

# Realistic, Cost Effective and Useful Artificial Intelligence (AI)



Joel Gilbert, P.E., Chief Software Architect Sydney Roberts, PhD, Technology Director

# APOGEE PRESENTERS



# Sydney Roberts, PhD

**Technical Director** 

Spent years leading research on energy end use and performance models for major home appliances.

Delivers market-leading solutions based on building science and stakeholder engagement expertise.



### Joel Gilbert, P.E.

President, Chief Software Architect

Leads Apogee's accomplished team of engineers, data scientists, analysists, and researchers.

Responsible for applying highest standards of excellence in building science and engineering, applying artificial intelligence and predictive analytics to build strong customer relationships.







### "Moving from anecdotes to analytics!"



# AGENDA



Use Customer Bills for Ongoing Engagement



### Monetize Financial Benefits of Analytics



Use Interval Data for Rate Transformation and Mid-Cycle Alerts



### Expand Value Propositions



# What is Artificial Intelligence (AI)?

"the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages"





# The Imitation Game

### 2014 Story of Alan Turing (1940's)

- Touring created computer that cracked the German encryption: The Enigma Machine
- Puzzle had to be solved every day

**Spoiler Alert:** key step was "training" data set that occurred on Hitler's birthday.

**Standard for AI is the Turing Test** 





# Ex Machina (2014)

Application of a modern Turing Test **Spoiler Alert:** 

- Eva learns she is being tested
- She then tests the tester
- Realizes the consequences
- Takes control





# Al Analysis Improves Targeting





# Key Steps to Near Term Successful Al





# First Pick the Questions then use "Deep Learning"





# Key Steps to Near Term Successful Al

# Measuring devices

# **First Decide:** What do I want to know?

- Relevance to *individual* customers what can they do?
- Alert to replace filters and service air conditioners?
- Where are the inefficient air conditioners?
- How big are they? How much will they save?



# Key Steps to Near Term Successful Al

# Measuring devices

# **Start with:**

- Energy Bills
- Coincident Weathers
- You don't need AMI to work wonders!



### 600,000 Customer Summer Calculated Thermostat Settings



# 600,000 Customer Calculated Heating Setpoints



# **Proactively** Contact Customers

- With inefficient AC (possibly on stressed feeders)
- With gas or propane heat heat pump targets
- Pre-emptively avoid likely high bill complaints
  - Predict their seasonal energy costs
  - Remind them to change filters/service the units
  - Alert them to hot weather events





# **Smith House**

.....

# **Add** Personalized Elements



# **Engaged Customers**

- Add home profile details
- Indicate engagement agenda







# **How Accurate/Serious are Predictions?**

Think about weather forecasts

- Probability of rain tomorrow
- Probability of rain in each hour today

How about COVID-19 tests?

- Test indicates positive – but wrong
- Test indicates negative – but wrong



### Increase Accuracy using Online Self-Serve Online Audit







# **Promote** Electric Vehicles

3) HOW MANY PEOPLE LIVE IN YOUR HOME?						
1111	Num. Occupants:	Saving Tips	Energy Forecast	Bill Analysis Electric Vehicle	My Home	
4) WHAT TYPE OF CAR DO YOU DRIVE?		(Go Back)	Congratulations: your profile is c	ompiete	My Notifications	My Alerts
			Upfront Cost S S S S S S Vou can save money at the gas pump! Switchl carbon a year compared to what you are performed.	ing just one of your cars to an electric vehicle can a dig on gasoline.	Difficulty	os of
Car 1 Type: Car 2 Type: Add Mo	ore Cars		MILES PER DAY: 30	Tell us about your Gas vehicle	COST PER GALLON: \$2.50	
Gas / Diesel        Miles / Day:        Miles / Day:        20        Miles / Gallon:	.60 +			DEFY VAT FOR DE AMA	REW KISSA LEAF YOUR RESULTS Monthly Fuel Cost Pounds of Co <sub>2</sub>	0
25 <b>•</b> 40 <b>•</b>			CHEVY BOLT	Current Cas Vehicle New Electricity Cost New Gasoline Cost Monthly Savings	\$90.00         707           \$27.72         348           \$0.00         0           \$59.53         359	
5) HOW MUCH INSULATION DO YOU HAVE?			238	% OF (	Standard Rate •	•
			This application (	uses your local weather and energy rates. This is only an estimate APOGE INTERACTIVE, INC. & 2020. ALL RIGHTS RESERVED	of your actual energy use.	
Reset Profile Show Analysis	]					

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# **Once Engaged** Add Monthly Bill Analysis

YOUR MONTHLY ELECTRIC COST BREAKDOWN



### Estimated Monthly Electric Use

Bill Date	Avg. Temp	Days	Cooling	Heating	Refrig.	Lights	Cooking	Water Heating	Dish- washer	Clothes Washer	Clothes Dryer	Other Appliance	Actual Bill Total
Sep 19, 2019	83.7 F	31	715	0	110	83	110	398	13	13	94	120	1,748
Aug 19, 2019	82.6 F	29	619	0	103	77	103	350	12	12	88	113	1,627
Jul 19, 2019	82.9 F	32	699	0	114	85	114	410	14	14	97	124	1,854
Jun 19, 2019	82.6 F	30	638	0	107	80	107	386	13	13	91	117	1,790
May 20, 2019	76.7 F	32	372	0	114	85	114	410	14	14	97	124	1,443
Apr 18, 2019	70.7 F	29	125	12	103	77	103	351	12	12	88	113	1,115
Mar 20, 2019	70.0 F	29	114	27	103	77	103	356	12	12	88	113	1,051
Feb 19, 2019	62.1 F	29	17	121	103	77	103	379	12	12	88	113	1,143
Jan 21, 2019	64.8 F	34	49	90	121	91	121	454	15	15	103	132	1,334
Dec 18, 2018	63.0 F	30	69	138	107	80	107	421	13	13	91	117	1,159
Nov 16, 2018	76.4 F	28	320	1	100	75	100	338	12	12	85	109	1,238
Oct 19, 2018	83.9 F	31	727	0	110	83	110	398	13	13	94	120	1,656
Sep 20, 2018	83.1 F	32	711	0	114	85	114	410	14	14	97	124	1,643
Annual Total		364	4,464	389	1,294	972	1,296	4,650	156	156	1,099	1,414	17,158
Monthly Average		30	372	32	108	81	108	388	13	13	92	118	1,430

### Your Monthly Natural Gas Cost Breakdown



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### Your Monthly Estimated Natural Gas Cost by End - Use



	Last Year 04/22/2019	Last Month 03/23/2020	Current 04/21/2020
Avg. Temp	56.5°F	50.2°F	62.6°F
Cost	\$78	\$127	\$60
Therms	66	113	49
Days of Service	28	33	29
Avg. Daily Therms	2	3	2

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# **Relevant** Outbound Messaging





### Mid-month notification



tips and rebates

# Post Audit Messaging – Stay Connected

### View this email in your browser



### Hi John Smith,

Thank you for using our Energy Advisor! There were several programs suggested to help you save based on your personal home profile.

One of these is our **EnergyWise Attic Insulation Program**. You can receive up to \$300 towards upgrading your attic insulation by participating in this program. Learn more...

You can update your profile at any time. <u>Click here</u> to make changes or see more personalized savings tips!



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**Our mailing address is:** 123 Main Street, Atlanta, Georgia

Want to change how you recieve these emails?

View this email in your browser



Did you know you may be eligable for a rebate when you purchase a smart thermostat through our Utility Marketplace? Visit our website at www.utility.com/marketplace and save up to 50% when you purchase a new thermostat.

Use our Programmable Thermostat Calculator to find the best thermostat settings to save energy and money!



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Want to change how you recieve these emails? You can <u>update your preferences</u> or <u>unsubscribe</u> from this list.



# Automated Marketing... Relevant, Timely Engagement Throughout the Year



- Drive TARGETED program participation
- Increased visibility through planned, ongoing customer engagement
- Establishes loyalty, trust, builds Customer Satisfaction

# Personalized Video Messages **Proven** Results:

99% Recipients request *more* videos
97% Rate videos very or somewhat USEFUL
37% Click-thru rates ... 18 *times* Industry Standard
24 to 100 Point increases in JD Power scores
15% Reduction in high bill calls



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# **Add Personalize Elements**



# Expand Agenda

- Mid-Cycle Bill Alert engagement
- Rate Transformation to TOU/Demand



# **One Day – 1 Minute kW Data**



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# **5 Minute kW**



# **15 Minute kW**



# Hourly kW



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# Integer kW



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# Residential Rules of Thumb

- Daily total kWh is generally useful
- TOU bucket data is generally useful
- Hourly data necessary for Demand Rates
- 15 minute data does identify end uses
- Most customers will not read graphs
- Engagement requires outbound and use video













# **Clear** Monetization in Year One

- 15% Reduction in high bill calls to the call center
- 80-90% Reduced frivolous audit costs re high bills
- 25 100 point Increase in JD Power scores
- Improve EE and DR program **targeting** and yields
- **Increase** revenues with your online store
- **Promote** Heat Pumps and EVs
- Explain complex pricing/rate transitions







# SUMMARY



Customer Bills Enable Ongoing Digital Engagement



### You *can* Monetize Advanced Analytics



Interval Data works for Rate Transformation and Mid-Cycle Alerts



### 15% call reductions 25-100 point+ CS



# Any Questions ?



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# Upcoming Webinars **Q**

**MAY - TBA 2020** 

# "Relating New Rates Using Personalized Videos"

by:

Apogee Interactive, Inc.







### Karen Morris, Marketing Manager info@apogee.net 678-684-6801 apogee.net





