

## Electricity and Climate Resilience Part 2


### Resiliencia Climática Y Electricidad Parte 2




Today's focus: How  
we can be more  
resilient

Enfoque de hoy:  
Como podemos ser  
mas resilientes?

## Welcome! | Bienvenidos!




**Microphone:** Auto-muted for background noise. Unmute yourself as needed.  
**Micrófono:** Silenciado automáticamente para ruido de fondo. Actívelo según sea necesario.




**Chatbox:** Ask questions and make comments in chat  
**Ventana de Chat:** Haga preguntas y comentarios en el chat.



**Video:** You can choose whether or not to be on video  
**Video:** Usted puede escoger si quiere o no quiere estar en video



**Raise Hand:** You can also raise your hand to ask a question  
**Levante la Mano:** También puede alzar la mano para preguntar



**Captions:** created by Zoom  
**Subtítulos:** Creados por Zoom

A couple of additional notes:

- Once the presentation is over, please feel free to unmute yourselves and you will be able to verbally ask questions. During the presentation, all questions will need to be directed to the chatbox. You can open the chat box by clicking the chat icon at the bottom of the page.
- If you would like to stop video, simply click stop video. We'd love to see your faces, we understand if you'd prefer to leave it off. One additional note, is that you can change the layout of the presentation by clicking a button in the upper right of your screen to either speaker view (you will only see my webcam) or gridview where you will see a panel of all participants. You can also adjust what you see based on clicking the area between the box showing my face and the presentation to make one side bigger or smaller.

## INTERPRETATION

Para escuchar un canal de interpretación, haz clic en el ícono de globo y escoge el canal de tu preferencia. Si seleccionas "Apagado" escucharás el lenguaje original.

*To listen to the interpreter, please select the globe icon and choose the language of your preference. If you choose "Off" you'll hear the original language.*

Manjeet

## Community Agreements | Acuerdos Comunitarios

- Take care of yourself  
(stretch, drink water, rest)
  - Take space/make space
  - One mic, one speaker
  - Stay present
  - Speak from your own experience
  - Embrace curiosity
  - Don't stay confused  
(ask questions)
- Cuídate  
(estírate, bebe agua, descansa)
  - Toma espacio / haz espacio
  - Un micrófono, un altavoz
  - Estar presente
  - Habla de tu propia experiencia
  - Abraza la curiosidad
  - No te confundas  
(haz preguntas)

Manjeet

## Let's reconnect | Vamos a Reconectarnos

Type in the chat:

- Name
- Pronouns
- What are you grateful for today? What are you looking forward to today?

Escribe en el chat:

- Nombre
- Pronombres
- ¿De qué estás agradecido hoy? ¿Qué es lo que espera el día de hoy?

Jairaj

## Interactive Activity / Dinámica

What are examples of climate resiliency?

¿Cuáles son ejemplos de resiliencia climática?



## Elements of Environmental Justice and Climate Resiliency

### Elementos de la justicia ambiental y la resiliencia climática

[Video](#)

Environmental Justice with adrienne maree brown  
**Justicia ambiental con adrienne maree brown**



15:38 - 27:22

## Goals of Today | Metas de Hoy

### Learn about

- How electricity production can be better
- How people and utilities can adapt to changing needs and disasters



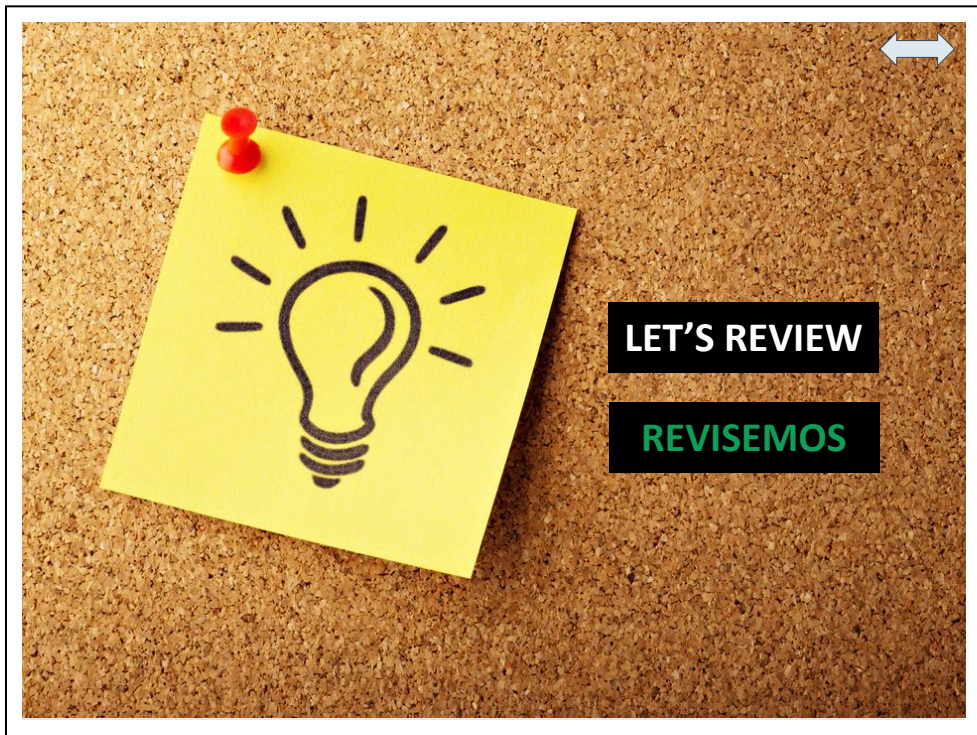
### Aprender sobre

- Como la producción de la electricidad puede mejorar
- Como las personas y utilidades pueden adaptarse a las necesidades cambiantes y los desastres



## Agenda | Agenda

- Review
  - Distributed Energy Resources
    - Renewables & Storage
    - Energy Efficiency
    - Smart Technology
  - Evaluation
- Revision
  - Recursos energeticos distribuidos
    - Renovables y almacenamiento
    - Eficiencia energetica
    - Tecnología inteligente
  - Evaluacion



what were the discussion points and things you learned yesterday that stood out to you? Drop in the chat!

## Renewable Energy

### Energía Renovable

Energy from a source that is not depleted when used

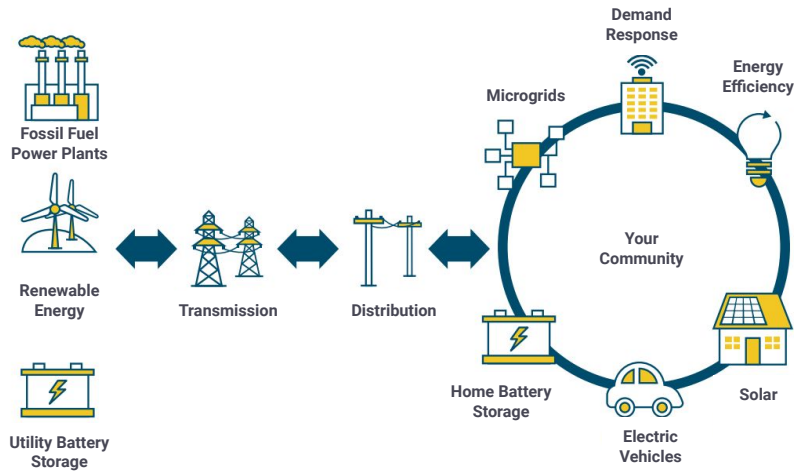
Energía de una fuente que no se agota cuando se usa.



We're going to talk today about how renewable energy plays a part in our energy futures

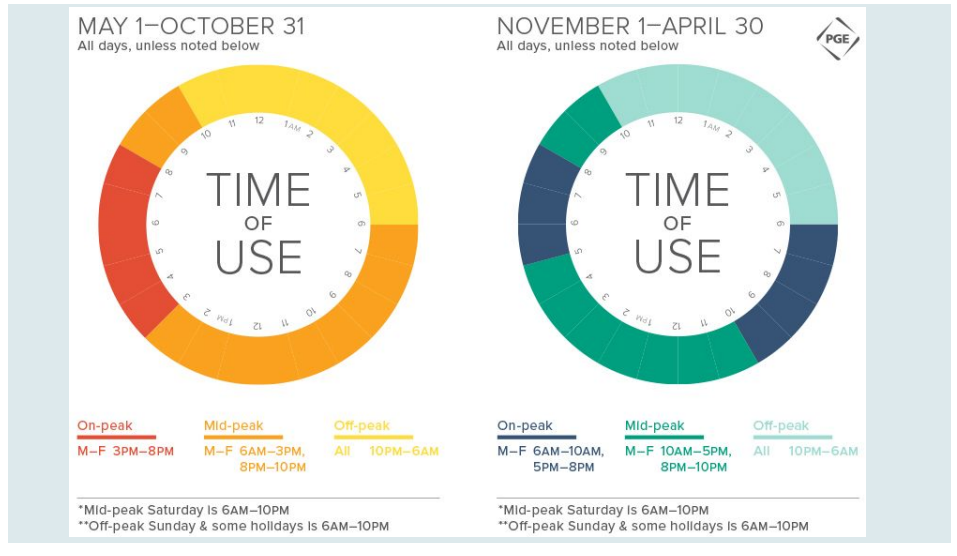
# The Modern Grid

## La Red Moderna



We talked about the modern grid, and how we have energy coming from all kinds of places now from these big utility levels to “microgrid” which would be people producing electricity themselves, such as having solar panels. Now we’re going to get into the circular part of this graph - what is demand response? How does energy efficiency come into play?

## Peak Demand | La Demanda Maxima



We also talked about Peak Demand, AKA peak use or load. This is when we as consumers are all tapping into the grid at the same time using energy, and the grid has to be able to accommodate these kind of daily peak events but also annually with the seasons and also very hot and very cold days when people are using electricity for heating and cooling on top of their usual daily use

## Disaster Strikes | Golpe de Desastre



And then we talked about how natural disasters can cause us to lose power unexpectedly, and how different communities are impacted differently with things like wildfire, ice storms, extreme temperatures, and drought. You all were generous enough to share your experiences with the group.



DER's are ways to manage that peak load - physically and virtually. At the small, home-scale and at the big, utility-scale.

## Distributed Energy Resources

### Recursos Energeticos Distribuidos

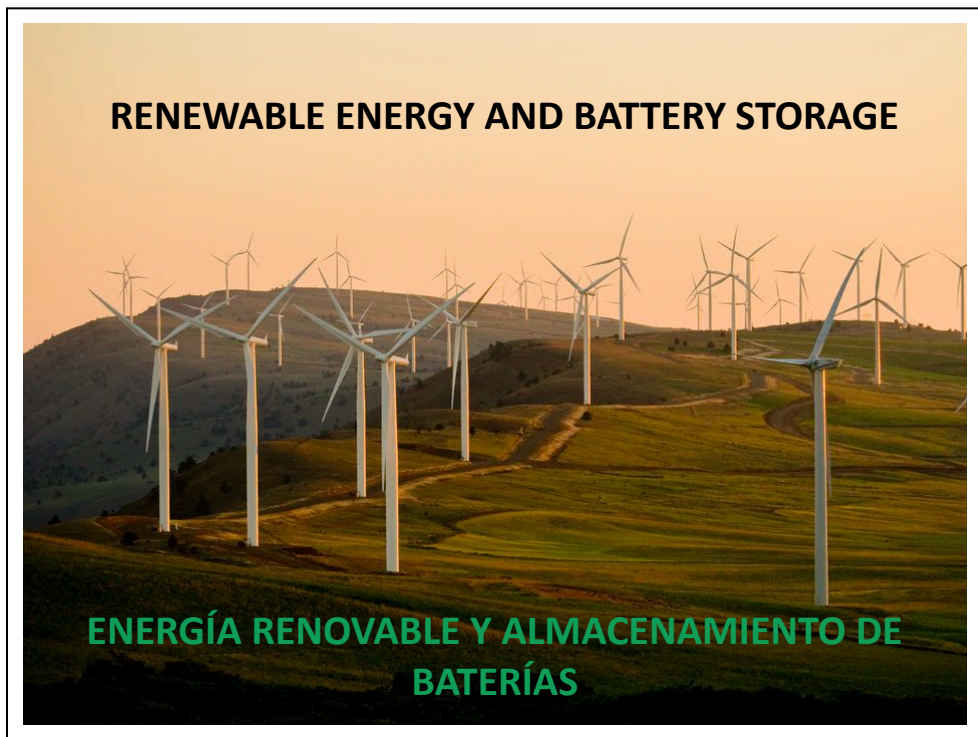
1. Renewable Energy & Battery Storage
2. Energy Efficiency
3. Smart Technology

1. Energía Renovable y Almacenamiento de Baterías
2. Eficiencia Energetica
3. Tecnología Inteligente



There are four elements we're going to talk about, regarding distributed energy resources. A lot of it is going to come down to reducing peak load to keep the grid resilient in a big-picture sort of way. we will go through an overview of each of these concepts, and talk about how they relate to resiliency and the touch on some of the equity considerations each will have.





So let's talk about the first one!

## Daily Fluctuations

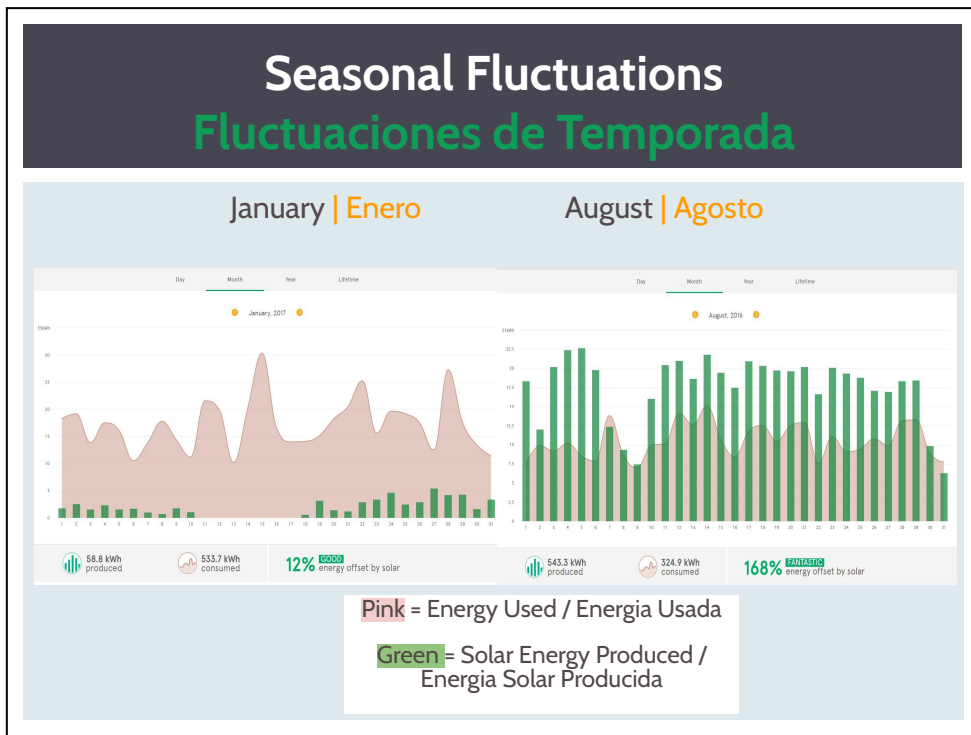
### Fluctuaciones Diarias

- All the power you use NOW is generated right NOW.
- The sun doesn't shine and the wind doesn't blow constantly
- Toda la energía que utilizas AHORA se genera AHORA mismo.
- El sol no brilla y el viento no sopla constantemente.



The distribution of electricity to your home occurs at essentially the same time as generation, meaning there is no need for it to ever be stored anywhere. It's simply produced, then it's transported, and then it's used.

This poses a challenge, because Mother Nature does not behave like a machine.

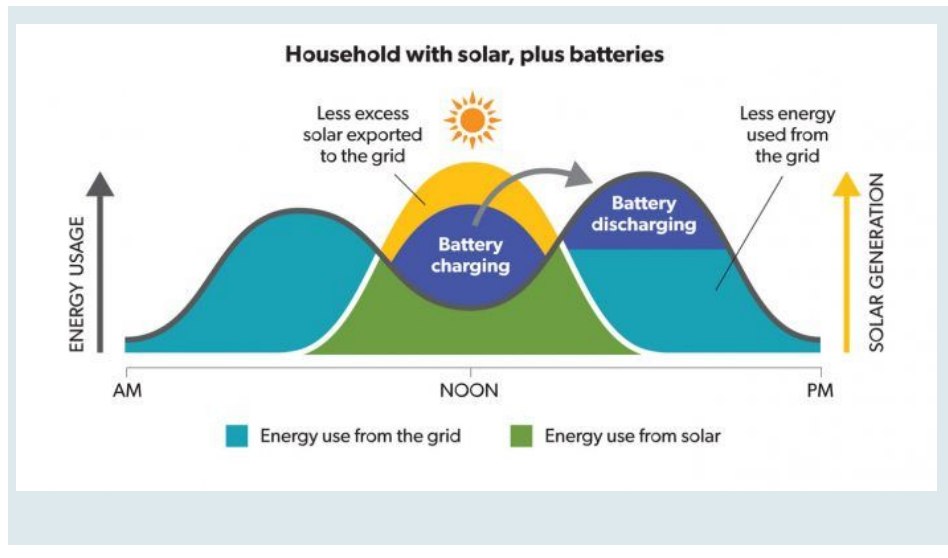


Not only does the sun shine more in August than it does in January, but the angle of the sun is also higher in the summer than in the winter. These are two screenshots of my solar panels use vs production. When the sun is low in the sky all winter, my neighbors house blocks my panels so i lose some of the available light.

You can also see that in the summer I'm producing far more power than I'm actually using. So what happens when you produce more power than you can use?

## Solar + Battery Storage

### Almacenamiento Solar y de Batería



The sun shines to shine in between those areas of peak energy use, so solar is charging beyond what we need. But if it charges a BATTERY instead, then we can use energy from the battery to lower the evening peak load. Batteries at the small level can also provide energy to our homes when the grid goes down.

<https://www.energytrust.org/solar-storage/>

## Utility Level | Nivel de Utilidad



350 MW = 57,000 homes  
hogares

1 MW - 1,100 lbs of coal carbon

PGE's new Wheatridge plant:

- 300 MW wind
- 50 MW solar
- 30 MW storage

PGE's nueva planta de Wheatridge:

- 300 MW viento
- 50 MW solar
- 30 MW almacenamiento

Enough energy to power over 57,000 homes.

It takes 1,100 lbs of coal to create 1 MW energy.

The storage isn't there to help power homes when the grid goes down, but rather as a utility-level resilience strategy. It helps avoid blackouts, and manages peak load. Because it's built to a very large scale that's centralized, it's also cheaper for utilities to do it this way than to add tiny projects to many homes and spaces. However, a more local approach (with small projects) can save on transmission, even though it's still more expensive.

<https://www.power-grid.com/der-grid-edge/pge-and-nextera-advance-innovative-hybrid-project-that-combines-wind-solar-and-batteries/#gref>

## Home Resilience | Resiliencia en el Hogar

Charged batteries can run:

- Communication
- Medical equipment
- Heating/cooling
- Elevators

Las baterías cargadas pueden funcionar :

- Comunicación
- Equipo Médico
- Calefacción/ Aire Acondicionado
- Elevadores



On a building-wide scale, batteries for homes and apartment complexes can be extremely helpful if they're charging while the grid is down. From charging communication devices to running an elevator for people with disabilities while the power is out or running medical equipment or maintaining safe temperatures - it could go from convenient to crucial. Those with EV's already have a large battery they can use to plug in a phone - but in a few years the hope is that an EV battery could keep a home operating.

## Community Resilience | Resiliencia Comunitaria

### Blue Lake Rancheria Tribe Microgrid Humboldt County, CA



- Can serve as a community gathering place with power during an outage
- A “Microgrid” that can operate when the grid goes down
- Pueden servir como un lugar de reunión de la comunidad con energía durante un apagón
- Una “microgrid” que puede funcionar cuando la red se cae

Beaverton Center - keep crucial services (hospital, police) running.

<https://www.npr.org/2020/01/11/795248921/california-reservations-solar-microgrid-provides-power-during-utility-shutoffs>

The utility, Pacific Gas and Electric (PG&E), shut off power to more than 30 counties in Central and Northern California on Oct. 9.

"We had probably 30- to 45-minute gas lines," Ganion says. "People were fueling up vehicles, but also their home generators. That continued, basically, for the duration of the 28-hour outage."

As one of the only gas stations in the county with power, the reservation provided diesel to United Indian Health Services to refrigerate their medications and to the Mad River Fish Hatchery to keep their fish alive. The local newspaper used a hotel conference room to put out the next day's paper. Area residents stopped by to charge their cell phones.

Ganion estimates that on that day more than 10,000 nearby residents came to the reservation for gas and supplies.

## Equity | Equidad



- Which communities are the most energy resilient?
- Which communities have the greatest need?
- Qué comunidades son las más resilientes a la energía?
- Qué comunidades tienen la mayor necesidad?

Who pays to upgrade distribution lines when certain groups of people are causing an increase in demand? (A tesla charged on the end of a transmission line - knob & tube)

Old systems have different electrical load expectations than the current reality

For example - in an apartment complex, people with mobility limitations may be unable to get out of a building if the power knocks out the elevator.



**ENERGY EFFICIENCY**

**EFICIENCIA ENERGETICA**



## Less Energy, Same Results

### Menos Energia, Mismos Resultados



Simply put, energy efficiency means you use less energy to get the same results as using more. LED and CFL light bulbs put out the same amount of light with a fraction of the energy, insulation and air sealing keep homes warmer and cooler with less energy, and Energy Star is a certification that helps consumers choose more efficient appliances.

the magic about energy efficiency is it works 24/7/365! we've talked about how energy production always has consequences, but energy efficiency means we are using LESS, no matter what the source is. And it's always a plus.

## Weatherization | Climatización



Weatherization breaks down to essentially two components. Air sealing, and insulating.

Air sealing stops the exchange of air. Our skin is sensitive to air movement as well as temperature, so air sealing keeps our indoor air indoors - where we want it.

Insulation slows down the rate at which heat moves through a space. So, like a thermos, a well-insulated home will keep you warmer in winter and cooler in the summer, because as heat leaves or tries to enter, the insulation will slow down it's progress.

To keep a home cooler in the summer you also need to control the way light enters your home - but that's a different workshop. :)

## Efficiency and Peak Load

### Eficiencia y Carga Máxima



#### Efficient Homes

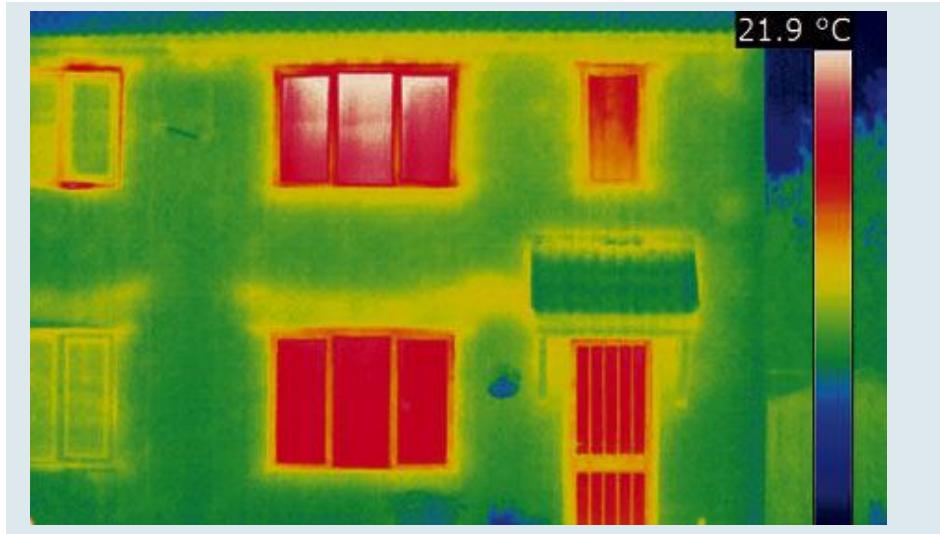
- Reduce demand
- Save Money
  - Individually
  - At utility scale (rates)
- Reduce carbon footprint

#### Hogares Eficientes

- Reducir la demanda
- Ahorrar dinero
  - Individualmente
  - A escala de servicios públicos (tarifas)
- Reducir la huella de carbono

Energy efficient homes help with electricity demand because efficiency is constant and efficiency measures can last for decades. Because every type of energy production carries a price, using less is usually what's best.

## Resilience | Resiliencia



In the case of a power outage, the efficiency of your home is going to have an enormous impact on the comfort and safety of those living inside.

In this image you can see how heat is escaping from the windows, even though they're closed. The heat shows up in red. The windows in the middle of the image have no weatherization, and the home is losing a lot of heat. Even the walls are losing heat. The windows on the far left, however, have plastic window kits up and they are losing heat at a slower rate.

## Resilience | Resiliencia

Efficient homes:

- Maintain temperatures and air quality
- Are safer
- Are more comfortable

Hogares eficientes:

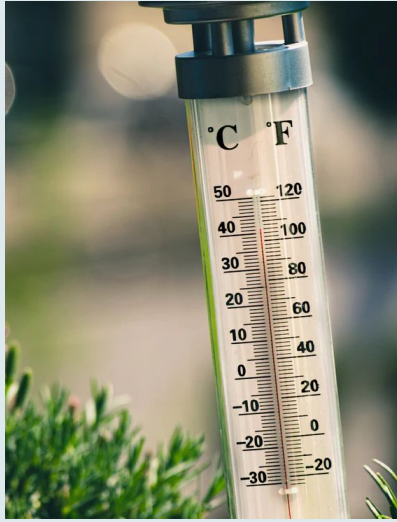
- Mantienen la temperatura y la calidad del aire
- Son mas seguras
- Son mas comodas



Efficiency is a way for individuals to remain resilient in situations like a power outage (or to keep out wildfire smoke with air sealing).

FUTURE QUESTION: what are other benefits to having an efficient home?

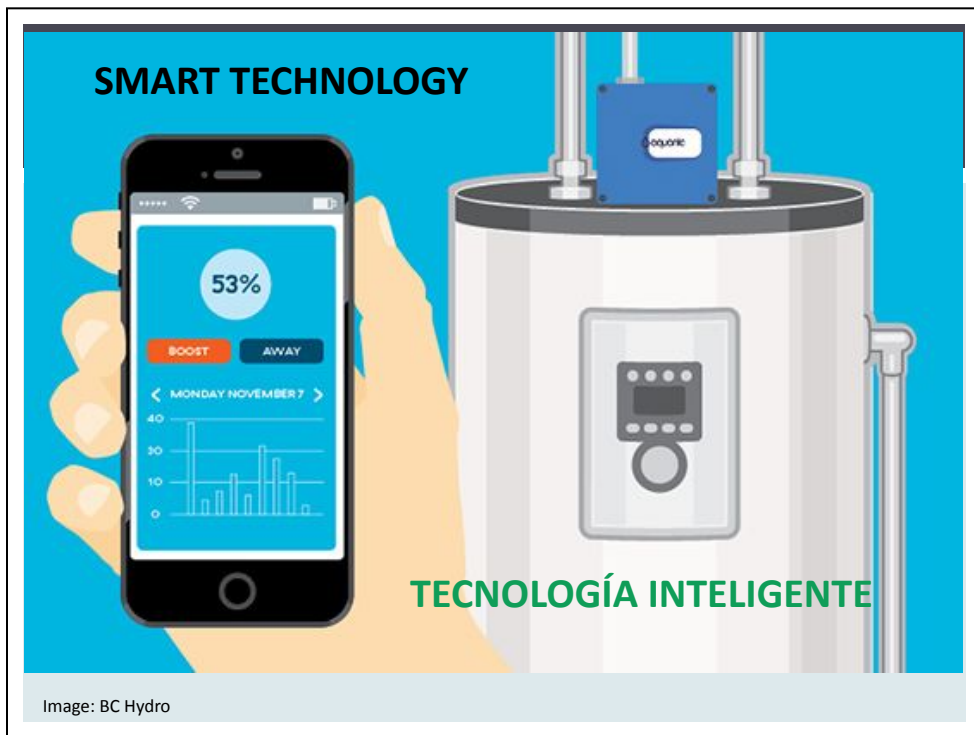
## Resilience | Resiliencia



- Who is more likely to have an efficient home?
- What are the consequences?
- Do you consider your home efficient? How does that impact your life?
- ¿Quién tiene más probabilidades de tener un hogar eficiente?
- ¿Cuáles son las consecuencias?
- ¿Considera que su hogar es eficiente? ¿Cómo impacta eso en tu vida?

Hopefully the discussion from Saturday will help prompt some answers to these questions. If people's homes filled with smoke, let's see if they make the connection to air sealing and keeping smoke out in the future. This can also tie to pollution (air as well as noise) that frontline communities live in every day. If you're next to a freeway, or a pulp mill - you may want windows open when the breeze blows one way and everything tight when it blows another. This can easily expand into a larger environmental justice discussion.





In addition to being energy efficient some water heaters and thermostats have electronics like tiny brains that make them “smart” and allow them to use electricity when it is less expensive for you or better for the grid. You can even control them from your phone.

If Demand Management - include EE, but DR would not include EE

Supply - renewables & storage (utility scale)

Demand - energy efficiency, and demand response

EV's are a combination of both at the residential level

Smart technology makes energy efficient equipment like your water heater



## Balance | Equilibrio

The grid must be perfectly balanced.

La red debe estar perfectamente equilibrada .



This really comes down to the fact that the grid has to be perfectly balanced and also has to handle those peak loads.

## Demand Response | Respuesta de la Demanda



### Smart technology

- Thermostats
- Water Heaters
- Electric Vehicles

### Tecnología inteligente

- Termostatos
- Calentadores de agua
- Vehículos eléctricos

Smart technology can help manage the demand that we as customers have for electricity to help lower the needs during peak use times.

in the context of this workshop we're really talking about smart appliances and electric vehicles.

Energy use can be managed by machines that work with utilities and know when peak load occurs, and avoid using energy at that time.

For example

- maybe you take a hot shower in the morning during the morning peak in energy use. But your water heater doesn't actually heat new water until a few hours later, when grid demand is lower.
- Or your thermostat starts to "pre-heat" your home earlier in the afternoon on a cold day so you don't need to turn up the heat when you get home during peak time
- Or an electric vehicle waits to charge until the middle of the night when everyone is sleeping and using the least amount of electricity

## Utility Resilience | Resiliencia de Utilidad



As the population grows and we electrify more of our lives, demand management will be an important aspect of keeping our power infrastructure strong.

A medida que la población crece y electrificamos más nuestras vidas, la gestión de la demanda será un aspecto importante para mantener sólida nuestra infraestructura de energía.

Utility control of an appliance:

Incentivized for you as a customer to choose to turn down power during a peak event - an individual benefit

Aggregate benefit for many customers doing it at the same time, which is what manages peak load. The more people who take part, the bigger the impact. If you have enough people taking part, it can be the equivalent of a new power plant.

## Smart Tech Equity

### Equidad de Tecnología Inteligente

What will that mean for those who don't have access to smart technology?

Who would be least likely to have access? What are the biggest barriers?



What is done with the information gathered? How does this impact future decisions, if only the more privileged communities behaviors/uses are what's being analyzed?

There are a lot of unknowns - with the digital divide among a host of other things.

leading with racial equity, because when all else is equal, race is the biggest indicator of inequities. PGE is looking at external sources - housing type, census, race/ethnicity, etc.

What about digital trust - utility management of smart technology - how do people feel about it? How can this help PGE engage with community in the future (as this is to feed the plan) What are the elements that would change your mind?


Concerns | Preocupaciones

What are concerns about smart technology?

Cuales son las preocupaciones sobre la tecnología inteligente?

What would make you more or less concerned?

Que te preocupe mas o menos?



What about digital trust - utility management of smart technology - how do people feel about it? How can this help PGE engage with community in the future (as this is to feed the plan) What are the elements that would change your mind?

Selling data? Why? Who's making money from this?

Connection between saving money (peak load) and smart technology.

Break



### Break Out Room Prompts/Questions

#### Indicaciones / preguntas de la sala para grupos pequeños

1. Introduce yourselves
  - a. (Name, pronouns, where are you calling in from?)
2. What have you learned so far?
3. What kind of actions are you willing to take at an individual level?
4. How are you willing to be adaptive with the planet and climate change/chaos?
5. What are some examples of things that you are already practicing to address climate change/chaos?
6. How do you think we can transform the wound that has taken place between humans and the planet?
7. How do we create more possibilities for us to be on the planet?

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-

Presentaos

(Nombre, pronombres, ¿desde dónde llamas?)

¿Qué has aprendido hasta ahora?

¿Qué tipo de acciones está dispuesto a realizar a nivel individual?

¿Cómo está dispuesto a adaptarse al planeta y al cambio / caos climático?

¿Cuáles son algunos ejemplos de cosas que ya está practicando para abordar el cambio climático / caos?

¿Cómo crees que podemos transformar la herida que se ha producido entre los humanos y el planeta?

¿Cómo creamos más posibilidades para que estemos en el planeta?





## Incentives | Incentivos

### Peak load incentives

Reduce electricity use during peak times, earn rebates on your bill.

<https://portlandgeneral.com/save-money/save-money-home/peak-time-rebates>

### Incentivos de carga máxima

Reduzca el uso de electricidad durante las horas pico, obtenga reembolsos en su factura.

<https://portlandgeneral.com/save-money/save-money-home/peak-time-rebates>



Save money and the planet!

## Support Renewables

### Apoyo Para Las Energías Renovables

#### Green future choice

Make all your energy use renewable for about \$6 more a month and help fund new renewable projects in Oregon.

<https://portlandgeneral.com/energy-choices/renewable-power/green-future-choice>

#### Elección de futuro verde

Haga que todo su uso de energía sea renovable por aproximadamente \$6 más al mes y ayude a financiar nuevos proyectos renovables en Oregon.

<https://portlandgeneral.com/energy-choices/renewable-power/green-future-choice>



Spend money and save the planet

## COVID Debt Relief

### Alivio de la Deuda de COVID

Matched payments, low-income energy assistance, and more. Funding is available but limited, so it is important to apply now by visiting the website or calling 800-542-8818 <https://portlandgeneral.com/help/help-topics/bill-payment-assistance-residential>

Pagos igualados, asistencia energética para personas de bajos ingresos y más. La financiación está disponible, pero es limitada. por lo que es importante solicitar ahora visitando el sitio web o llamando al 800-542-8818

<https://portlandgeneral.com/en-espanol/ayuda-para-el-pago-de-facturas>



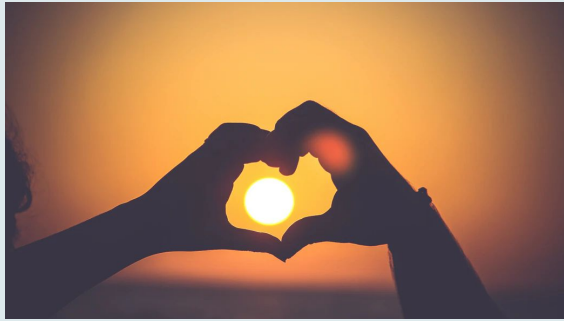
There's no shame in being in arrears to a utility. Disconnections will start again this summer. There are programs to help now, but the money is going fast. If you or somebody you know needs help, please contact your utility and pass along resources

## Oregon Community Solar Program

You don't need to own home to go solar. Subscribe to a big, off-site project and get credits back on your utility bill. Additional benefits for low-income customers.

[www.oregoncsp.org](http://www.oregoncsp.org)

No es necesario ser propietario de una casa para utilizar la energía solar. Suscribase a un gran proyecto fuera del sitio y obtenga créditos en su factura de servicios públicos. Beneficios adicionales para clientes de bajos ingresos [www.oregoncsp.org](http://www.oregoncsp.org)



Check out Oregon Community Solar Program - you can sign up to be a part of solar and if you're low-income, it can come with bill discounts.

## Free Weatherization | Climatización Gratuita

- Multnomah County Weatherization:  
<https://multco.us/dchs/weatherization>
- Washington County Weatherization:  
<https://caowash.org/programs/housing-stability/conservation.html>
- Clackamas County Weatherization:  
<https://www.clackamas.us/cfcc/weatherization.html>
- Yamhill Community Action Partnership:  
<http://yamhillcap.org/energy-services>
- Marion County: Mid-Willamette Valley Community Action:  
<https://mwvcaa.org/programs/weatherization/>

Here are some projects, by county, who can provide free weatherization for low-income households

## Do-It-Yourself | Hazlo tu Mismo

Free weatherization workshops and supplies

- Stay warmer in winter
- Stay cooler in summer



Talleres y suministros de climatización gratuitos

- Mantente más cálido en invierno
- Mantente fresco en verano



CEP also provides free workshops! Because of the pandemic we are having workshops online in how to stay cool in the summer and warm in the winter. Great for people in all kinds of homes - apartments, mobile homes, houses, etc. and free. If you're in Multnomah County you even get free supplies.

[www.communityenergyproject.org](http://www.communityenergyproject.org)

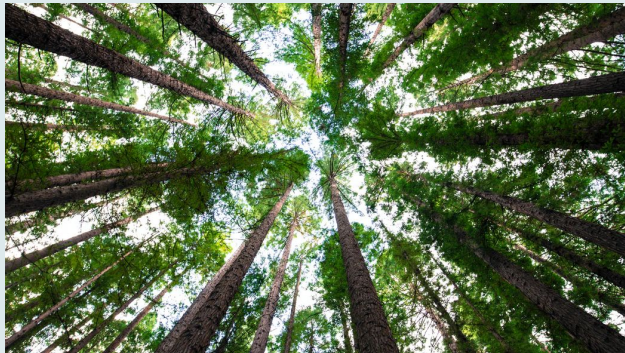
## Together | Juntos

Since 2002, Energy Trust

- 32.7 million tons of Co2
- \$8.2 billion saved on bills

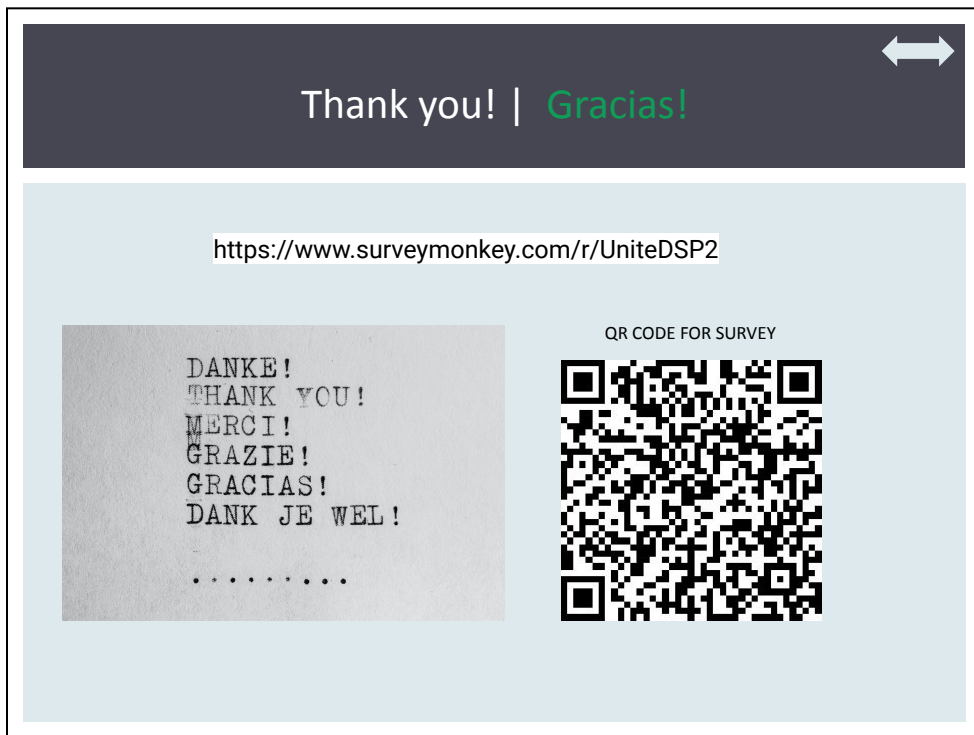
Desde 2002, Confianza Energetica

- 32.7 millones de toneladas de Co2
- \$8.2 mil millones ahorrados en facturas



These tactics work really well, and it'll take many of us at all scales (individual, community, and systemically) to make these changes happen now.





Thank you s o much for your time and sharing your thoughts and stories with us!

Thank you

Gracias

