



Data Driven Utility AI Solutions

Increase Customer Satisfaction

Drive Customer Insights and Programs





is a Utility AI-powered SaaS company based in the Silicon Valley. Est 2011

INNOVATION PARTNER TO OVER 40 UTILITIES SERVING OVER 25M HOMES



SERVING 40 UTILITIES GLOBALLY

2021 | INNOVATION

2019 | AWARENESS

2020 | TRACTION



2016

2017

2018

2019

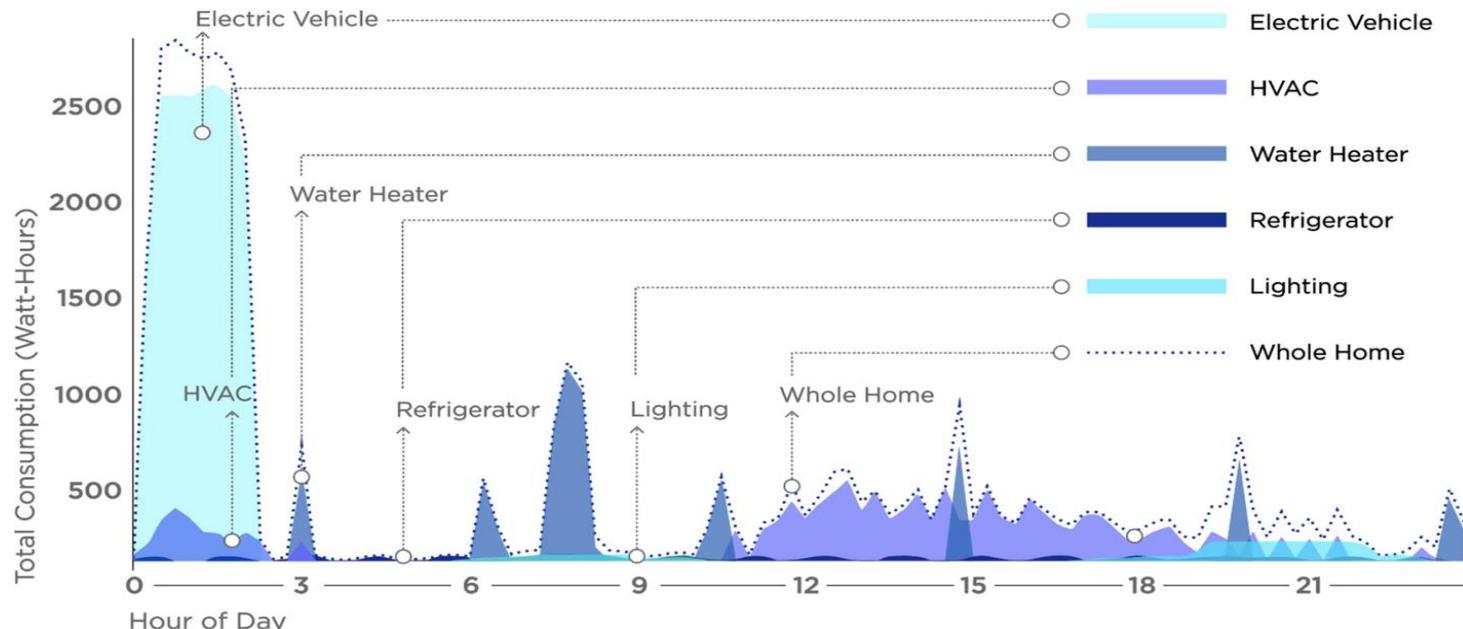
2020

2021

2022

POWERED BY LOAD DISAGGREGATION ALGORITHMS

Appliance signatures from whole house meter data extracted using AI and ML techniques



17 Patents

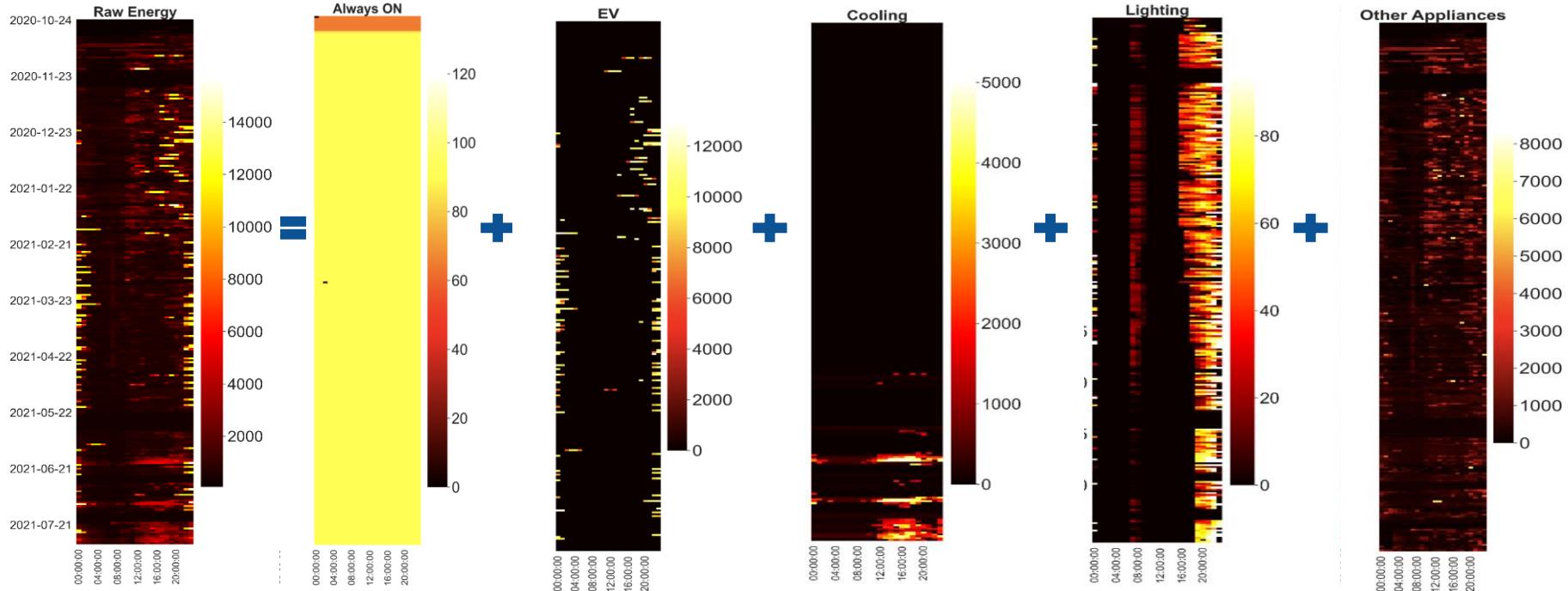
Applicable for
All Meter Type

No Hardware
Required

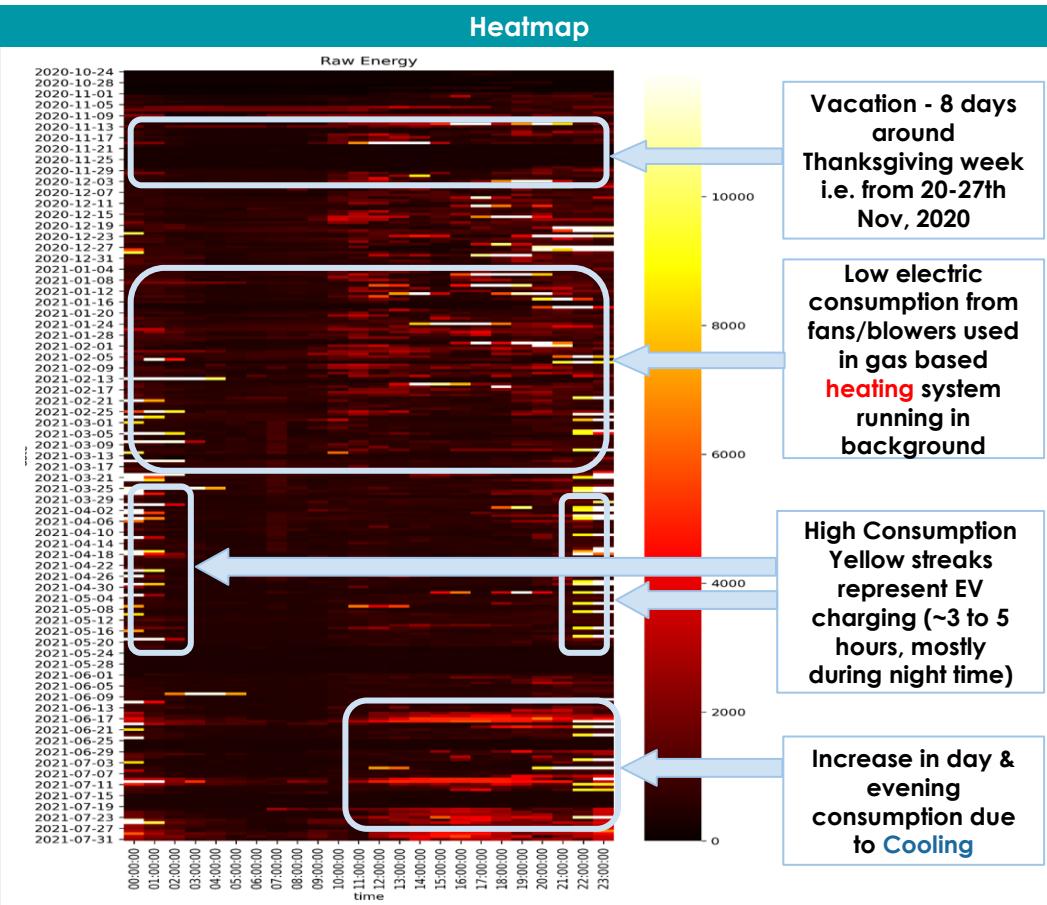
Speed to
Scale

Zero Customer
Inputs Required

The user's consumption data exhibits presence of an Electric Vehicle, Electric Cooling, Lighting as shown in the heatmaps below -

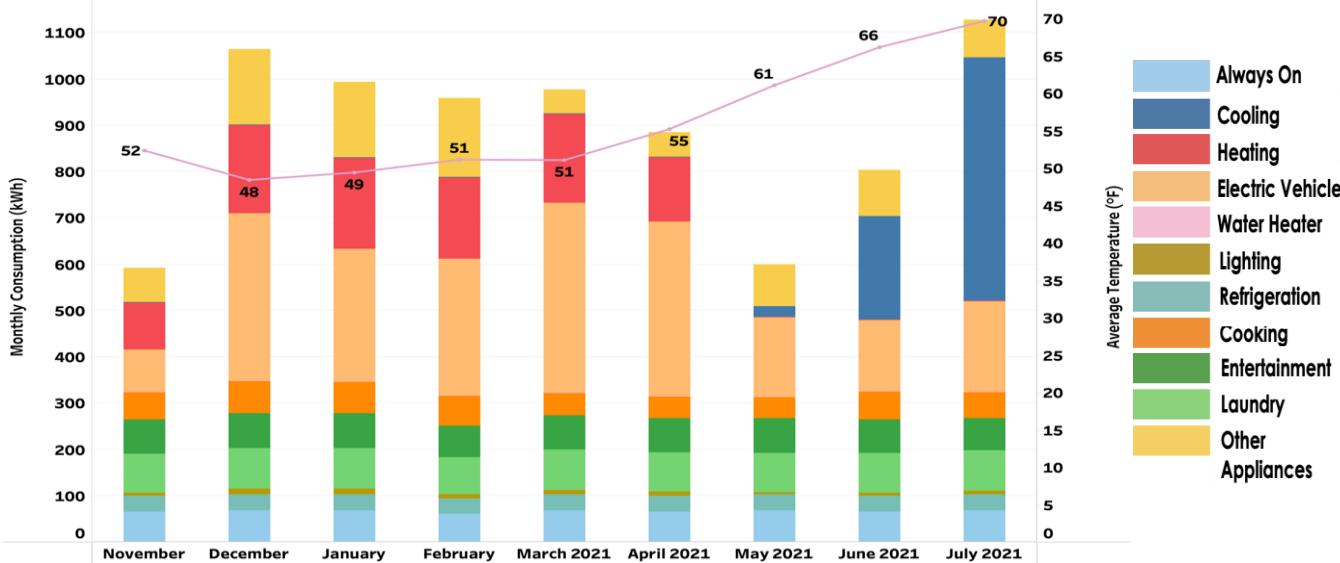


Please refer to Appendix to understand the heatmaps shown above.

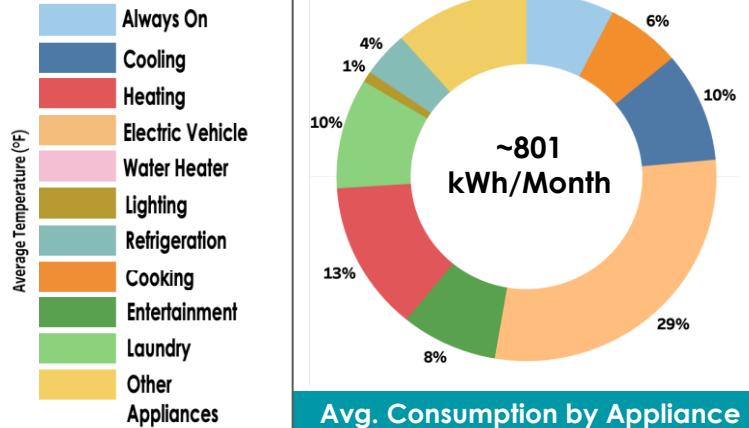


- **Electric Vehicle (EV):** ~11.4 kW L2 charger, used for **3 - 5 hours**, generally around **~9.30PM to 1AM**, used from Nov, 2020 to July, 2021
- **Always On (AO):** 8% of energy consumed by Always on appliances which is efficient behavior when compared to the other users
- **Heating:** Primarily uses **gas heating**
- **Cooling:** **Electric Cooling appliance** used primarily from June - July, 2021
- **Lighting:** used majorly at **~7-11PM** at night
- **Vacation:** No human activity suggests vacations, major vacations detected in Nov, 2020 May-Jun, 2021 & July, 2021
- **Water Heating (WH):** Most likely **gas based WH** (availability of Gas data will help confirm this)

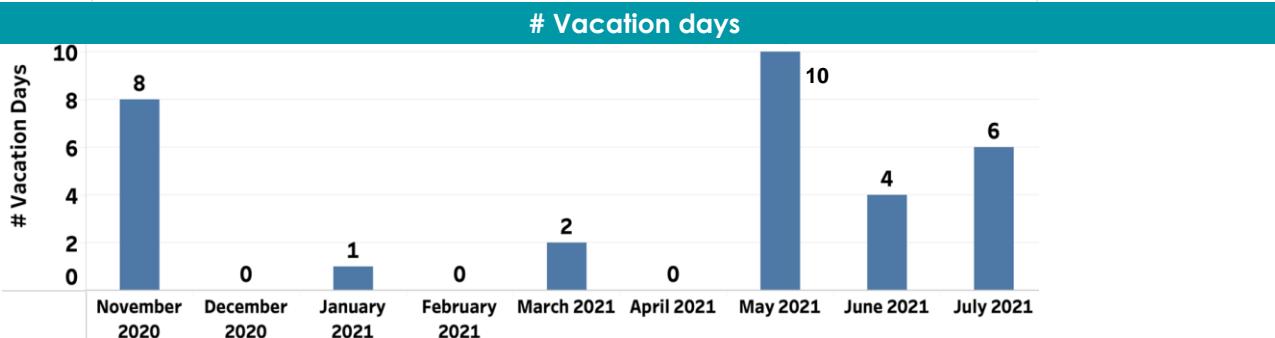
Monthly Electricity Consumption Across Appliances



Distribution of Total Electricity Consumption



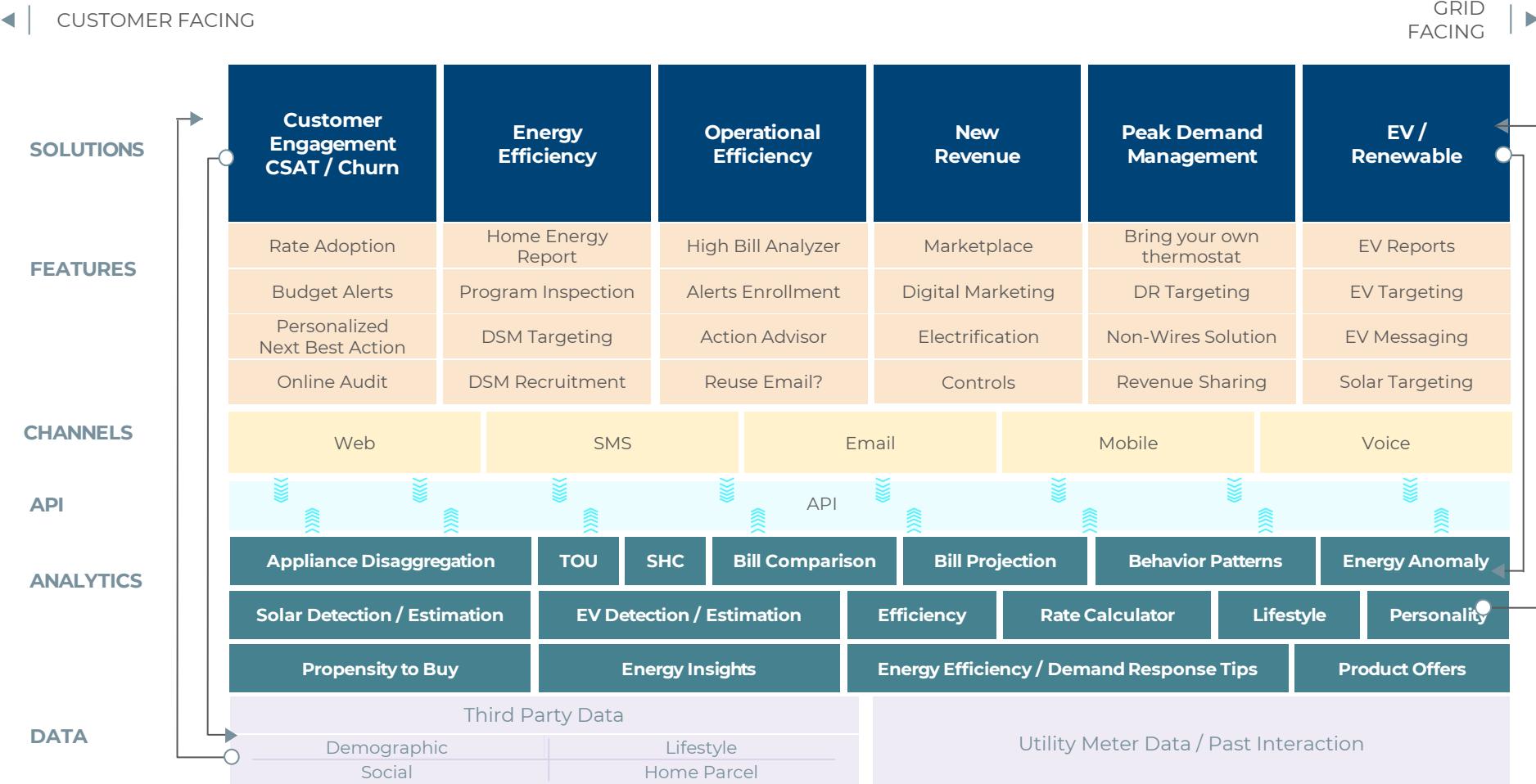
Vacation days



Avg. Consumption by Appliance

Appliance Category	Avg. Consumption (kWh/Month)
Always On	60
Cooling	257
Heating	167
Electric Vehicle	260
Water Heater	-
Lighting	7
Refrigeration	32
Cooking	53
Entertainment	66
Laundry	77

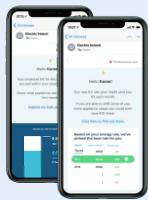
BROAD PLATFORM FOR ELECTRIC UTILITIES



DELIVERED IN MULTIPLE WAYS

White Labeled Solutions

Emails / SMS



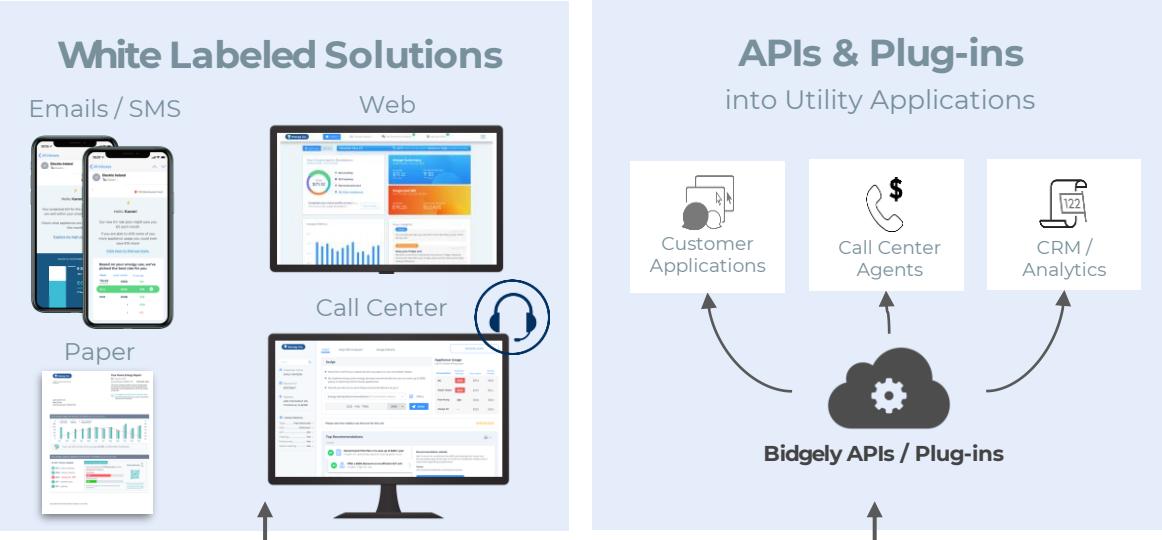
Web



Call Center

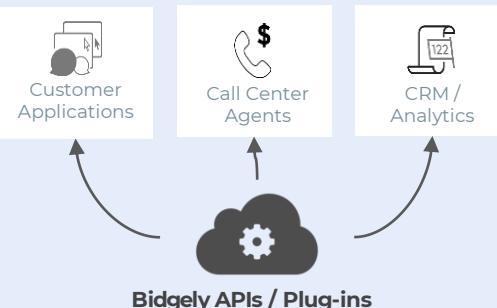


Paper



APIs & Plug-ins

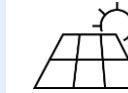
into Utility Applications



Analytics Workbench



EVs



Solar



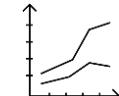
TOU



Segmentation



Targeting



Metrics

BI

UtilityAI - Hyper-Personalization Analytics
(AMI / Non-Smart Meters, Enhanced)

BIDGELY: DRIVING MULTITUDE OF UTILITY OBJECTIVES

1

ENERGY EFFICIENCY/ CUSTOMER EXP'NCE

Itemized Appliance wise
Billing
Smart Alerts
Behavioral EE
Behavioral DR
DSM



2

REVENUE PROTECTION

Revenue Leakage
Detection through
consumption analysis



3

EV/ PV DETECTION

EV Detection and
Estimation
PV Detection and
Estimation



4

SHORT TERM LOAD FORECASTING

Day ahead demand
forecasting at Grid as well
Individual Level



CALL CENTER

Energy Advisor
Remote Audit
High Bill Analyser



5

6

LEAD GENERATION

Personalized Products &
Services
Exclusive Manufacturing Disc.
Tie Ups



bidgely UtilityAI™

Insights Driving Multiple Use cases

ENERGY INSIGHTS DRIVE CUSTOMER ENGAGEMENT

Proactive and Immediate

Being Top-of-Mind with Customers requires Proactive Outreach

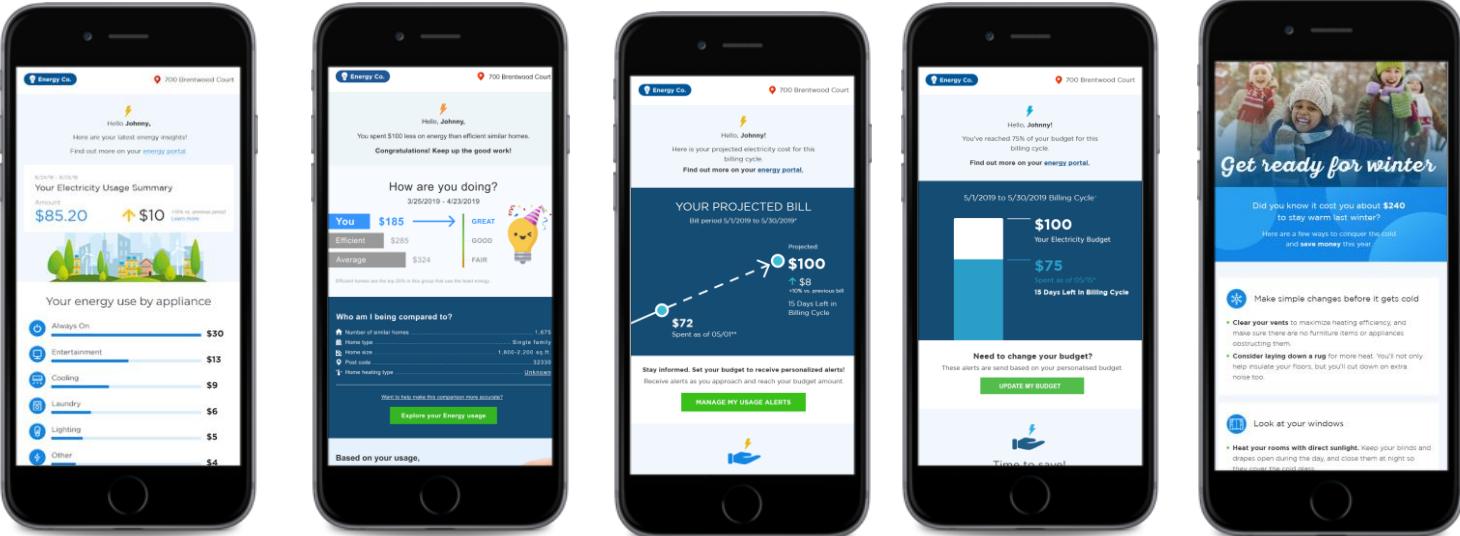
Sample Journey



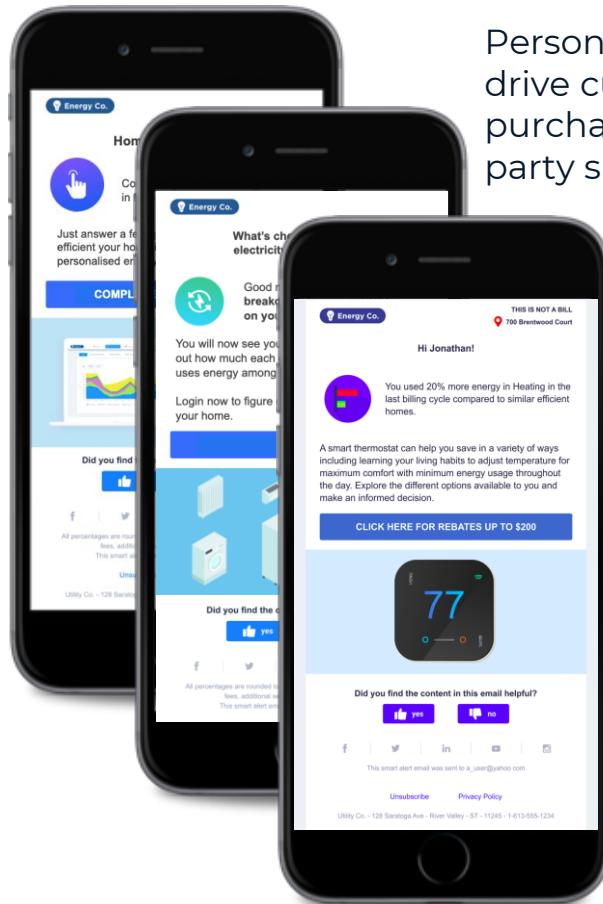
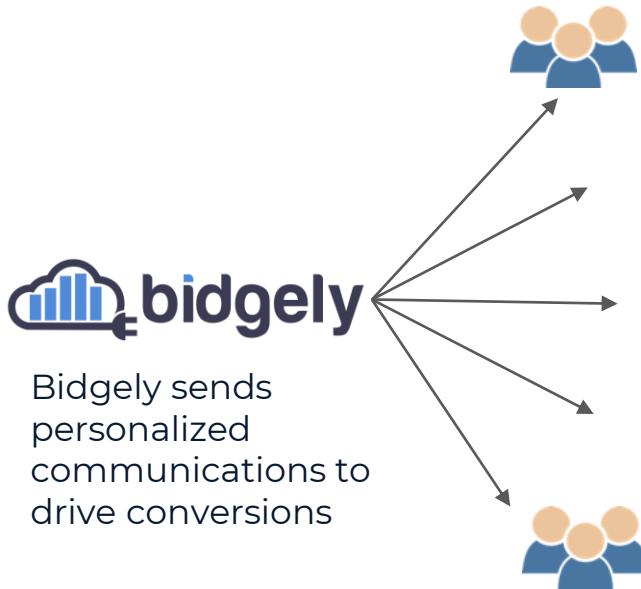
*Only for AMI

45% Repeat Email Open Rates compared to Industry's 15%-20%

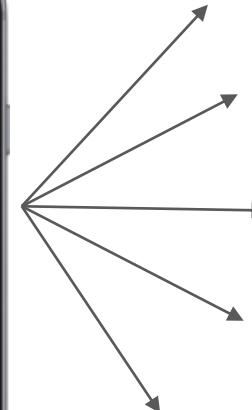
Only 0.2% Unsubscribe Rate



DRIVING UTILITY SCALE PROGRAM, PRODUCT & SERVICE LEADS



Personalized Insights
drive customer
purchases on third-
party sites



ecobee





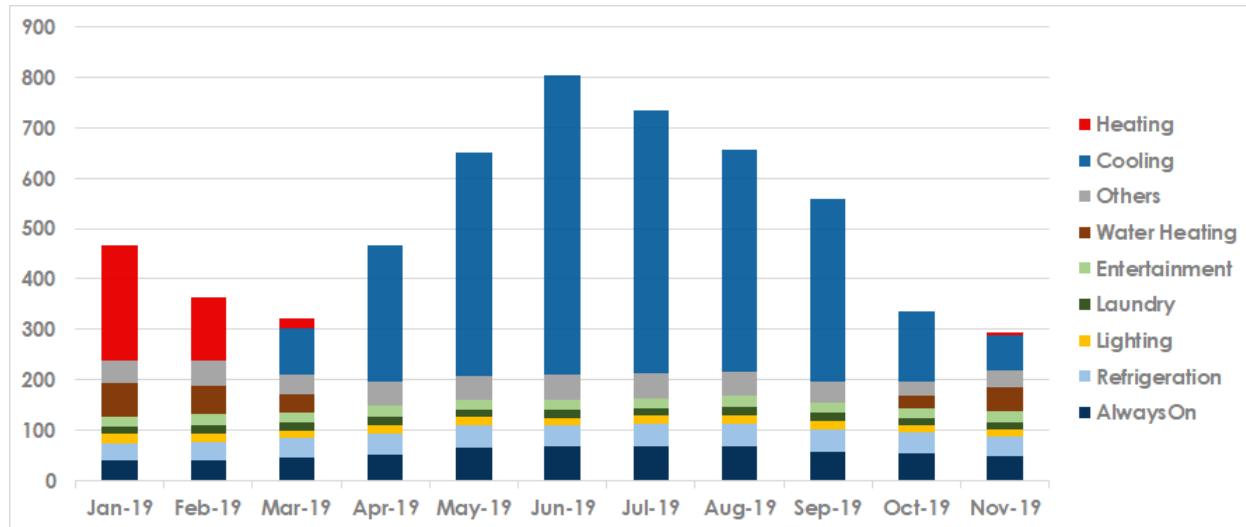
bidgely UtilityAI™

Consumption insights for Indian utility

AI-Powered Aggregate Level Itemization

(Total Smart Metered Residential homes)

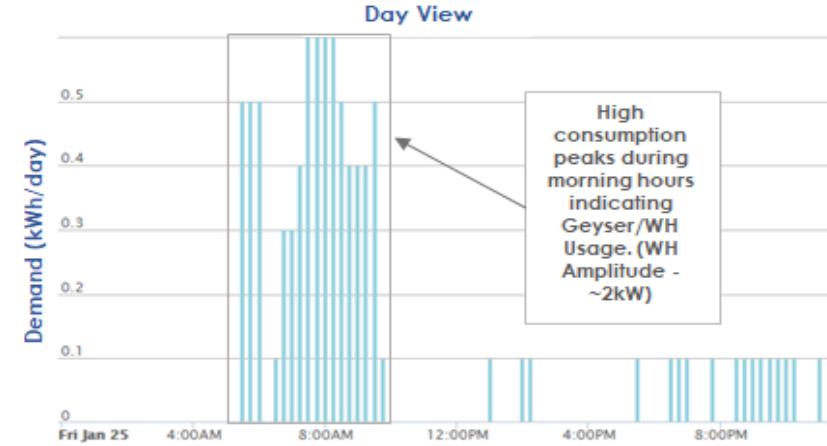
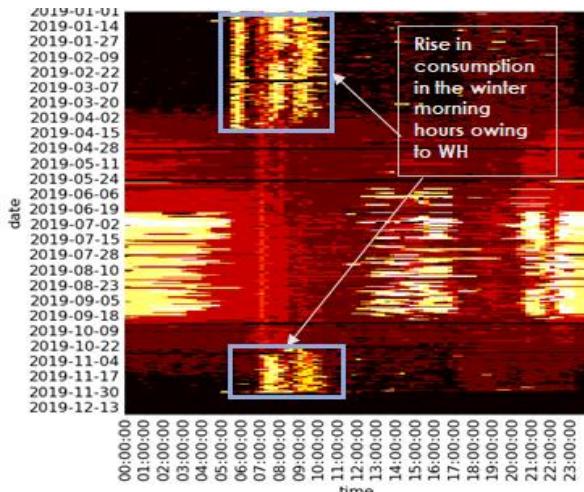
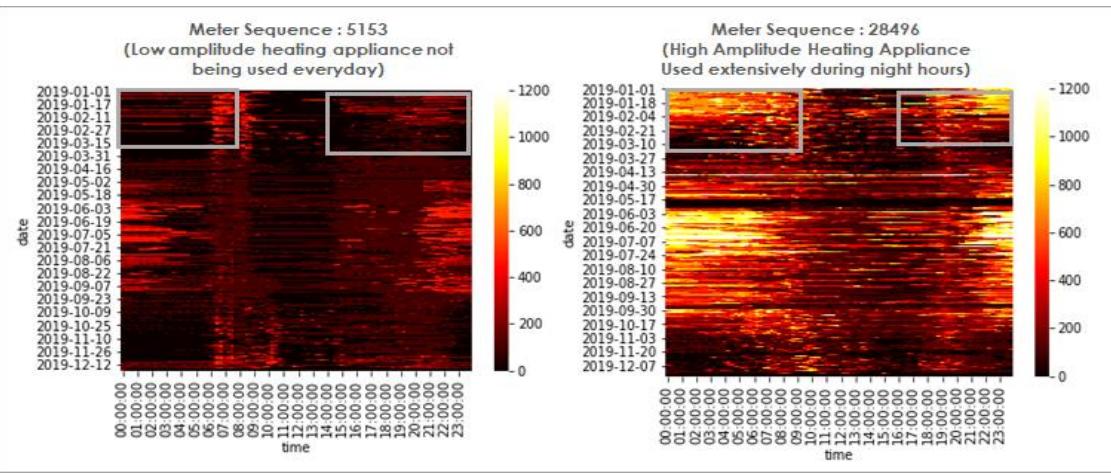
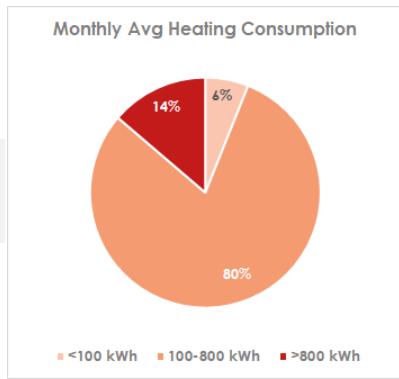
Average Monthly Electricity Usage (kWh/month)



Appliance	Homes Detected %
Cooling	99%
Heating	36%

Extracting Insights on Electric Heating & Water Heating

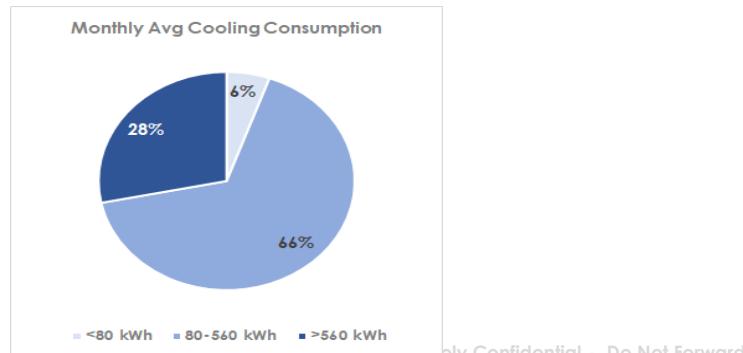
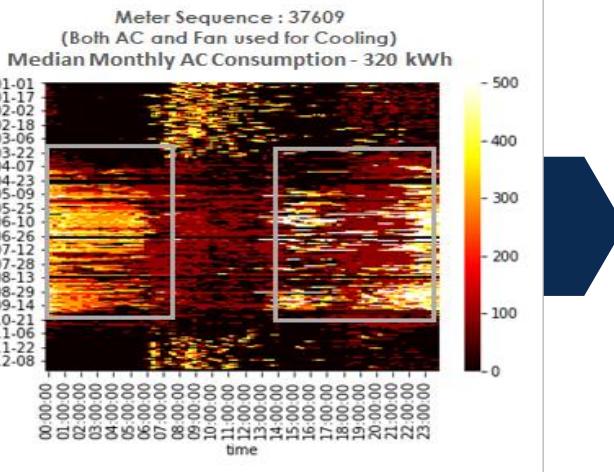
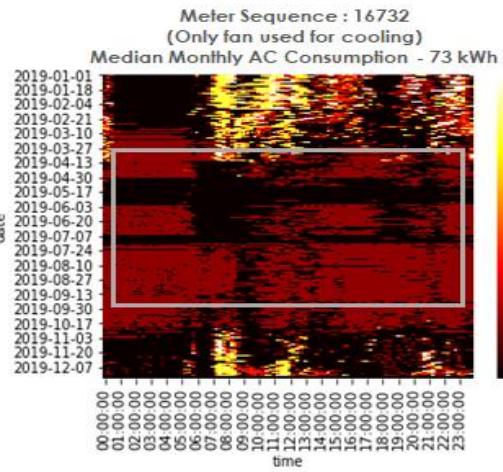
Space Heating (Electric Heaters)



Water Heating (Electric Geysers)

Cooling Insights

Targeting Cooling usage homes with personalized messaging



Energy Co. 14, Panchsheel Marg

Hi Anita 🙌

Here's your latest energy insight!

You spent ₹720 on cooling your home in the last billing cycle. That's 59% of your total bill!

See what you spent on other appliance categories in your energy portal.

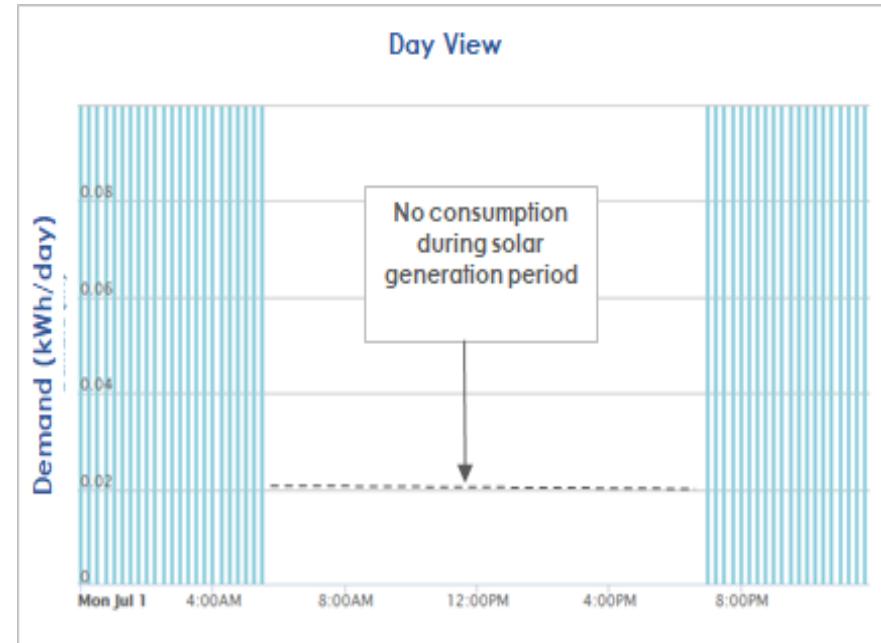
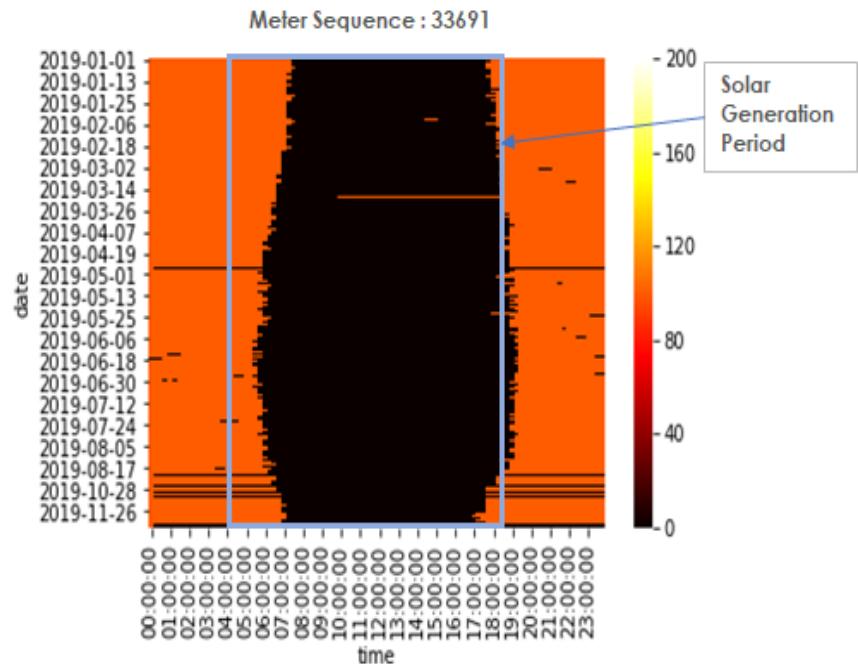
[CHECK APPLIANCE SPENDING](#)

Appliance Category	Percentage
Refrigerator	60%
Air Conditioner	20%
Washing Machine	10%
Other	3%

Did you find the content in this email helpful?

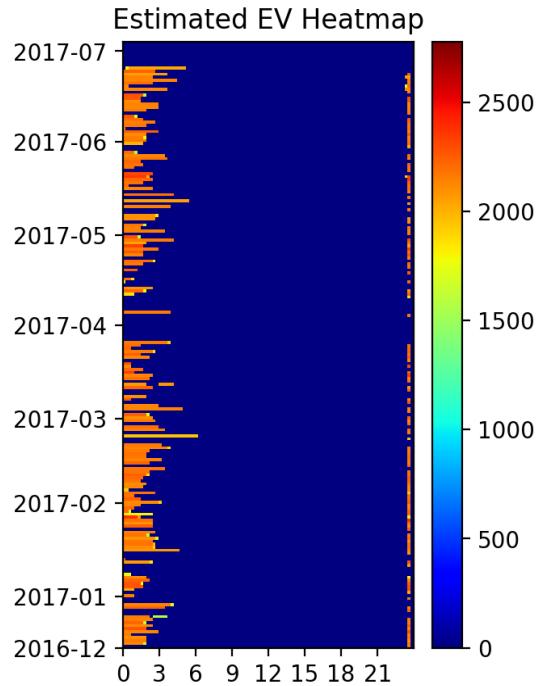
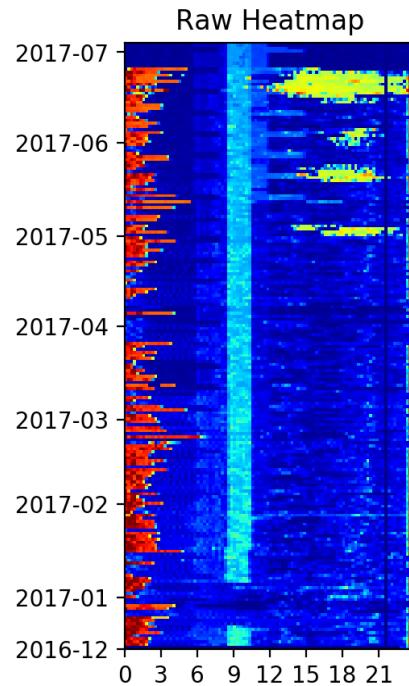
yes no

DER Insights : Solar Homes



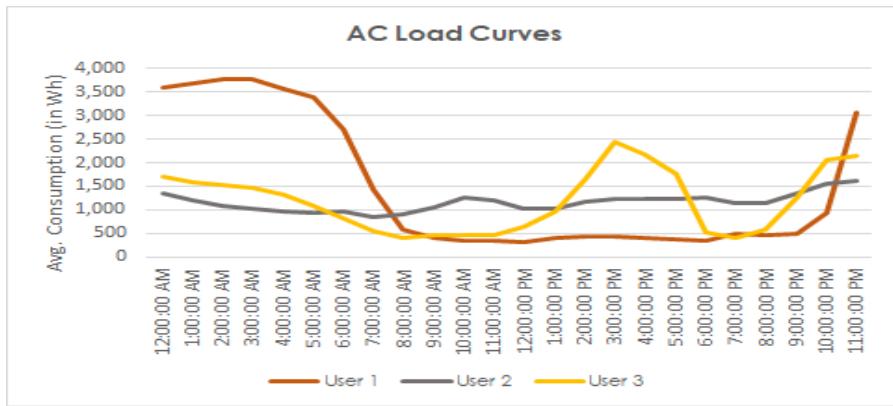
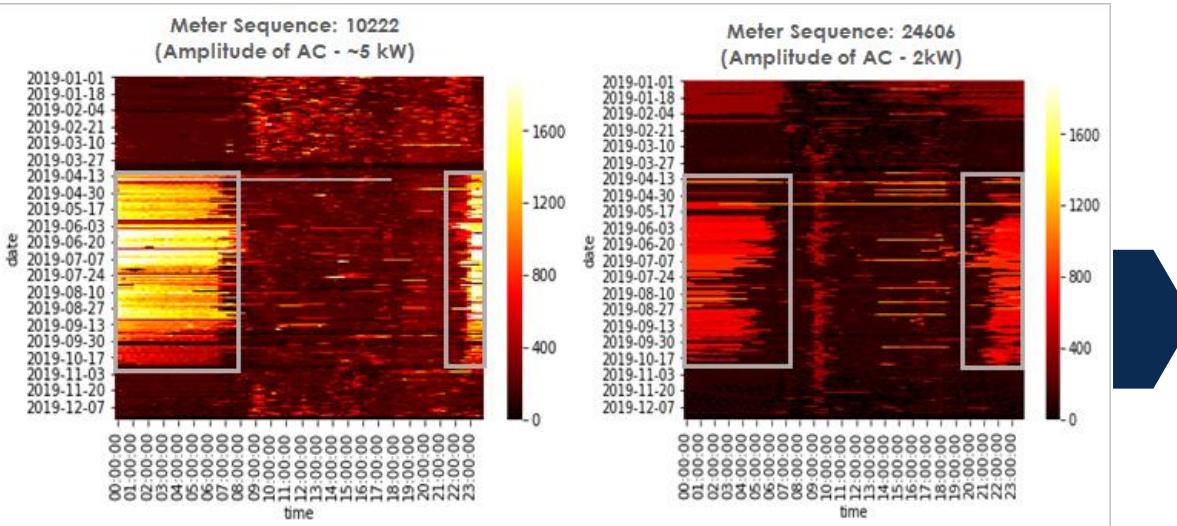
Bidgely also is able to determine the generation output of solar and provide 100% itemization

Extracting EV Usage, Charger Type



ATTRIBUTES	
Power Rating	8.5 kW
TOU	Vector
Charger Type	Level 2
Avg. Commute Distance	53 Miles
Charging Location	Home
Schedule	12am - 3am
# Charge per day	1

Targeting for Inefficient Air Conditioners



Energy Co. 14, Panchsheel Marg

Hi Raj 🙌

Cooling usage

Your Cooling usage last month was 30% inefficient compared to peers.

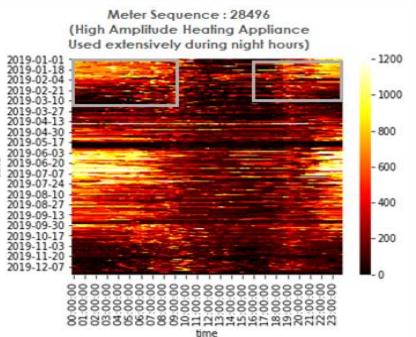
Check out our recommended HVAC Maintenance Plans.

[CLICK FOR MORE INFORMATION](#)

Did you find the content in this email helpful? yes no

Behavioral Nudging for DSM

Targeting Top 10% High Heating usage homes



Energy Co. 14, Panchsheel Marg

Hi Raj 🌟

Heating usage

Your Heating usage last month was 30% inefficient compared to peers.

Check out our recommended HVAC Maintenance Plans.

[CLICK FOR MORE INFORMATION](#)

Did you find the content in this email helpful? yes no

Energy Co. 14, Panchsheel Marg

Hi Anita 🌟

Save ₹230/mo. by shifting your cooling!

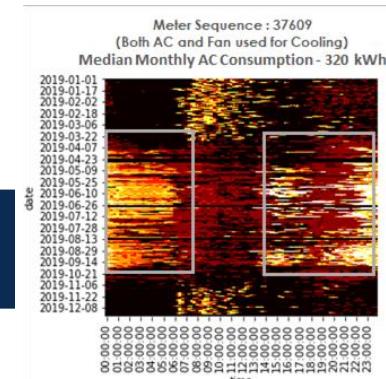
Did you know?

You spent 30% on cooling during 1pm - 6pm last year?

Check all the appliances you can shift to off-peak times.

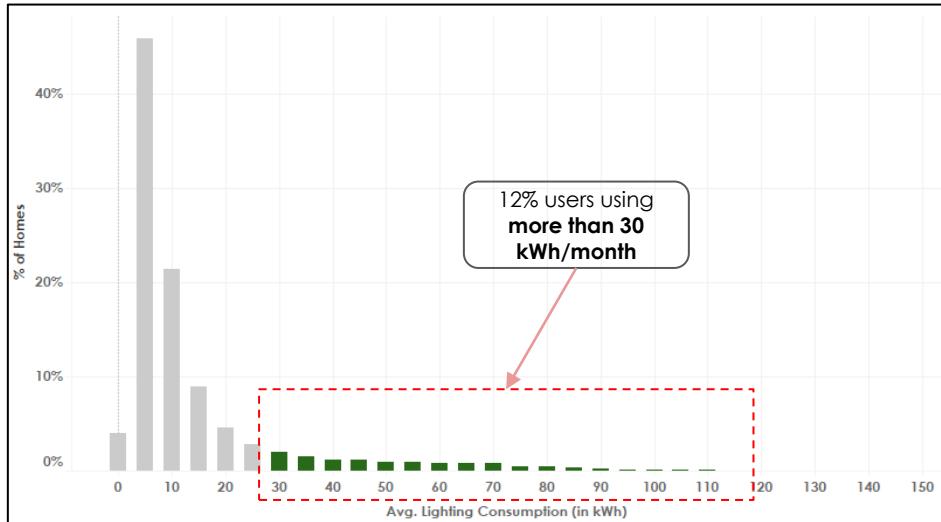
[SEE WHEN YOUR APPLIANCES ARE RUNNING](#)

Did you find the content in this email helpful? yes no

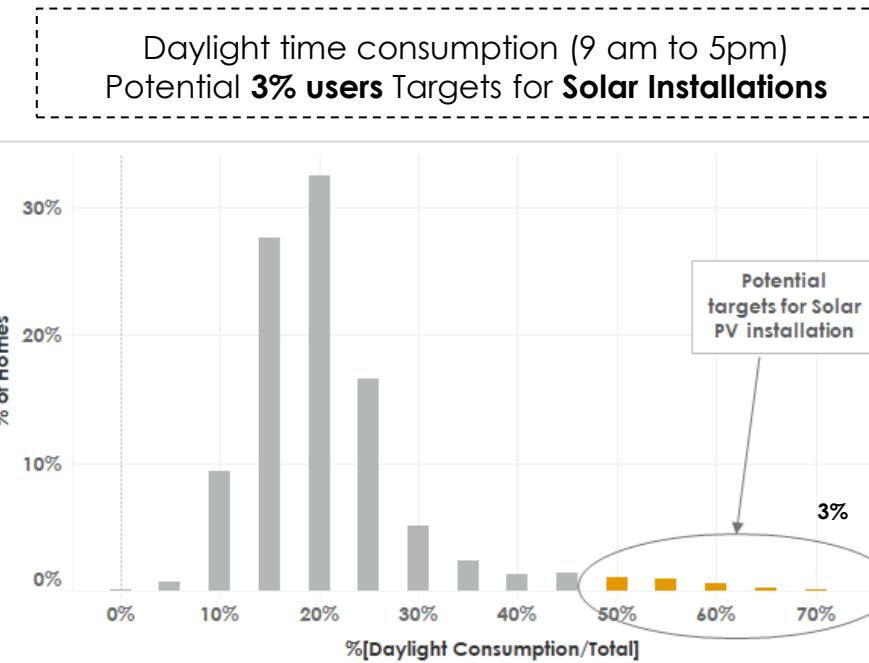


Targeting Top Cooling usage homes

DSM : Targeting for LEDs/Renewables



12% users using
more than 30
kWh/month



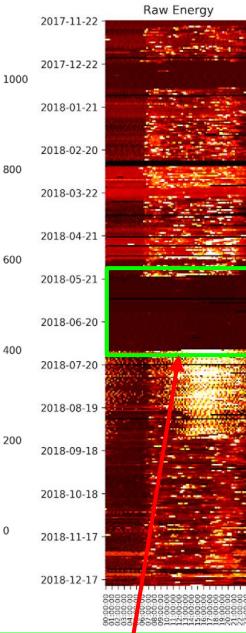
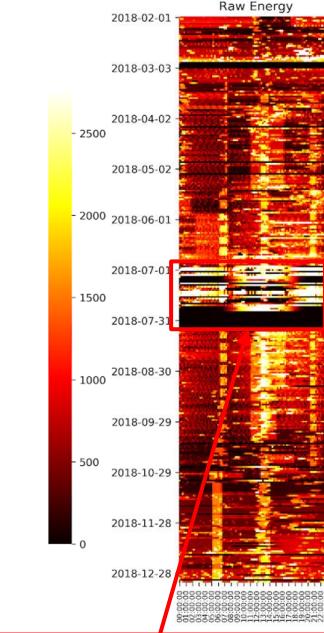
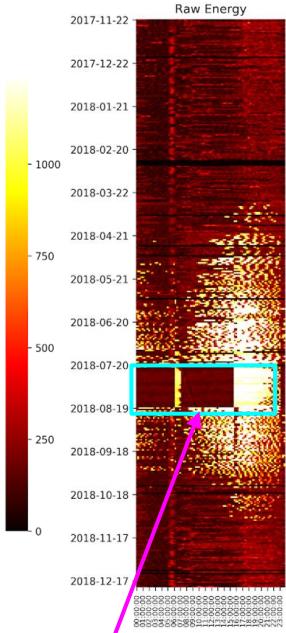
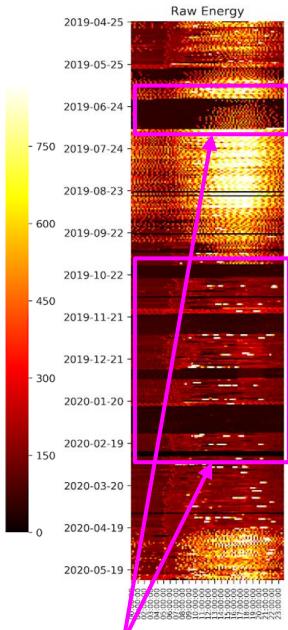
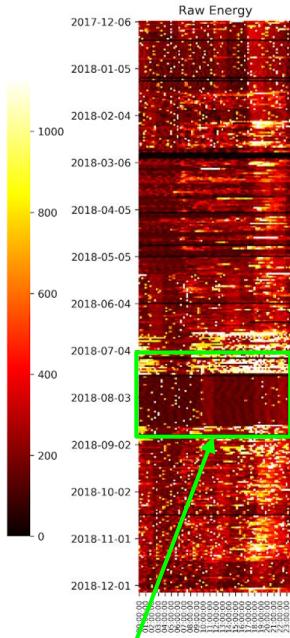
Daylight time consumption (9 am to 5pm)
Potential **3% users** Targets for **Solar Installations**

Potential **12% of users** from a cluster a good target
for replacement of CFLs/Tube Lights to **LEDs**



Protecting Revenue Leakage

ANOMALY DETECTION DRIVING REVENUE PROTECTION



Theft for entire day in AC consumption, during peak season

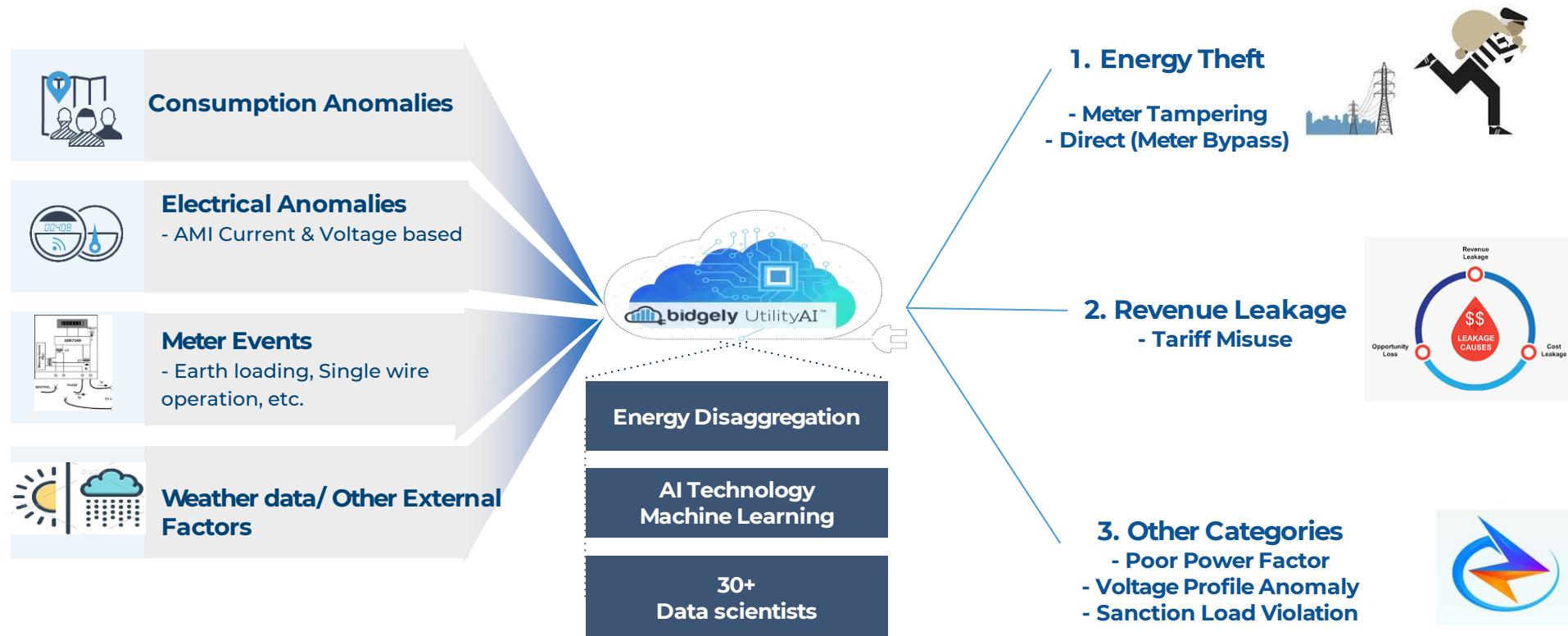
Suspect for theft distributed over most part of year

AC consumption specific theft, for a part of the day

Suspected Intermittent theft over peak summer only

Suspected continuously over long duration

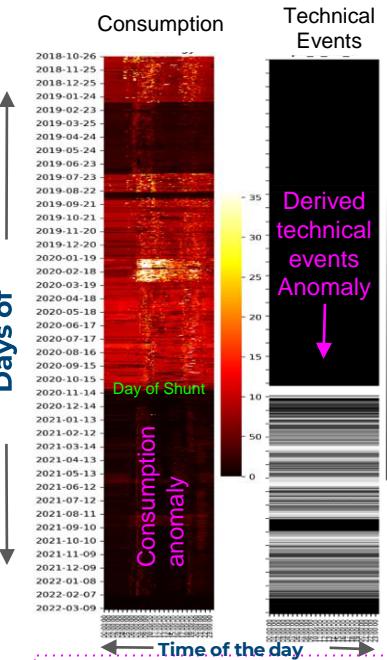
Extracting Anomalies: Revenue Leakage Protection



Theft/ Revenue Leakage Categories

Meter Tampering

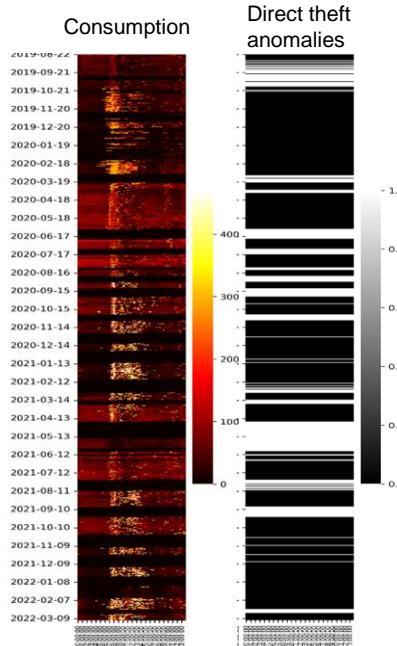
Appendix-1



=
Meter Tampering

Direct Theft

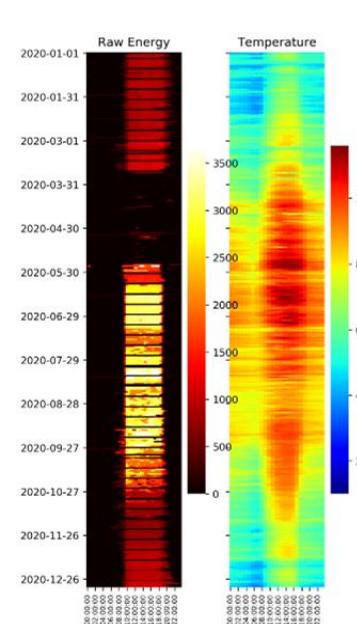
Appendix-2



=
Direct theft

Tariff Misuse

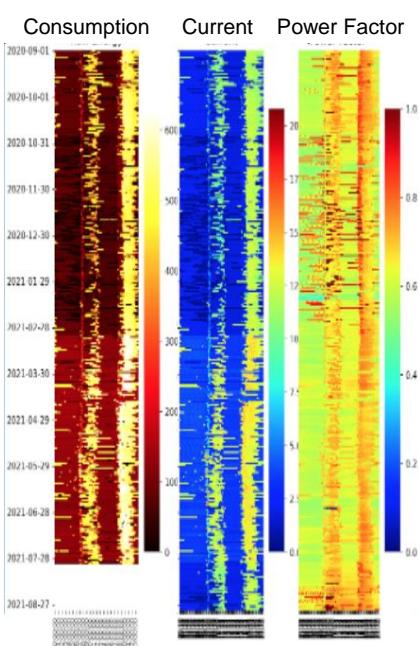
Appendix-3



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Tariff Misuse

Poor Power Factor

Appendix-5





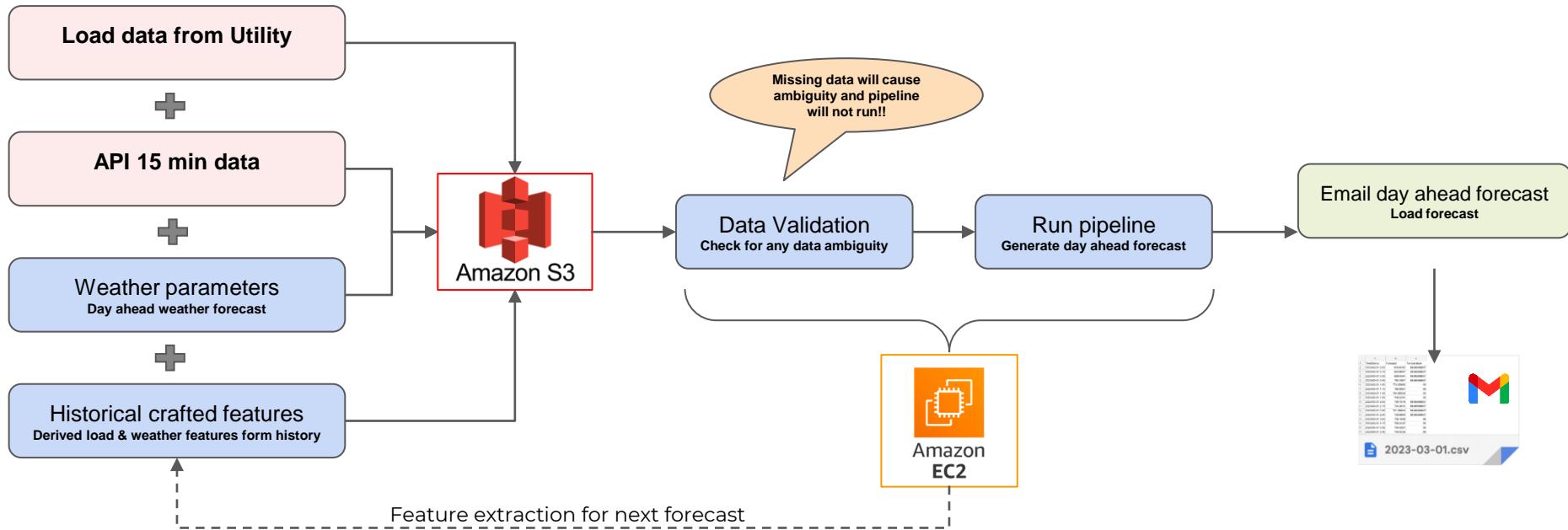
Short Term Load Forecasting

Data Requirements

Requirements	Ideal
Load Data available at	Discom / District / Substation / Feeder / DT / Occupation Level
SCADA data (sector wise load data)	Discom / District
Granularity	5 / 15 / 30 / 60 (min)
Historical Data	4 years
Weather Information	Source currently in use (eg we use weathersource API)
Current/Historical Results of Forecasting by Utility	Benchmarking Results
Technical domain knowledge (if available with the utility)	Area specific Information (segmentation by usage)



Process & Challenges



Project Background

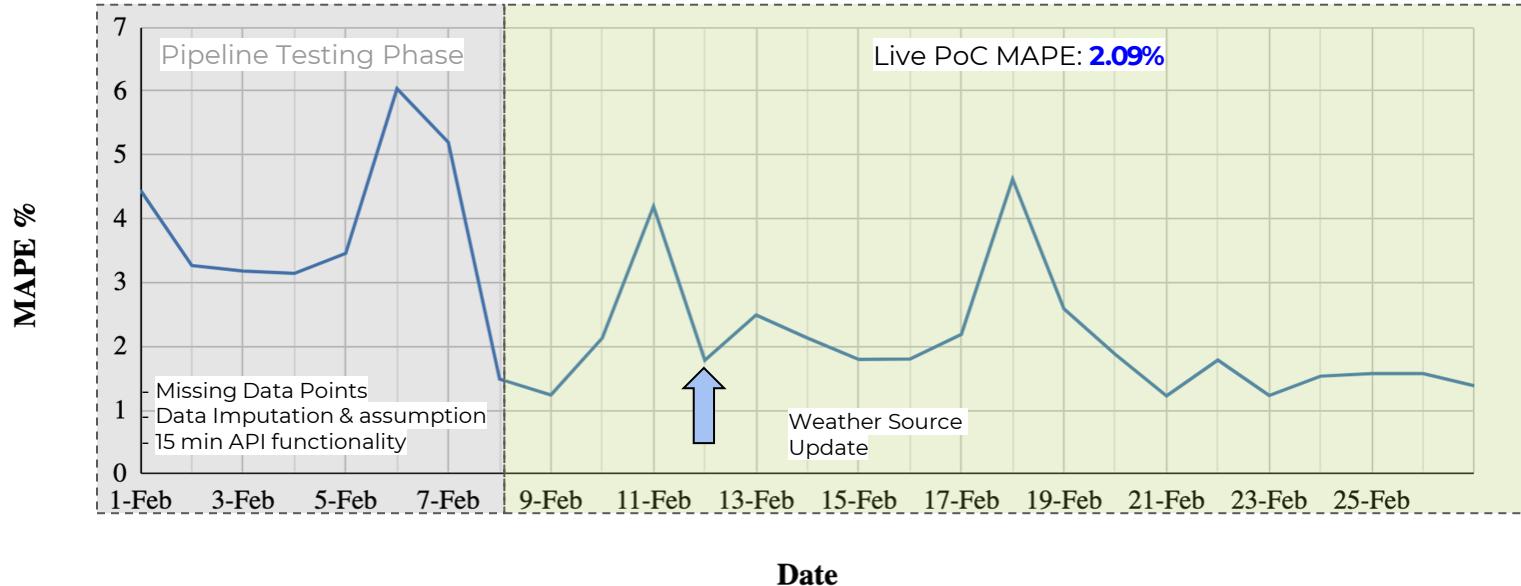
Objective: To use machine learning techniques to predict day ahead energy demand with an improved accuracy vis a vis the techniques/ solutions being used the discom at present.

Data Set Used

- **Data received from the Discom:** Demand data at 15 min interval for 2018, 2019, 2020, 2021
 - District wise load demand for 2020, 2021 at an hourly level.
 - Benchmarking Results:
 - Evening Projections : Hourly level for 2021
 - Morning Projections : 15 min interval for 2021
 - Software Projections** : Nov-21, Dec-21, Jan-22, Feb-22
 - Occupation Details
- **External Data:** analyze the following types of variables:
 - Weather information : 15 Districts
 - Calendar Holidays
 - Social Data

Results Summary

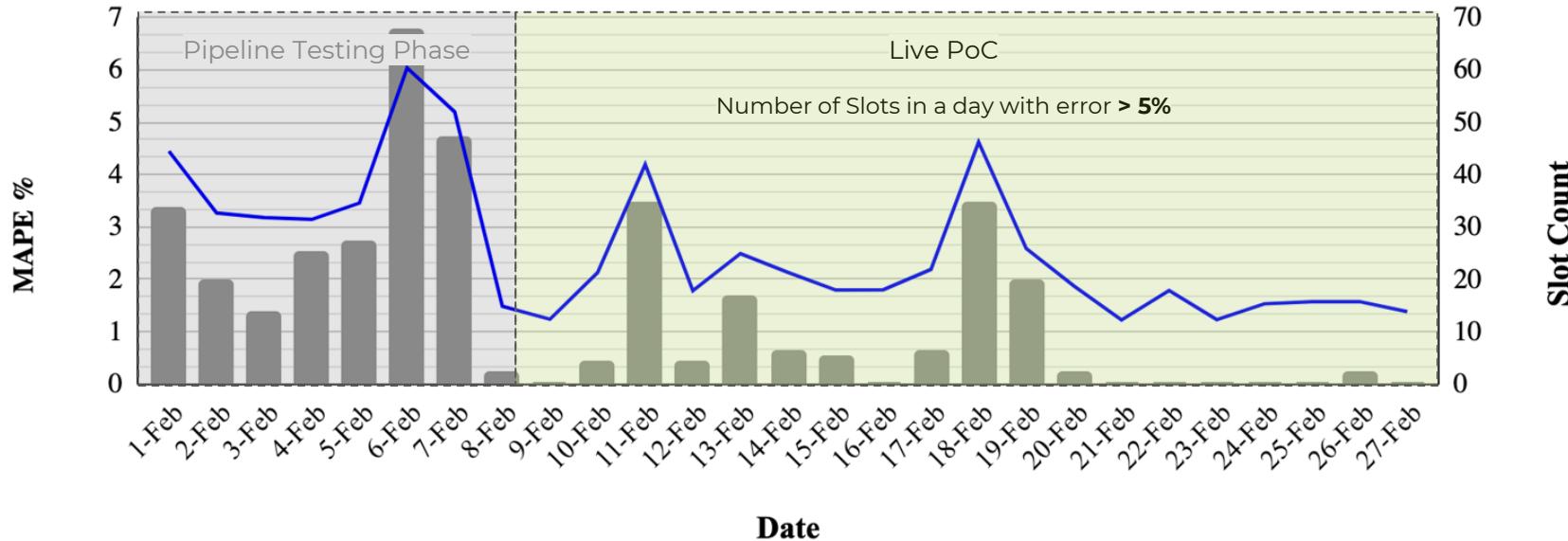
Error Metric: MAPE



- Bidgely's Deep learning model is trained on 4 years of historical demand data.
- MAPE since the pilot is live is 2.09% (< 3%) & **1.77%** excluding outliers.
- High Error on 18th Feb was because of Pattern Change on the occasion of Maha Shivaratri.

High Error Slots

Count of Daily High Error Slots



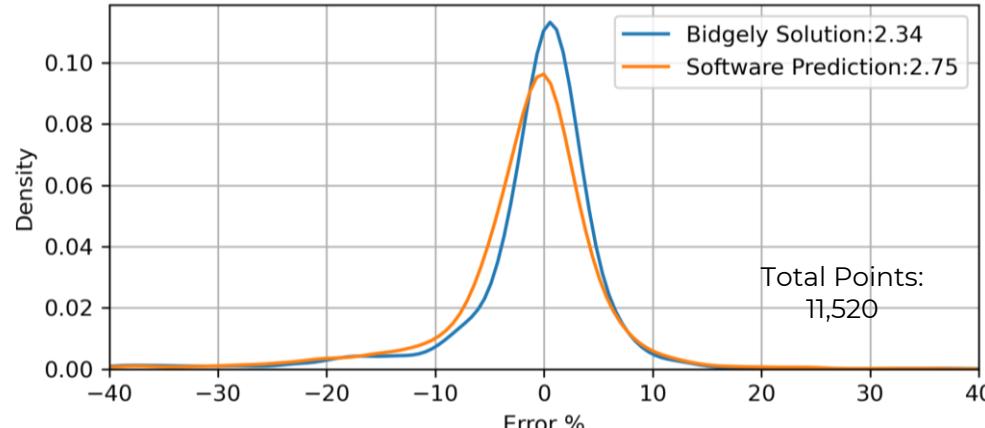
- 4 out of 20 days in the Live PoC have more than 10 slots with error > 5%
- High Error slots are concentrated in the morning time range of 7 AM to 9 AM.
- Domain expertise with recent error trends can reduce this number further.

Results So Far: Higher density around Zero Error

Bidgely's AI based algorithms have shown **higher density of 15-minute data points around zero-error** than shown by the utility software - with more data availability, the accuracy is bound to improve further.

Errors are calculated at each point (15 min)

Error Percent (%) = $\frac{100 * (\text{Actual Load} - \text{Forecasted Load})}{\text{Actual Load}}$



Median MAPE	Nov-21	Dec-21	Jan-22	Feb-22
Bidgely	2.36 ↑	2.32 ↑	3.05 ↑	1.02 ↑
Discom Software	3.34	3.29	3.19	1.53

Lower Absolute error with higher density centered around zero



ANALYTICS WORKBENCH

Increase Customer
Satisfaction

Drive
Strategic
Goals

MAXIMIZING VALUE FROM EXISTING INVESTMENTS

ENTERPRISE ORGANIZATION



**Enterprise Analytics Platform
with Consumer Energy Profiles**



Data Lake and Data Scientists & Analysts



Meter Data Management System



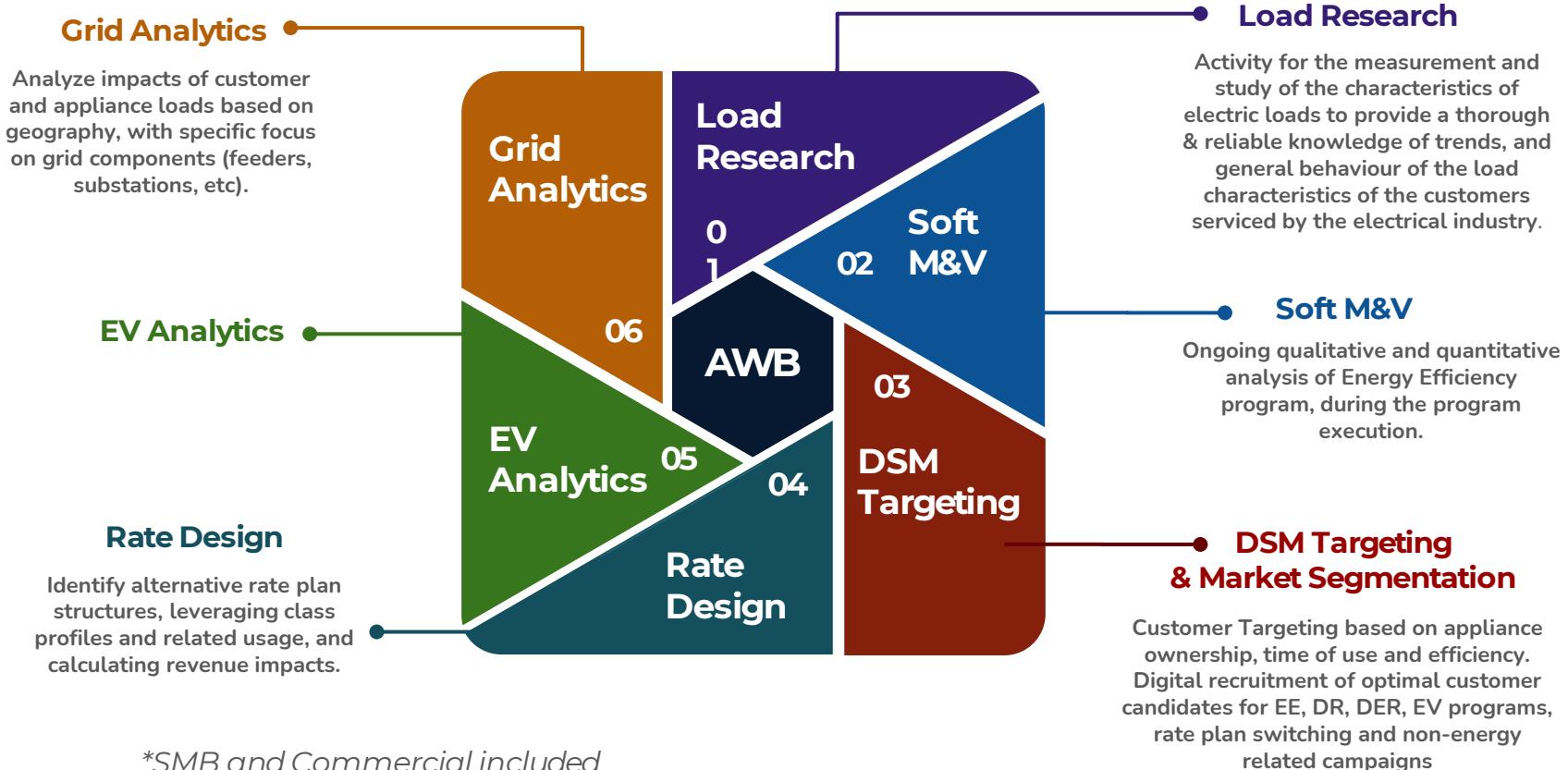
Smart Grid Infrastructure

Tens of Millions/Yr

Millions/Yr

Hundreds of Millions

AWB Business Areas - Use Cases coverage



GRID OPTIMIZATION, DSM TARGETING

Usage

Load Type Usage

Select All / None

- Always On 11%
- Cooling - Central 18%
- Cooling - Room 14%
- Electric Vehicle 2%
- Heating 21%
- Lighting 14%
- Pool Pump - Multi Speed 0.3%

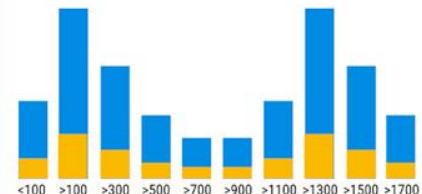
- Pool Pump - Single Speed 0.3%
- Refrigeration 12%



Fuel Type Usage

Select All / None

- Electricity (kWh)
- Gas (Therms)

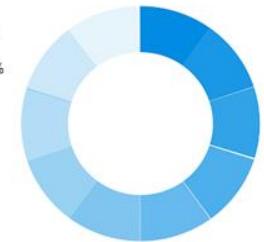


Line Chart

Efficiency

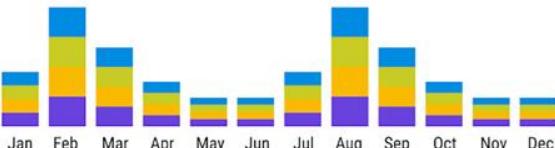
Select All / None

- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%



Monthly Usage

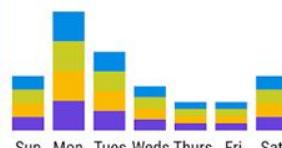
Select All / None



Line Chart

Daily Usage

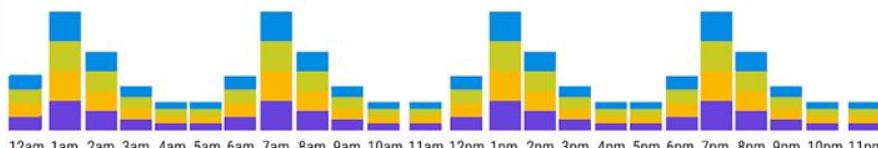
Select All / None



Line Chart

Hourly Usage

Select All / None



Line Chart

Sharpened Grid Planning with accurate insights on load profiles

END USE ANALYSIS

Data Visualization Provided by Bidgely	Data Provided by Bidgely	Questions that can be answered	Possible Use-cases
<p>Data Visualization Provided by Bidgely</p> <p>The visualization cards show electricity consumption data categorized by end-use type. The legend includes: Always On (blue), Cooling (light green), EV (cyan), Lighting (orange), Pool Pump (purple), Refrigeration (red-orange), Space Heater (dark red), Water Heater (light blue).</p> <ul style="list-style-type: none"> Load Type Usage: A donut chart showing the percentage distribution of electricity usage across different categories. The largest segment is Cooling at 77.2%, followed by Always On at 12.3%. Monthly Usage: A stacked bar chart showing total consumption (GWh) over four months (Jun, Jul, Aug, Sep). The bars are stacked by category, with Cooling being the dominant component. Daily Usage: A stacked bar chart showing total consumption (GWh) per day of the week. The bars are stacked by category, showing a similar pattern to the monthly usage. Hourly Usage: A stacked bar chart showing total consumption (GWh) per hour of the day. The bars are stacked by category, showing a clear diurnal pattern with higher consumption during the day and lower at night. 	<p>Data Provided by Bidgely</p> <ul style="list-style-type: none"> Residential & SMB End-Use categories Monthly, Daily, Hourly Heating, Cooling, Always On, Water Heating, Space Heating, Pool Pump, EV, Lighting, Refrigeration, Laundry, Entertainment, Cooking, Solar 	<ul style="list-style-type: none"> What is the end use of electricity? Do different types of customers have different end uses? How does this change in summer/winter? How does usage impact rate design or customer segment for certain programs 	<ul style="list-style-type: none"> Understand end use more granularly (e.g. end use for low income customers, EV owners, seniors) Automate end use reporting - send to rates group

VISUALIZING THE GRID BY DEMAND CAPACITY

Feeders

Search

Show Selected

Sort by Capacity

✓ H23214	205	340
✓ JU2142	274	321 MW
✓ H34213	162	265 MW
✓ N22424	230	250 MW
✓ J21424	210	243 MW
✓ E24421	44	210 MW
✓ J21242	172	188 MW
✓ N23442	134	172 MW
✓ E35634	112	117 MW

Substations

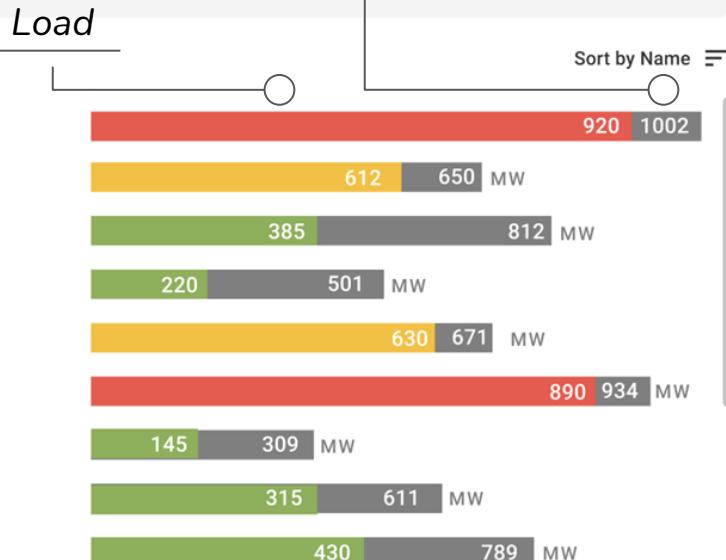
Search

Show Selected

✓ Baker Street 115/13 kV
✓ Bartholomew 115/13 kV
✓ Dartmor 115/13 kV
✓ Eastbourne 115/13 kV
✓ Elm Grove 115/13 kV
✓ Lyceum 115/13 kV
✓ Picardy 115/13 kV
✓ Ward Lock 115/13 kV
✓ Wimpole Street 115/13 kV

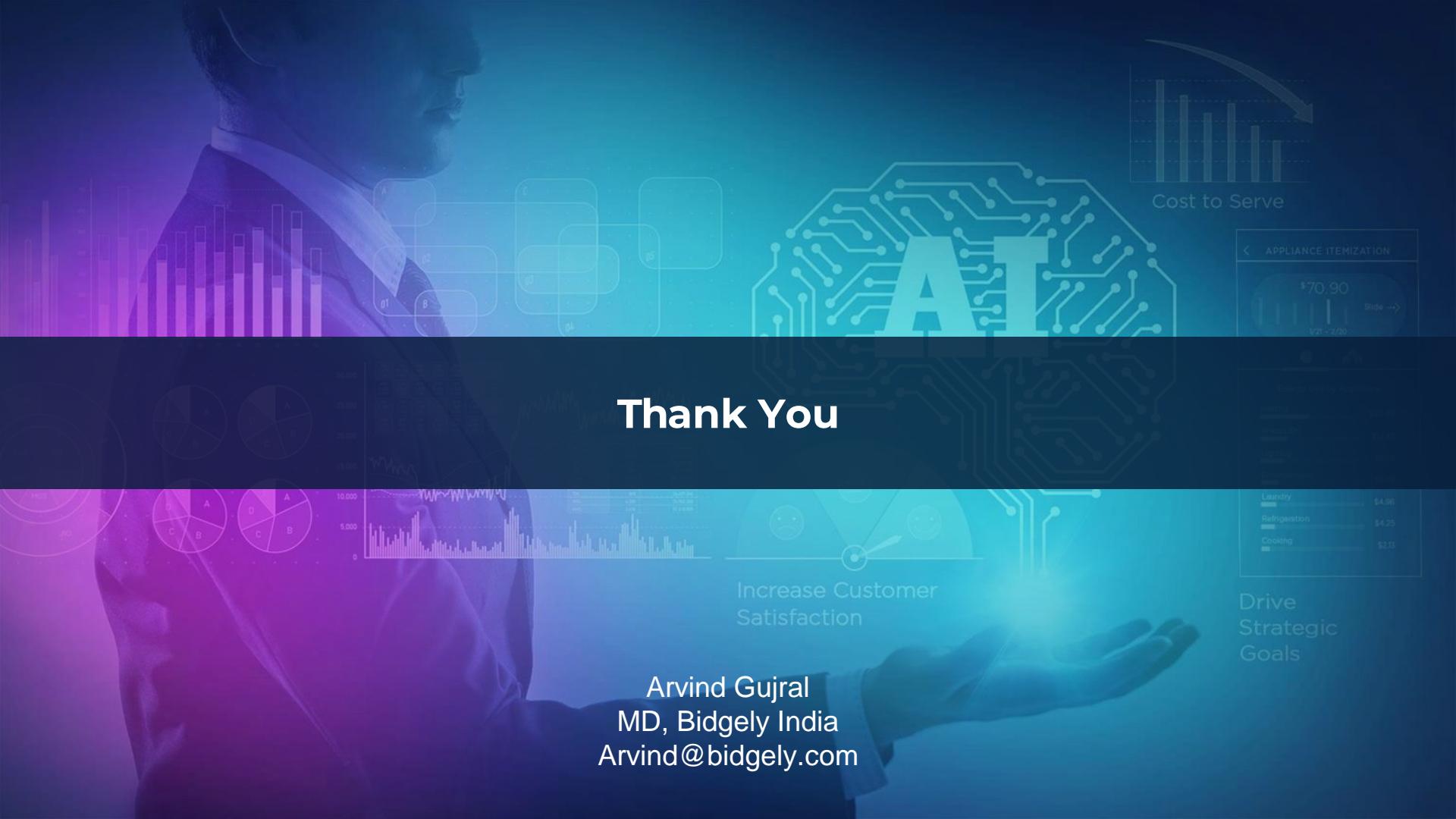
Total Capacity

Load



Analyses for decision support

Possible Use-cases	Questions that can be answered	Data Provided by Bidgely	Data Visualization Provided by Bidgely
<ul style="list-style-type: none">Evaluate NWA based on shiftable load on a feeder/transformerSupport infrastructure investment planning based on non-shiftable loadDesign demand response or demand shift programs based on actual load and projected growth	<ul style="list-style-type: none">What times of peak load cause constraint by grid asset. <u>example:</u> 1 city but only one area has constraints and only at X hoursWhat load is shiftable load with my territory, which is not?	<ul style="list-style-type: none">Identified energy consumption curves with shiftable loads and non-shiftable loads within the gridIdentified peaks with shiftable and non-shiftable loadsIdentified loads such as EV charging, Heating, AC & hot water	<p>Ideal to show 2 load curves</p> <ol style="list-style-type: none">1) Shiftable and non shiftable loads2) Peak with less shiftable loads



Thank You

Increase Customer Satisfaction

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Drive Strategic Goals