

# ET Summit 2021

Presented by



# Voice Assistants for Customer Engagement & Customer Programs

Application of Amazon Alexa for customer engagement and energy management



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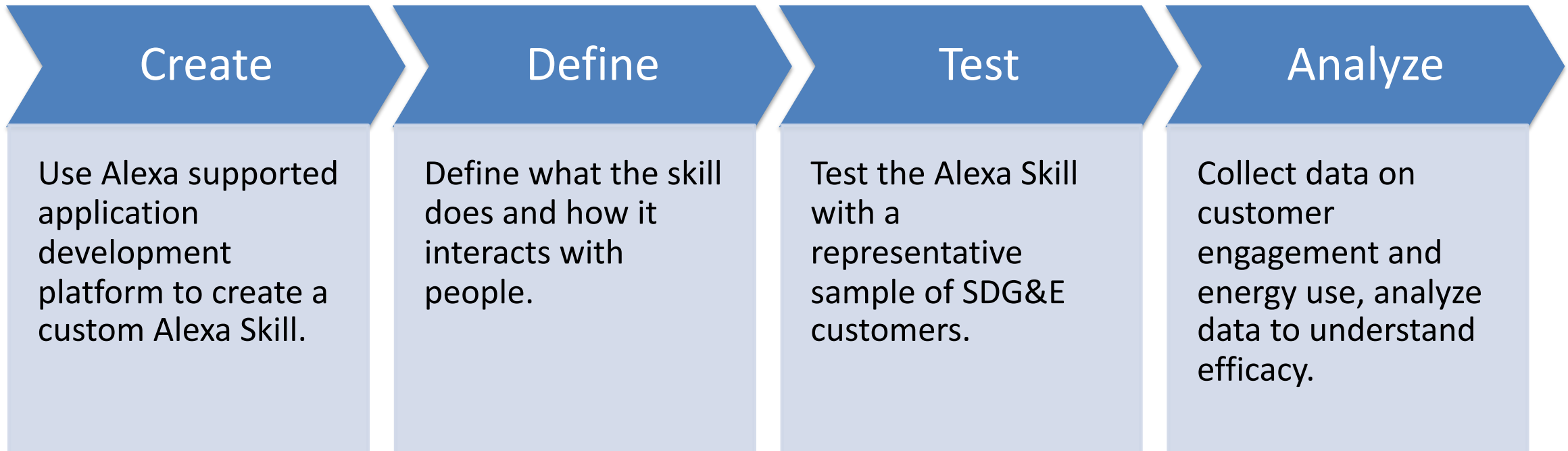


## Research questions addressed

- What is the feasibility for utilities to use voice assistant technologies to engage customers?
- What are the optimal strategies for using voice assistants for energy management related to TOU rates?



# How can we customize voice assistants?



## What are the objectives of our study?

How often do the homeowners engage with the Amazon Echo regarding their energy consumption or TOU rates?

Do homeowners respond to Alexa notifications of high-rate periods in ways that reduce their energy use?

Does customer interaction reduce over time?

Does automating energy management in conjunction with voice assistants help?

Do customers opt-out of automated control? If so, how often?

# Customer/Site Selection Process

## Required

- ✓ Is customer on SDG&E TOU Rate?
- ✓ Does the customer have reliable Wi-Fi Connection?
- ✓ Does customer have Zigbee enabled smart meter?
- ✓ Is customer willing to participate?

## Optional

- ✓ Does the customer have a central air conditioning system?

	AMAZON ECHO WITH ALEXA	RAINFOREST AMI METER	RHEEM HEAT PUMP WATER HEATER	SMART THERMOSTAT	TOU RATE
HOME 1	X	X	X		TOU DR1
HOME 2	X	X		ECOBEE	TOU DR1
HOME 3	X	X		ECOBEE	DR SES
HOME 4	X	X		ECOBEE	TOU DR1
HOME 5	X	X			TOU DR1
HOME 6	X	X		ECOBEE	TOU DR1
HOME 7	X	X		NEST (NO ACCESS)	TOU DR1

**Seven homes were recruited to participate in the study**

# Project Design



Phase 1 – Installation of Alexa, Controllable end-use technologies, and notifying customers of TOU rate change events.



Phase 2 – Providing useful energy savings tips to customers for a variety of end-uses.

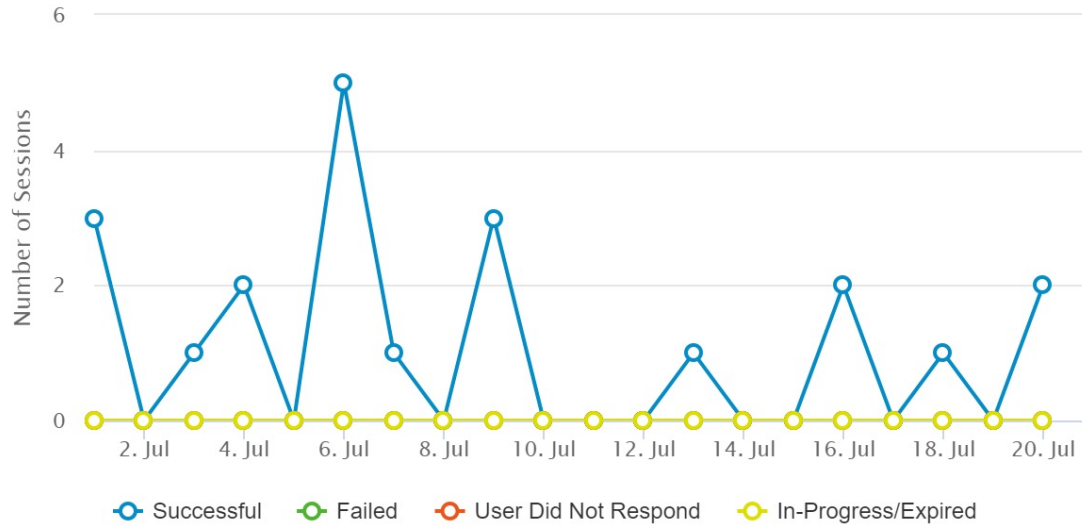


Phase 3 – Providing feedback on energy use against a baseline.



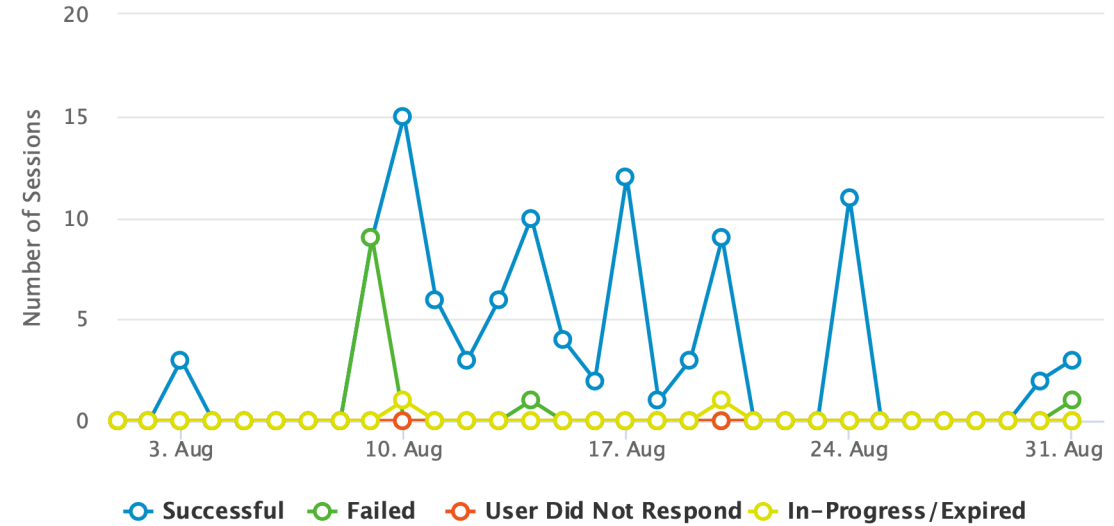
Phase 4 – Automating TOU based energy management using end-use automation (ecobee thermostats).

# Customer Engagement Results



Phase 1 – Engagement was consistent with notification frequency and dates

- ⊕ Higher engagement on days when we messaged.
- ⊕ No failed transactions.



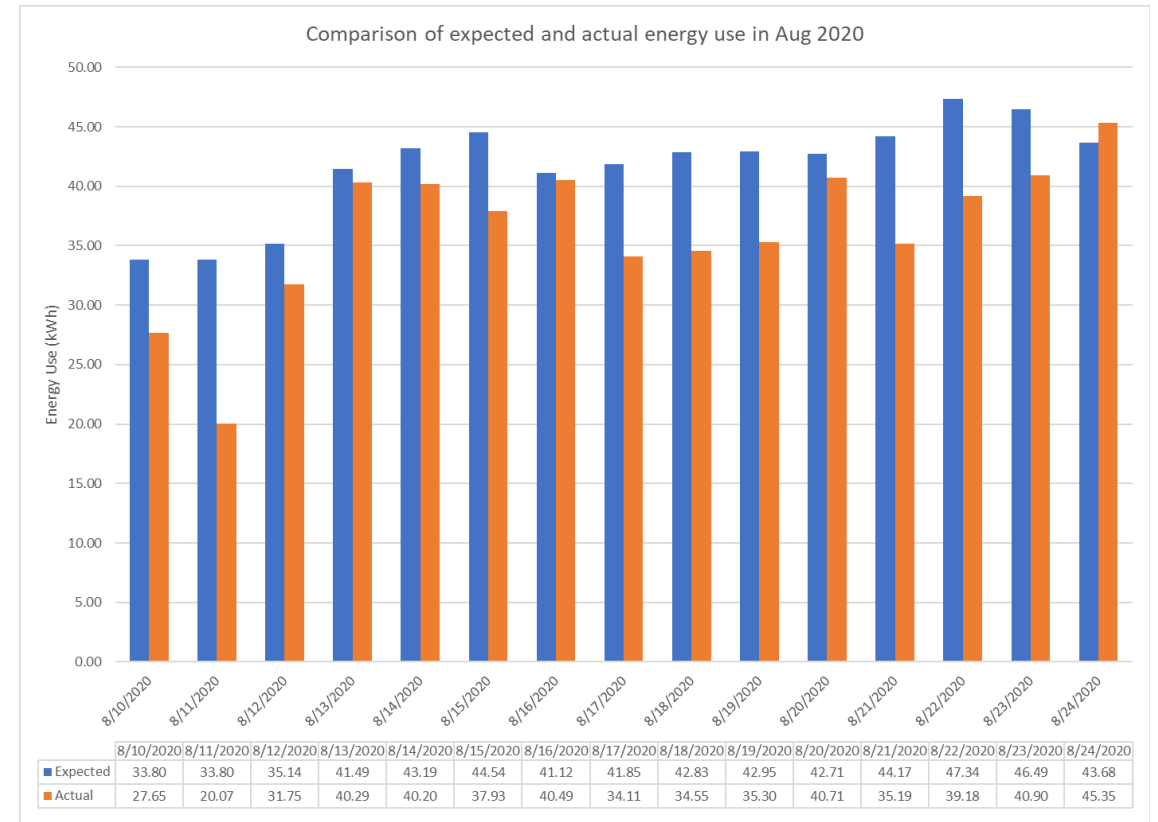
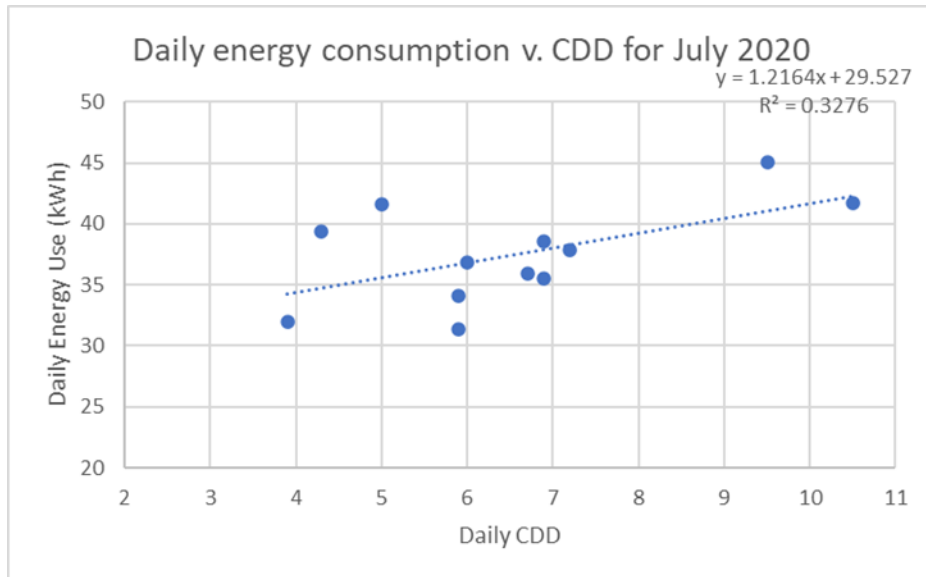
Phase 2/3 – Engagement improves with added functionality and features

- ⊕ Higher levels of engagement than Phase1.
- ⊕ Period of high engagement corresponds to higher outdoor temperatures.
- A few failed transactions.
- A few transactions where customers “stopped” Alexa.



# Phase 2 & 3 – Energy Performance Results

- Using Phase 1 energy performance as baseline, Phase 2/3 energy performance was estimated on a weather normalized basis.
- Weather normalization uses Cooling Degree Days to correlate energy use to weather.



On the average savings of 5 kWh per day during high engagement period.

## Phase 4 – Energy Performance Results

METRIC	NON-TREATMENT PERIOD	TREATMENT PERIOD
Peak Load – Nov 2020	1.64kW at 5pm	1.95kW at 5pm
Energy Use during 4-9pm Nov 2020	5.67 kWh	8.17 kWh
Peak Load – Dec 2020	1.39 kW at 6pm	1.44 kW at 6pm
Energy Use during 4-9pm Dec 2020	5.79 kWh	6.00 kWh

**Automation helps to reduced HVAC usage but does not translate to lower energy use**

# Answering Research Questions – Key Takeaways

What is the feasibility for utilities to use voice assistant technologies to engage customers?

- Yes, it is feasible.
- The overall approach has to be thoughtfully engineered.
- Achieving persistent engagement is crucial.

What are the optimal strategies for using voice assistants for energy management related to TOU rates?

- Increase awareness.
- Provide recommendations & feedback.
- Automate sparingly!

## Next Steps

- Recognizing the small sample size but promising set of results, it would be beneficial to continue the study to a wider audience.
- Key question that remains open on automation is to understand the role of “de-facto” standards for smart home devices in the form of voice assistant platforms to help improve scalability.

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