



# APIs: An Unlikely Weapon against Climate Change and Blackouts

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## Annual Twin Cities Marathon in Minnesota Canceled Because...

- A) Blizzard
- B) Flash floods
- C) Extreme heat
- D) Wildfires
- E) Tsunami warning





**Hottest summer since 1880\***

NASA's Goddard Institute of Space Studies

Is 2023 over yet?

**A Year In Review**



# Phoenix, Arizona



110°

54

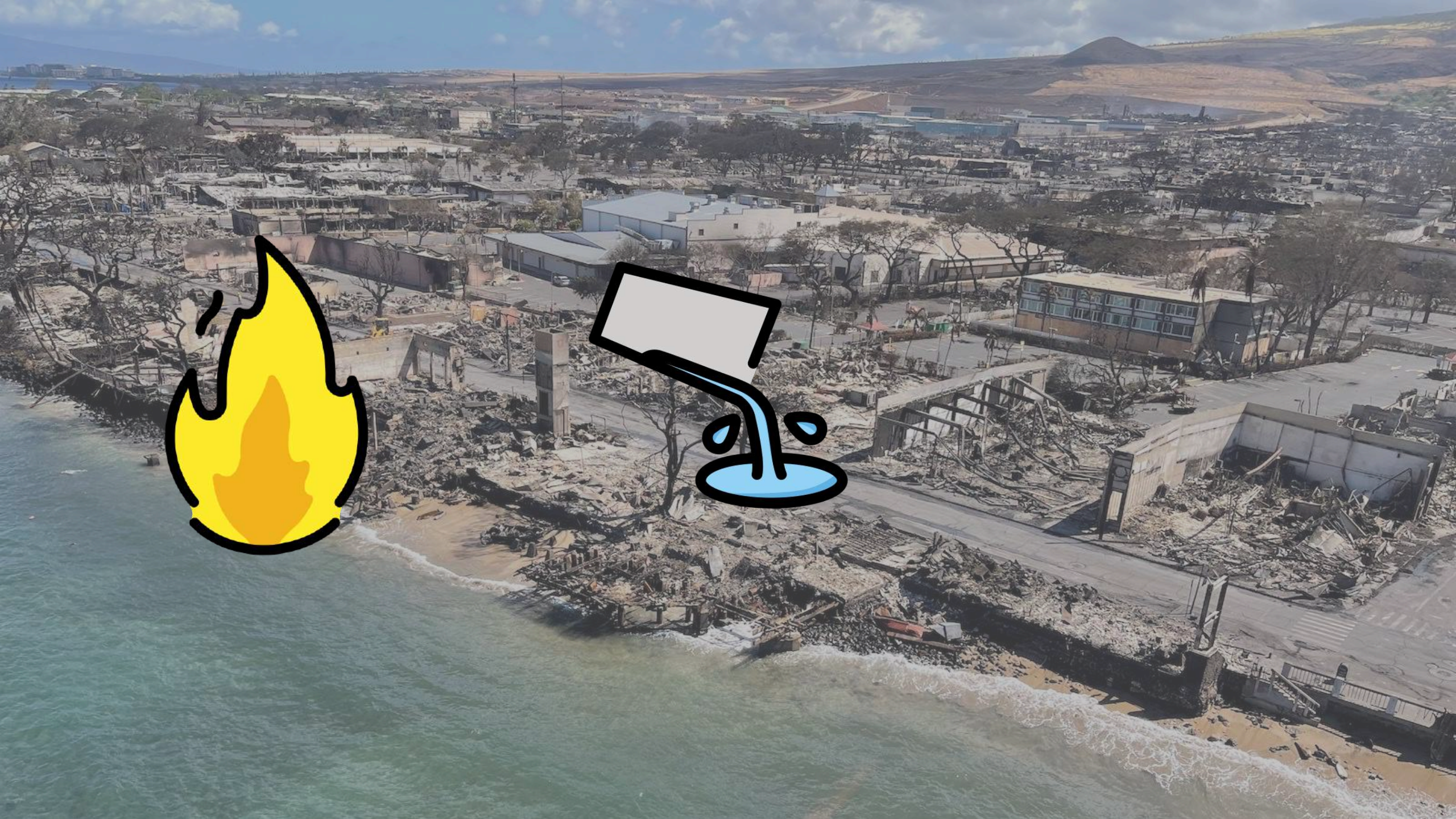














# Everything is on fire



Alaska, Arizona, California, Colorado, Florida, Georgia, Hawaii, Illinois, Louisiana, Michigan, Nevada, New Mexico, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, Utah, Washington, Wyoming. That's 21/50.



Every province and territory. That's 13/13.



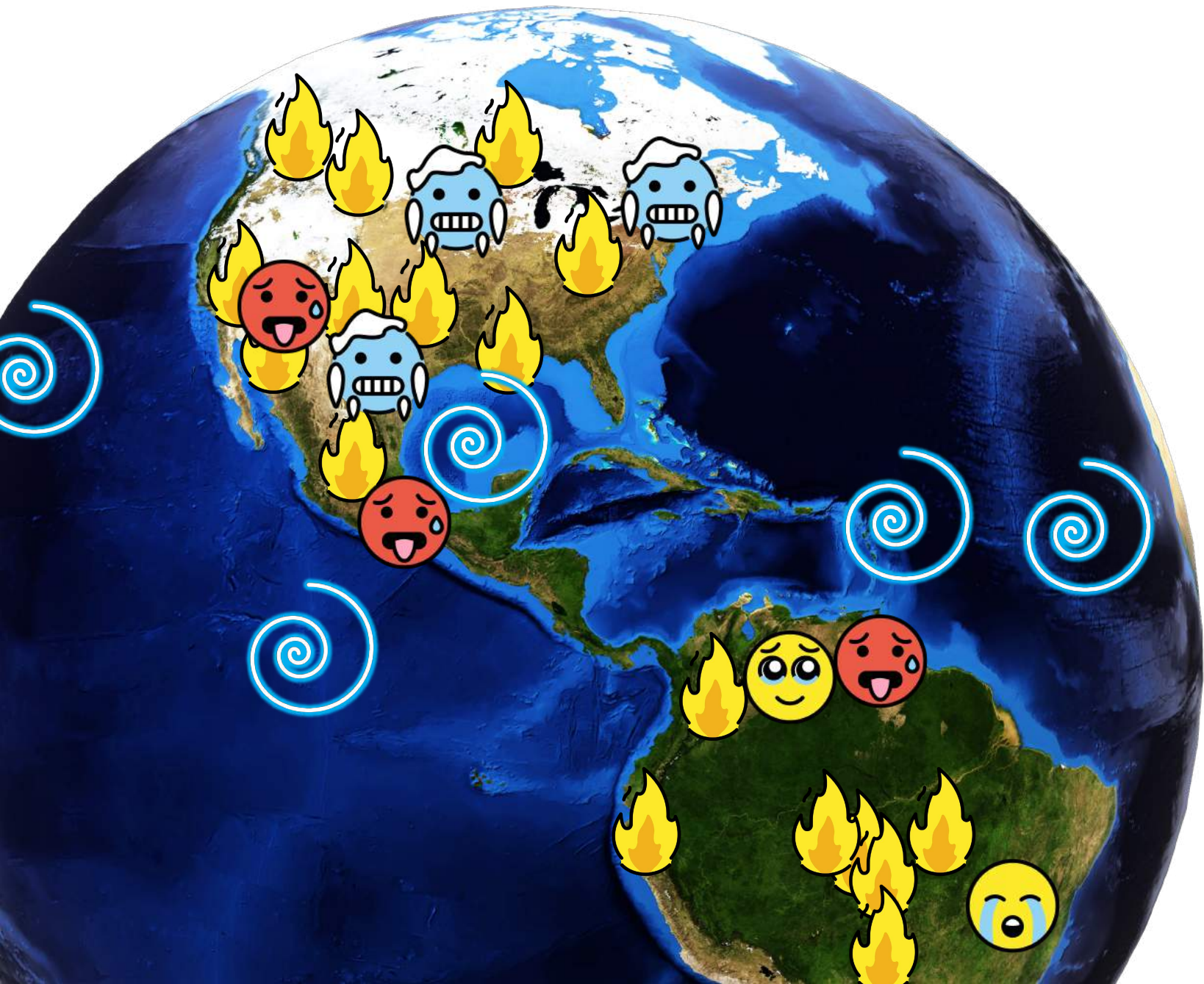
Chile, Kazakhstan, Turkey, Greece, Italy, Spain, Scotland, etc.





Rome, Italy

**109°F** / 42.9°C on July 19, 2023



This is home.





# Hi, I'm Amrit Sharma

Board member, OpenAQ

Chess player @smokeyowl

Senior Developer Advocate, ecobee

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# Energy 101: Everything you need to know about U.S. Energy Grid

A Crash Course in the Companies, Infrastructure, and Incentives That Keep Your Lights On





 **Xcel Energy**<sup>®</sup>

 **PSEG**

EVERSOURCE

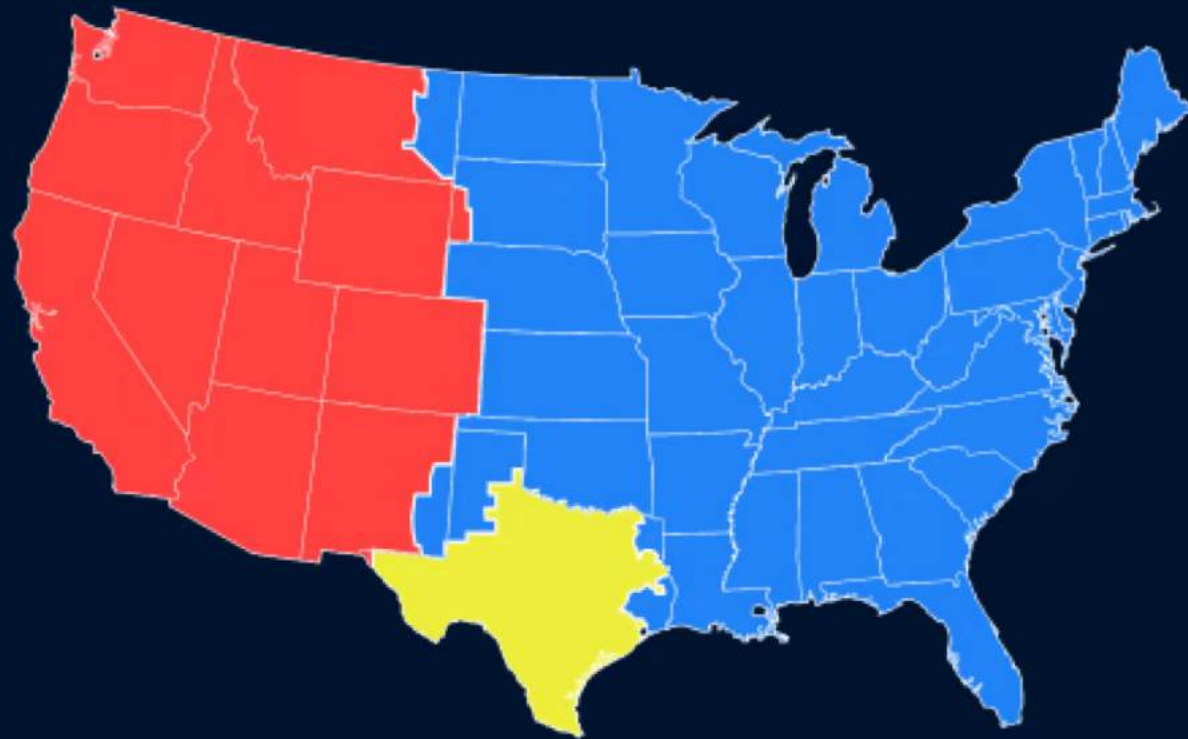
 **conEdison**

national**grid**

 **WESTERN  
INTERCONNECTION**

 **ERCOT**

 **EASTERN  
INTERCONNECTION**





SPEED  
LIMIT  
65

Mayford Rd  
Sawdust Rd

HOV 2+ ONLY

HOV 2+ ONLY  
2 OR MORE  
PERSONS  
PER VEHICLE

#1 AGAIN!  
AFEB KEE  
TOYOTA WOR

WOW! SELECTION  
NO WAVE PRICES

VOSS LAW  
CENTRAL  
FLORIDIA

Cody



## 2021 Texas Winter Storm

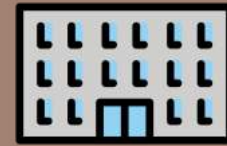
-2°F / -19°C

4MM+ homes w'out power

210+ lives lost

\$195 Billion in damages  
(costliest natural disaster in TX ever)







# WattNow Gas & Electric



# WattNow Gas & Electric





1. Buy some



2. Create more



3. Phone calls



4. Blackouts



A long long time ago...



Baseline Theme	0	BASE	LINE 500 MV	V547	00:00:07
Baseline Voltage	0	MCCABY	LINE 500 MV	50K	Time Deleted
Baseline Angle	0	NE_LOB	LINE 500 MV	V55	\$0.00:07
Pool Contingency Angle	0	NELRO	LINE 500 MV	TO KOP	Normal
TOM Active Constraints	0	REDTAP	LINE 500 MV	5MG Alarm Heartbeat	Normal
		OTC	LINE V547		

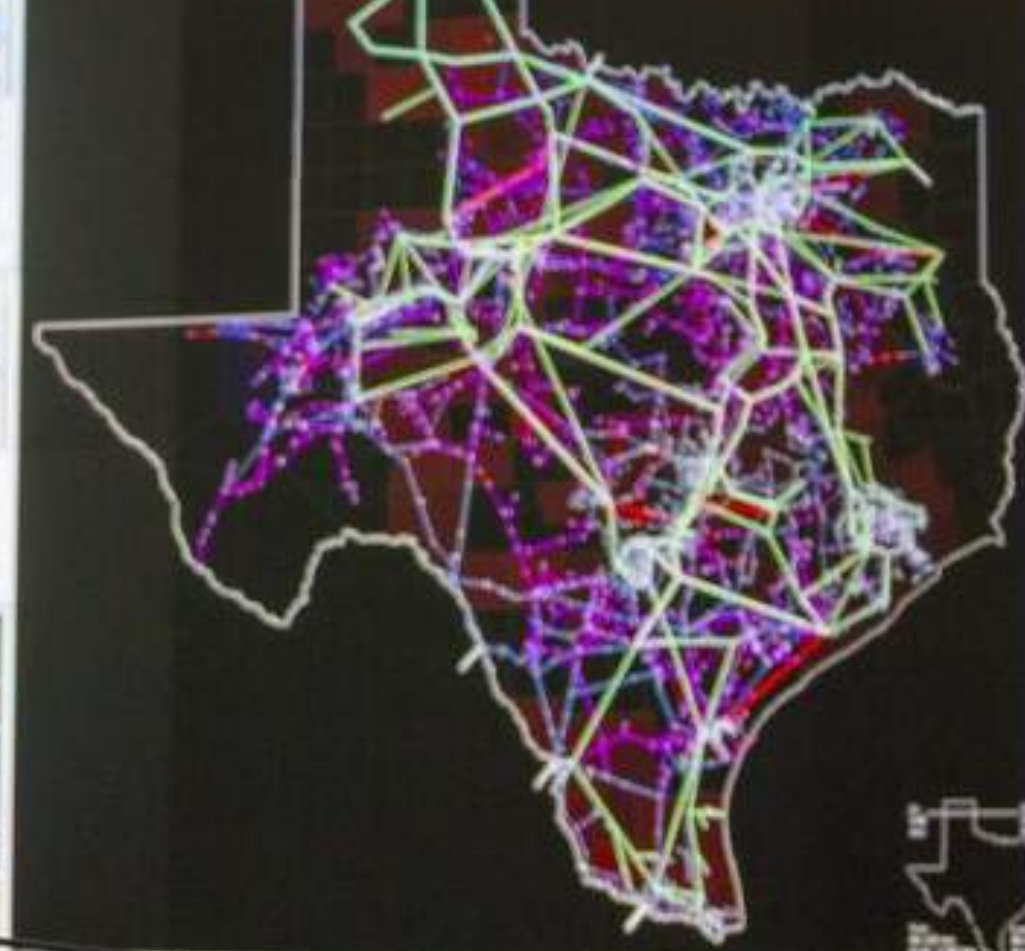


Time Error	
CPD1 (1-yr Avg)	173.76
OTBO Offset	

Unit	SLAKE	WYLER	EDWARDS
W. TO 4	43%	2201	1274
BARTEX	90%	1559	3000
MCCABY	9%	530	3000
NE_LOB	1%	130	3000
NELRO	1%	79	3000
FRINCL	43%	1559	2500
REDTAP	0%	-12	3000
VALNF	71%	1047	1481

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Load	49429 M
24-hr Ld Delta	-1255 M
Proj Ld Ramp	39 MW/hr
Gen	49335 M
Expected Gen	49612 M
Gen Deviation	-283 M

Current Interval	49183
5-min Ahead	49371
15-min Ahead	49558
15-min Ahead	49737
25-min Ahead	49915

Reg Up	277	330
Reg On	0	177
RRS	0	2048
NSPH	0	1738



## Is there a win-win-win?

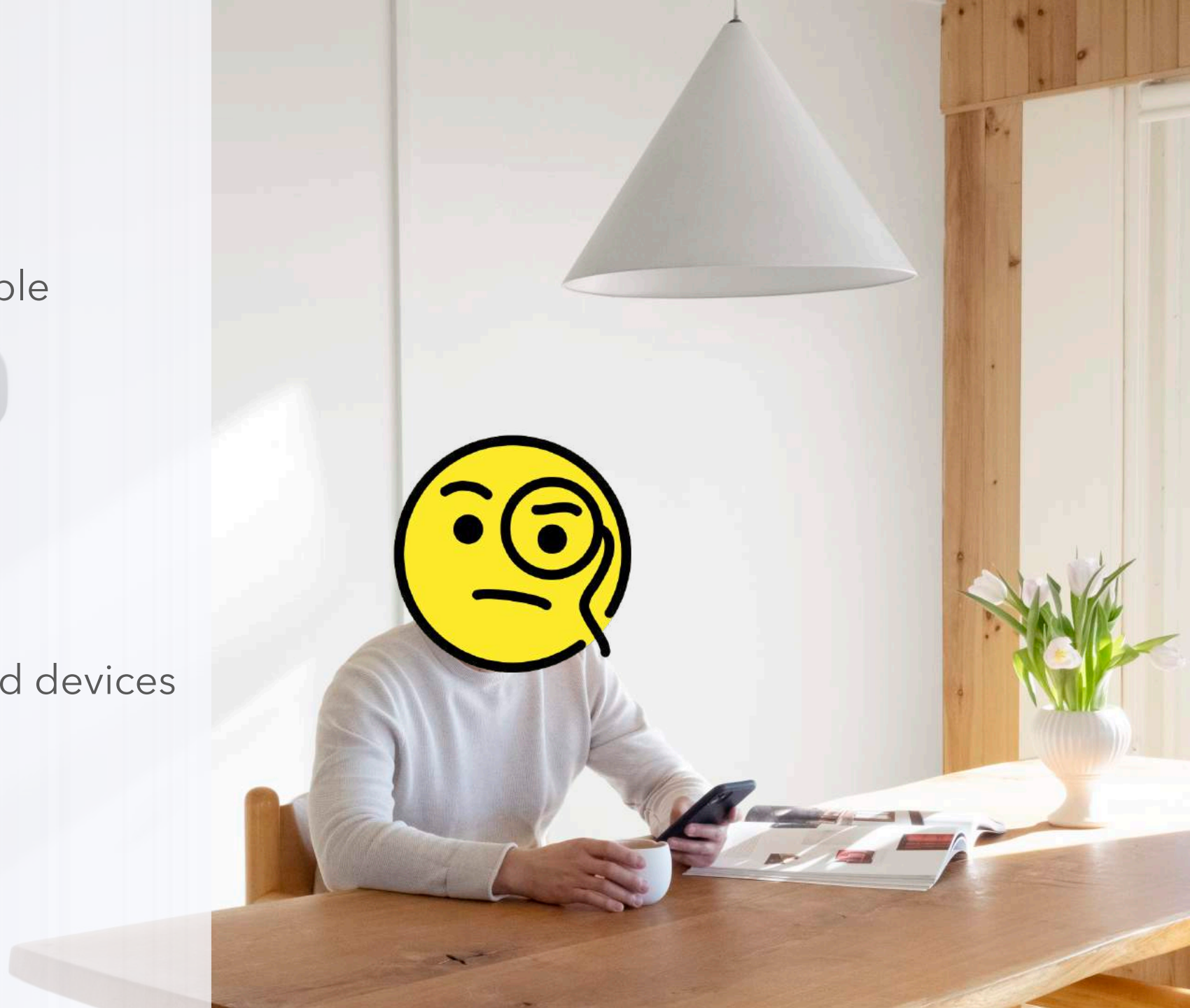
Utility, environment and people

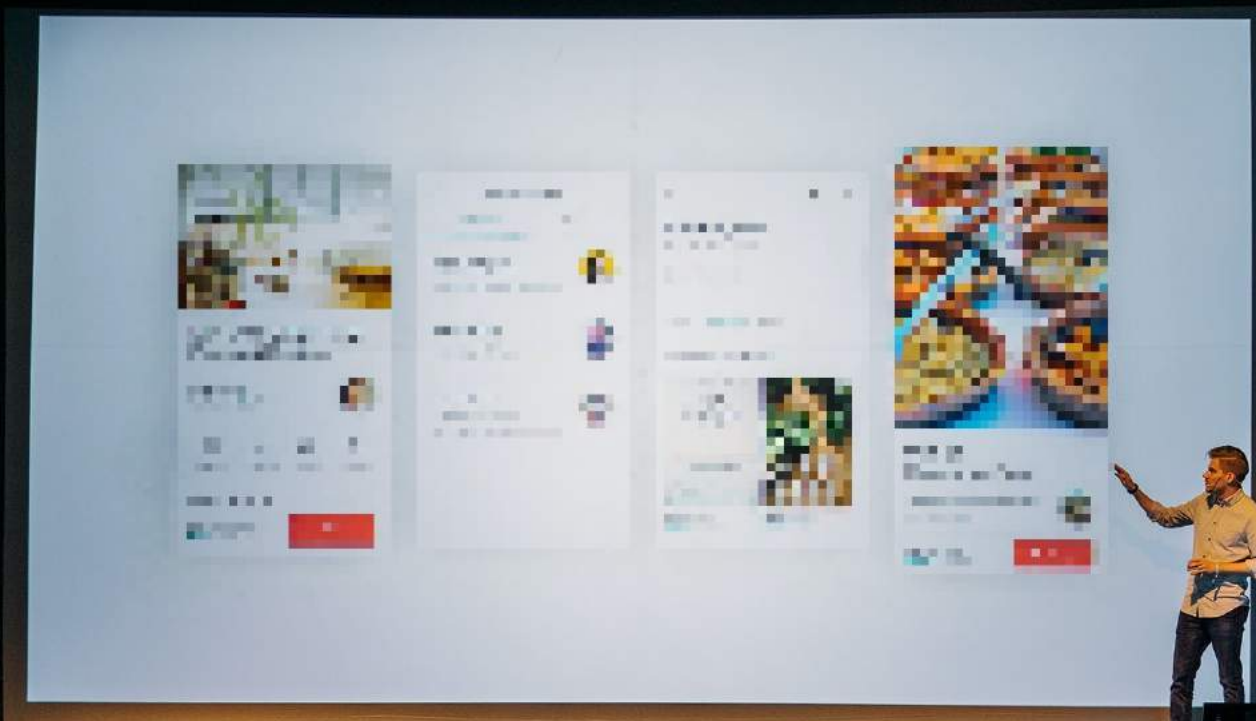
The solution needs to be...<sup>72</sup>

- cost-effective
- quick to get results
- feasible?
- environmentally-friendly

Millions of internet-connected devices

“demand response”





Network error?

Ugh, WiFi is slow.

What year is it?

## Win-win-win for WiFi woes?

\$100 incentive for 2 hours

Opt-in and opt-out anytime

No up-front costs

Cheaper than new WiFi solution

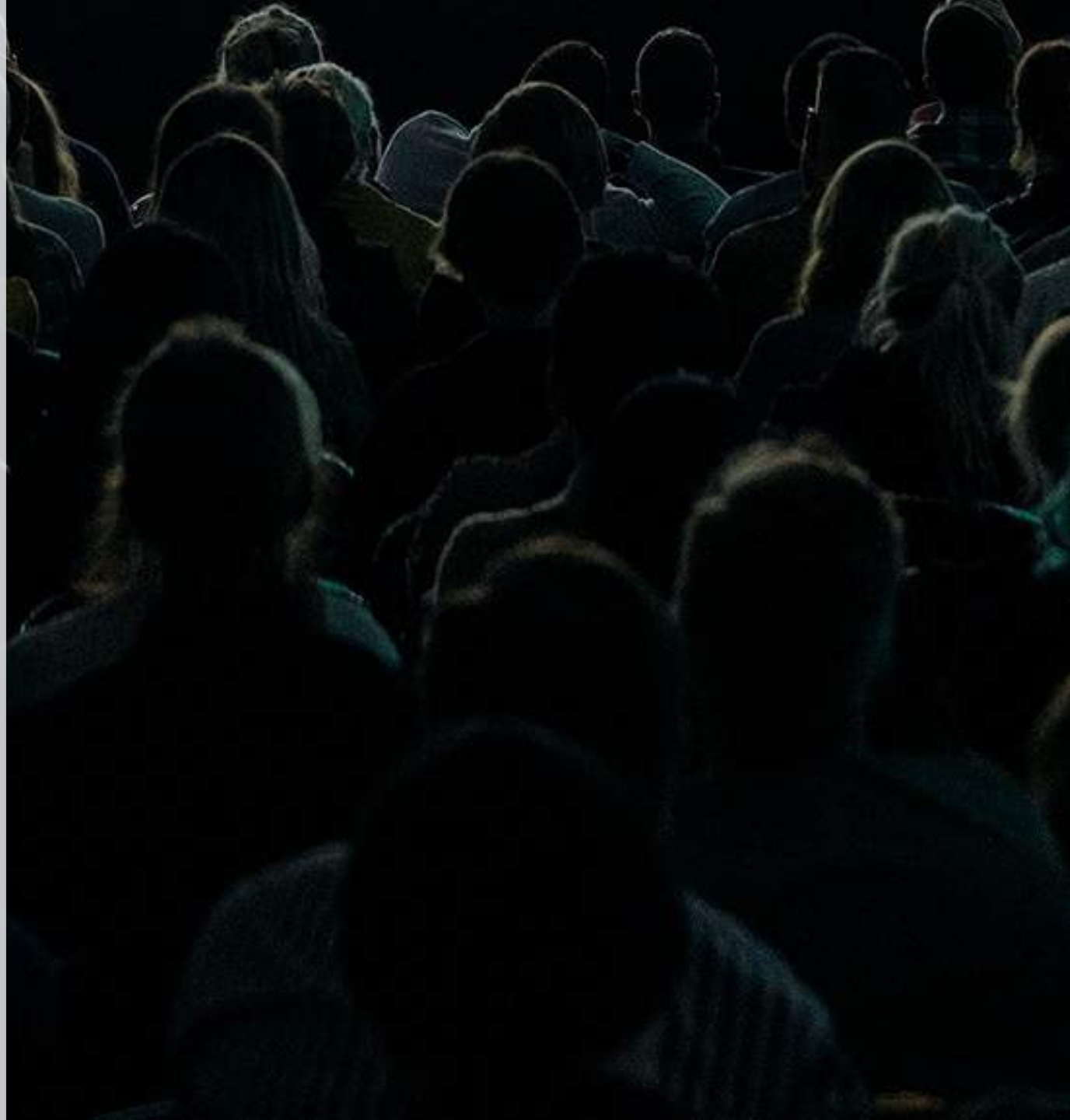
Quick fix

Win for attendees

Win for conference

Win for speakers

“demand response”







## **“demand response”, aka**

Energy Action Day

Energy Savings Day

Peak Savings Days

Peak Demand Event

Peak Savings Days

Peak Time Rewards

Peak Weather Event

Reduction event

SmartDay

System Relief Program Event

...



## Smart Thermostat APIs

Customers always in control  
They opt-in and are incentivized  
Lower energy costs for everybody

Utility companies:

1. Manage thermostats at scale
2. Demand Response (with AI/ML)
3. Near real-time events in emergencies
4. Data-driven performance metrics
5. Fully digital. No 📞 or 📺.

APIs make it happen.



## Electric Vehicle APIs

1. Stop charging please
2. Reduce rate of charging
3. Give energy back to the grid

Reduces load on the electric grid.

APIs make it happen.





## Battery Storage System APIs

1. Stop charging please
2. Reduce rate of charging
3. Prioritize battery power > grid
4. Give energy back to the grid

Reduces load on the electric grid.

APIs make it happen.





## Hot Water Heater APIs

1. Stop heating water please
2. Reduce rate of charging

Reduces load on the electric grid.

APIs make it happen.





## Solar Panel APIs

1. Prioritize solar power > grid
2. Reduces load on the electric grid.

APIs make it happen.





Buy some



Create more



Phone calls



Blackouts



DRs with APIs





Cheaper than  
alternatives



No blackouts



Data-driven  
decisions



Automated  
and scalable  
with APIs



**WattNow**  
Gas & Electric





Always in control



Lower prices long term



Incentives \$\$\$



Breathe easy





Lower energy  
demand



Reduced land and  
habitat impact



Reduces  
greenhouse  
emissions



Better air  
quality



## Smart thermostats are helping Arizona's grid ride out brutal heat

Amid soaring temperatures, Arizona has seen success with utility programs that incentivize people to turn down the AC when the power grid is stressed.

14 September 2023



### Case Study

"In July and August, Arizona's three biggest utilities were able to call on more than **100,000 customers** to reduce their electricity use by a total of **276 megawatts** during afternoon and evening hours when demand for power was at its peak."

"Like many utilities across the country, [Arizona utility companies] offer **incentives** ... for customers who agree to **let the utility remotely turn their temperature settings up by several degrees** when the grid needs relief from air-conditioning power use – with the option for customers to "**opt out**" by manually resetting their thermostats."





## How to design *delightful* developer experiences?

- 🏷️ Eat the dogfood
- 🏷️ Collaboration across organization
- 🏷️ Do things that don't scale to learn
- 🏷️ Final Cut Pro > VS Code?

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