CONNECTIONS SUMMIT

The Real Game Changer in Energy…

Tim Fairchild
Director, SAS Global Energy & Communications Practice

ELECTRICITIES of NORTH CAROLINA, INC.

HOOVER INSTITUTION MITei
GAME CHANGERS

Article
McKinsey Quarterly
April 2017

Three game changers for energy

By Nikhil Patel, Thomas Seitz, and Kassia Yanosek

New sources, mobility, and industry fragmentation are set to disrupt the system.

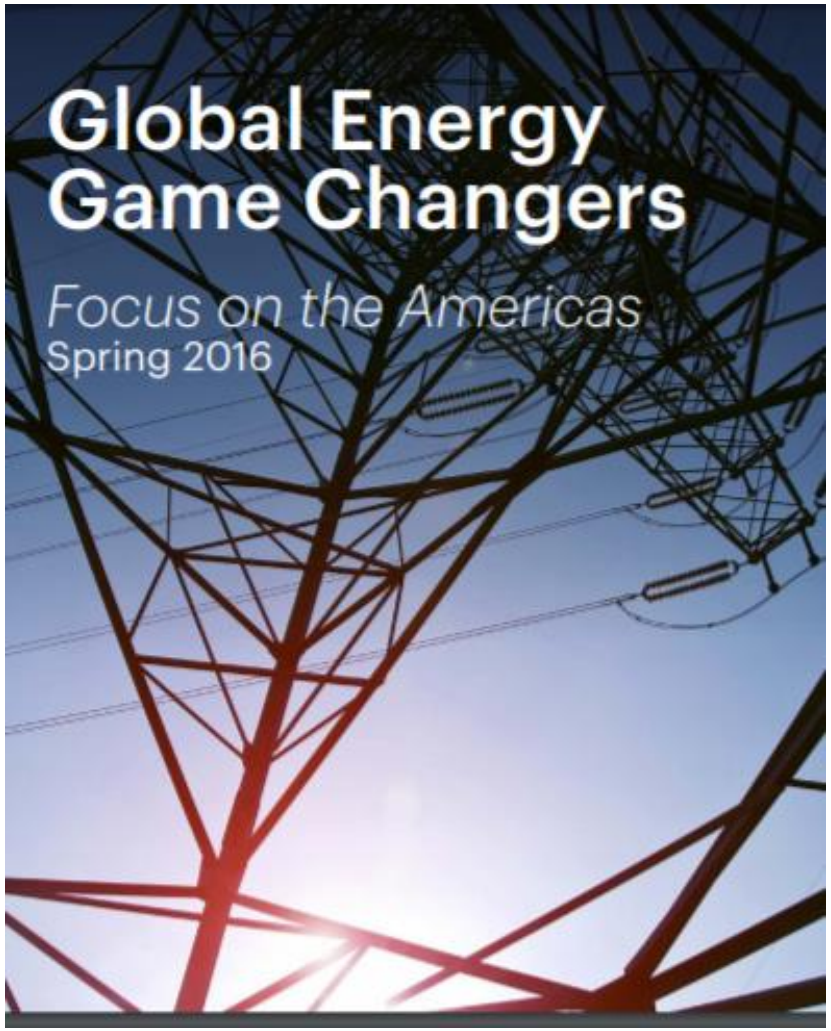
WORLD ECONOMIC FORUM

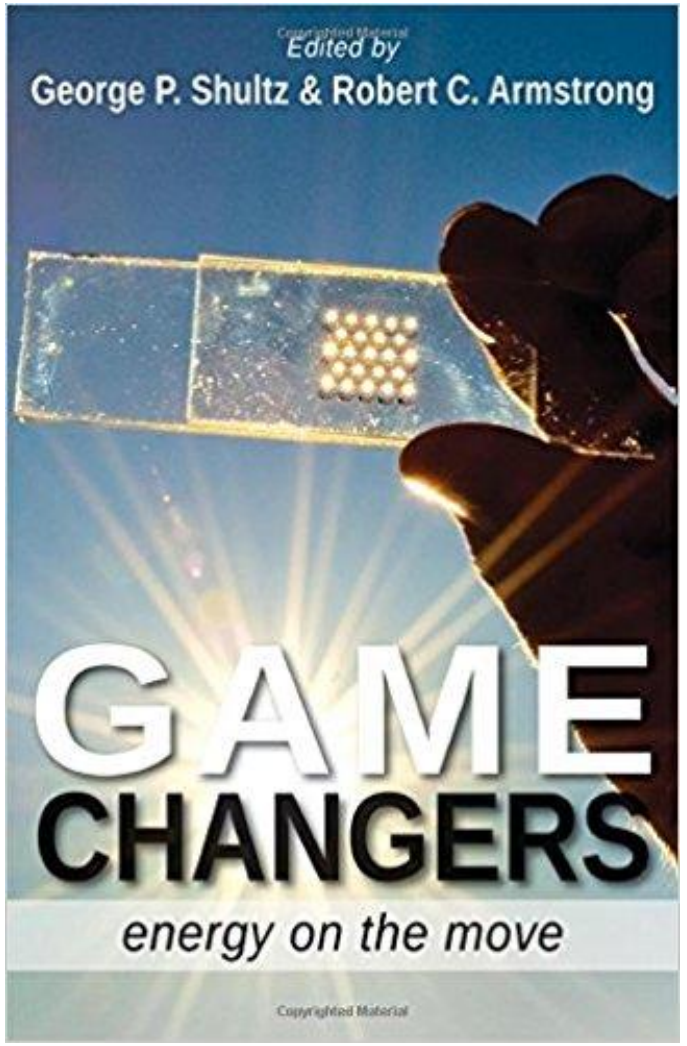
COMMITTED TO IMPROVING THE STATE OF THE WORLD

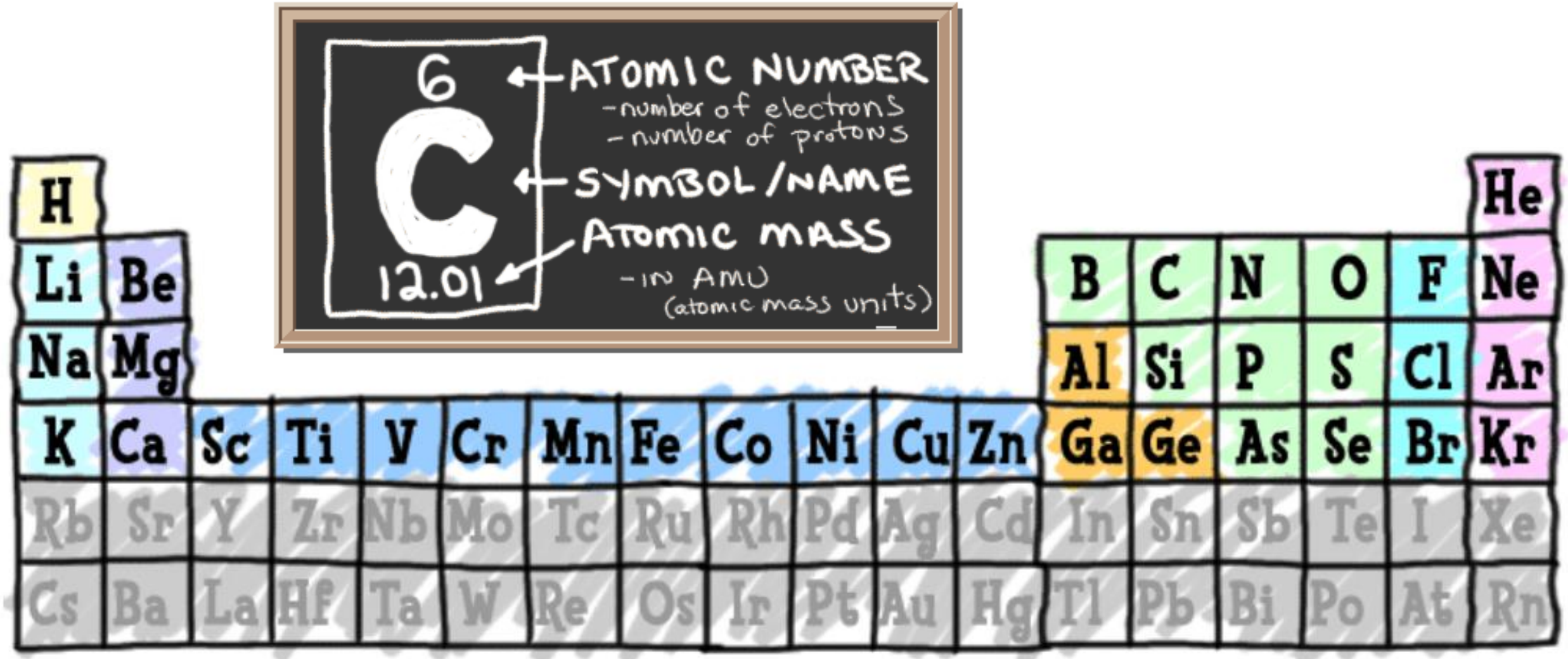
White Paper

Game Changers in the Energy System

Emerging Themes Reshaping the Energy Landscape


Global Energy
Game Changers
Focus on the Americas
Spring 2016


Edited by
George P. Shultz & Robert C. Armstrong
GAME
CHANGERS
energy on the move

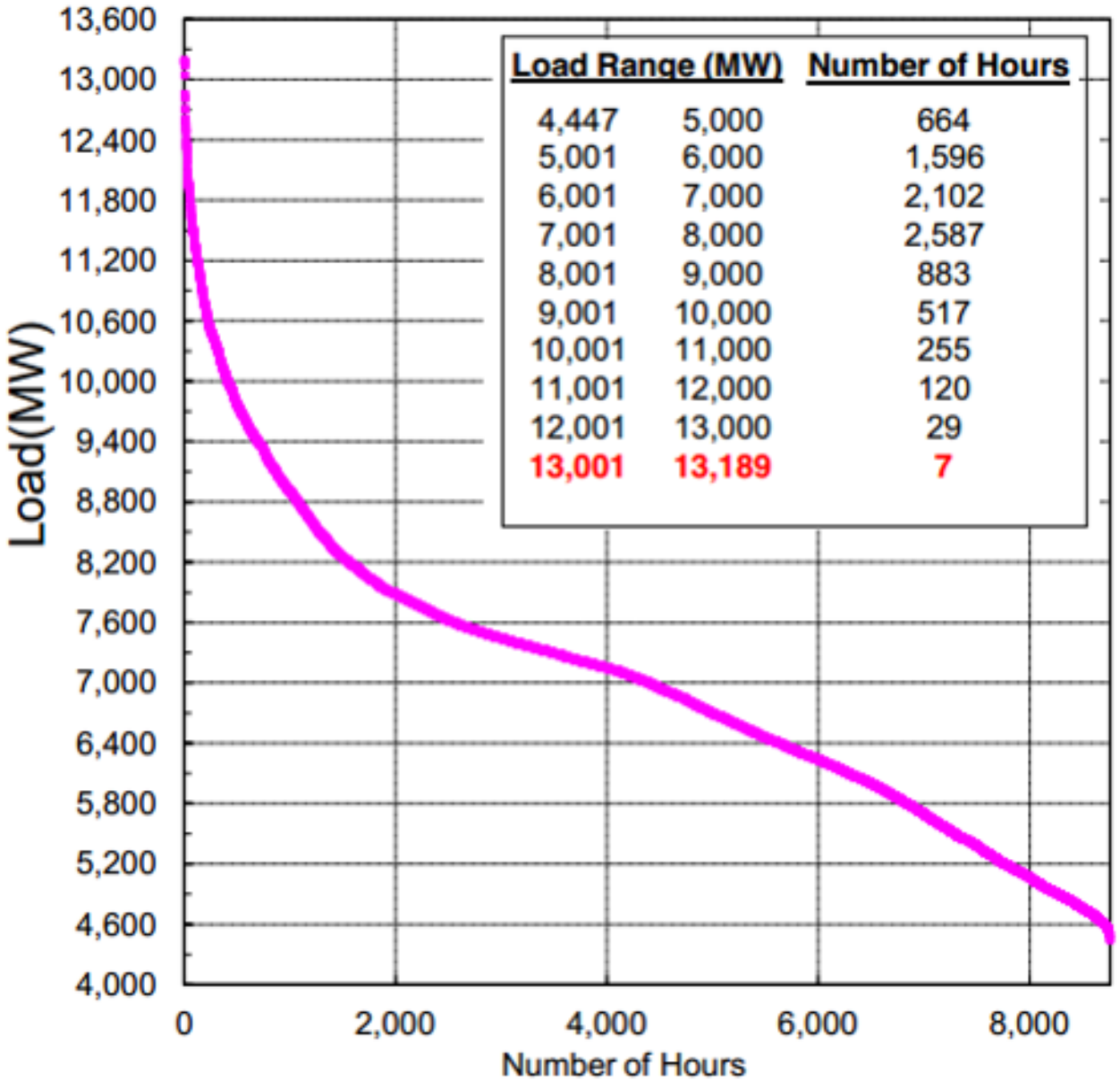


Source: www.chem4kids.com


SAVE OUR PLANET
STOP THE
WARMING

Getting Graphic…and One Utility's Journey

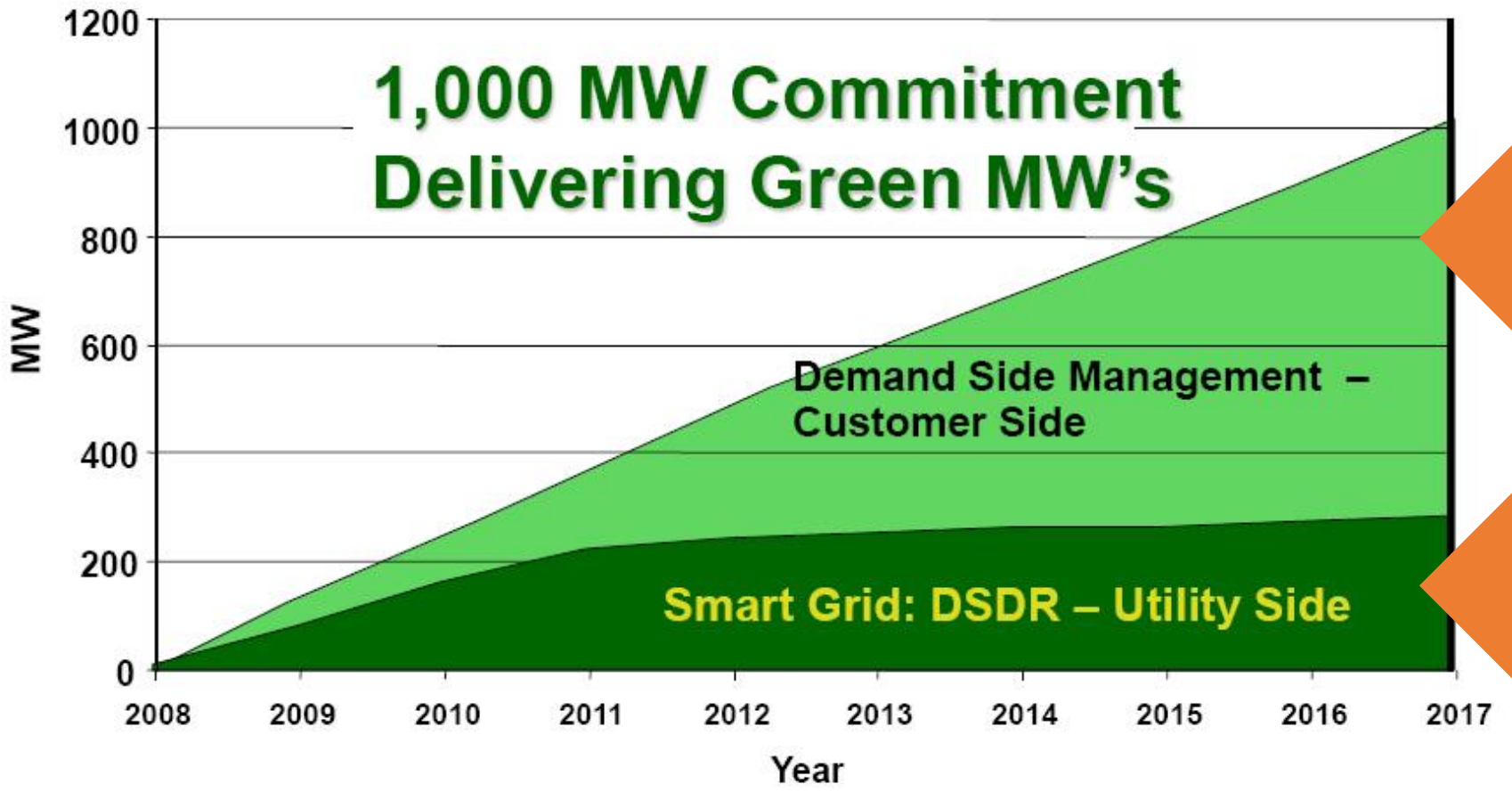
CECONY Service Area Load Duration Curve



Load Range (MW)		Number of Hours
4,447	5,000	664
5,001	6,000	1,596
6,001	7,000	2,102
7,001	8,000	2,587
8,001	9,000	883
9,001	10,000	517
10,001	11,000	255
11,001	12,000	120
12,001	13,000	29
13,001	13,189	7

Source: https://energywatch-inc.com/heat-wave-peak-load-day-capacity-costs/

Demand Side Management

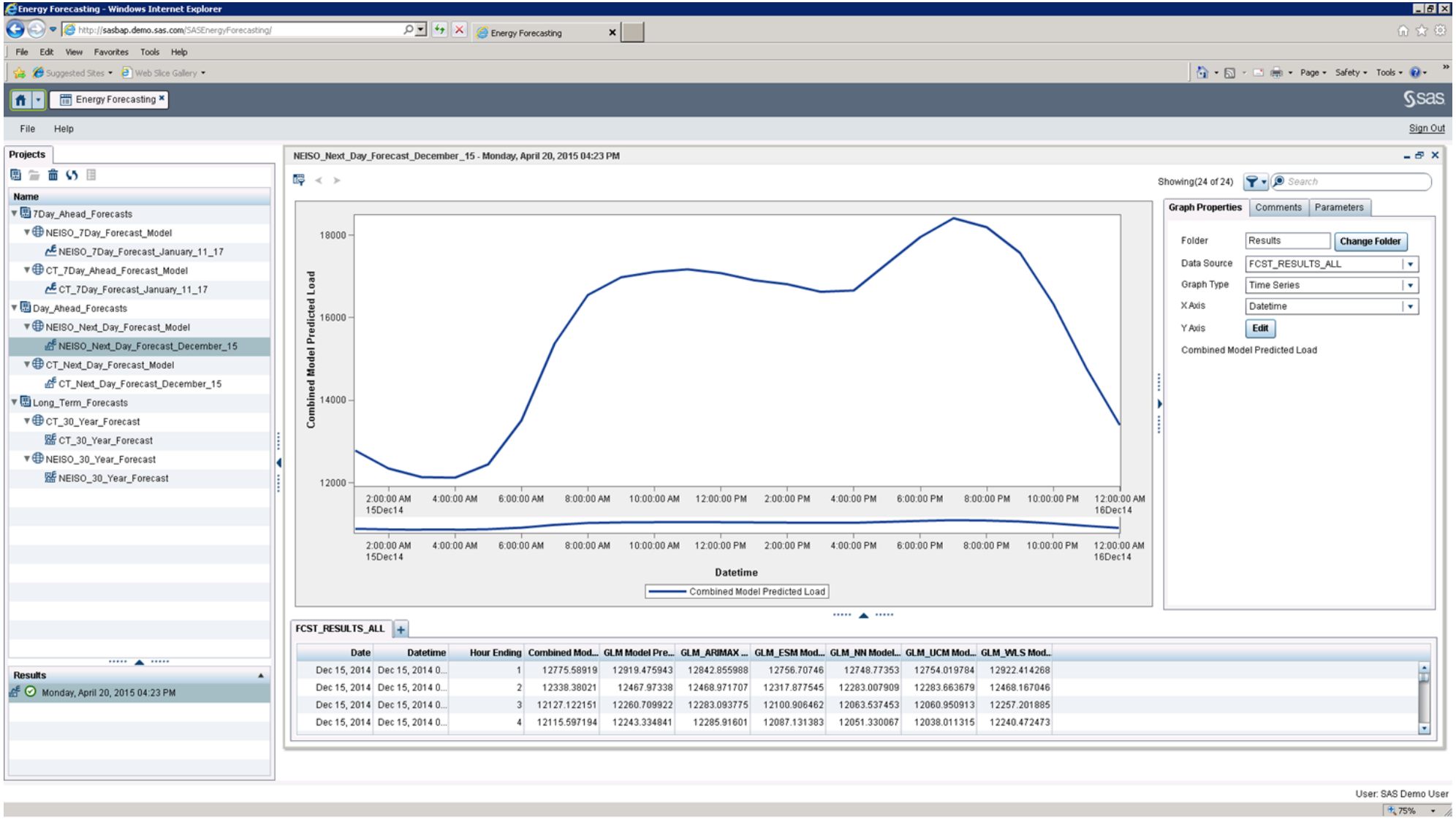


Complexity + Uncertainty

Complexity

Progress Energy | EnergyWise SMART GRID INITIATIVES

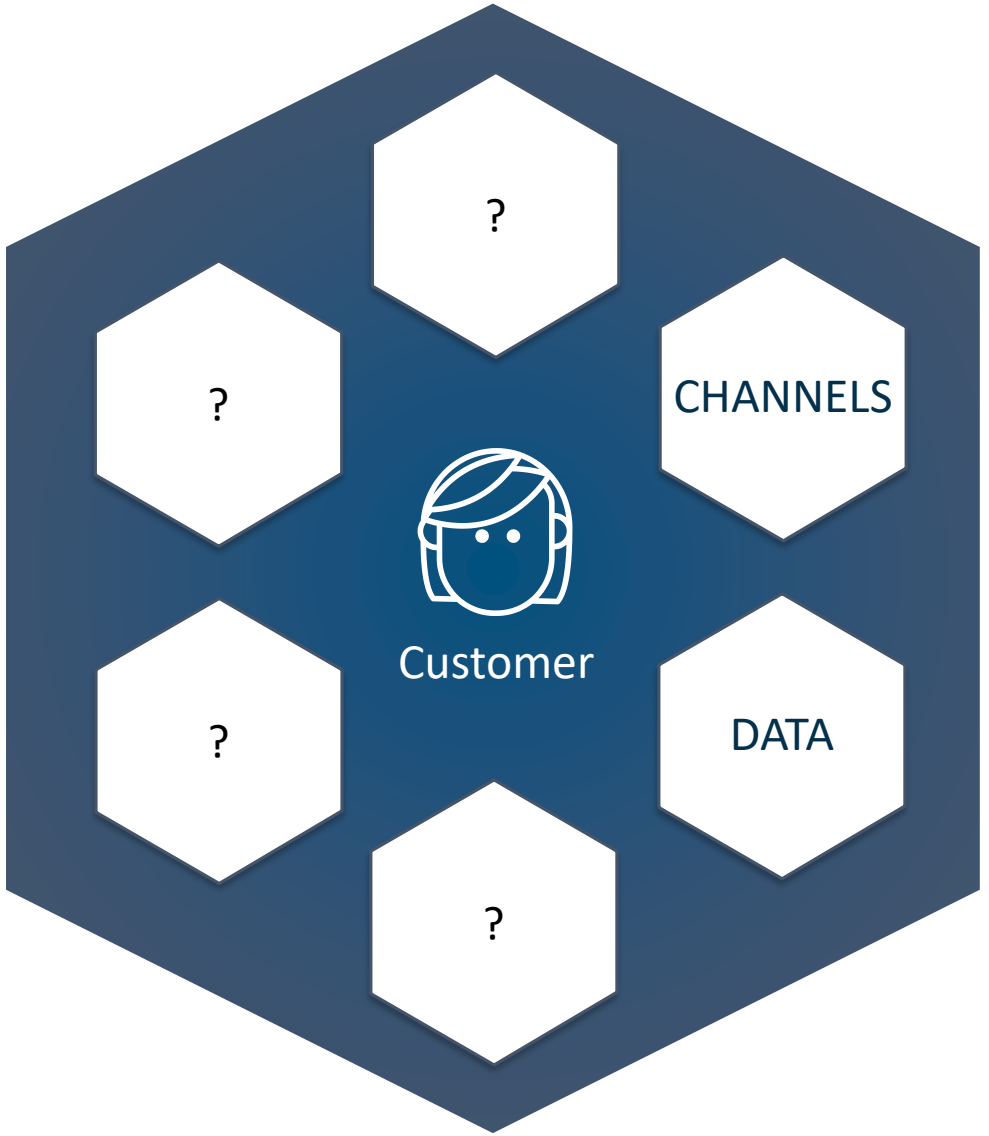
From Load…


Energy Forecasting - Windows Internet Explorer
Energy Forecasting
File Help
Sign Out
Projects
Name
7Day_Ahead_Forecasts
NEISO_7Day_Forecast_Model
NEISO_7Day_Forecast_January_11_17
CT_7Day_Ahead_Forecast_Model
CT_7Day_Forecast_January_11_17
Day_Ahead_Forecasts
NEISO_Next_Day_Forecast_Model
NEISO_Next_Day_Forecast_December_15
CT_Next_Day_Forecast_Model
CT_Next_Day_Forecast_December_15
Long_Term_Forecasts
CT_30_Year_Forecast
CT_30_Year_Forecast
NEISO_30_Year_Forecast
NEISO_30_Year_Forecast
Results
Monday, April 20, 2015 04:23 PM
NEISO_Next_Day_Forecast_December_15 - Monday, April 20, 2015 04:23 PM
Showing(24 of 24)
Search
Graph Properties
Comments
Parameters
Folder
Results
Change Folder
Data Source
FCST_RESULTS_ALL
Graph Type
Time Series
X Axis
Datetime
Y Axis
Edit
Combined Model Predicted Load
Combined Model Predicted Load
18000
16000
14000
12000
2:00:00 AM 15Dec14
4:00:00 AM
6:00:00 AM
8:00:00 AM
10:00:00 AM
12:00:00 PM
2:00:00 PM
4:00:00 PM
6:00:00 PM
8:00:00 PM
10:00:00 PM
12:00:00 AM 16Dec14
Datetime
Combined Model Predicted Load
FCST_RESULTS_ALL
Date
Datetime
Hour Ending
Combined Mod...
GLM Model Pre...
GLM_ARIMAX ...
GLM_ESM Mod...
GLM_NN Model...
GLM_UCM Mod...
GLM_WLS Mod...
Dec 15, 2014 Dec 15, 2014 0... 1 12775.58919 12919.475943 12842.855988 12756.70746 12748.77353 12754.019784 12922.414268
Dec 15, 2014 Dec 15, 2014 0... 2 12338.38021 12467.97338 12468.971707 12317.877545 12283.007909 12283.663679 12468.167046
Dec 15, 2014 Dec 15, 2014 0... 3 12127.122151 12260.709922 12283.093775 12100.906462 12063.537453 12060.950913 12257.201885
Dec 15, 2014 Dec 15, 2014 0... 4 12115.597194 12243.334841 12285.91601 12087.131383 12051.330067 12038.011315 12240.472473
User: SAS Demo User
75%

To Meters…


00000
CL200 240V 3W TYPE CV50D 3QTA 1.0Kh
CenterPoint Energy
METER NUMBER
Itron

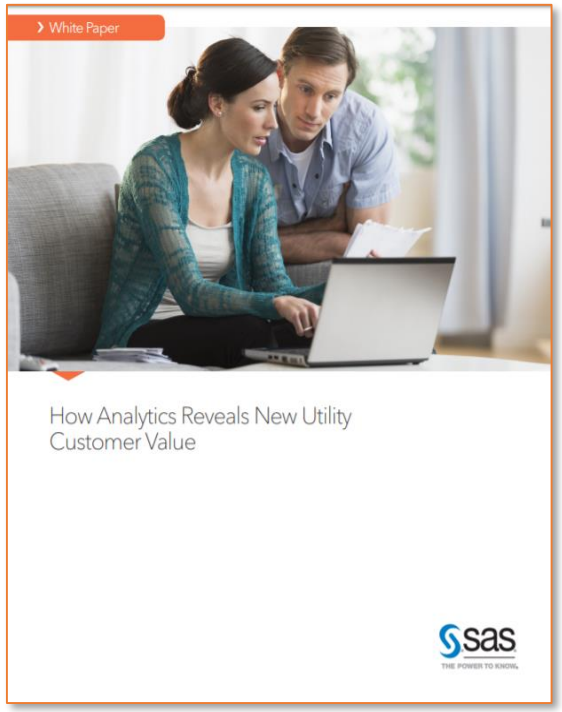
To Customers



Lessons From the IOUs

How Analytics Reveals New Utility Customer Value

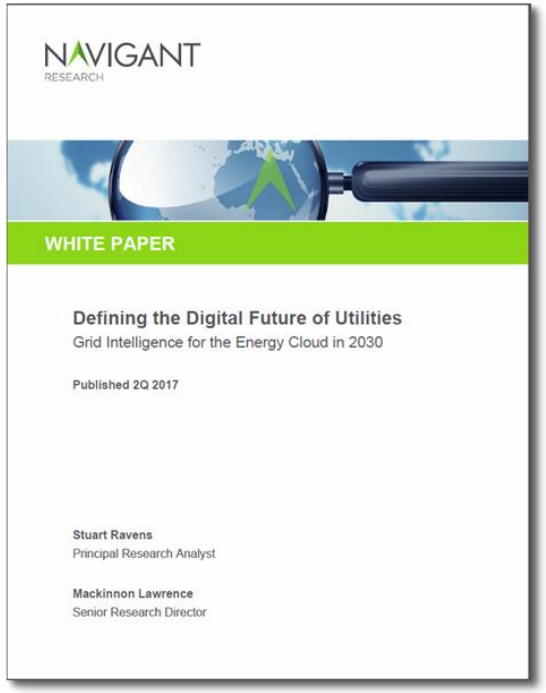
SAS Whitepaper



- To reshape the customer experience, utilities must first understand their customers intimately. Only then can they develop new avenues for customer engagement and build programs and services that redefine them as trusted energy partners.
- Analytics provides a framework to monitor, measure, react to, predict, and optimize the impacts and changes sparked by customer behavior.

Defining the Digital Future of Utilities

Navigant Research



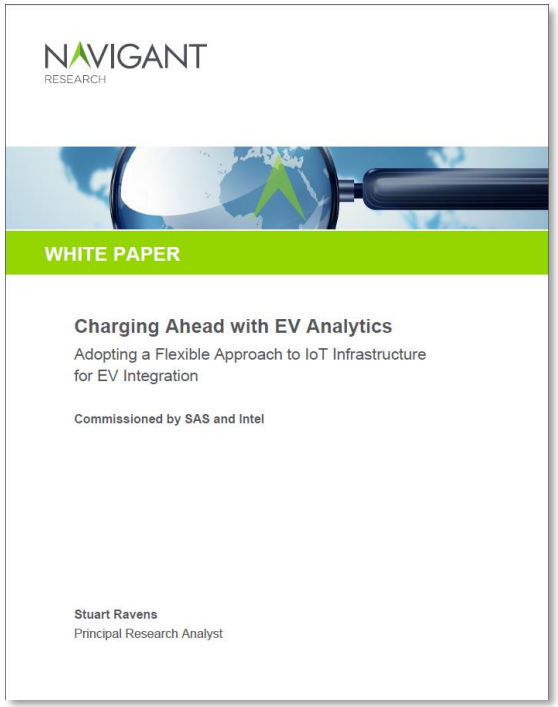
- Data offers visibility into each prosumer's electricity exports and imports, providing the fundamental basis of the transactive energy market.
- Rather than focus purely on the delivery of grid-sourced power, energy service providers offer individualized products and services to suit their customers' specific needs.
- Customer centricity is no longer a marketing buzzword; in 2030, it accurately describes the entire utility value chain

A Perfect Storm


Excellent
Good
Average
Poor

Charging Ahead with EV Analytics

Navigant Research



- To date, the electricity industry has never had to deal with anything like EVs.
- Utilities will have to work with a complex and competitive ecosystem of stakeholders, a diverse customer base with different requirements, and a wide range of technologies that affect the grid in different ways.
- It is critical that an EV strategy must include a data strategy that optimizes data access, both for existing and future business models.

the EVOLUTION of ENERGY

Last 100+ years

1890 – 1920s

First power plants

Cities and homes lit by electricity

Electric appliances becoming commonplace

More reliable service

1950s

Nuclear and hydro scale up

Rates remain stable, cleaner air

1970s – 1980s

More efficient plants built

Scrubbers reduce air emissions (Clean Air Act)

Energy conservation began to be emphasized

Environmental issues came to the forefront (acid rain)

2000s – present

Increased regulations to reduce emissions

Renewables (wind and solar)

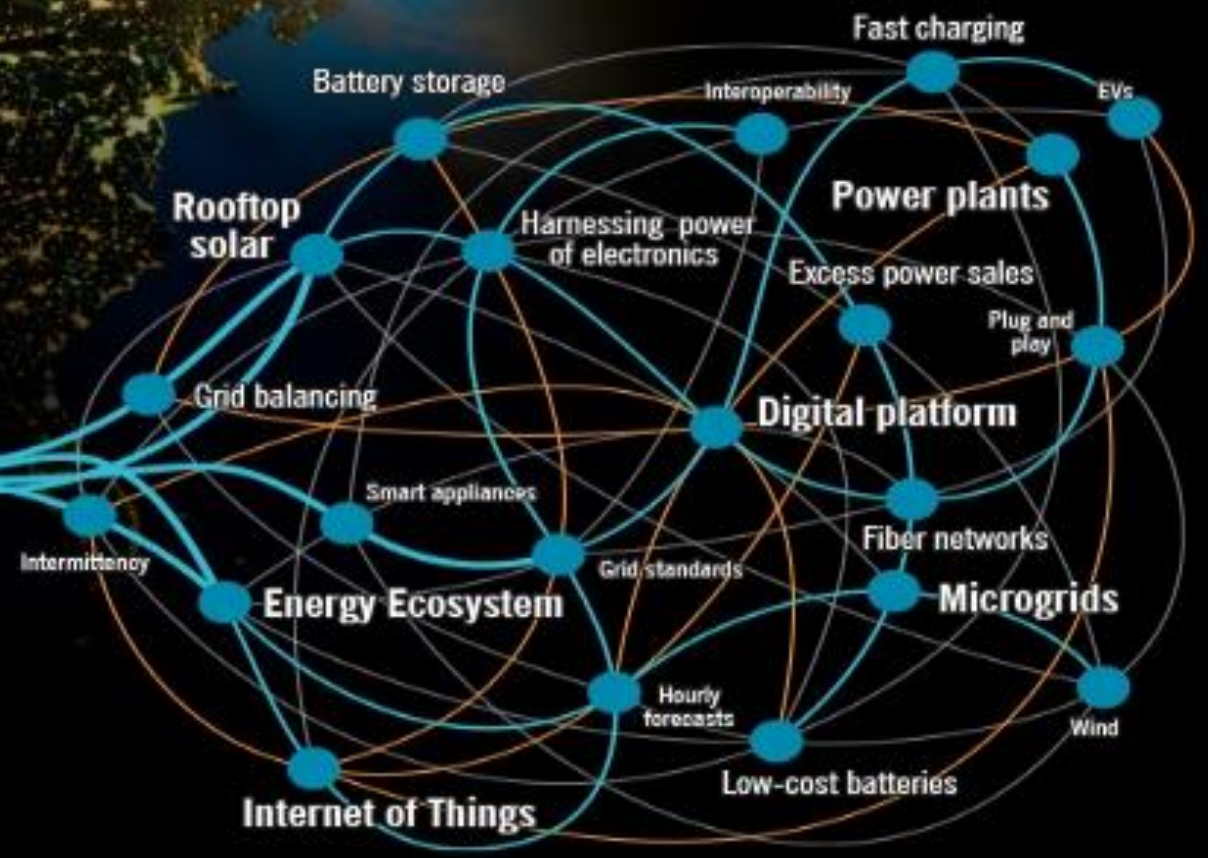
Natural gas generation

40% decrease in SO_2 emissions from 1990 levels, decrease in mercury levels

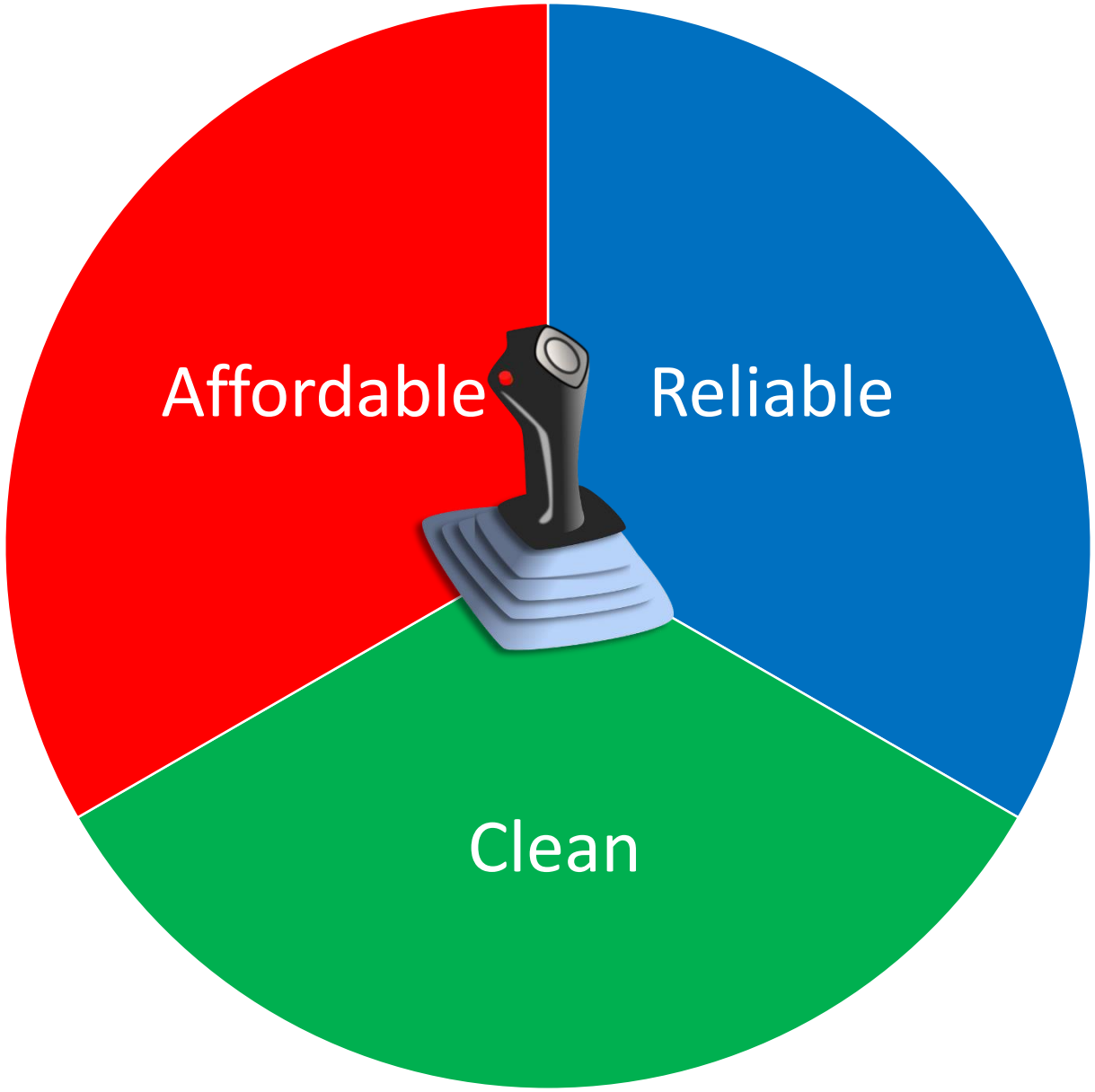
Increased support for renewables

Cleaner air but continued reliance on traditional generation for reliable service

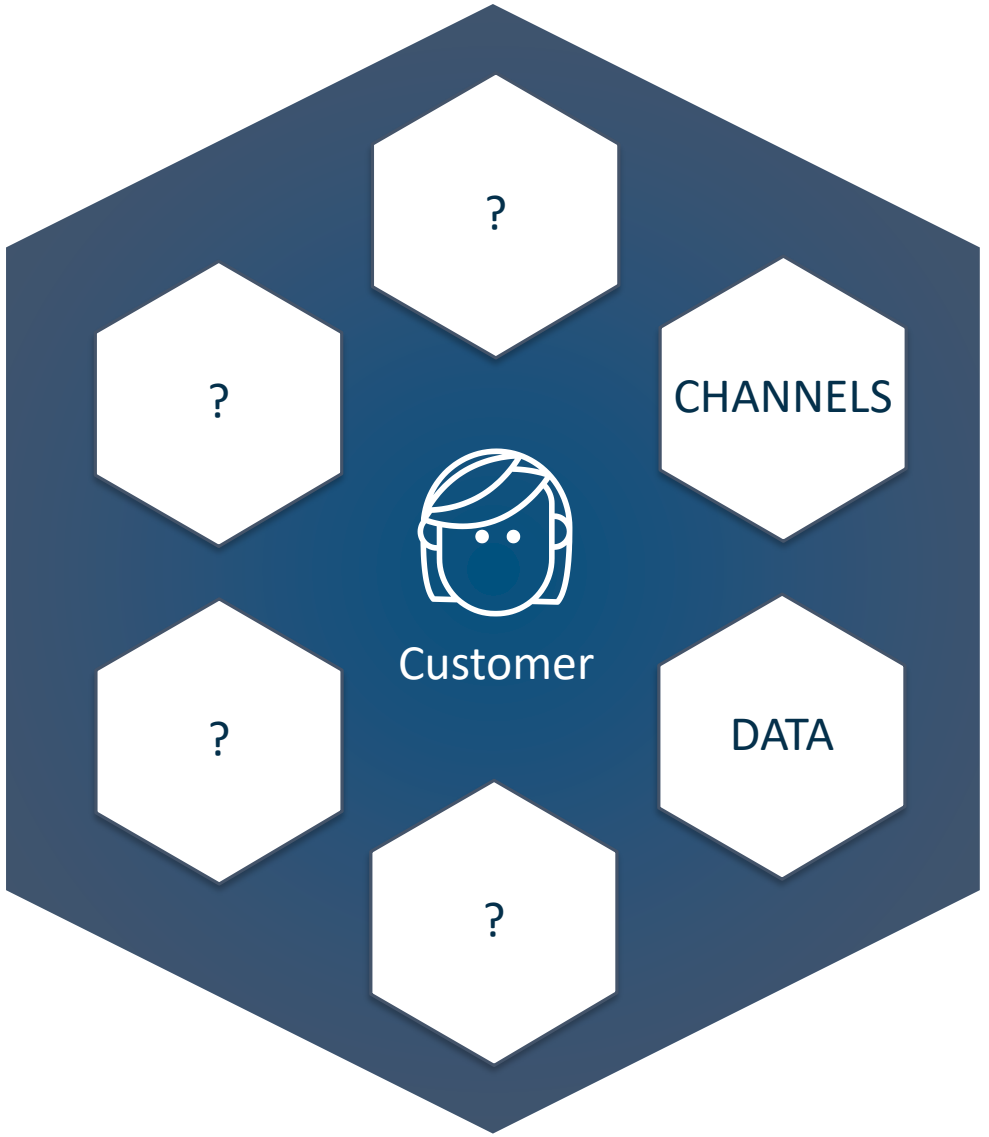
NEXT 25 YEARS



DUKE ENERGY®


Affordable
Reliable
Clean

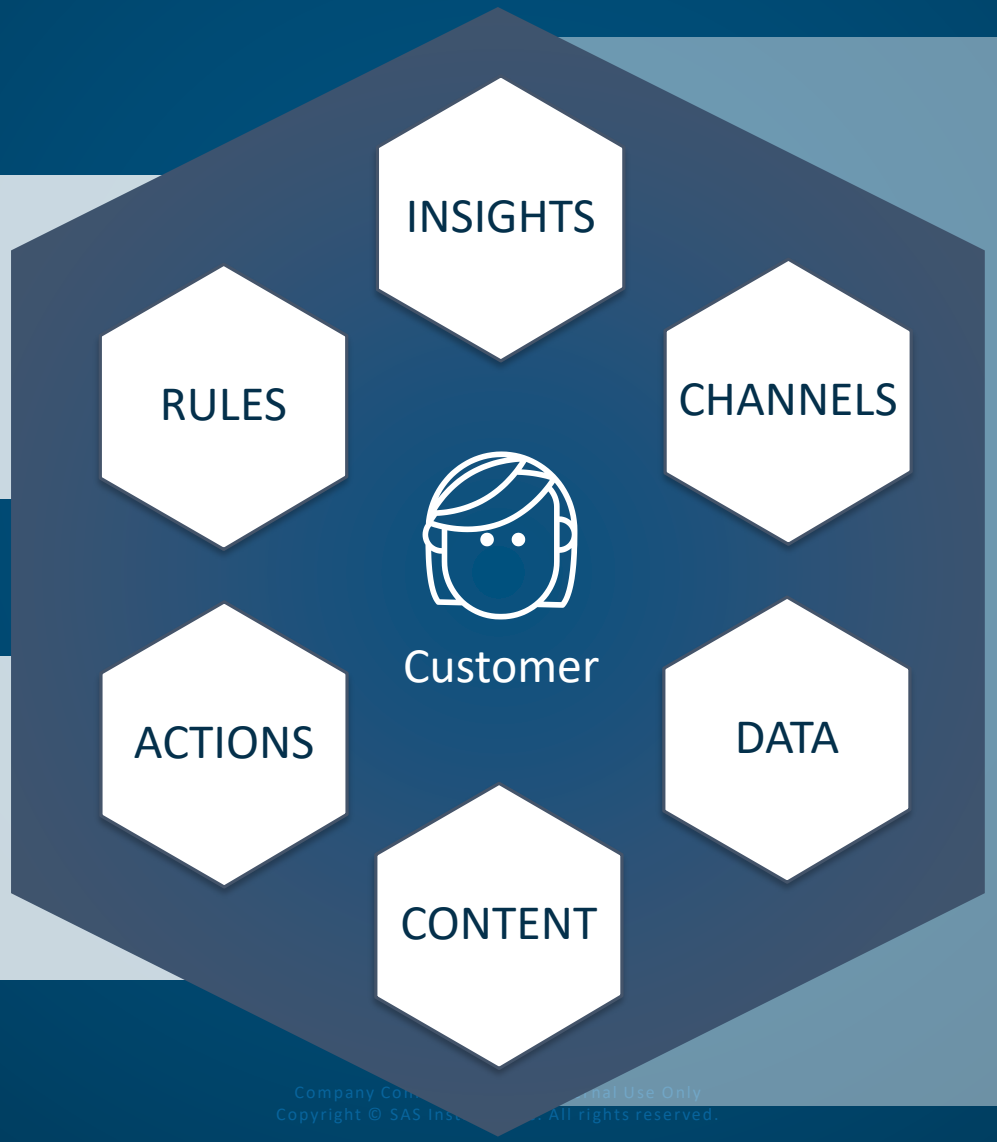
How Will Analytics Help?


?
?
CHANNELS
Customer
?
DATA
?

Analytics for Best-in-Class Customer Experience

Real-Time
Customer Experience

Customer Data &
Analytics

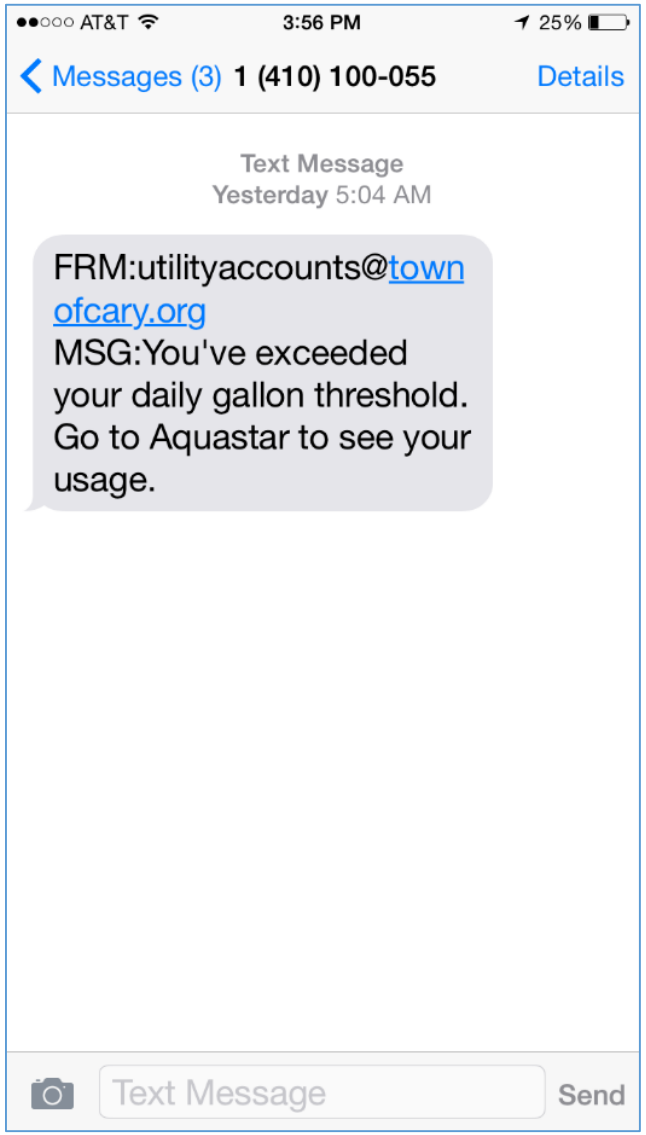


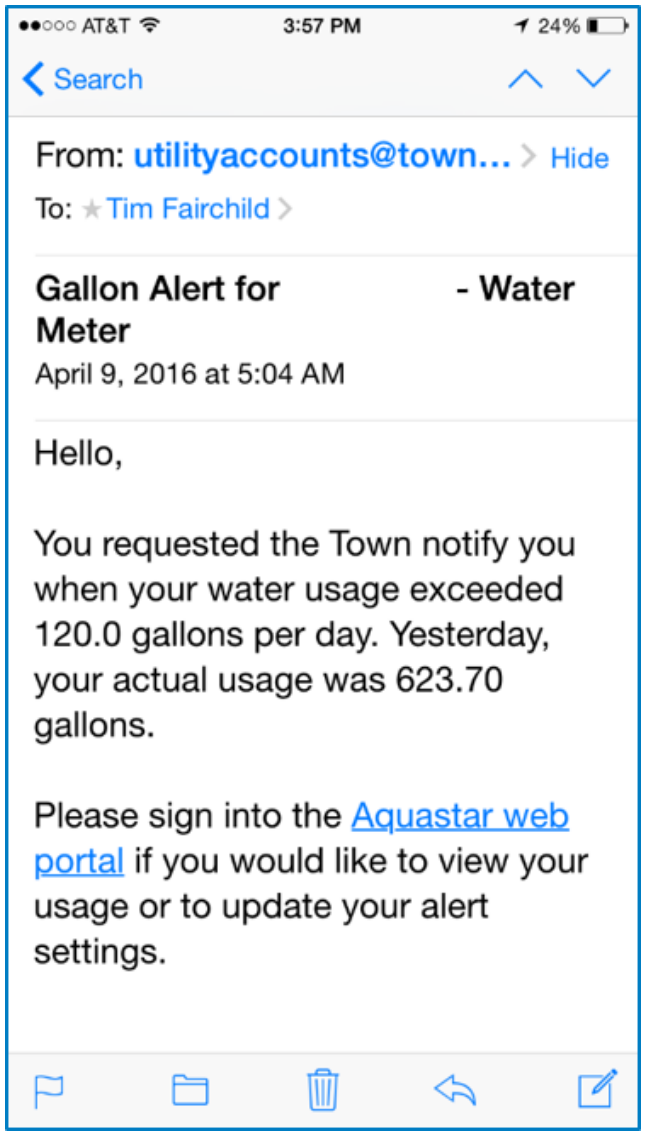
Increase Revenue

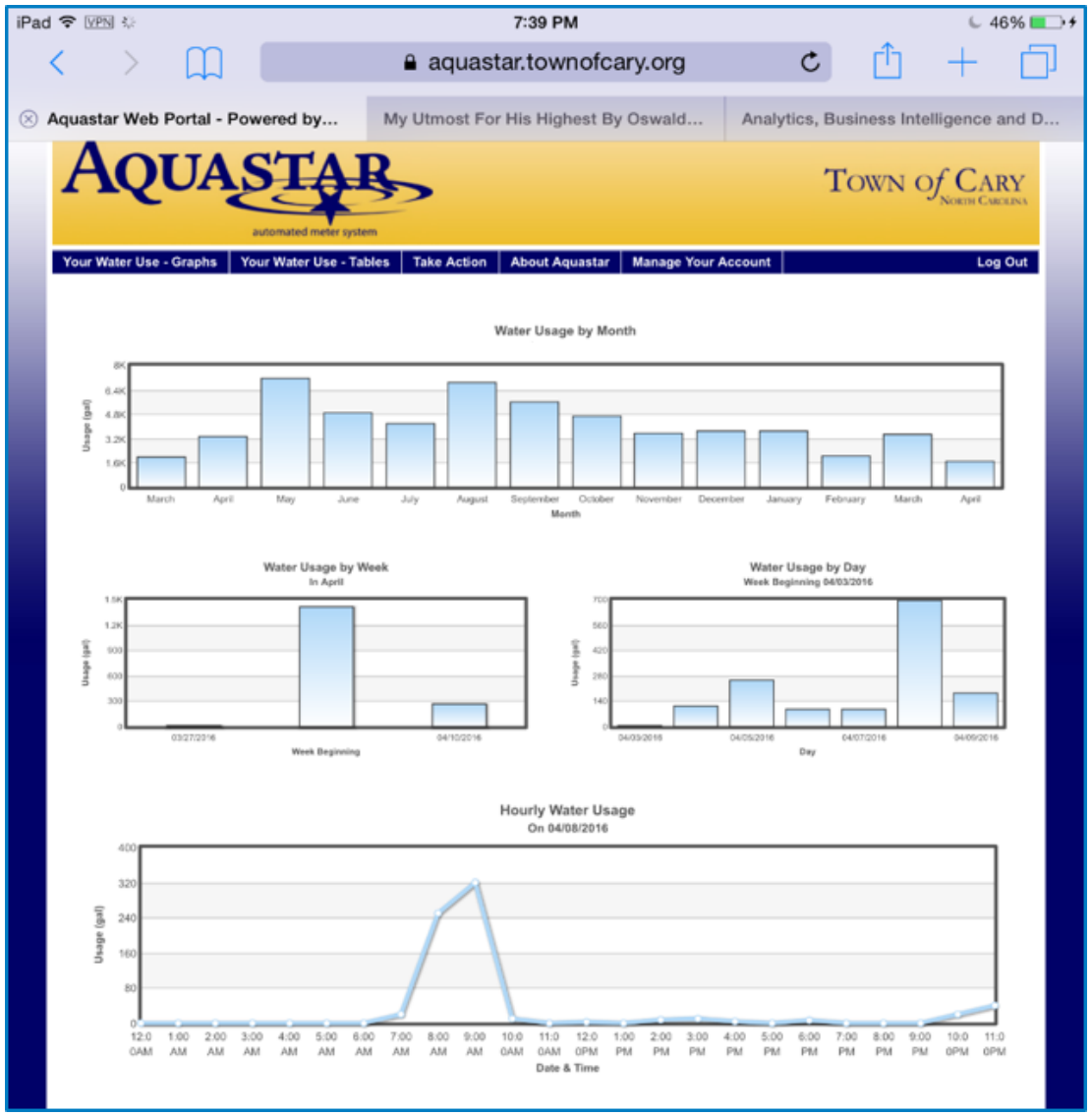
Decrease Churn

Improve Customer
Experience

How to Delight a Citizen With Data


AT&T 3:56 PM 25%
Messages (3) 1 (410) 100-055 Details
Text Message
Yesterday 5:04 AM
FRM:utilityaccounts@townofcary.org
MSG:You've exceeded your daily gallon threshold. Go to Aquastar to see your usage.
Text Message
Send


AT&T 3:57 PM 24%
Search
From: utilityaccounts@town... Hide
To: Tim Fairchild
Gallon Alert for - Water Meter
April 9, 2016 at 5:04 AM
Hello,
You requested the Town notify you when your water usage exceeded 120.0 gallons per day. Yesterday, your actual usage was 623.70 gallons.
Please sign into the Aquastar web portal if you would like to view your usage or to update your alert settings.


iPad 7:39 PM 46%
aquastar.townofcary.org
Aquastar Web Portal - Powered by...
My Utmost For His Highest By Oswald...
Analytics, Business Intelligence and D...
AQUASTAR
automated meter system
Town of Cary
North Carolina
Your Water Use - Graphs
Your Water Use - Tables
Take Action
About Aquastar
Manage Your Account
Log Out
Water Usage by Month
Usage (gal)
March April May June July August September October November December January February March April
Month
Water Usage by Week
In April
Week Beginning
Water Usage by Day
Week Beginning 04/03/2016
Day
Hourly Water Usage
On 04/08/2016
Date & Time

From: utilityaccounts@townofcary.org [mailto:utilityaccounts@townofcary.org]
Sent: Saturday, January 10, 2015 6:03 AM
To: Tim Fairchild
Subject: Gallon Alert for 73456267 - Water Meter

Hello,

You requested the Town notify you when your water usage exceeded 120.0 gallons per day. Yesterday, your actual usage was 619.70 gallons.

Please sign into the Aquastar web portal if you would like to view your usage or to update your alert settings.

Apex

JANUARY 2015

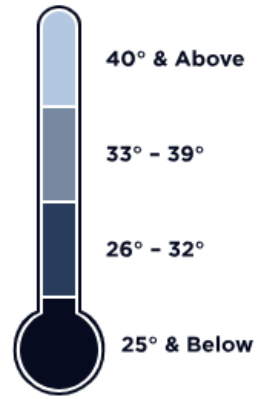
Energy Efficiency Tip

Consider replacing your old heating/cooling system with an energy-efficient heat pump.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 51° / 23°	2 54° / 41°	3 51° / 46°
4 69° / 48°	5 56° / 32°	6 55° / 26°	7 39° / 16°	8 27° / 10°	9 45° / 22°	10 39° / 21°
11 49° / 17°	12 48° / 35°	13 44° / 30°	14 33° / 28°	15 41° / 31°	16 53° / 30°	17 51° / 27°
18 60° / 41°	19 63° / 31°	20 67° / 39°	21 54° / 36°	22 59° / 30°	23 41° / 35°	24 49° / 35°
25 55° / 29°	26 50° / 38°	27 44° / 30°	28 46° / 25°	29 47° / 23°	30 48° / 28°	31 48° / 22°

Cold Weather

Temperature Scale



Average High:50
Average Low:30

Powered By ElectriCities

TempTracker 365™

Mon 1/12/2015 3:26 PM

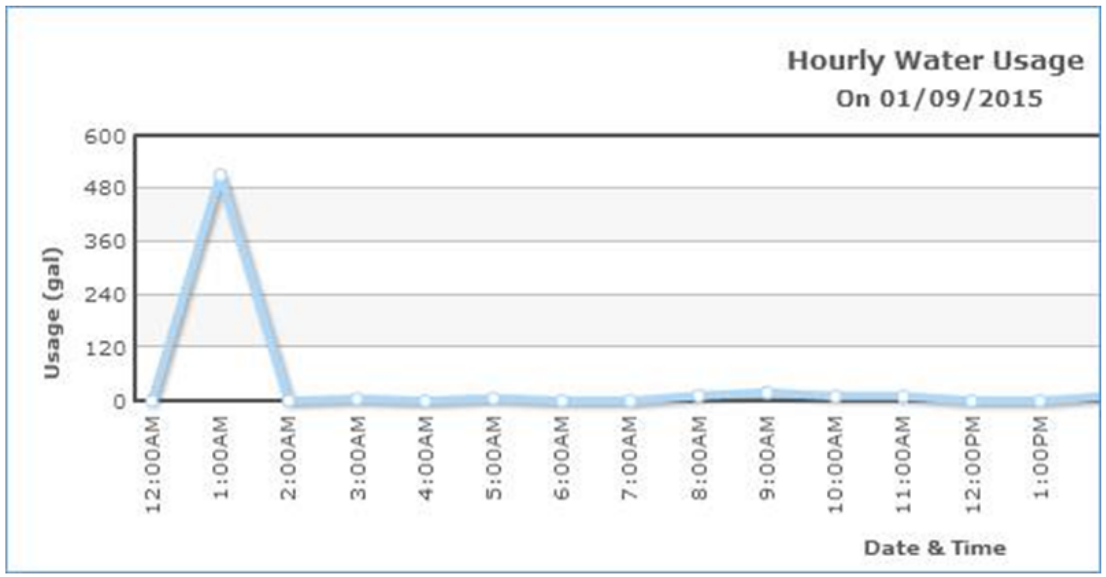
Tim Fairchild

Aquastar alert and reporting problem

To karen.mills@townofcary.org

Hi Karen. My water usage in the winter is typically quite low so when I received the email below on Saturday morning I was sure that a pipe had broken. I immediately crawled under my house to check and everything was fine.

When I looked at the hour-by-hour data in Aquastar I was surprised to see that it showed me using 510 gallons between 12:00a and 1:00a on 1/9. That's an impossible consumption pattern.



Water Usage by Day

	▲ Date ▼	Usage in Gallons
	01/10/2015	0
	01/09/2015	619.7
	01/08/2015	184.2
	01/07/2015	92.2
	01/06/2015	106.3
	01/05/2015	77.7
	01/04/2015	102.8
	01/03/2015	94
	01/02/2015	183.2
	01/01/2015	170
	12/31/2014	303.2
	12/30/2014	6.8
	12/29/2014	0
	12/28/2014	56.5
	12/27/2014	95.3
	12/26/2014	105
	12/25/2014	123.6
	12/24/2014	78.8
	12/23/2014	140.8
	12/22/2014	217.6
	12/21/2014	127.1
	12/20/2014	84.8
	12/19/2014	93.5
	12/18/2014	67
	12/17/2014	79.5
	12/16/2014	65.4
Overall Total		3,275

Best Practices in Delighting Citizens

The Response from Karen Mills

"In overly simple terms, your meter transmitted a large negative usage read and then the large positive read to recalibrate. The large negative read was presented as a 0 on the website so you only saw the recalibration. We are looking into why this happened, but you are correct that the high usage was not physically possible in one hour. We have encountered this anomaly only a couple of times in the last month, and we are working with the vendor on this issue.

First I appreciate that you use the Aquastar system, and secondly I appreciate your thorough and logical approach to problem solving.

I apologize that there was a problem to solve."

SAS & Utilities – By the Numbers

- 560: energy customers worldwide
- 100%: of Fortune500 US Utilities are SAS customers; 30 years average use
- 80%: of Global Fortune500 Utilities are SAS customers
- 1976: SAS founded and 2 utilities among initial customers

esri

intel

SAP Partner

RESEARCH TRIANGLE CLEANTECH CLUSTER
» Transformation Through Collaboration

SmartCitiesCouncil
LIVABILITY | WORKABILITY | SUSTAINABILITY

UtilityAnalytics INSTITUTE

OSIsoft. partner

CISCO

UNC CHARLOTTE
Energy Production & Infrastructure Center
The William States Lee College of Engineering

FREEDM systems center

Recommended Reading

- Navigant Research, *Defining the Digital Future of Utilities**
- Navigant Research, *Charging Ahead with EV Analytics**
- SAS, *How Analytics Reveals New Utility Customer Value**
- SAS, *Municipality Puts Wireless Water Meter-Reading Data to Work**
- S. Ransbotham and D. Kiron, *Using Analytics to Improve Customer Engagement*
- Nicola Smith, *Customers Are in the Driving Seat Of Digital Transformation*
- *SAS, Utility Analytics in 2017: Aligning Data and Analytics with Business Strategy*
- McKinsey & Company, *The Digital Utility: New Opportunities and Challenges*
- Thomas Davenport and Jeanne G. Harris, *Competing on Analytics*
- T&D World, *The Long & Winding Road to Utilities & Analytics: How Do We Build It?*
- MIT Sloan, *Analytics as a Source of Business Innovation*
- TM Forum, *Journey to the Core of Customer Centricity*

** Highlighted in this presentation*

Summing It Up

Key Takeaways

It’s about carbon…but not in the form that makes the headlines

It’s a perfect storm with the citizen at the eye of the storm

Customer experience = citizen experience

Thank You

Tim.Fairchild@sas.com

Connect with me on LinkedIn: www.linkedin.com/in/TDFair
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