity. Yeah. Then it gets a bit cloudy around 8:00 am because there's a dip. It peaks at noon and then it kind of drops slowly. And this is how much it's producing and energy by 8:00 PM where it sunsets.

It's really fast introduction..

H6: That's fine. I'll. I'll catch up as we go. No.

F1: Do you have some questions? Anybody. If there are questions, please do interrupt me.

Alright, so I thought the first thing we can do is actually take our data and based on the little sheet you have here, which its kind of from your own information on how flexible and not it is. Let's try to place our blocks on the on the graph and I would suggest that you start from the bigger ones first, because it's going to make them more legible, kind of drawing graph again.

F2: At the moment you're just translating on their exactly as it says on your side.

[00:12:30 - Participants are assembling the chart and are talking all together]

...

H12: The next one is 12. Everyone might have turned on the dishwasher at about the same time in the morning right after it had breakfast. That's interesting.

H14: Also completely untypical for us, because we only do it in 3:00 AM in the morning.

F1: With the DIY I assume that there you use a drill or something like right?

H6: Like something phone charger?

F1: Ohh no today I means like a tool - some kind of home improvement. Yeah. Say, yeah. I don't know. I just assumed that could be something..

H6: Yes, this is something I have going.

H12: Did you lose your data?

H6: No, I didn't lose them. What happened was I didn't... What did I do? I did. I did. I didn't get them it in time. I'm sorry. I tried to download it. Yeah, I felt like I lost it, but apparently it's in there, right? So. Yeah. So it isn't lost, but. Yeah, it didn't go through. Did you have that problem?

H12: No. No. But I also work in tech, so it would been really hard for me to have that problem. Yes, exactly.

H6: I don't. I'm I'm a bit not very..

H12: Yeah, I get that too. I understand the extreme advantage I have. And it is I mean, I have a job, so it works for this.

[finished setting up the graph 00:15:34]

F1: Alright, thank you. So I guess now what we're seeing here visualized is a common day of you 5. Is there something you notice that you find interesting about your own or your other peoples data or the collection?

H14: We’re very passive at night.

F1: You mean here?

H12: Yeah. I'm fascinated at the different capabilities. Different washing machines.

H15: Yeah, I need a new one.

H12: Yeah, I'm looking at some people's washing machines and some people's dishwashers and thinking that they're all pretty different.

I need to hurry my cleaner up. She's the vacuum to.

H11: You know, I mean, it really depends on what you day and night rate right? So if you just got one rate doesn't really matter. So but I've got no benefit for using it here.

H12: In reality, my house does that 24/7.

F1: Yeah. In reality, everybody kind of this data all includes a base state into it, right?

H12: Umm, we will need to time shift with the battery to be able to get the evening meal done. We all need to learn how to say hey, the dishwasher gets programmed. Come on. I don't know. Maybe in the evening or morning. Whatever it is, the washing machine. We need to be doing as they're doing in community housing, everyone having a time slot to do it in perhaps, or we all just rely on the actually having enough. And we definitely need some kind of data tells how much is left and we're going to make of it,

H15: I guess if you're if you go for a battery battery is not efficient. So no, if you're going just off the solar generation during the day and you have to try and coordinate that during the day,

H12: Well, we wouldn't have enough for most of us to cook our evening meals.

H15: Yeah, exactly. So that's where it becomes really difficult. Either shift where we you know, go back to the old normal. We were cooking, eating the main dinner in the middle of the day, and then just sandwiches in the evening.

H11: Or we're looking at slow cookers and things like that, so yeah, yeah.

H6: No, I was just going to say that wouldn't depend on whether the the solar panels were collecting were needing sunlight or daylight to operate. So it's daylight. Because the old fashioned panels were were needed sunlight to be able to charge, but they have now making the panels where they only need daylight. Which means I don't wouldn't need to

H12: Do you means that the sky can be surrounded by clouds and it can still collected energy? Is that what you mean?.

H6: Yeah. Yeah. Yeah, yeah, yeah,

H12: I think that's all you can get nowadays

H15: There’s a big gap there isn't there?

H14: Yeah

H12: We all do nothing straight after lunch.

H15: That's good.

H12: Maybe we are still living with a big meal like the past

F2: Could I also like just? I mean, obviously this was just picking a day that was a high consumption day, but looking at your own consumption on here, do you look at it in kind of recognize it and think that's quite typical? Yeah. Do you have quite standard pattern or is it like,

H11: well, yeah, I think so,

H12: Yeah I could predict week to week once can look like almost. Now, having done a week worth, I'd be like, wow, that's very typical week.

H15: Me was a little abnormal because I got two wash 2 loads of washing on which we usually wouldn't do, but I just know that there were things going on that week where we need to do a couple of extra loads and which we wouldn't usually do. And when it's sunny we'll try and get the load done in the morning so they can get it outside and have it dry without needing a drier.

F2: So, you're thinking about solar power not in terms of electricity, you're thinking about its solar drying capabilities. Yeah. Yeah.

H14: Dishwasher normally be running and washing machine learning be running over night

F2: Actually, over in like in the early hours of the morning?

H14: So yeah.

F1: Is that choice or is it there a tariff or?

H14: I believe maybe I'm substantially. That's that it it it take the grid is less busy at that time also it doesn't affect us to do it then so we do it then.

H12: For the right tariff it will cost you less too.

H6: Yeah, it would only cost less if you want that dual. Yeah. Yeah, yeah, yeah.

H11: You can't switch at the moment.

H14: I got my interrail booked for two months we’re just moving the time that we go away.

F2: [H6 name] I know yours is just kind of mock data, but when you look at it, does that does that look like when you use sort of appliances? I only usually only have one, if I have one. So 2 kettles also quite, quite well. I noticed what fascinated me was that when I was out all day, I came back and looked at the data it showed there were spikes in my electricity usage and I thought how did that happen so? There's been, like, stop happening that I don't really understand.

H15: That’s disconcerting

H14: Sorry?

H15: Disconcerting.

H14: Yeah!

H12: When you say spike, we're talking like double the height or…

H6: Yeah, sometimes it's quite high.

Yeah. But you'll see. OK. Yeah.

H15: The neighbours are just using the extension code.

H12: Yeah. Someone is backing their House of yours.

H6: The thing is. Yeah. Well, that well, yeah. OK, but. I was. I became really fascinated with the whole process of how, you know, looking at my usage, I've got, Oh my goodness. But it it wasn't logical for me It was a logical I couldn't because I looked at the times. Eventually I started to exactly whatever time I've got washing machine on, I put it, wrote that time down exactly what timeline charged my phone. I put that down, but then I've noticed since then that I had things I think I had the loft light on, which I didn't realise. And then I had because I don't know whether it makes a difference if you've got, if you've got something plugged in, even if it's switched off, it uses electricity.

H12: It's a little bit less than yes.

H6: Yeah. So that was something that. Make me alerted me. So that's good. Yeah. Yes. I'm kind of going around checking

F1: the fridge. Also has a very specific pattern in your data, so it doesn't those spikes, but not like really big spikes. But if you look at it, it just goes flat and up and flatten up as it kind of maintains the right. So if you notice, enough in your data, you can actually separate it as a pattern.

F2: And it would be doing it a lot during this extra hot weather.

F1: OK. So now I'm imagining you. I've entered a little bit this before, but let's try it again. So you're imagine that you're all neighbors and that you are considering buying a PV installation kind of all of you together. And you purchased the panels together collectively divided by 5, so that everything that is you generate here from this one, for instance, then it gets divided equally amongst you five. When it's there is power and then it gets divided by 5. Everything that is outside the curve. So everything that is outside of these, the dark shaded area, you would need to pay off the grid by yourselves. So each of you individually not collectively and it would let's put some prices there. It's free if you buy it. If you get it directly from the solar panel, it's 30P per kWh. If you buy it from the grid and anything that is solar generated, that is solar energy that is generated but is not consumed, you give it back to the grid for 5p so much much less than what you buy it.

H12: Yeah its best to use it.

F1: UM, So what? As you can see, it's on your benefit, let's say, to to try to maximize the use of the solar panel that you have just purchased. What of these activities can you actually shift or what can you shift? Shifting means that you would take it from outside of the curve and try to put it in a time slot that is inside. Are they, are these activities flexible or do you think that they are not?

H11: The appliances.

H12: I suggest all these appliances there should shift back up here and here at noon.

H15: Yeah.

H14: Yeah.

F1: Is that realistic in in your real life.. if you can remember that day you also have some notes on you about whether it was flexible or not.

H15: I kind of have the the dinner as less flexible but I mean that's if we are eating in the evening.

F2: So who thinks, who's got, who's got sort of usage right up at the end there and thinks that they would be able to move, move it to another time and maybe they could just do that. Yeah, I could definitely do this.

H15: I can definitely move this.

H11: I mean I could move that green one

H15: This one?

H11 Yeah.

F2: So those were those were ones that you think you could have done?

H6: So you're talking about us purchasing all of us purchasing. So if I was going to purchase with my community with all of us together, I wouldn't want to be paying a bill on top of buying the solar. So I don't see why, like can we if we don't use our allotted amount, can we carry it over or can we work out a system where we use it and then none of us get a bill at the end of the month if we kind of work out. What were using devices? Because to me I wouldn't wanna have a bill on top of buying.

H12: I tell you what, I'll buy your excess of 20p. Yeah, yeah.

H6: I mean, I'm saying if we did it in such a way where we could use things so that we don't, general.

H12: I mean, I'm not making a joke. I actually think that's really insightful stuff. So you get a fifth, but you don't need a fifth. But I know I need more than 1/5, so yeah, I'd be quite happy to you know. Well, pay back, yeah. That's a cost of the power that I'm getting at at your extra power off this versus the 50 P I'm gonna buy off the power company. No. Yeah, but more than 5p get from selling it. Basically sell to me at 10 P. And that works out pretty well.

H6: The thing is that the way that I look at it is if I'm get, if I don't use all of it and I've got some leftover and you can use it cause you need extra, I'd give it to you because we're working as a community. So that's the way I would look at it.

H12: And then just you also had, you have your cost of purchase, you have your purchase contribution,

H6: but let's say it out, yeah, but let's say we paid it all off and we've just got this amount of.Yeah, we've only got this. I don't see why I'm gonna be saying pay me 20. I mean, it's it's just doesn't make sense.

F2: I mean, I think that's definitely a good point. And so the in some respects of the setup here is basically saying you can get that situation in theory where you've got no bill, but only if you move your consumption to run within when the solar panel is generating it. And you're saying you wouldn't like that.

H6: Ohh, I'd be happy to work with everyone. What works for each of us, but I'm saying if I don't use mine I'm happy to give it to whoever needs it in the group in the you know, because we're a community, the whole, the whole ethos of this is that it's a community.

Umm, uh, initiative and so.

H11: But we have to sort of plan out all the activities at the beginning of each day seems to be a bit intense.

H11: Yeah, how how often would we work out?

H12: Well, my friend in her Swiss house, where they all have this shared set of washing machines down the bottom. They actually just get them allocated today and time they can do their washing, right? OK. I imagine with software you can make more flexible because nobody wants to Friday, 8:00 o'clock window, but yes I imagine it would have to be an extension of that. It will go. ‘Hey flat number 43. This is your turn to use your washing machine’. Yeah, and we all know we're all gonna cook dinner around this time, and we can handle that peak load because we've maybe figured we can't do that thing load. And so we've been able to offset a little bit with the battery. We do have to make that decision. Yeah, and magine those kind of fixes.

H6: Does she get a bill on top of does she have to pay outside of the? No, no, no. All she has is but it's more to do with the access to the machine itself rather than having solar. But it would also work the other way. So if there's only N number of machines that are like to be use d, then and if everyone has the craziness of we've gone and done this community. But we haven't done washing machines, community. Yeah, we haven't gone up right operated all in AAA and put them all in one room. And you know, I imagine we have to figure out who's what consumption and then what time they could use this compared to somebody else's.

H14: Yeah. And I'm thinking that that there was a thing that existed for a while called a classic car club where they a pile classic cars some very mundane ones. some very nice ones. Yeah. Nice open top, E-type type Jag [?]. And you bought for your membership you got a number of points. You got, you know, 1000 points. And you could use those points whenever you wanted, if you wanted the E type Jag on a sunny Saturday in August. It was gonna cost you about 500 points on the rainy day in December you cleverly could drive the Jag for 200 and then away I think it kind of looking at going OK. Look, if you want to put your dishwasher on at this time then you're gonna be using 10 points. If you put it on at this time: 1 point. Yeah. And that and I would think computer controlled, kind of go, you know, actually it's true because I got it actually not, you know, it's peak times actually nobody doing it. You can now you can now have it here like.

H12: Yeah, it's an interesting way of encouraging usage. I like that

F1: So the points in this case would be dependent on how you agreed upon each other about what are the most wanted dates or needed days or hours, right?

H6: if if I'm not going to get a bill at the end of it, I'll I'll get up in the middle of the night and do my washing. Whatever I gotta do to avoid having a bill apart from if I've already thought out for solar, then I'll work with that.

H12: They have a timer now. I think we're all OK. No one here needs to be getting up in the night.

H6: I'm not the one saying is I don't want to generate a bill because to me that's a illogical paying out for that cause those aren't cheap.

H12: See, I'm lazy on the 11 spectrum. I always want to watch TV at 8:00 PM. There's no solar at that point I'm gonna pay to get the the power to run my TV.

H6: OK.

H14: And of course, The thing is that you're saying I'm very happy to put the dishwasher on at this time. But if everybody's very happy to put additional to get it free then suddenly the six person can come in can't put the dishwasher on because they, you know, it's. what you might get. Somebody kind of being very efficient and greedy and kind of getting up 8:49 I put everything on because I know that people are actually thinking about the 9:00 o'clock, you know, and it kind of… So, it can be gamed in that way and I think some people are kind of gonna try and really make it work. Other people just going to go, I really wanna watch telly now. I'm gonna do it and that's the.

Yeah.

H12: That's when it comes. That's when its runs out. I use my 5th. I'm either buying extra off the capacity or I'm paying for a direct off the grid on it.

H14: Yeah, it's also how it happens within this time. So it could be that you're actually yes, because if you do, you have like this much electricity that you can use anytime you want or do you have to use it spread. [pointing on quantities of electricity]

H15: I think something was still looking at though is there's, we're still looking at individual homes. I mean if we having solar solar panels as a community, why not just have community areas so like washing rooms like they do in like Some you know, other other parts of Europe, even even like you know our kitchens, like, if I'm using my oven and typically only using one level of my oven if someone else is cooking dinner at the same time, the same heat, why not jump in on that?

H6: Yeah.

H15: And he, you know, eventually you move towards trying to get a larger washing machine so it can handle 8K loads or whatever, but also as energy efficient as you can get so that I can just do one load rather than having to do 3 loads.

H12: I would do three to four a week.

H14: Yeah. Yeah. I don't know with the best rule in the world. I think, you know, most people will prioritize ease and convenience…

H11: Yeah, that’s what I was just thinking,

H14: Over making that trip to the launderette. It's like, do I really want to sort of have to be there on time to get my smalls out before that teenage teenager next door? You know? Yeah, no thank you. Yes, it can work. It certainly environments because I think if you’re looking at bigger roll-out you want to make it so OK would be easy for me to do this, but actually I'm going to get hit by a sledgehammer if I do that, I won't do it.

H12: So can we make community solar work effectively with software solutions without having to enable other parts of community such as...

F1: ..talking to each other…

H12: Yeah, .. actually caring.

H14: I think you can have a bit of both its all about removing resistance not intention, but just making it as easy as possible. So if for example, everybody knows how their timing works on their things and they're more like to use it well, I would have hoped that.

H12: I mean, in the way that they plan on changing the way the car charges work because we haven't so that you can program when they're gonna come on and they can come off and so this could always be API driven now and so it can be done from the central hub to do demand sculpting. One would hope that that kind of tech solution would be as part of this community would come out with these things, so the hopefully they'll be more of a central node to control and allow and perhaps..

H14: you could actually say look, I need my washing be ready by this time. When it goes on in that time I don't care to it turns it on and off. Perfect!

H6: But then what if we have a power cut.

H12: You mean the sun doesn’t shine?

H6: And then maybe I'm not your you're high tech solution doesn't work. What if we don't have the option to have electricity? You know, like off the grid and we've only we can only depend on the solar panels.

H12: But the so this is basically this is basically a small network running the houses. So all the tech helping it run would still be powered by it.

H6: If we there is tech, I mean we could all it means that we got to talk to each other. We got communicate. We gotta get along.

H12: I would assume I would assume considering we're debating running electronic devices or electronic network, we can safely assume electronic solutions to that would be available to this during meanwhile. Otherwise we're not running these things anyway. So then what's the point?

F1: But there are other kind of. If we're talking about technological solutions, I mean there are many opinions we've heard also in other workshops that there are issues, for instance, about privacy or about security or about other things that some people are much more conscious about when it comes to technology and not everybody is necessarily on board. And that's completely understandable. H11, you haven’t said much what do you think about coordination?

H11: Yeah, I think, yeah, it's it's a really good idea. It's just the practicality and the ease. And I don't know because I mean, I live in a block with seven flats and most of us, you know, we will get on and but some people they just don't respond and I don't know. I just think it'll be a bit tricky. That's what I mean about how you know, how often would you have to communicate this and plan it out? It's, yeah.

F1: How? How is it a situation now? Like, what do you communicate about, for instance, like and you have shared resources for some service.

H11: Yeah. Just like service charge stuff and. Yeah.

H6: And but not the actual washing machines, cookers?

H11: Uh, well, no. Not the moment we all have individual, yeah.

F2: Just to observe on this this question, the coordination is going to come up a lot throughout the discussion. So we come back to all of these things just to describe the situation on there at the moment. Any block that's lying on white instead of gray, you're getting hit with 30p unit versus being free inside. And I just wondered if everyone could look at their blocks in there and think is that something where I'm happy? Like you were saying to pay because I want to do that thing at that time or is it something which I think I would want to move to avoid the cost, but I couldn't.

H6: Yeah, I mean, I would be happy to move it, but sometimes you can't move it, you know, like I'm looking at this last one DIY and if the builders there and it's doing something, I can't say well, you know what? I don't want incur a charge. He's gonna think I'm mad.

H15: Just push the charge on him.

H12: You don't do it. 240 no 140

H6: But, I would technically be trying to squeeze everything into that grid. OK, yeah, as long as it's possible.

F2: Does anyone else wanna move anymore? I don't think something say why or why not or looking at that one say why they wouldn't do.

H15: For me, like just showring, getting the kids ready for bed. I got three kids,

H12: So that's kind of fairly big non negotiable

H15: It's part of their evening routine, it helps them calm down and yeah, get ready and not stink. So that's really not negotiable. And same with cooking dinner. The way we cook dinner can change. But we don't use the oven that often for dinner, we tend to just be able to cook on the hob or the slow cooker.

H12: Is that, I mean that seems like a lot of power for an oven. Does that seem normal for power people in the room?

F2: Yeah that looks quite normal, yeah.

H15: It might have been on 220.

H12: Yeah, I noticed a lot of difference between the 60 wash and a 30 wash that's for sure. Yeah.

H15: So stuff like that for me, it's not really negotiate, but. Yeah, like even on this day, we used the hub in the middle of the day for prep for dinner. Something we knew we could do earlier on in the day when we were already cooking lunch, so we made use of it and that's something we always do though that it's not because this, you know we're being monitored.

H12: OK. Yeah. Who did change their behavior because of being monitored?

H6: Yeah, I did. No, but I loved it. I loved the fact that I could actually see where, where my usage is going right? I thought it was great. I loved it. I'm so disappointed that my information did not upload.

H12: You sound like you should definitely call up your supplier and get input a smart meter in. and then you get one of the monitoring devices and it's that is your craft.

H6: If I get a smart meter, I am going to put a Faraday cage around it because I'm really not into the radiation and you know they kind of track you, they can track you through your smart meter and you know when you're and when you're not. I’m not into the smart stuff.

H14: I'm going back to the, you know, I'm very happy to shift everything around, but I do live with two other people and some of them have a more pragmatic life view than I do about actually, you know, I'm going to go off there there and I need to have a shower before I go. And so I think that. Again, I think that the. I think that there is there's there's kind of.

The interesting question is how you can, you know, you can change that switch from using the cooker to the slow cooker or to the microwave and the that can kind of be facilitated, I mean, you know, I'm. I'm really intrigued. You know that that kettles and you know that the kind of.. So my mum's just got a 1 cup thing where she just presses a button and that kind of wooshes up a cup if she can come up but it makes it easy and safer than much and I suspect cheaper.

But it is. It's that kind of, you know, that most of the time I'm making, you know, I'll make a pot of tea and I make a pot of tea that's, you know, don't use more water than the teapot needs. But actually, I quite often don't drink that tea pot of tea. So there's kind of really interesting things about what apparatus they can. They can be so that.

H12: So the visualization really helped us think about our own demand for sure. And you look at this and you say yourself, we would all then be very interested in running our main negotiables in a group in the middle to consume that battery. But I have a feeling we've all got a solid amount of non negotiationables at the end that it just we're all gonna be paying 50p.

H11: It's just kind of little well, it seemed like everybody works nine to five, Monday to Friday, maybe from home. That's the impression I'm getting. But I don't know what it would be like if someone did night shifts or. And yeah, yeah, because then you can't. You're sleeping in the day. You can't really have all appliances as well if you are in a small flat.

F1: Do you work from home mostly?

H11: Yeah. Umm, yeah.

H12: Yeah

H14: Yeah

H15: Yeah

H6: Yeah, in and out.

H11: Yeah. Yeah. So we were able to..

F1: to already able to shift.

H12: I don't think to do their washing at that point, yeah.

F1: OK, so this was a day in June. If you can take your data out. We have like a little bit more constraining version. It's not that bad. It's not. It's it's not January darkness or something. It's like something that is realistically still kind of doable.

H11: March, so yeah.

H6: So you asked about working from home. You can use those plugs and put timers on them and then things come go yeah.

F1: No, I'm asking whether you're working from home because sometimes the patterns of peoples data when they work from home is, is is different. So usually you work nine to five like we're saying, if you're working from home, you can even put the laundry during the daytime or something like this.

H12: Yeah, I would have always been coming home and put it on and now I put it on at 10:00 AM because I can.

F1: OK, so this is a March day. As you can see, it's much shorter. It gets daylight around 6:30 almost 7 and it gets night by little bit before 6.

H15: That's not that depressing.

F1: Yeah, I told you it's not. I'm not gonna do January because we won't be getting anywhere. So we're we're working on a March Day, which is actually a very sunny March day because it still produces 5 kilowatt at noon. But it's also a day that is has intermittent clouds. So you can see it goes up and down and up and down and up and down. So let's try to put our data back. You can think of it in the shifted way already if if you want to, let's put the boxes back your your consumptions back.

F2: So it is like as if you have seen a forecast.

H15: So do you want to have a fan on?

H12: I mean I know it says air but its mostly my computers and my laptop

[00: 45:12 participants are placing their boxes]

Can you do you yours earlier? Yeah. Oops.

F2: And if you want [H6 name], you can move them around. You can move it to fit in where you'd like to make the best use of the free solar electricity. But try to still make it realistically possible.

??: I should just say that I've gone with takeaways and consuming crokery.

??: Cutlery looking through that lot of work exactly.

??: I'm still gonna go back on that.

??: What was open?

??: Now.

??: Oh yeah.

??: No, OK, not eating.

??: I'm in there.

??: So I'll just clean here cleaning that hour.

??: I've already got the washing machine on that.

??: Breakfast.

??: Oh.

??: What time do you have?

??: Yeah, we're outside of the free.

??: So I can change that to cerial.

??: So.

??: I will have to do loads of washing back to back.

??: Umm.

??: The Bread makers will just gotta go.

??: Don't do it. Don't do it always. Basically getting it inside of the food trying to.

??: So basically the way it currectly works is if there's any time when your combined comes. So you're converting together in 1/2 hour goes up and outside of the Gray, then basically all of you have to split like all of you who are using edges. Do they have to split them?

??: You know that. So basically I mean it's not really there's not really an example. You just pay for what you're using outside, it's everybody's split. Well everyone who's using like.

??: No, not everybody. Everybody wants everybody. We ran out of somebody, yeah.

??: What is used outside, not outside.

??: Using it and it's at a time when it takes it out, I'm willing to like use together with those other people, watch stranger things with other people, right? Yeah. I think we're all watching the same thing.

??: So.

Yeah.

??: Dishwasher again. Maybe understand how they can do that, right?

??: So is that realistic that you would put? That's not realistic at all

[participants end placing their boxes]

H14: Normally we do, but on this day we we had two. That's where we have to leave it and the next day I'll throw it away.

I mean, if realistically you would do it in the night, then I would put it.

H12: I mean I am a little bit surprised. Yeah, I think the dishwasher twice today, but like, wow, you obviously had stored up four days and then somehow not quite sure you got to a second one on Monday. Yeah, that's a tough one.

H14: I think it was probably jam making. I mean, I don't. I don't do it. I just eat the produce.

H12: That is what I'm saying - I need to improve my lifestyle.

H6: I think also it's like you can review what devices we use. I mean, I don't own the microwave, we don't own the dishwasher. So something like this, you might decide to start washing up manually.

H11: Yeah.

H12: And relying on gas.

F1: So we can see that it's much more constraining the to do it in this way, right?

But there's also, like a catch here that he now I saw you Jigsaw in the information in, but in reality you will not have this map. Yeah, of the how the day is going to go out in such perfect detail, right. This is a little bit you can have like a world to the broadcast sorry a forecast forecast of the weather and of the sunshine and then you can kind of assume a little bit how the day is going to plan out but you won't be able to say so I'm going to put my dinner and hope at exactly 11:05, because that's the moment that that there's sunshine, right?

So there is going to need a level of coordination amongst you and there are different kind of ways and you mentioned some ways already like having a specific day to do some tasks like washing or having an AI or some kind of technology to help you support this like one way that a technology can support it would be for instance to predict when is the best time to when is the cheapest time because of kind of how much sunshine there is and tell you like. Why don't you do your laundry now? Because it's this much money. So you would have like a booking system where you can kind of book the time slots.

H6: Does that include hot water?

F1: No, this is electricity,

H15: It depends on how you heat your water.

H6: Because what I was going to say is that there is the PV solar PV, which can be triggered by the sunshine or by daylight. So I'm hoping that if I was part of this, that that I would be paying for an installation of solar panels that are treated by daylight. So whether it was good weather or not it, it would generate a lot of energy. In enough for all of us to use if we're relying on sunlight, we're gonna be in a bit of trouble because..

H12: Well we get this graph. That's what we get, right?

F1: And I don't know, maybe you can talk more about how the daylight versus sunlight is.

F2: I mean, solar panels will generate under whatever light circumstances, but basically sunlight because it's a lot brighter, would generate a lot more electricity. OK. So that's the way it would work. So if you get, I mean, modern solar panels that you get will generate from those data, right, but not as much as under direct sunlight

H14: And by substantial difference I assume.

H6: I see.

F2: Yeah, by quite substantially.

F1 So it's realistic to assume that a graph like this would be...?

F2: it's probably a combination because it would have, you know, there might be certain things of cloud. It all depends exactly how much you're getting through. You get resume data.

H6: Also, there are solar thermal panels which heat the hot water.

H12: Im Australian, we're very used to those.

H6: Yeah. Yeah. That would bring the cost down

H14: I think the thing is things like kettles all of that thing if you need hot water and you're pointing it from basically sort of ambient temperature up to a thing and it it kind of going there must be a way that you can have water of a sort of a higher starting rate which is kind of around you know if you think about your hot water boiler of you know that you kind of you know

H12: That is where a good air source heat pump system comes in store the excess energy in a huge tank. That's almost like a big battery install.

H14: Yeah, so so if you could get that in and that reduces your, your kind of kettle loads and everything else and the same way as we were mentioning your 60 to 30 washing, you know, the more that you can kind of get to a low wash than that's gonna make that difference.

H12: Yeah, I'm. I'm left wondering sometimes if my 60 wash is just my mother's talk sitting in my head versus the realism of I need to wash my towels at 60. I don't know. I should probably just shake off some of the older ways bit more. Do I need a wash?

F1: OK, So what do you think about the coordination? How? How do you matching coordinating in this like would you accept the technological solution to this like you have a booking slot with timetable like that says that I'm going to book it for next day or like which says when it's going to be cheaper or not like depending on

H11: Yeah, that would be my preference, then you get a notification saying now's a good time to use whatever based on your household’s what you use.

F1: Better than having [?]

H11: Yeah, I wouldn't wanna have meetings.

H12: That's like trying to regularly book my tennis game every week at the very quickly booked up Sports Center. That sounds vaguely exhausting.

H11: Yeah. I don't think I could

F1: OK, so it will be more automated then.

H6: Yeah, I mean, I wouldn't mind. I would kind of let other people take priority if they really wanted if they got really set way of doing it and I would work around that. I think quite happy to do that.

F1: How would you think in practice that could work?

H6: Somebody might ring me up and say, you know what I want, blah, blah slot and I'll be like, yeah, fine, you know. I am quite amenable and flexible. I think. I think with the project like this with the community setup, whatever it is, and particularly with energy, everyone's got to be flexible. Everyone's got to be able to get along and we've all got to be able to allow for error for all of us to make a mistake and be OK with it.

H11: I wouldn't wanna ring you though. I'm I'd rather do it on an app or something.

H6: Ohh yeah. Yeah.

H11: I mean that show or something, but yeah.

H6: I guess it happens. So chat function and then booking thing.

H12: Yeah, different generations. Yeah. Yeah, they don't talk. I'm fine. Yeah, yeah, that's good.

H6: But and it's not only that, it's also I kind of get the feeling like you don't want to, you don't wanna feel like you're taking space as I don't know what this is, what I need. And I think in a project like this, everyone's gotta be able to have a level of being assertive, saying what you feel, I think it's appreciated. I would appreciate you saying, you know what? I'm sorry, but this doesn't work. And this is what I need. And I would be happy with that.

H11: Yeah, I would not have been able to do that and I would get the rubbish slot.

H14: What about having a social traffic light system. So it's kind of, you know. If it's green, then it's like, yeah, just feel free to go for it. If it's amber. Look, you know, if you need to to to, to do it now, then then go for it. But if you can delay it, delay it, and if it's if it's red, then it's like, you know, no, really don't do it unless you, you know, that might be a. But again that's gonna expand over time because like ohh, I've got green. My goodness go. I'm gonna put the dishwasher on the washing machine on there like 3 hours later.

H12: And then everyone's done it, and then the whole groups now saying 50p versus having able to put a everything across the day.

F1: So in that way the signaling system would show how much energy there is right now, right, how much generation?

H14: Well, I think you have to look at it going because otherwise how much there is right now, there's no termination of an hour's time.

F1: So it's a signal of look, from now on, there's gonna be 3 hours, lot of sunshine, something like this. OK. Interesting.

H15: I think people are quite arbitrary though. Like we do the same things all the time. So you could kind of Plan out like you know, a week or couple of weeks as a community and then review that and see how well it was working and kind of refine it and it would get to a point where you just get used to like on Thursday, I do the washing because I know I 57 is doing it on the Friday and yeah, and I think it would all kind of sort itself out,

H6: Yeah, I think so.

H15: But I do like the idea you mentioned earlier about like you know; you're booking the more you're spending more of your points on the high demand areas.

F1: To try and take the socially higher demanded that

H15: Yes, exactly like a Friday night might be really high for for certain activities Umm, you know more lights on or TV or whatever, you know, cooking or because even having friends over whatever it may be. But like on a Wednesday morning, I'm not really wants that just because it's Wednesday. So the biggest.

H12: So we bought this thing and power costs as we all know we need to use power later on. So the biggest waste for us is not using the power we have available, right. So it's not consuming every last inch when there's something that we could do. In that time that is flexible. So I'm imagining if it was able to predictively sculpt what the day was like well enough plus a combination of we've kind of all agreed that we're gonna put, you know, washing on this day versus on that day and our dishwashers, if we all have a dishwasher, we kind of go like you get the morning so that you get the afternoon slot and we do that enough and you get like a midday slot. Then we've kind of put dishwashers, the band across the bottom and then we've put like washing machines across the band. And so we then have the greatest chance of on each day probably using all of our power on the things that are flexible, which is great for us, we solved a little bit. We sold the little bit we didn't manage to demand right back. Umm. And then we average out across the whole group. Perhaps those times you've gone over that because we ask people to do it, then when they had to pay, they didn't really want to. but we didn't get enough power that day and so we as a collective have to go, we'll kind of OK, so I community on items community, which is at the top have to kind of pay as a community, not just that person who turned it on that date. Yeah, that's something that might have to start happening. And then yeah, that community fund that's paying for that is making its 10p the extras and hopefully that's offsetting it and everyone that's outside of that kind of like sculpted window paint going away and then I guess the only thing left in my mind that's an unknown is for those days I'm getting a bit lucky and we're getting a little bit extra power out the edges and things are on how does that work and people winning when I don’t turn on my TV on that size Sonny's day? Because that side of that flexible things or yeah, I don't know how that works. Yeah. In my head. Yeah.

H6: So on the back of what you said, what happens to the energy that is not used?

H15: We get paid for that. Yeah, we sell it back to to the grid. We sell at 10. They said that's the basically the playback.

H12: We buy it for a higher price 1/5 the cost of in case we buying it. So that's better than users or

H14: Or you put your own battery. Yeah, battery.

H12: I mean, I'm getting a solar system getting a 6 1/2 kilos system installed over the next couple of weeks. I'm buying a probably a four kilowatt battery complete before we move into the battery conversation, because we're gonna talk about this more thing I would like to ask you. What about your real neighbors now I give you a fictional scenario where you're all five here. Do you know your real neighbors and would you be will be able to?

H14: AirBnB that come and go all times of the day..

H12: Then no chance.

H14: Then they're not. No, no. But we do have. But we do have. We do have one within the within the, you know. So that's not unreasonable. That's one within 48 at the moment. It's definitely got You know, 8-10 tenanted houses, you know with we have those with families.

H12: Could you negotiate with them?

H11: Yes, yes. But what I'm saying is you're gonna, you know, you're gonna be negotiating within parameters of interest and acceptance to get involved rather than kind of an idealic buy-in. But hey we will be have to be doing that in the household.

H15: I was thinking that this might have a really negative effect on the way that we interact with our neighbours. Like we might be like. Ohh. You know number 57 is using a lot of power when they shouldn't be less evict them and let's find someone else who uses less energy.

H12: OK. Yeah. Wow. Yeah. I mean, the bad actor thing everything is definitely a an unspoken thing. Even haven’t talked about about yet.

F1: What do you imagine? OK, so one thing would be to evict them. OK, that's the penalty. Right. What kind of penalty would people get if they're not kind of compliant to the system? That's what we're talking.

H14: But it's also, I mean, the bigger issue of now people are kind of monitoring what that person is.. you already get people to kind of get that in the recycling that was You know, you take that up to something which is I wish is more sort of financially, you know, it's like it doesn't really affect me if they put the wrong thing in the recycling, you know. Now we're getting to this effect and the potential of disagreements increases, so it needs to be a system which really doesn't kind of take it really doesn't shouldn't take you into the individual. You should have no idea whether someone’s got the dishwasher going. Yeah, what business is it of yours? What are the? You know what they're doing? So again, this is where the smartness of the system, I think needs to come in to. Just kind of thing like, you know, we know that this time is a peak demand time. Therefore they're gonna have to fight for it through points, whatever. And you know who's, you know, who's in there is.

F1: So yeah. Would you trust would you trust that the machine or the algorithm or whatever kind of system would negotiate for in on behalf of you more fairly than so you wouldn't have to see what everybody else would be generating because what you're describing is like you're wouldn’t be able to see, to check if someone has been off, the has generated more or consume more outside. Right.

H14: I mean, I. So there's that and I think you have a point where you're seeing that more has been consumed and you could have it that at a randomized level if it's a big enough group, to truly be randomized,

F1: it's you five,

H14: Oh, then I'm probably gonna have a pretty good guess that there was that person over there who was doing this at that time. Because I know they they've had to, you know, 14 house guests to stay. And they had a big party. So. So at that point, you know? Am I now trying to police them?

H6: I don't know. Because I think if it's like five of us I think that if we set to kind of set of foundation of accountability that's where it's gonna come down to something like this. You know things are we are. we've got convenient, we need convenience because we have access to convenience, but if suddenly there was no convenience, we would work with what we've got part at the same time in terms of the usage I would say, hey, you know what? I've I've, I think I've gone over. I would. I would volunteer that information I wouldn’t have a problem with that.

H11: I think the kind of people that would do this, other ones that are actively trying to cut their consumption, I don't think anyone would bind to this and they didn't care at all.

H14: I said that's what the question was, the personal question. So I'm going to float it as a question of people can decide that will not be able to answer it. How many people regularly use Amazon to shop here?

H6: Now and again, not all the time

H14: But you know, I'm sorry. Yes. Basically I try very hard not to Umm, but obviously you know their business model is that's as cheap as we could practically deliver it. It's as quick as you can have it as quick as we can practically get it to you and it will work.

H12: It's kind of that's the sort of, you know, it's like that. I think there's are they not somewhat useful at the economies of scale consideration. Do they actually therefore perhaps minimize impact? They might get rid of the local jobs and local shops.

H14: I'm not sure. They have very clear proposition, which is to be as efficient as possible, as quick as I think you know, they are hugely successful. Sounds like we as a group use Amazon less than perhaps the population does. So I'm thinking that skews. Perhaps our perception of I would say. What an awful way of putting this! People like convenience. They like things to be cheap and they like things to work and anything that you're doing against those three. Yes, there's a trade off between the two except, but anything you do against those three is gonna fall into grief or some point.

F1: I'm gonna challenge that a little bit, huh? Because I remember flights could be much more comfortable. At some point, they'll be all got used to having much more.

Yeah, yeah, we did, right. So I mean, people change and people get adapt, adapt slowly perhaps, but they they do adapt into more uncomfortable situations that they're become the the new reality in a way. Anyway, I'm not trying to.

H14: I have to say we very seldom fly. But trains in my experience but in large trains are well, they be paying a, you know, first class or second class.

H12: I'm just losing a bit of the macro point we're trying to make here.

H12: So, we're trying to say we need it to be as convenient as possible to be able to have this work. It already has a maximum convenience. We can just go buy power, so that's not going away. We're still pretty connected and not talking about going complete isolation on this. So the bigger thing is being able to then, in my mind, say when are we using that and how do we distribute that fairly amongst everybody?

H14: My point is we might want to it to be as convenient and easy as possible.

H12: [?] then it is that overcost when we don't have the power to give them the free and we are paying 50p for it. Then how do we distribute it just be left them fairly to everybody? I think that's seems to be one of the bigger unknowns.

H6: Well, maybe if there was, if I knew that on a Wednesday evening between say 11:00 o'clock and 4:00 o'clock in the morning and there was lots of extra unused energy, I probably would do something.

H12: You’d go for it, you’d get a green light, you’d go put your dishwashing on.

H6: Yeah, whatever.

F1: Can I get back to the question of uh, who who would do it with the real neighbors? You, you answered that they are moving in and out they’re tenants, right? They're not necessarily.

H15: Mine are all young families

F1: Do you know them? Do you think you would be able to coordinate with them to do this sort of thing?

H15: Umm probably, I think something would be more resistant to try to get on board with this just because they don't want to change their lifestyle as much to try and accommodate when I can. Why am I only able to do my washing on Tuesday and Thursday now when I used to be able to do whatever I want?

F1: Umm.

H6: I think if things are explained to people sometimes in life.

H11: Ohh especially when you said about money. Yeah, there's a financial incentive.

H12: So if you do [change your habits?] you have it for free, if you don’t, well, you have to pay.

H15: I think just, you know, monitoring, having someone monitor and annotate their data for week gives people a really good perspective. Yeah, just do that first.

H12: Yeah

H11: Yeah

F1: Like your neighbors and then.

F2: I will just Introduce another sort of possible scenario in a way that this could happen, just because it's relevant in this discussion. So we kind of set it up as if you had kind of come together with people and gone through the solar panels and really agreeing with essentially people who knew or people that you had discussion with. Another way it can work and possibly an even more common way is that an organization like [Charity Name] has installed solar panels on the top of the block of flats or in housing estates. And then you're just part of it, you're on the grid that those that are serving. You may be not getting free electricity from them because repowering have invested in them and repowering investors, so it's cheaper. But it's also good for [charity] when you use electricity during this during this time, so you've got access to this solar panel solar power instead of being free. But when it's grey there, it might be 15 minutes instead of 30 p. But it's good for [charity] because they're selling it to you at 15p rather than sending it to the grid of 5p.

H11: How was it spotted up at the moment on council estate or something?

F2: Well, I mean, it's quite an uncommon situation, but so the moment, normally if you get PV installed on a block of flats, , that will probably won't be doing anything for the residents that will just be kind of powering like the communal areas.

H11: yeah

F2: But if you wanna kind of get these ones where the more, you know, people are getting it, its gonna be, it's gonna be more like that. But then you know so. It's good. You know, you might people might be getting access to cheaper power without having to had to invest in anything and they were doing good for the community, but then you are dealing with people, neighbors who. Well, that's just your random neighbors. Everyone's in it. And if some people are using them loads at certain time, there's less free electricity to go on, less cheaper electricity to go around and so.

H12: It feels like a different business model that needs a different piece of software which tells you, hey, now we've got lots of it. Now go ahead and use it.

F1: I'm hearing here that there's a lot of software, a lot of software preference here, but is that for everyone, or is it?

H6: No, it's not. But with my neighbors, I think it would have to go that way, but it would have to be have some computer controls and stuff, but my neighbors we’ve live around each other for well.. They are strong characters, but we get on really well, you know, and I imagine one of my neighbours would be like ‘ohh my goodness. Ohh no, I wanna use it at this time.’ Well, I'd be like, ‘yeah, cool. Do it.’ That's it. You know, my other neighbour, his wife, she's she's more amenable. And she'll work around and I'll work around. We it would work, you know? But what it would do would trigger conversation. So it gets people talking. Some people are thinking I don’t wanna talk about this all day long. I don't wanna talk to my neighbors. And you can't have that mentality when you're doing something like this. You've got to wanna be part of a community. If you don't want to be part of a community, is not going to work because it's gonna rely on communication skills. Being able to raise anything you're not happy about, you know. That takes a lot of skill to do that.

F1: Can I build on that a bit? So I sounds like, you know, your neighbors quite well on a personal level.

H6: Yeah.

F1: Would you be comfortable with sharing your data with them, like telling them that this is the time where I will be doing my laundry?

H6: Yeah. Yeah, yeah, yeah, yeah. We would. We would have those conversations. OK. We would kind of take care of each other.

F2: Well, that a good question for everyone I think, yeah. So if there was a choice between sharing your personal life to use and sharing it as you were suggesting as part of a kind of big long aggregated. So people couldn’t tell it was you, which would you prefer?

F1: Knowing also that you would get the same from the others, right? That's the. Otherwise, why would you do that?

H11: I think the aggregated one for me. yeah

H14: I think we probably wouldn't be too fast either way, I think probably on balance probably aggregated but yeah, no problem sort of going ‘What time do you want to use the dishwasher?’

H6: Well, if I put money into it, that means I'm invested into it. I'll do it whichever way it works. So you know, we can't until we actually do. We don't know what is going to be more effective. So if I'm invested, then you know, when I start conversations about it. Yeah. So

F1: That makes a lot of sense. And part of the, let's say, I will bring some reasoning of the project behind here. What where reason we're having these groups and discussions is because we don't think that there's 11 system that fits every time preference for coordination, right. So there has to be some kind of dimensions in which are we would like to figure out what are those dimensions are interesting in terms of coordination to be able to kind of design a system like this that can function for more as many people as possible. So one of those is privacy. That we have come to see.

H15: But living in the UK in midterraced, I can tell when my neighbours are using something

H12: Exactly!

H15: Its not like I got my big open home like in Australia.

F1: OK, yeah,

H12: I know when my neighbours are doing most of the things in there anyway.

H15: Yeah, exactly.

H12: And well and the other one is we're all the same human. We're all pretty much living an identical life. My God. So we're all going to do exactly the same data. So I'm OK at that little thing. Just go ahead share it whatever.

H14: What's interesting with this, I think is also looking at ways that people can be helped, nudged whatever, to change and also, that's particularly looking at things like appliances, washing temperatures, insulation and the, you know, actually kind of as part of the scheme having a house Doctor who kind of is not known, you know, it's not somebody on the estate status.

H6: Yeah, I agree with, you know, you know a third party.

H14: It's a it's a third party can come in and kind of go ‘Look actually you can change that that kettle to this you could, uh, you know roof insulation, but actually you can do this and.

Uh, you know the priorities I suggest are to do this, this and this’. And ideally, here's a voucher. That I think would because obviously that you know it's about reducing the load.

H12: Ohh yeah, because if we replace your kettle as a community who is about to buy this, the voucher to do that would pay itself off after two years. Let’s do it.

F1: OK, so we put the battery.

F2: Yeah, just very briefly

F1: Go.

F2: Just very briefly, I was just saying I just recognizing that we near the end, OK.

H12: You've got half an hour.

F2: Of course, we're not finishing right now,

[F1 is setting up the laptop to the screen in the room until 01:17:00]

F1: So until now, we've played with the scenario that you have to use the electricity consumption directly. Not consumption, obviously, the generation from the solar panel, you would need to use it directly, but now we're going to kind of simulate as if you would have a battery. So in this case what you see when the graph here is the similar March day on the background that is here on the on the physical one on the paper with the different colors representing the same colors that you have on your on your own data. The Gray is visualized as black that’s the only difference.

And you can see here, as you were showing before, this is like in the original time table that you had before, that everything is kind of shift: it's very loaded in the evening and there's a lot of stuff happening in the midday with your lunches and I'm kind of washing. So here what we have is on the side, you have the solar generation, energy, energy generation and on the left you have the energy consumption. So this is everything that has been generated by the solar panel and what is in green is what is actually consumed directly. It's here. So what this is is equal to this right? It gets consumed directly because it's underneath the curve. And the black here is what is consumed from the grid. It's what you actually pay for, which is, if I see correctly around £7.00, right? So it's actually paid year 7 pounds you earn £7 by using directly from the solar generation and you've also paid 7 extra from consuming from the grid. And now this we're introducing a battery.

F2: Just quickly. Is everyone follow that? Does anyone need some sort of clarification?

H12: If you can just explain this side.

F1: So all of this block together, all of it is all the solar energy that is being generated by the solar panel. What is in green is basically all of this area underneath here in gray,

H6: Unused?

F2: The entire box is the the entire box there, the green and the gray together is everything that solar panel generated.

H15: OK and it says how much is unused, exactly as it was in this graph as a percentage.

F2: Yes, exactly every bit of that’s got a box over it a color box that was used, so that is now shown in green at the top right-hand side of that thing.

H14: So as we move things across the grey will go down into the green there.

F1: Exactly.

H14: So. So the green comes down here. And equally over there. Exactly. You would get a black.

F1: Exactly.

H12: So looking at this you you end up paying that much instead.

F1: Exactly.

F2: So at the top you can see the green box at the top is the same size as the one at the right because that's what was used by you. Yeah, but there's also a bunch of electricity that you use together that didn't come from the solar panel that came from the grid. And that is the black box.

H6: That's great.

H12: That's my 8:00 PM TV right there.

H14: And if you're watching it at noon, you could have had it there.

H12: Believe it or not, I'll get in trouble with my job if I tried that!

F2: So that's the stuff that you know, when you were saying you didn't want to bill, that is all the stuff that was just used as normal off the grid and that you would pay for.

H6: Yeah. Thank you.

F1: So now if we would introduce a battery, what the battery would be able to do is save some of this unused energy and allow you to use it later on in the day when you have activities that are are still not.

H6: Is that all of us having a battery. Or is it..?

H15: Yeah, central battery for our solar.

F1: And so, then what you would see happening is slowly you would be this is what's gets stored in the battery. And here I don't know if it's easy to see in the small screen, but it shows how big is the battery. This is a 3 kWh battery so that the bigger the battery you get, the more the chances that you're going to to have like this, still you will never kind of completely. Because you need a very big battery to have that.

H12: You would need to make a cost-benefit analysis. Is it worth buying such battery for the number of days we actually go over. Plus in the winter, we can't store that much energy anyway. So you have to size it for somewhere in the middle.

H15: And you are also assuming 100% efficiency.

F1: Yes, I'm assuming 100%, but it's not that different now we're talking about 93% or something like that. So it's not that off.

H12: They are worth getting.

F1: But anyway, 20 kWh you know about our battery is huge. It's like half a car. Almost. So we're looking at some realistically, how much did you say you're going to get?

H12: I'm getting a four, four and a half. So I mean, I'm gonna have a chat with him on Wednesday.

F1: So, let's say it's more probable that you would have like a I don't know how much you would decide to invest.

H12: For 5 people, probably a lot.

F1: And what do you think that influences like having a battery in terms of coordination? So looking at this graph and knowing what you were discussing before, how do you think adding a battery impacts the coordination?

H11: And I guess it'll make it easier if we know how much we'll be able to store against what's forecast to be generated that day or week. Uh, yeah, I think the software we have to work with all that out.

F1: And so from your point of view, the more that is offloaded to a software to figure out the better right?

H11: Yeah, right. Yeah. OK.

H14: The thing is actually; it can be a bit more casual. There's, like, you know, there's a battery in there which has got power. So I mean, you know, really I should be putting this on now, but actually I will stay in bed for another half an hour, yeah – sod it. So that's the risk perhaps with it.

H12: And I'm not going to risk my salary. [laughing]

F1: Do you agree with that risk?

H15: Yeah, I think it would be more relaxed.

H11: Yeah, I think

H15: when you're when you're when you're really worried about how much power using and then having to pay for it out of sunlight hours. You know, tend to be, you'd expect people to be a lot more, worried about when there's anything's on and should I be turning this on? Do I really need to be doing this right now or not? But if you've got a battery in place, I think that kind of goes away..

H11: And then at least it is better that it is not coming from the grid. It’s coming from the battery so it is renewable energy.

H12: Yes, so the next conversation that happens, is how much is everybody consuming. And [?], because now you know you can time shift a bit yeah. Then the question is how much in total? Which is an interesting, different challenge.

H6: So does this community initiative mean that it's so everyone or nobody owns their home or you can own your home.

F1: This is a simulation about you 5 in this conditions that you five are living in. So I don't know who owns or rents, but then that's why I'm asking you to imagine.

H6: Like, you're saying we could live in five different places and we do this thing?

F1: No, but I mean, this is kind of a fictional scenario. I mean, also in reality policy-wise this is not possible to do right now just to clarify. But because it's an interesting kind of, it's a future thing.

H6: It’s a great idea.

H12: Seriously. It's not available to us policy wise?

F1: Yes. You can give more information if you want, but as far as I know you're not allowed to.

F3: No. Yeah. That’s right, that’s why in [charity] we don't sell electricity to residents. We sell to school or yeah, leisure centers. Whatever building the solar is on.

H11: Otherwise you have to set up as a proper energy supplier.

H12: But if we're not. If we're not buying it, buying locally, consuming it, we're not using [charity] and 3rd entity to like thing that be OK?

F1: You cannot share it. Isn't it? So that you cannot share it between different households.

H11: There is this new legislation about like the microgrids and things like that.

F1: The thing with the microgrid it’s all about really where the meter sits. And if it's, if you're going across multiple meters, then you get into the realm of as someone said, say, of being the licensed supplier. I mean, these things are all kind of big evolving and changing right now, but the the trials which are being done basically the regulator gives a special permission to to do things in a slightly different way.

H14: If one had a your two power sockets, in your home. And you can plug your dishwasher into one or the other thing. The switch, perhaps because that way. So you could have your independent server array off grid. So it has its own cable, comes in, you know, and you've got a green you can ‘go’ then you can have it with multiple households it has nothing to do with the regulation, because it's not going through the normal meter there.

H12: Yes, you could maybe hack your way around it,

H14: But no, no, no. But but but. What about this? Yes, I mean obviously it's not a convenient way of doing it. So that's why things get to go towards running the lifts because that's allowed in that context, yeah. But it's I've noticed for example, you know we're likely to have electric charging points being put into the garage for people’s cars. Because look, if we've just agreed to put on a pile of solar panels on on all the households’ roofs that goes towards powering car batteries. What's that got to do with the grid?

F2: Yeah, I mean. I think it in theory it it is.. as you say a bit hacky, but certainly I mean you can for example get solar panels that you can just literally plug in to your wall outlet and then they will put power onto like your sort of ring and then when you use that device, it will just kind of draw first thing from the solar panel and then otherwise so. And as far as I understand it, that's within the regulations, but it is a bit hacky, as you say, because you tend to have like wires coming in through windows and so on. So it's it's not beyond the realms of possibility of people do find ways around these things.

H12: If we if we were really focused, I'm sure we could run five cables to each unit and not tell the regulator and totally be OK. But electrician might be hard pushed to say yes and singn us off. And I suppose our insurance might be challenged.

H14: But there's also the interesting thing with this I think is you know if you look at the RV community at the whole sort of 12 Volt will the boat owners and the rest of it to you know, to what extent you know?

H12: Let me use your roof space, I'll throw the cable over the fence every now and then.

H14: No, it was it was. It was more to what extent the LED lighting, and that sort of thing to what extent could you just run everything off 12 volts and how would that change the scenario?

F1: Everybody's looking. [laughing]

H14: I think might be best to park that.

H142: I'm not sure the voltage makes a difference.

F2: No, it is. I mean it's interesting case study is some ways because people using those low voltage kind of supplies like on boats like you say.They've done a lot of thinking about how to kind of manage that power. Although to be fair, probably not in sharing situations like what we're talking about now, but it is definitely a useful in terms of.

H6: So I've got a question. So say the five of use are all living in the same building and we are doing this initiative this sharing solar power and say I decide to move away for whatever reason and somebodyelse moves in and they say ‘well, this is really good. I'm not going to get involved in this’. How does that work? Because then it messes everybody else up because everything we've got it down to a fine art we built the relationships we’re respecting each other's usage. You know, we've gotten to know each other on a very personal level in that sense. And then some people moves away and then Well.

H12: Take the panels off their roof.

F1: What I am hearing is that perhaps it's more. What I'm hearing is that perhaps it's better for people that are homeowners or people that are more likely to stick around for longer periods of time, right?

H14: Yeah, it's actually kind ofYou move in somewhere and it's very straightforward and obvious to make the decision, so you know, price being the classic incentive.

H11: I suppose if you're moving that that you you'd be told about it in advance as part of the selling/buying process.

H6: Yeah. I mean, whether you're buying or renting. Whoever comes in might say, ‘I don't want to be involved in this. I'm just going to use whatever I'm gonna use ’and they've got no regard for the system that's in place. I'm just going to put the money into that.

H12: But then you then you could change the way it's working and then they're just buying it off you. I think instead of buying it off the grid that just buying it off the system, that they don't actually own a share of now because they haven't paid for it. And so they're they're fractionally paying for the system that's already been paid for by it's now just generating money for the community that bought it. As share owners of feel like repairing as shareowners of that system when you paid for it, you're getting money off that you owner in that new building, those getting a win.

H6: So you're saying like I moved out and I would still get the feed in tariff?

H15: No you would have to you have to sell that right. So those shares to be sold with your flat. So the person moved in would probably own the shares that I imagine they would get the benefit of that.

H6: Is that right?

F2: That is certainly a way it could work.

H12: But and so I'm gonna put solar on my house whoever buys my house after me gets to have that benefit. It's no different to that, right? Yeah.

H14: And they will probably pay a bit of a premium for it,

H12: But yeah, I mean my pay-out rate should be about 9 years. I plan on owning for another 9.

F1: So that's more or less the questions we have about the coordination, except if you would have something else you would like to to ask? No? So then the last part of this is a little bit of a debriefing like a little bit I want to to know some how it was the experience for you both the workshop and the physicalization, but also like the monitoring at home. So maybe you can tell me like some things that you enjoyed, some things that we think should be fixed improved and we can just do around perhaps. I mean, you're next to me. So you're always first, right?

H11: I don't know. I like the monitoring. I thought it was, was insightful.

F1: Umm did you learn something new about your your consumption?

H11: Yeah, yeah. Yeah, yeah, I definitely did. Yeah, I've been trying to get smart meter for a while but they are not doing it.

H12: My answer might help. I have a smart meter. It has no graphing tool, it cannot help in the same way this does. This was deeply insightful into what I use in my house day-to-day the differences between because it also gives that graph like over 1/2 an hour or hour or whatever. It's going 60 in a wash. I would turn off the stage that usage of my House is that would be known. I've got to start learning how to turn off more stuff, that's for sure.

H11: It would be handy if I told you on the graph what it was. Yeah, just for short.

H12: But yeah, so I did. I mean, I did have to go around. OK. So beginning. What are the things are on standby and the middle of like at 6:00 AM or 5:00 AM what is the usage? And so therefore I assume that across the day kind of thing that's those devices and I should try and learn how to turn them all off to consume less.

H6: Unplug them out.

H12: Well, no, because it would disconnect my internet and things like that.

H11: Yeah, that's what I'm worried about.

H12: But yeah. But then, like yourself, put it on a timer. It doesn't need to come between the hours of, like, I don't know, 12 and 6.

H14: Expect of course that's when whoever does their upgrade.

H12: That's fine, that's fine. So they’ll try again later. So it might do things like that.

H14: So for me the I think the thing which is frustrating was not being able to stack several appliances on top of one another at a time when there's always going wrong, but it would have been really nice just to have been washing machine and the dishwasher, yeah.

F1: Uh, and then it kind of automatically knows that it's those things not having to write it in the description. Yeah. And then, yeah.

H14: I probably also didn't use the other boxes as a sinuously as I could. I kind of. Well the big thing that's on the moment is the dishwasher so we're done, let’s move on to the next half hour.

F1: Does that mean that you trust the information that is here or are you a little bit?

H14: Oh, I mean, well, I trust it partially. I would. I would. I would say it's I'd say it's probably well. So I've left out the base load entirely, I've done nothing with that. Umm timings I've kind of gone by and large, you know, I know you know that roughly the dishwasher is a or the washer is a three hour thing because it is on an economy mode but

whether it was three hours or actually two and a half, I have absolutely no idea, but obviously the title of the electricity was being used during that. Do you know when the heater was being pushed spinning? No idea that.

F1: Interesting,

H14: But I also have a smart meter, and it is absolutely bloody wonderful to watch it go up to green and my going ‘who switched the water on’.

H15: I like. Yeah, I like being able to see what was going on. Uh, I made a conscious decision not to change our habits during the monitoring phase. Umm, but it changed our habits afterwards. So like, you know, having iPads on constantly charging overnight. I liked what you mentioned earlier about: I think it would be really intelligent for phones to be able to, you know when you set your alarms and wake up, do they make sure they don't start charging so they know they're going to be 100% charge of that point, right? Instead of being like constantly trickle charging all night.

H12: They do that now, they predict when they start using them they start charging. Probably about an hour for you.

H11: Yeah. They're still on, though, isn't it?

H12: So it's plugged in, but it's not drawing the kind of current would be for a charge, so it actually holds off its own charge.

H15: I wish that the flexibility doesn't text box and it was just like, high flexibility, somewhat flexible. OK, but maybe that was just me, my. But I also kind of really interesting to see how the different appliances were using power as well, like with the washing machine. And you put on the eco mode that just doesn't really high. And then like every half an hour you can see it dropping off what was doing.

F1: Were you were aware of that pattern from before?

H15: No, no idea. We’ve actually been experimenting like from going from the 30-minute quick wash to like the two-hour normal wash to the three hour eco wash but that gave us a pretty good idea of what was going on.

F1: You mentioned before when I asked do you trust this data that I'm showing here and you were like [shaking the head]?

H15: No, not really. Just because of the the multiple things going on at once and you know, did you remove the baseline off these when you did it and? Yeah, but all the other thing that I I mentioned earlier when we're downstairs that I was able to look at my baseline and see that I was using that 200 Watts per hour. And I calculated that to be about 39 P a day of just like noise that I'm paying for,

H12: So like an existence charge.

H15: Yeah, yeah. Just for being connected to the grid.

H12: Along with the standing charge, yeah.

H14: So that's the fridge switched off from December. And then you remember you had the freezer attached to it as one unit.

H12: I put it all [?? ] outside in an esky during winter.

H15: Yeah, absolutely. Great idea.

H6: I was just gonna say, is there a standing charge with how this works or is it? With the solar panels?

F2: I mean, it's a it's a good question. It's a good point in some ways because so long that you are connected to the electricity grid, which you still would be in this situation, you're still be paying the same standing charge as you as you would have been before, which might be whatever 30p a day or more or a bit around that. So yeah, that doesn't get effected. That doesn't go down because you're still essentially you're paying for the privilege of being connected to the grid and having meter readings and stuff.

H12: You have you have a much better chance of getting off gas and going full electric. Actually. The major plan to save planet is to go full electric and everything. So I don't think any of us will be disconnected from the grid. What will be doing is hopefully drawing less from the grid by having solar and drawing more overall in total because we got rid of gas, but the fastest, best way to get in the standing charge is to get off gas.

H6: All right. OK.

H12: And electricity is fine, electricity can go renewables, gas can’t go renewable gas we just need to get rid of. So electric hotplates are a great starting point and get rid of you boiler at some point. Tough one.

H6: Yeah, but think about the what's it called? Ground source heat pumps.

H12: Air source heat pumps?

H6? Is that they drill a great big…

H12: That's a ground source heat pump… An air is literally an air conditioner, modern day air conditioner that does heat and cold so you can actually still go and get your VAT at off. Now for a split cycle system that does heating and cooling in your house. If you have a small flat. Yeah, get yourself an electric shower system? Get yourself an get yourself a Peter cooler. Kind of getting both VAT off including on installation. Bob’s your uncle.

H6: How much?

H12: It depends on how big a kilowatt system you need to have bigger space you've got right.

H11: It'll be like thousands and thousands.

H6: But nowadays of course you can ge a government grant, right?

F1: OK, so nice tips going around. One last question and then then we can just kind of.

H6: Yeah. I was just gonna say with regards to collecting the information, I wasn't sure because I couldn't really do it until the end of the day. So I wasn't quite sure how, how far I could go back? Because there were times that I missed the day so it would have been good to know if I could have gone back 24 hours or yeah,

H12: On that the scrolling's really broken.

H11: Yeah, it does not.

H12: The chunks do not keep up the scrolling and lose itself really bad on the software.

H12: And others I think would be really nice if you zoom in close in half an hour, but I know it doesn't collect on that, so that's it.

F1: It does actually. The data that you downloaded is in two minutes later.

H12: Ok Wow. so I think would be really nice for someone who's gone a couple of days in goes well. I'd like to zoom in. Really fun to be able to do that.

And then of course, I don't think anything needs to be automating identified, but being able to stack like the other guys said and also what you've used by I used a dishwasher and then also just a sign for the base state and just have that taken out, that'd be great.

H6: All said.

H12: Software guy sorry.

F1: OK. Last last past question, we showed in this project like 3 different types of visualizations. So one was the one that the annotations that you annotated on their interface in the house. The second one is a physicalization like physical tangible boxes and the third one is the the battery simulation kind of thing and how would you compare can you reflect or comment a little bit on these again you're next to me. So I'm going to start. Sorry you want to be last?

H6: OK. Would you want me to do?

F1: Reflect like about the use of visualizations. Then how did they work for you? Did they not?

H6: The use of the..?

F1: ..visualization,

H6: so you mean of the graph?

F2: We've kind of you've looked at energy data, so the thing you were filling in, these these cardboard boxes here right now, the thing that's on the screen right now. Are there any that you can't more or less easy things that particularly helpful?

H6: Yeah. I mean mine mine was that logical I couldn't the usage that it was kind of going up and down. I don't know where because I think I started to discover there were things on that I didn't know about it, so it was a learning process really for me because I eventually had to do a bit of detective work and think, well, why? Why is it so hard? What's going on? Why is why is my usage increasing while I'm not in the house? And then if I wonder if my neighbours are using some of my energy. I’m starting to think all kinds of crazy stuff, so I don't know it's thrown up a lot of questions for me, and I'm literally on the verge of at some point talking to my energy providers say, hey, you know, as part of this project and I don't understand what's going on and see if they can answer some of those questions.

F1: Interesting, Thank you.

H15: I really liked this. I like the fact that we could stack things and and move them around. I just found that as we started to stack, though, we couldn't, we could no longer see what that day looked like. So I thought maybe if these were like translucent or something like that, so you could still see you know, I actually think it's here all of this is you kind of lose the fact that we're now paying for this this time because we've just covered it up.

Umm. Or even being able to, you know, capture this and display it back onto the screen so we can we can move it around and see what's going on. So yeah, something visual data capture.

H14: Overall this you know the the first this one was… This one [pointing to the battery screen] I was less. I think it would have been really good to have done something with the slider thing earlier on in the explanation as part of the the description of even maybe starting with the battery in kind of going what we're going to do is we're going to have solar being used, solar going to a battery and I think that the next to sliding it show that that may have been a better way of presenting,

F1: OK, OK. But the other two were OK.

H14: Yes I agree with the [pointing to H15]

H12: You've taken a great amount of time to make 3 dimensional. I don't. I don't know if they need to be 3 dimensional, but I guess that'll go hand in hand in solving the base load out of them problem so. And if they're 3 dimensional, I guess it will be hard to be translucent. I don't know if that needs..

H14: But the thickness has no bearing on, you know... So. So there's no reason for it to be.. [3d]

H12: I mean, it's definitely make sure we can't all cheat and slide them under each other, but that's right. I don't think we needed to go through that far. But but I really like I thought all the tools worked, they were very handy in helping us see.

H11: Yeah, that it wass good. Yeah. Today, I don’t know if the battery as you changed, it would have changed on the graph at the bottom somehow but.. Yeah,

H14: It would have been lovely to have a toogle here that says, now all of these things now go into here and that's changes. That would have been a really nice toy.

F1: Thank you very much for your time and your feedback and if you have any more feedback now or question, now is a really good time to to to tell them

H12: Who's grey? What model TV you got? This is ridiculous. [comparing the blocks]

I was wondering if you guys what's going on.

H14: Let's start off with this very recent TV, OK. And it's about that size.

H12: I have an ancient one.. maybe that's my problem.

H14: There you go.

H12: It's quite.., I don't even know. I didn't even buy it myself it was a gift from somebody else.

H15: OK, so it's not led?

H12: No, it's nothing. Well, yeah, it's still flat. Yeah, I'm finding that very odd. Im going to back into my spreadsheet of data. I've now going to have to go home and figure out my smart meter a whole lot more see if its got graphing or something else, and now I'm gonna actually have to figure out what's actually consuming how much because this is this is unreal.

H15: This is 1.42 kWh. Because when I had my TV on I think it was similar to this [comparing to another block], 1.8. Yeah. So I don’t think even mine was drawing that much.