



- Energy intelligence software and the future of energy management

Two takeaways

- Energy intelligence software is transforming energy management
- Innovative partnership models will accelerate this transformation

The energy industry was static for over 100 years

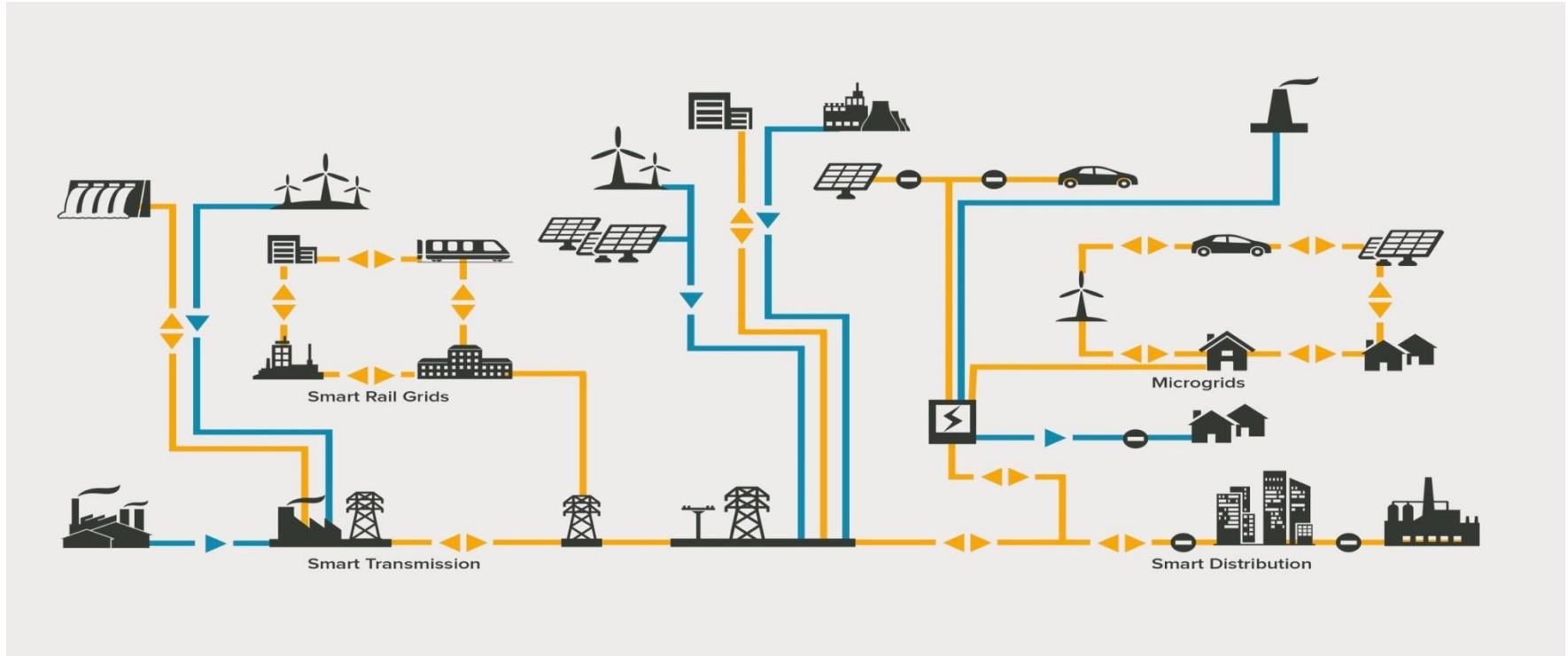


Power grid in
1884

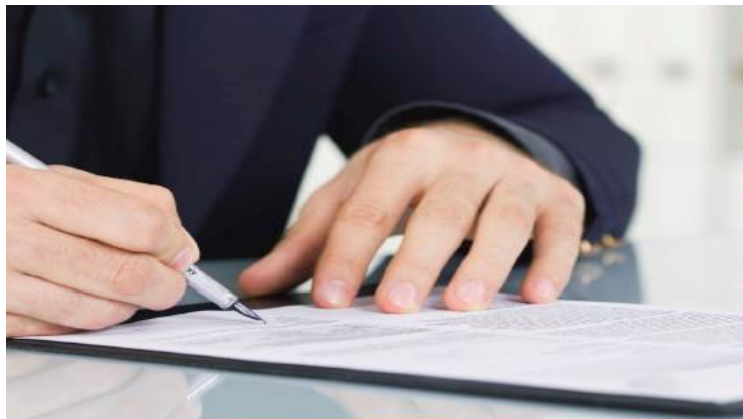


Power grid in
2004

... but that is now changing with new technologies



Consumers now have more choice...



... and businesses have more pressures to manage sustainability performance



...which adds to the complexity of energy management



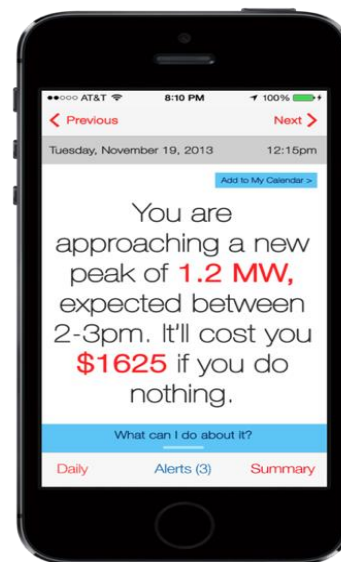
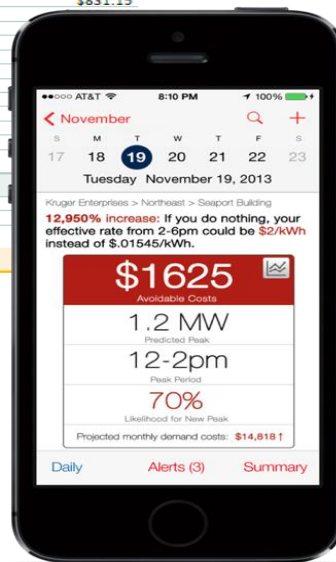
Software is well suited to deal with complexity



Example: making complex tariffs simple

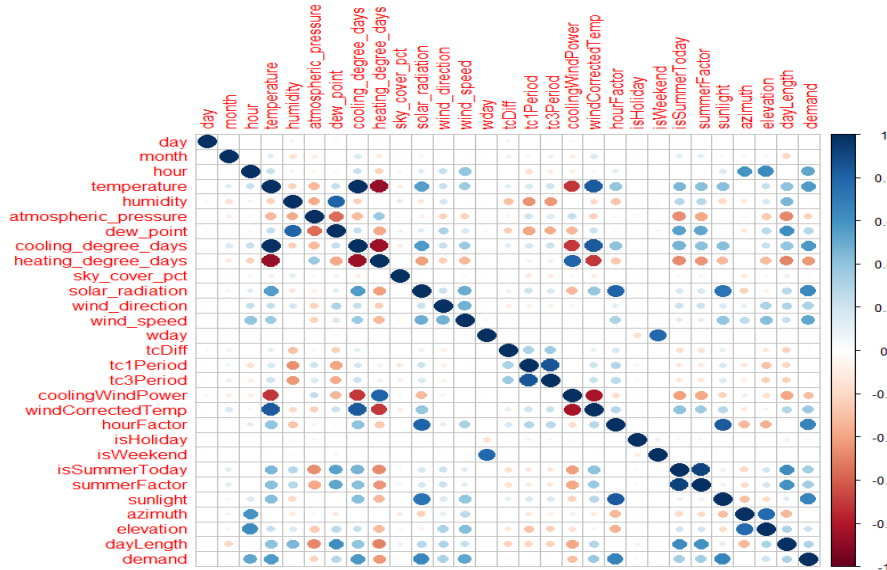
Line charges					
Capacity Charge	217.00 kVA	30 days @	3.689	cents per kVA per day	\$240.15
Demand Charge	178.93 kVA	30 days @	34.033	cents per kVA per day	\$1,826.88
Power Factor Charge	47.89 kVAR	30 days @	32.411	cents per kVAR per day	\$465.65
VariableChg 0700-2200			36,108.19 kWh @	2.367 cents per kWh	\$854.56
VariableChg 2200-0700			14,722.90 kWh @	0.933 cent per kWh	\$137.41
Total line charges					\$3,524.65
Energy charges					
Weekdays (0000 - 0400)	4,054.59 kWh	210.84 kWh losses @	7.053	cents per kWh	\$300.84
Weekdays (0400 - 0800)	9,554.52 kWh	496.84 kWh losses @	8.269	cents per kWh	\$831.15
Weekdays (0800 - 1200)	11,513.18 kWh	598.69 kWh losses @	10.357	cents per kWh	
Weekdays (1200 - 1600)	9,512.53 kWh	494.65 kWh losses @	9.835	cents per kWh	
Weekdays (1600 - 2000)	6,449.89 kWh	335.39 kWh losses @	10.744	cents per kWh	
Weekdays (2000 - 2400)	4,385.65 kWh	228.05 kWh losses @	9.304	cents per kWh	
Weekends (0000 - 0400)	794.04 kWh	41.29 kWh losses @	5.849	cents per kWh	
Weekends (0400 - 0800)	954.65 kWh	49.64 kWh losses @	6.538	cents per kWh	
Weekends (0800 - 1200)	1,078.15 kWh	56.06 kWh losses @	8.629	cents per kWh	
Weekends (1200 - 1600)	972.25 kWh	50.56 kWh losses @	8.159	cents per kWh	
Weekends (1600 - 2000)	795.22 kWh	41.35 kWh losses @	8.915	cents per kWh	
Weekends (2000 - 2400)	766.42 kWh	39.85 kWh losses @	7.734	cents per kWh	
Total energy charges	50,831.09 kWh	2,643.21 kWh losses			
Other charges					
Administration Charge		30 days @	3.980	dollars per day	
Electricity Authority Levy		53,474.30 kWh @	0.117	cent per kWh	
Total other charges					
Total charges					

From complex bill...



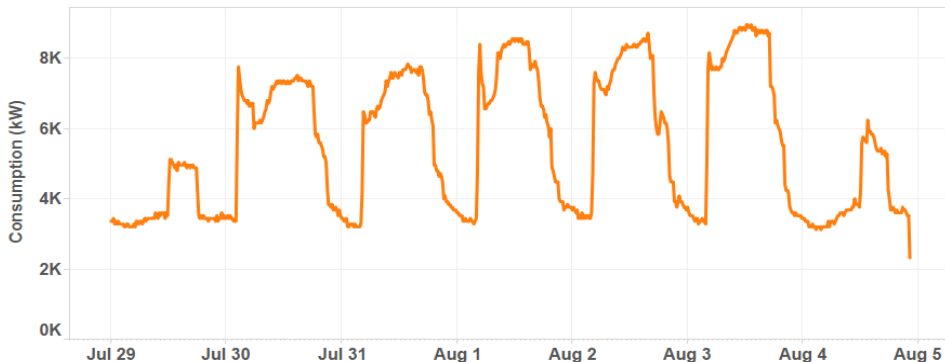
... to actionable insight

Predicting peaks by identifying the strongest correlations



- 9 attributes have the greatest influence on the prediction model
- Examples include temperature, solar radiation, and hour of day

Combining electricity prediction with tariffs



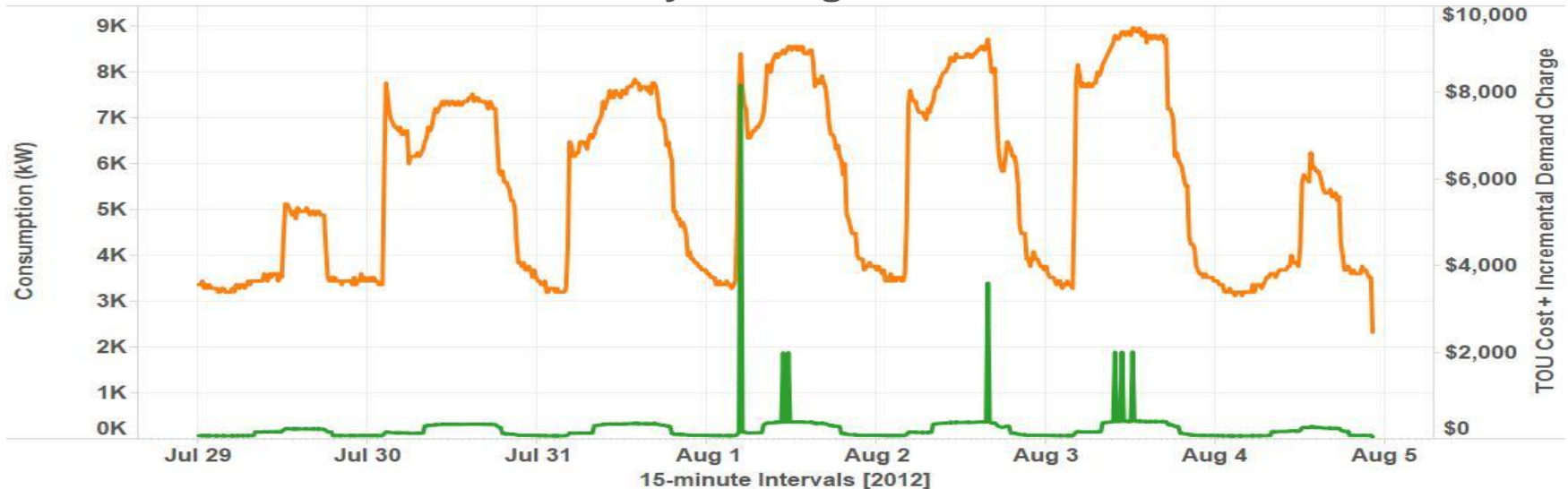
Tariff Name	PDF (KB)	Title
A-1	PDF	Small General Service
A-6	PDF	Small General Time-of-Use Service
A-10	PDF	Medium General Demand-Metered Service
A-15	PDF	Direct-Current General Service
AG-1	PDF	Agricultural Power
AG-4	PDF	Time-of-Use Agricultural Power
AG-5	PDF	Large Time-of-Use Agricultural Power
AD-ICE	PDF	Agricultural Internal Combustion Engine Conversion Incentive Rate
AG-R	PDF	Split Wheel Time-of-Use Agricultural Power
AG-V	PDF	Short-Peak Time-of-Use Agricultural Power
CCA-CRS	PDF	Community Choice Aggregator Cost Responsibility Surcharge (Station)
DA-CRS	PDF	Direct Access Cost Responsibility Surcharge
E-1	PDF	Residential Services
E-6	PDF	Residential Time-of-Use Service
E-7	PDF	Residential Time-of-Use Service
E-8	PDF	Residential Seasonal Service Option
E-9	PDF	Experimental Residential Time-of-Use Service for Low Emission Vehicle Customers
E-10	PDF	Medium General Demand-Metered TOU Service
E-20	PDF	Service to Customers with Maximum Demands of 1000 kilowatts or More
E-31	PDF	Distribution Bypass Deferral Rate
E-37	PDF	Medium General Demand-Metered Time-of-Use Service to Oil & Gas Extraction Customers
E-AMIS	PDF	Equipment Access to Meter Data Services
E-BP	PDF	Basic Intervention Program
E-CARE	PDF	CARE Program Service for Qualifying Group Living & Qualified Agricultural Employee Housing Facilities
E-CBP	PDF	Capacity Bidding Program
E-CCA	PDF	Services to Community Choice Aggregators
E-CCANFO	PDF	Information Release to Community Choice Aggregators
E-CHP	PDF	Combined Heat and Power PPA
E-CHPS	PDF	Combined Heat and Power Simplified PPA
E-CHPSA	PDF	Combined Heat and Power Simplified Under 500 kW PPA
E-CREDIT	PDF	Revenue Code Services Credits
E-CSAC	PDF	Commercial Smart AC Program
E-CASR	PDF	Direct Access Services Request Fees
E-OBP	PDF	Demand Bidding Program
E-ODD	PDF	Departing Customer Generation CG
E-DEPNT	PDF	Departing Customers
E-ERA	PDF	Energy Rate Adjustments
E-ESP	PDF	Services to Electric Service Providers
E-ESPNDP	PDF	Electric Service Provider Non-Discretionary Service Fees
E-EUS	PDF	End User Service
E-ERA	PDF	Family Electric Rate Assistance
E-FFS	PDF	Franchise Fee Surcharge
E-LORIS	PDF	Limited Optional Remote Metering Service
E-LRAO	PDF	Local Resources Advisory Obligations During Direct Access Reopening

E-AMCL	PDF	New Municipal Departing Load
E-NMCL	PDF	New WAPA Departing Load
E-OBP	PDF	On Bill Financing Loan Program
E-OBMC	PDF	Optional Billing Mandatory Cutoff/Plan
E-PVF	PDF	Section 399.20 PPA
E-REMAT	PDF	RENEWABLE MARKET ADJUSTING TARIFF (REMAT)
E-RSAC	PDF	Residential Smart AC Program
E-RSMART	PDF	Residential SmartRate Program
E-SGL	PDF	Split Wheeling Departing Load
E-GLRP	PDF	Scheduled Load Reduction Program
E-GOP	PDF	Residential Electric SmartMeter(TM) Opt-Out Program
E-SRG	PDF	Small Renewable Generator PPA
E-TMCL	PDF	Transferred Municipal Departing Load
ED	PDF	Experimental Economic Development Rate
EDR	PDF	Economic Development Rate
EE	PDF	Service to Company Employees
EL-1	PDF	Residential CARE Program Service
EL-4	PDF	Residential CARE Program Time-of-Use Service
EL-7	PDF	Residential CARE Program Time-of-Use Service
EL-8	PDF	Residential Seasonal CARE Program Service Option
EM	PDF	Master Metered Multifamily Service
EM-TOU	PDF	Residential Time-of-Use Service
EMC	PDF	Master Metered Multifamily CARE Program Service
EMC-TOU	PDF	Residential CARE Program Time-of-Use Service
ES	PDF	Multifamily Service
EBL	PDF	Multifamily CARE Program Service
ESR	PDF	Residential RV Park and Residential Marina Service
ESRL	PDF	Residential RV Park and Residential Marina CARE Program Service
ET	PDF	Mobilityhome Park Service
ETL	PDF	Mobilityhome Park CARE Program Service
EV	PDF	RESIDENTIAL TIME-OF-USE SERVICE FOR PLUG-IN ELECTRIC VEHICLE CUSTOMERS
LS-1	PDF	PG&E-Owned Street and Highway Lighting
LS-2	PDF	Customer-Owned Street and Highway Lighting
LS-3	PDF	Customer-Owned Street and Highway Lighting Electrical Meter Rate
NEM	PDF	Net Energy Metering Service
NEMBO	PDF	Net Energy Metering Service for Biogas Customer-Generator
NEMCOF	PDF	Schedule NEMCOF- Net Energy Metering Service For City and County of San Francisco Municipal Load Served By Health-Held City-Site Photovoltaic Generating Facilities
NEMFC	PDF	Net Energy Metering Service for Fuel Cell Customer-Generators
NEMV	PDF	Virtual Net Energy Metering for a Multi-Tenant or Multi-Meter Property Served at the Same Service Delivery Point
NEMVASH	PDF	Virtual Net Energy Metering For Multifamily Affordable Housing (MASH-EMV) With Solar Generators
OL-1	PDF	Outdoor Area Lighting Service
RES-BCI	PDF	Schedule for Local Government Renewable Energy Self-Generation Bill Credit Transfer
S	PDF	Standby Service
TBCC	PDF	Transition Bundled Commodity Cost
TC-1	PDF	Traffic Control Service

Over 90 tariff types for one utility!

Demand prediction + tariff = cost prediction

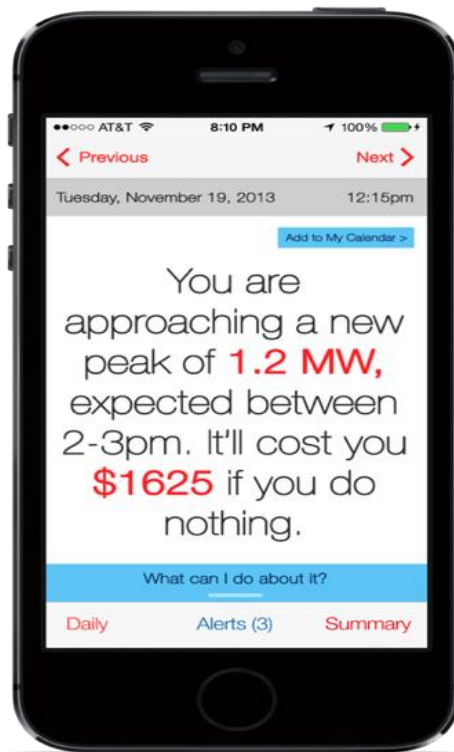
(Time-of-Use + Incremental Demand Charge Cost) vs. Consumption
July 19-August 5



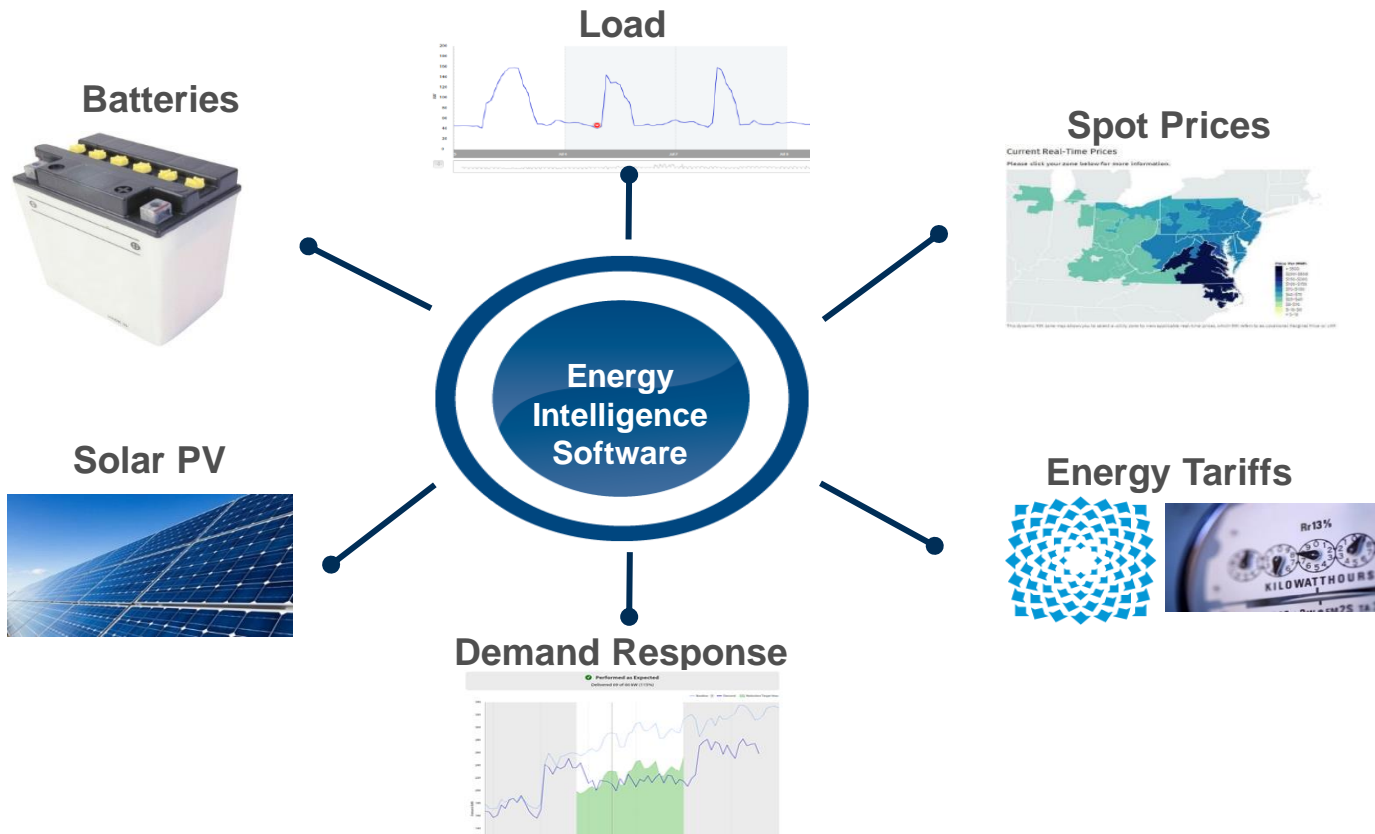
Measure Names

- Consumption (kW)
- TOU Cost + Incremental Demand Cha

The end result: simple, actionable insights



The next frontier: prescriptive optimisation analytics



Energy intelligence software is a new software category



EIS addresses all three cost drivers of energy

Not all kilowatts are created equal.



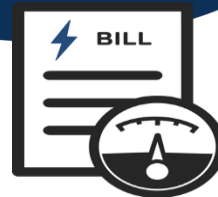
When you use it

How you buy it

How much you use



Buying energy isn't as simple as paying a monthly bill.



The cheapest kilowatt hour is the one you don't use.

Partnerships are key to addressing customer needs



Integration Partners



Consulting Partners



Predictive Partners



ISV Partners



Leading Information Providers Across Every Industry

Partnerships are key to addressing customer needs



Consulting Partners



Hardware & Controls



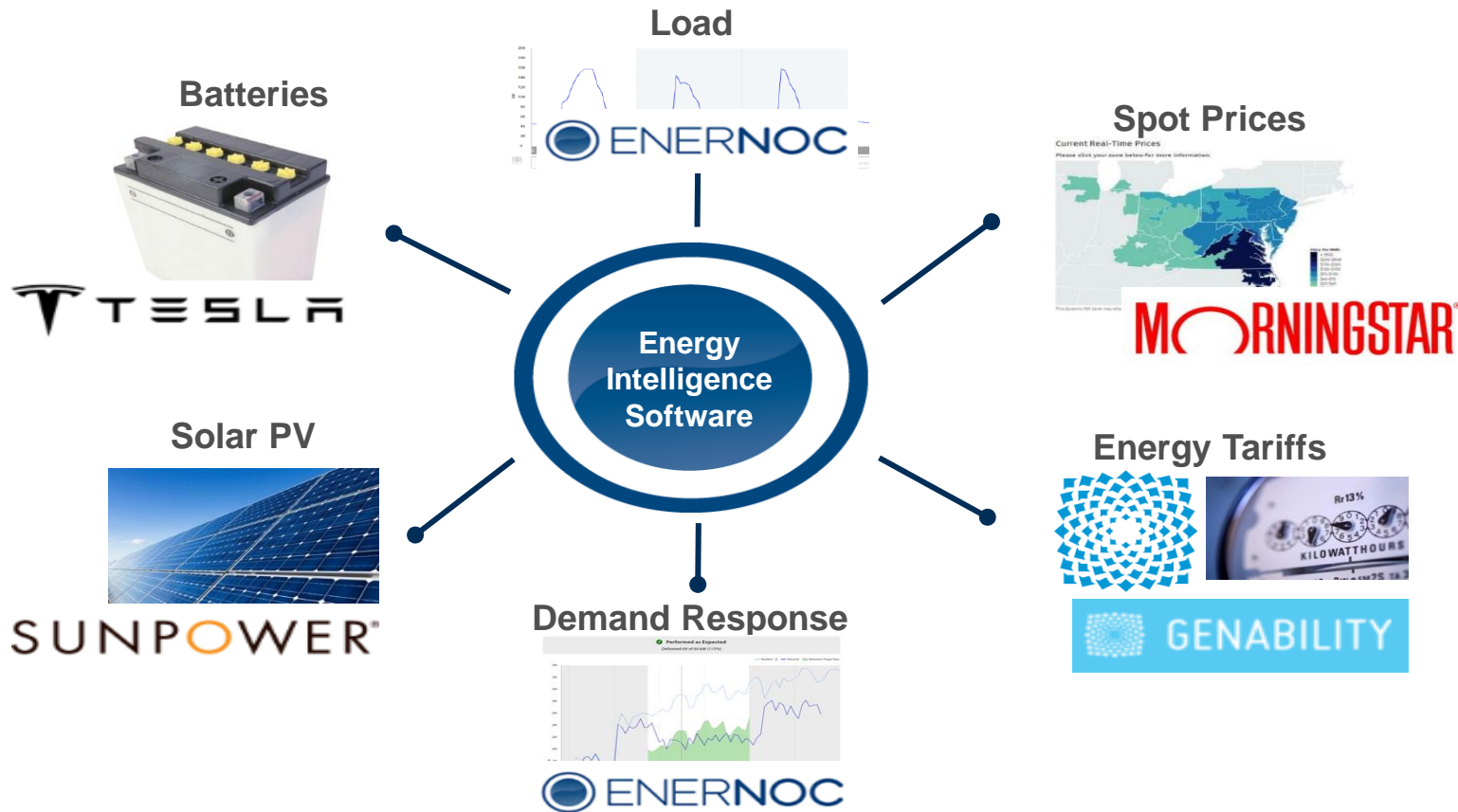
Distributed Energy Resources



Software Partners



Moving from point solutions to integrated EIS solutions



In conclusion

- Businesses have more choice than ever before
- They also face more pressures than ever before
- This duality creates complexity for businesses
- Software is well suited to deal with complexity
- EIS will transform energy management
- Partnerships will accelerate this transformation



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