Dr. Enes Hosgor

CEO & Founder

Bogotá

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ee·me

/ˈēmē/

noun · an enterprise analytics-as-a-service company based in Pittsburgh.

What is driving Smart Grid Analytics?

Unprecedented AMI adoption	New data sources and stream	Inexpensive cloud resources
Decades of Artificial Intelligence knowledgebase	Evolving regulation	Increasing DER deployment
Increasing reliability needs	Increasing IoT adoption	Reacting to climate change

What data sources can be tapped into?

AMI data	DER data	IoT data
Sensor data	Weather data	Demographic data
Property data	Social network data	Drone imagery

EEme is a proven machine learning platform that transforms smart meter data into appliance-level insights, with up to 99% accuracy, for energy efficiency stakeholders

smart me·ter
/ˈsmärt mēdər/
noun · an electronic device that records granular electric energy consumption and shares this information with utilities.

Utilities collect lots of data

$5B+ invested in smart meters to date (U.S.)

- Unprecedented energy data stream every 15min from each building

Smart meter analytics can empower

- Managing peak energy demand
- Meeting government efficiency mandates
- Improving customer loyalty

EEme's machine learning platform turns existing AMI interval data into appliance-level insights for…

- Energy Efficiency
- Demand Response
- Customer Engagement and Insight
- Utility Operations and Planning

EEme's *Disaggregation-as-a-Service*^{TM} offering supports the utility enterprise ecosystem

"State of the Art" algorithms

- Produces appliance-level energy insights
- Leverages existing smart meter data (no user input or new hardware)
- Accuracy tested in real-life situations

Empowering DSM and customer service

- Targeted DSM marketing and personalized messaging
- Improved customer engagement and conversion
- Resulting in greater energy savings and peak demand reduction

Providing more granular input to the planning process

- Market Potential
- Load Forecasting
- Network Planning

Unique load disaggregation technology validated extensively and certified by 3rd parties

12 deployments in the U.S., Europe and Asia-Pacific

Spun out of Carnegie Mellon University in 2013

Relationships with various utility technology and service providers

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Nobody knows how buildings use energy

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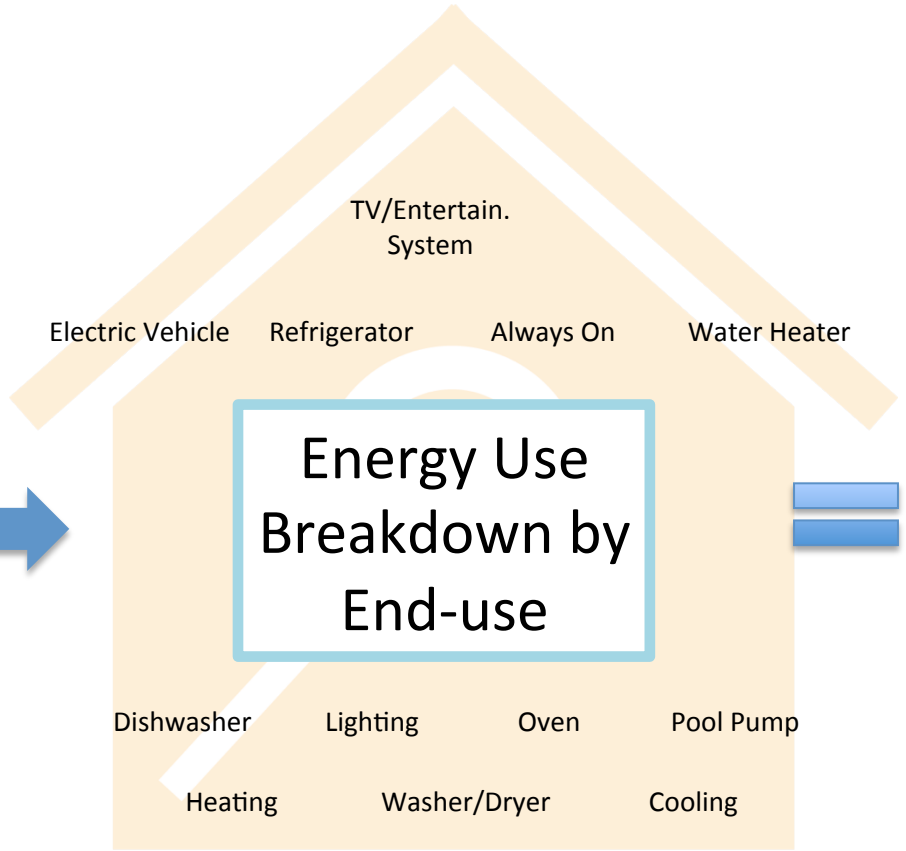
EEme's proven analytics engine requires only 2 inputs to create appliance-level intelligence

Historical Smart Meter Data

- Wattage
- Timestamp

Location Information

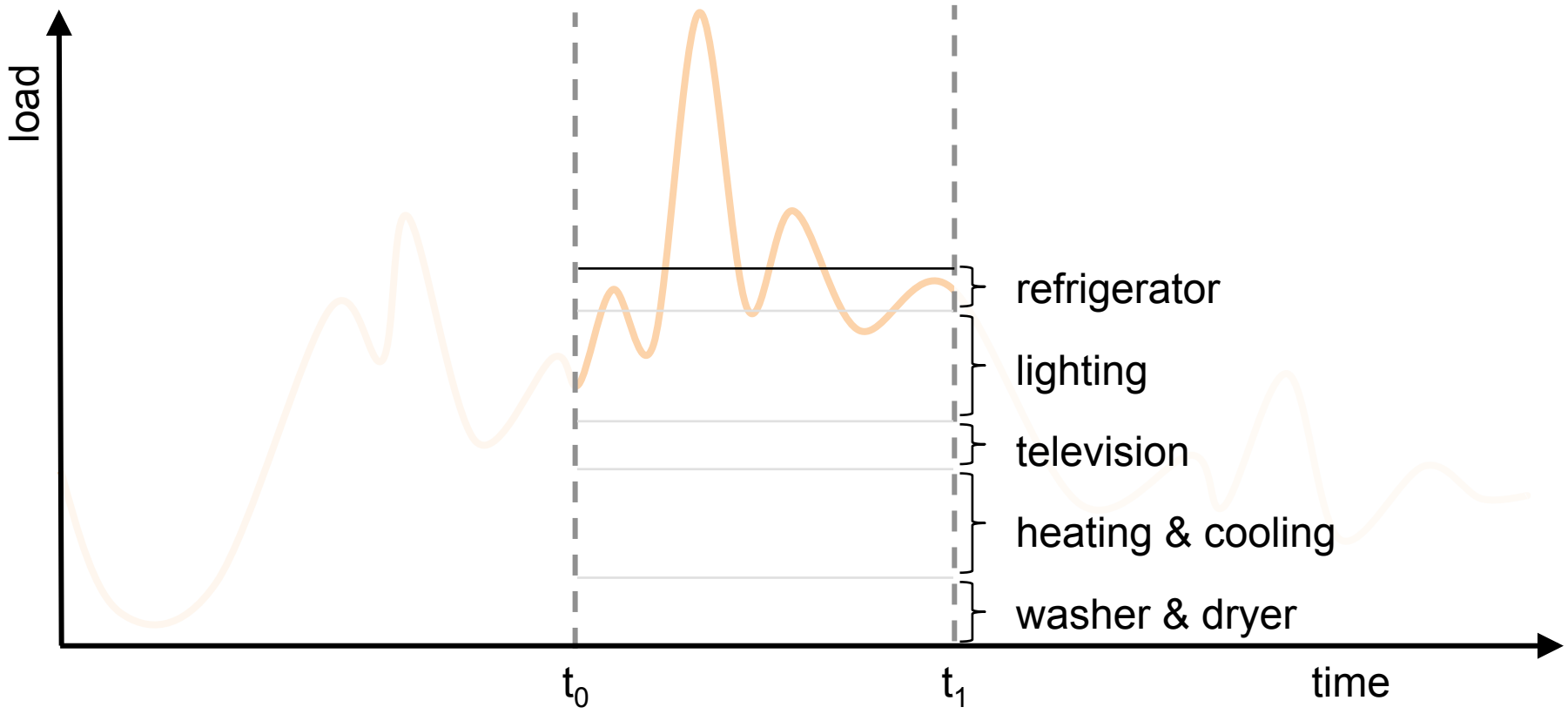
- Weather data



Analytics-as-a-Service API

- Cloud platform
- Per meter per year subscription service

EEme mines for unique appliance signatures using smart meter data



Our analytics engine leverages proprietary appliance libraries across the world

Load isolation

- Probabilistic machine learning models
- Domain-based assumptions

Verification of loads

- Iterative model fitting
- Using historical data

Model completion

- Unique for each home and end-use
- Mine for verified load signatures

EEme's technology supports numerous use cases across the utility enterprise

DSM Program Design	Segmentation and Targeted Marketing	Dynamic EM&V	Customer Profiles
Customer Feedback/Bill Transparency	Customer Service	Demand Response	Appliance Diagnostics
Cost of Service	Forecasting	T&D Planning	Integrated Resource Planning

Example use cases

High Bill Inquiry

- Compare appliance consumption changes between bills
- Delivered in the call center, mobile, web, or outbound email / paper
- Proactive notifications

Behavioral Efficiency and Demand Response

- Provide appliance-level reporting of consumption
- Allow the setting of appliance level consumption and load reduction goals
- Report on progress by appliance

Example use cases (continued)

DSM program marketing and enrollment

- Know who has which appliances and how much they consume
- Market only to the best qualified to participate
- Avoiding wasted mail costs and call center time on unqualified customers
- Validate pre and post consumption at the appliance level

Across the enterprise

- Addressing multiple use cases
- Delivering additional value to multiple applications and business processes
- One answer across many delivery platforms

Example use cases (continued)

Planning and forecasting

- Understand specifics of individual customers consumption rather than apply standard models and extrapolation for market potential studies
- Know who has which appliances and how much they consume by feeder, substation, etc.

Evaluation, Measurement & Verification

- Pre and post consumption
- Leverage highly granular data collection for a subset of customers via the AMI network or a gateway
- A viable alternative to end-use metering studies

Dr. Enes Hosgor
enes@eeme.io
+1 512-706-5054

5888 Ellsworth Avenue, Suite 250, Pittsburgh, PA 15232
www.eeme.io

EEme conducted the only comprehensive and publicly available 3rd party validation in NILM with Pecan Street

Sample size

- 264 homes
- in Austin, TX
- Across 12 months

Input

- AMI data collected in 15min intervals
- Zipcode
- No other input

Output

- HVAC
- Refrigerator
- Dishwasher
- Clothes Dryer

Accuracy

- Absolute Error= (Inferred use – Actual use) / Actual use
- Accuracy = 1 – Absolute Error
- Median accuracy of ~70%

EEme conducted a 1sec validation with Pecan Street

Sample size	Input	Output	Accuracy
10 homes	1sec interval data	HVAC	98%
in Austin, TX	Zipcode	Refrigerator	91%
Across 77 weeks	No other input	Dishwasher	89%
		Clothes Dryer	99%
		Electric Vehicle	95%

Leveraging even more granular data

Smart thermostat data

- Improved disaggregation accuracy
- Predictive HVAC diagnostics

High resolution data (<1min) collection

- Via Gateways, etc.
- Enhanced AMI functionality

New disaggregation capabilities and use cases

- Enhanced accuracy
- Near-real-time results can create new services and offerings
- Dynamic customer feedback
- Appliance diagnostics
- Supporting load control/balancing efforts

Technology and business model differentiation

Technology

- Unprecedented validation
- Uses existing smart meter data
- No new hardware
- No user training
- No additional input data

Business model

- “Intel Inside” for buildings
- Cloud-based API plugs into existing platforms
- Available to all parties
- The platform adds value to existing applications

Our technology is available

Through consultants and program administrators

- Market Potential, Segmentation, Targeting, One-to-One messaging, Evaluation
- Leverage existing smart meters

Embedded in other software applications

- Customer Engagement Portals, MDMS, AMI, CIS, Planning etc.
- Improved customer engagement and energy / demand reductions
- Increased intelligence for customer inquires, bill variance, etc.

Across the enterprise

- Addressing multiple use cases
- Delivering additional value to multiple applications and business processes
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