



**ELECTRICITIES
ANNUAL CONFERENCE**

Aug. 12-14 | Williamsburg, Va.



New River Light & Power - AMI Integration

Presented by: Ed Miller, Diana Wilcox

NEW RIVER L&P

Serving the High Country Since 1915

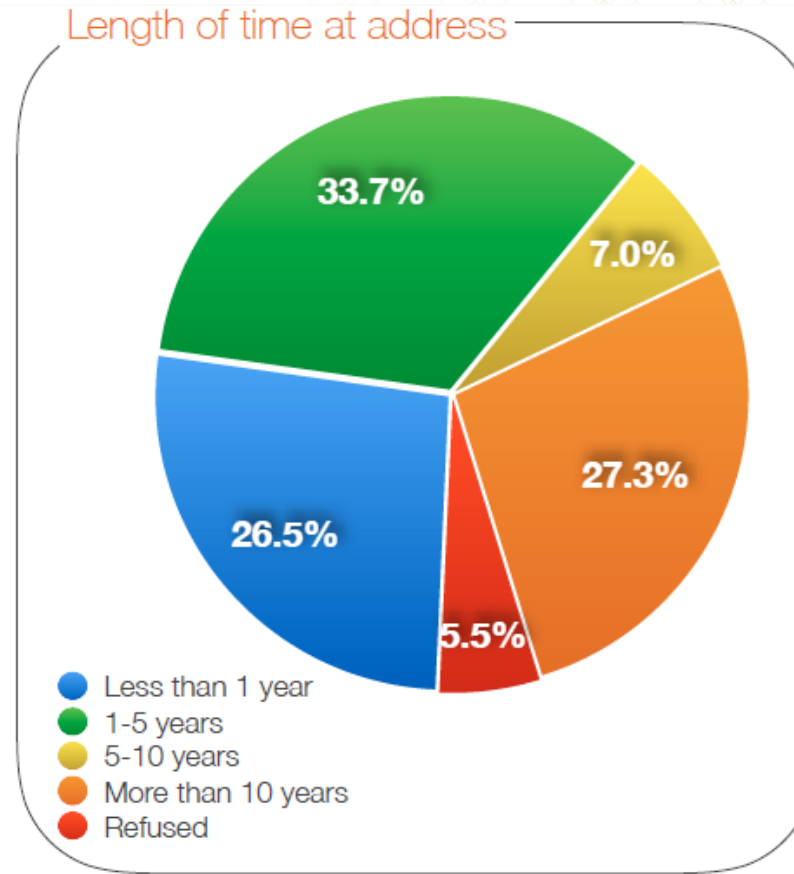
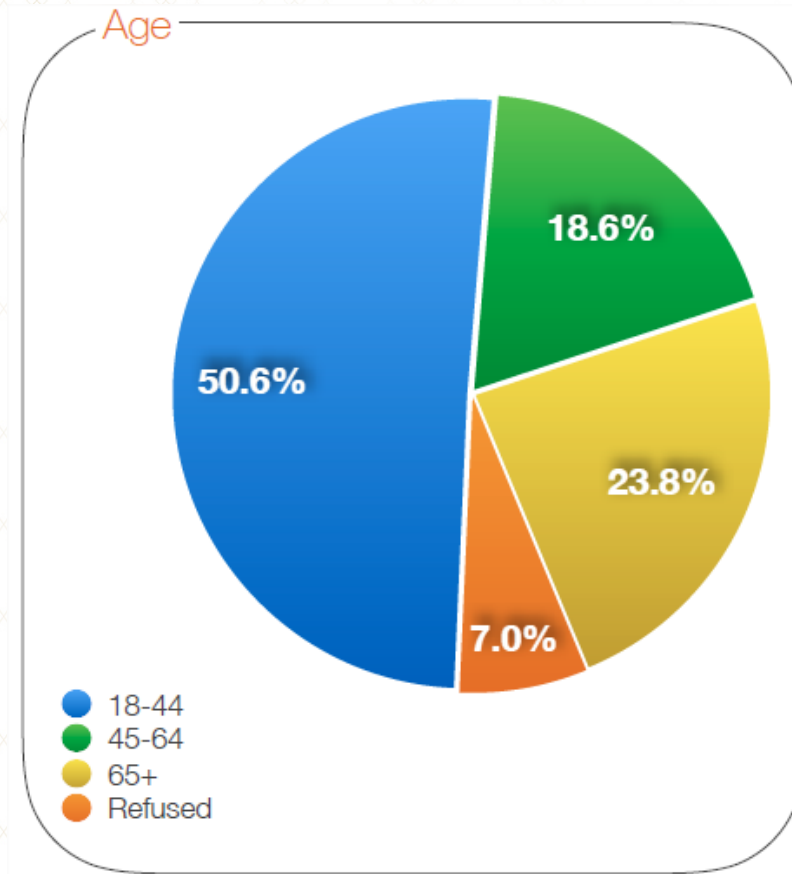
System

- Located in Boone
- Owned by Appalachian State University
- 8,500 customers
- 6,000 are residential
 - Over 2,500 residents turn over each year
 - Large percentage are in apartment complexes



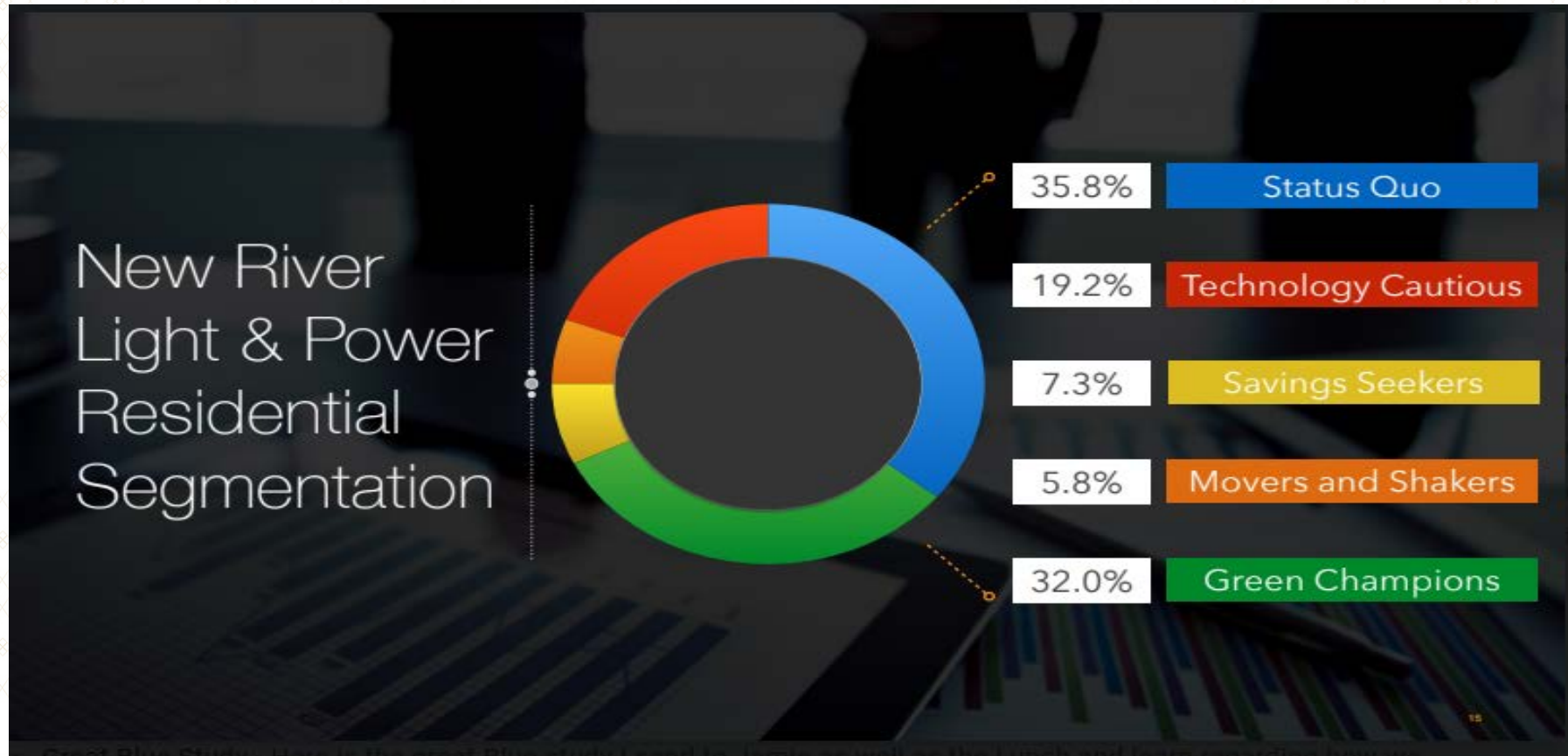
NEW RIVER L&P

Serving the High Country Since 1915



NEW RIVER L&P

Serving the High Country Since 1915



NEW RIVER L&P

Serving the High Country Since 1915

Challenges

- Justification- 2.3 Million Investment (\$270/meter)
 - Cost: 2.3Million
 - Payback - Tangible
 - + Meter Reader reductions (3)
 - + Meter reading accuracy/ +Reduction of rereads
 - (-) IT demands
 - Analytics resources
 - Customer access to Data
 - (-) Customer Service Representatives
 - Complex billing/payment options
 - Customer access to data reports



NEW RIVER L&P

Serving the High Country Since 1915

Challenges

- Payback - Intangible
 - Program offerings
 - Prepay
 - Customer Convenience
 - Energy savings
 - Demand savings (Beat the Peak)
 - Analytics
 - System efficiencies
 - Voltage reduction
 - Damaged Meters
 - Failed customer equipment



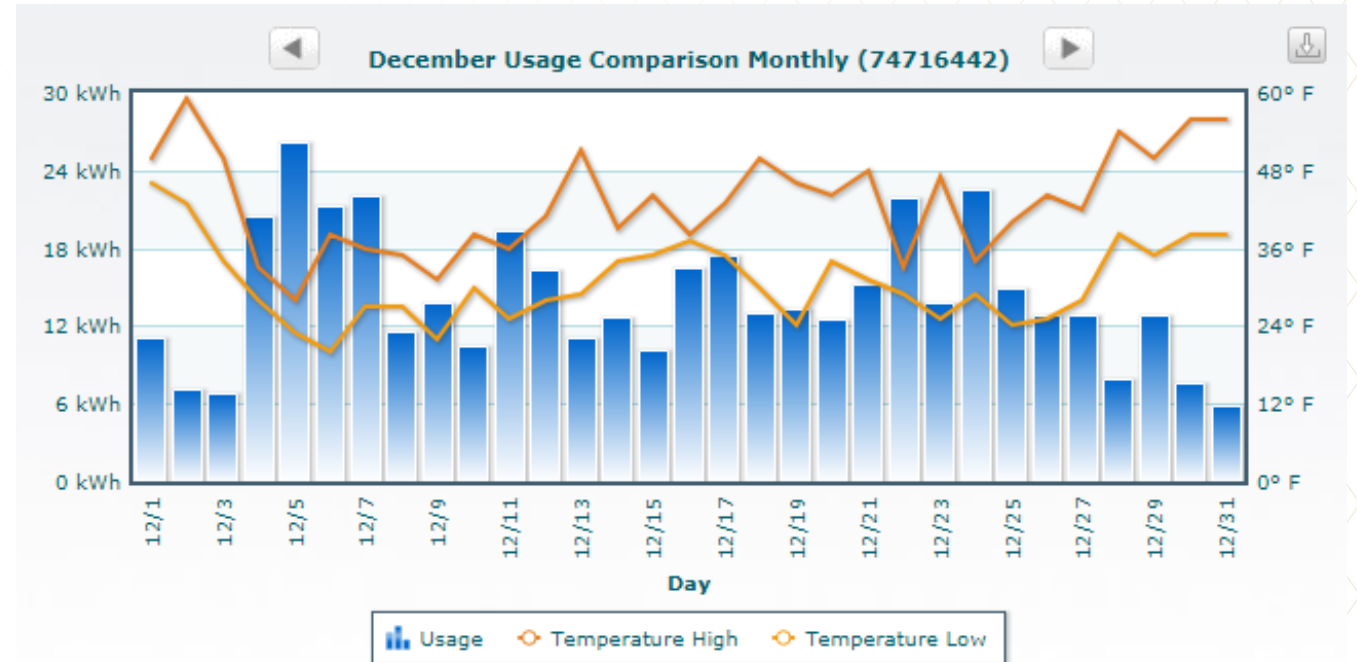
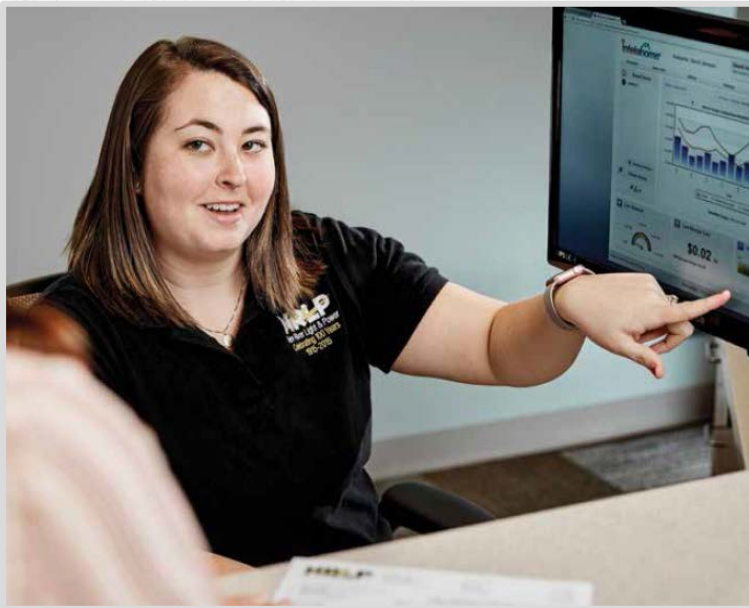
Getting Started



We wanted more than just a meter reading system...



Improved Customer Service



Monthly Usage: 439.658 kWh

We want to help our customers understand their bills and consumption...



Improved Outage Response

Outage Alert Inbox x

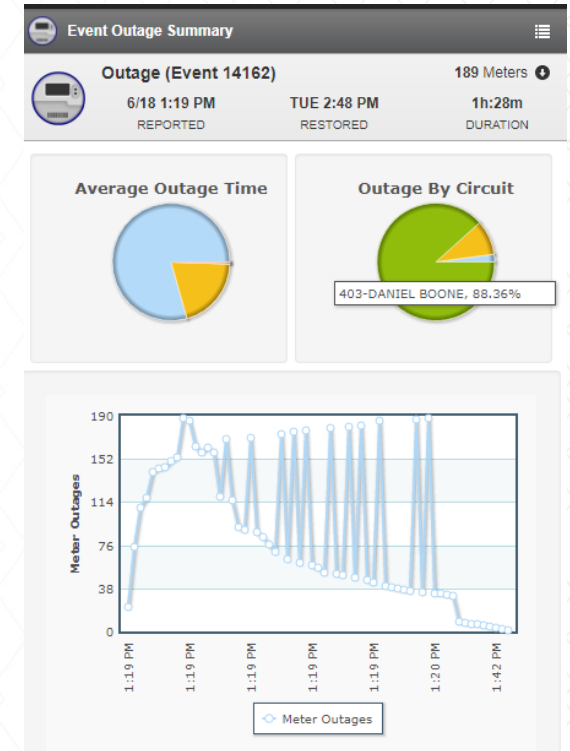
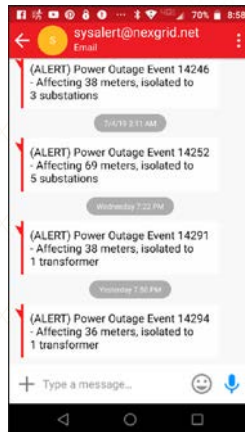
sysalert@nexgrid.net
to me ▾

Power Outage Event 14294:
Affecting 36 meters, isolated to 1 transformer

Nexgrid notification alert customized for Diana Wilcox
To change your alert settings in ecoOne select My Profile, User Alerts

Reply

Forward

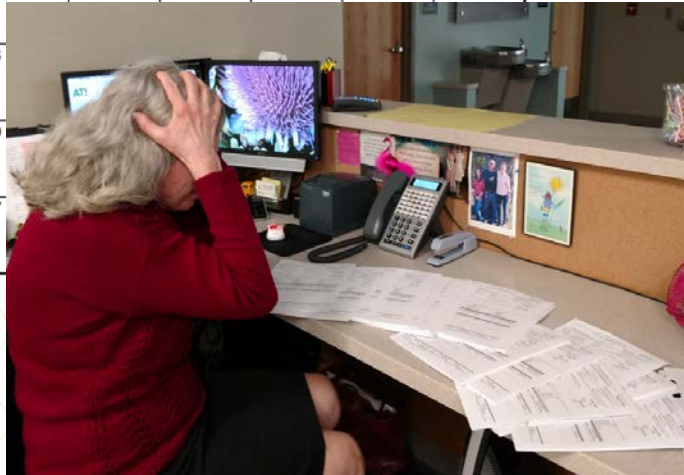


We want to know about outages...



Automating Service Orders

2018 AUGUST						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13					
19	20					
26	27					



The screenshot shows a web-based interface for managing service orders. At the top, there are tabs for 'Assigned Service Orders' and 'Unassigned Service Orders'. Below these, there are tables listing service orders with columns for Order No, Service Address, Map No, Work Type, Priority, Status, Created, and Required. A large yellow arrow points from the left towards this interface. Below the tables, there is a detailed view of a specific service order (Order No: 91037) showing fields for Work Type, Required Date, Primary Contact, and Other Contacts. At the bottom, there is a 'Service Order Review' section with a table of elements and their status.

Review Element	Element Status	Req'd To Create	Req'd To Complete
Customer Deposit	Deposit Complete	Yes	No
Meter Reading Taken?	Meter Read	No	Yes
Does customer want security light?		No	No
Resource Assigned?	Assigned	No	Yes
Charges on Service Order	Yes	Yes	Yes

Service Order Completed

Service Order: 91037, Account: 20215, Member: 19210, Man Number: 23000, Line and Pole Number: ELS 215.10 ELine S1, Status: Completed, Routed to CC, Assigned to AutoAML, Owner: Not Owned

We needed a way to simplify service orders...



Automating Cut-Off for Non-Pay

New River Light & Power Tel No - (828) 264-3671

Date 19 FEB 2019 COLLECTION VOUCHER SO Number 91885

[Arrears](#)

Cutoff Amount	\$0.00	Cycle	1	Meter Book	201
Past Due	\$92.99	Credit Rating	C	Sequence	166
Subtotal	\$92.99	Last Payment	\$100.00	Account Number	2015672701
Current Amount	\$56.74	Last PayDate	18-FEB-2019	Billing Type	Standard
Reconnect Charge		Collection Charges	(TAXES INCLUDED)	Name	
Total	\$149.73	Field Collection	\$0.00	Boone, NC 28607	
		Reconnection	\$26.75	Phone	(828)964-3793
		08:00:00 AM - 05:00:59 PM	\$64.20	Map Number	436204
		05:01:00 PM - 07:59:59 AM	\$64.20	Line and Pole	C17
		Weekends and Holidays	\$135.00	Service Address	Boone, NC 28607
		Current Deposit			

ADDITIONAL DEPOSIT MAY BE REQUIRED UPON RECONNECT

Active Sec Lights On Acct: 0

Active Sec Lights At Service: 0

Active Surge Dev On Acct: 0

Active Surge Dev At Service: 0

Assigned To: AMI - In Progress

Guarantor Branch New River Light & Power

Meter No	Slot	Srv Mult	Mtr Mult	Type	Collected By	Reading	Date
74715738	Master	1	1	KWH			/ /

ecoOne New River Light and Power 30°F 3mph

Dashboard Views Reports

intelMeter Samuel Craig Horton

Electric

Details

Customer: Address: Meter ID: Serial: 74715738 Model: I210+ Meter Details: 2S Install Date: 5/17/2017 11:55 AM

Change History

Change Note	User	Date
21 Multispeak: Meter Updated	Multi Speak	2/14 8:32 AM
22 Multispeak: Meter Updated	Multi Speak	2/14 2:32 AM
23 Multispeak: Meter Updated	Multi Speak	2/13 8:31 PM
24 Multispeak: Meter Updated	Multi Speak	2/13 2:31 PM
25 Remote Reconnect Success (Auto)	Multi Speak	2/13 1:00 PM
26 Remote Reconnect Failure (Auto)	Multi Speak	2/13 12:55 PM
27 EDS: Meter reconnect queued	Multi Speak	2/13 12:52 PM
28 Multispeak: Meter Updated	Multi Speak	2/13 12:52 PM
29 Multispeak: Meter Updated	Multi Speak	2/13 12:42 PM
30 Remote Disconnect Success (Auto)	Multi Speak	2/13 12:30 PM
31 EDS: Meter disconnect queued	Multi Speak	2/13 12:25 PM

And Cut-Off for Non-Pay needed streamlining...



Prepaid Service

Account Browser - Hughes, Dustin Robert (Account - 28137) Account Type - (Electric) - PrePay

Arrangement Drafts Bill Options Deposit Payments Adjustments Charges Notes Credit Letter Contracts Flat Charges Balance Transfer Tax Refund Account App Exit

PrePay PrePay Adj Pledge Commitment Add Task

Account Contact COMPANY OWNER

General Status YTD Prior Year AR Recapture

PRIMARY ACCOUNT
Active Not Billed

Arrangement Due 0.00
Deposit Due 0.00
A/R Due -50.69
Due on Account -50.69
PrePay Billed Balance 16.30
PrePay Balance -34.39

Other Account Contacts Add

Meter Status Connected

Dates Last 90 Days From 16-APR-2019 12:00:00 AM To 15-JUL-2019 12:13:13 PM Print Details Print Register

Register View by: A/R Only A/R + Arrangements PrePay Sort: Asc Desc Display Suppressed

Date	Description	Charge	Payment	Balance	Who
15-JUL-2019 07:02:31 AM	PrePay Bill 15-Jul-2019	1.43		-34.39	OPENPAY
14-JUL-2019 07:02:26 AM	PrePay Bill 14-Jul-2019	1.43		-35.82	OPENPAY
13-JUL-2019 07:02:11 AM	PrePay Bill 13-Jul-2019	1.80		-37.25	OPENPAY
12-JUL-2019 07:02:07 AM	PrePay Bill 12-Jul-2019	1.08		-39.05	OPENPAY
11-JUL-2019 07:02:48 AM	PrePay Bill 11-Jul-2019	1.43		-40.13	OPENPAY
10-JUL-2019 07:02:14 AM	PrePay Bill 10-Jul-2019	0.98		-41.56	OPENPAY
09-JUL-2019 07:01:59 AM	PrePay Bill 09-Jul-2019	1.25		-42.54	OPENPAY
08-JUL-2019 08:39:28 AM	PrePay Bill 08-Jul-2019	4.48		-43.79	OPENPAY
05-JUL-2019 03:33:57 PM	PrePay Bill 05-Jul-2019	2.42		-48.27	OPENPAY
03-JUL-2019 03:04:07 PM	Payment		69	-50.69	Noelle Gates
03-JUL-2019 03:03:16 PM	Payment		62.31	-50.00	Noelle Gates

Member Number Map Number Line and Pole Number ERT ID Quick Look Up

443453 120 268 FACULTY ST 5

Account Browser - Hughes, Dustin Robert (Account - 28137) Account Type - (Electric) - PrePay

Arrangement Drafts Bill Options Deposit Payments Adjustments Charges Notes Credit Letter Contracts Flat Charges Balance Transfer Tax Refund Account App Exit

PrePay PrePay Adj Pledge Commitment Add Task

Account Contact COMPANY OWNER

General Status YTD Prior Year AR Recapture

PRIMARY ACCOUNT
Active Not Billed

Arrangement Due 0.00
Deposit Due 0.00
A/R Due -50.69
Due on Account -50.69
PrePay Billed Balance 16.30
PrePay Balance -34.39

Other Account Contacts Add

Meter Status Connected

Registered Notification Addresses Setup/Manage

Unverified Notification

Verified Notification Log

Notification History

Subject	Message	Type	Successful	Date Sent
Account Balance	Your account balance for account as of 7:02 AM is \$34.39.	Email	Y	15-JUL-2019 07:03:27 AM
Account Balance	Your account balance for account as of 7:02 AM is \$35.82.	Email	Y	14-JUL-2019 07:03:27 AM
Account Balance	Your account balance for account as of 7:02 AM is \$37.25.	Email	Y	13-JUL-2019 07:03:27 AM
Account Balance	Your account balance for account as of 7:02 AM is \$39.05.	Email	Y	12-JUL-2019 07:02:27 AM
Account Balance	Your account balance for account as of 7:02 AM is \$40.13.	Email	Y	11-JUL-2019 07:03:27 AM
Account Balance	Your account balance for account as of 7:02 AM is \$41.56.	Email	Y	10-JUL-2019 07:03:27 AM
Account Balance	Your account balance for account as of 7:02 AM is \$42.54.	Email	Y	09-JUL-2019 07:02:27 AM
Welcome	Welcome. You have been registered to receive PrePay notifications for acct. If you wish to change	Email	Y	08-JUL-2019 11:14:27 AM

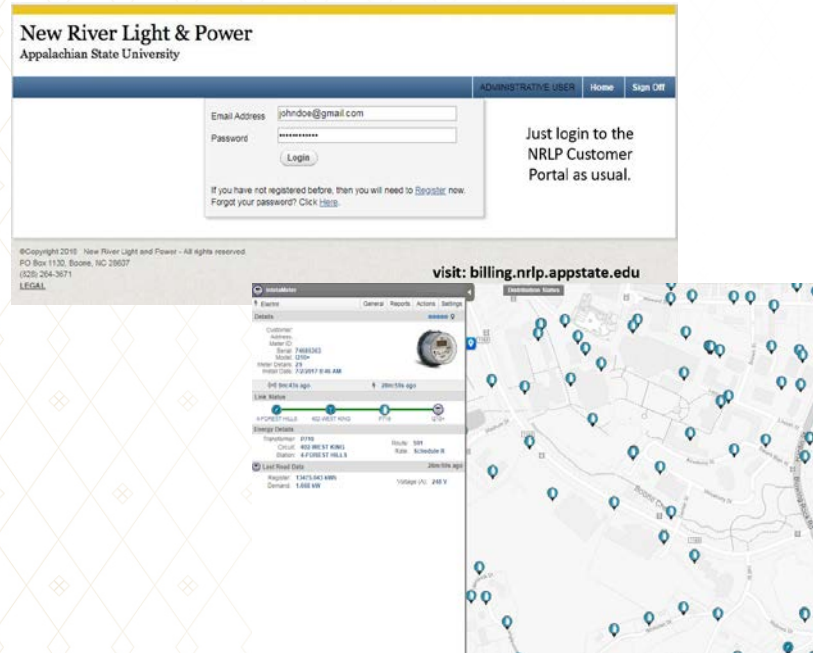
Member Number Map Number

443453

We want to allow our customers flexibility in paying for electricity...



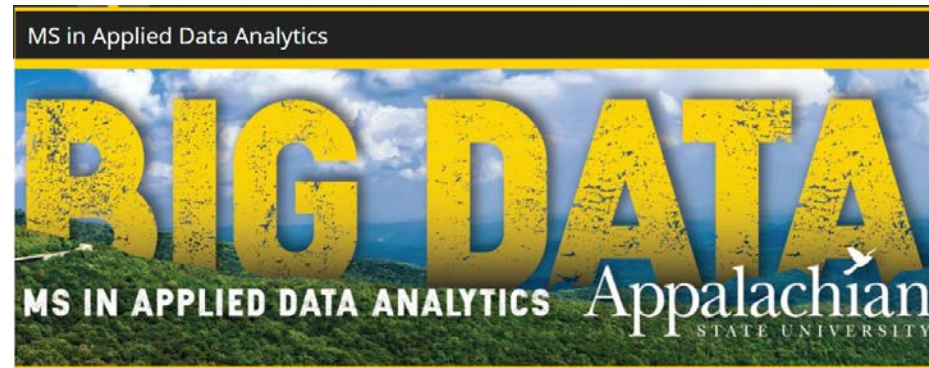
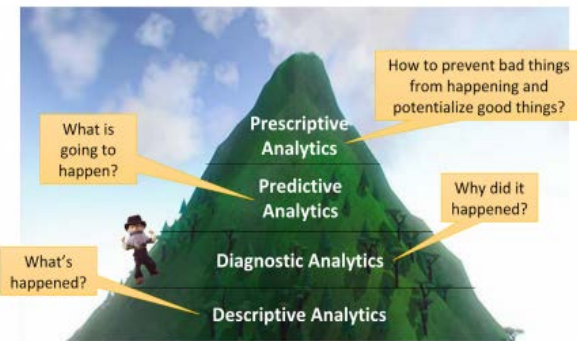
Joining NRLP Customer Portal with AMI Portal



We wanted customers to see all their information easily...



Academic Integration



We want to help the students at Appalachian...



Cost of Service and Rate Data

Hourly Demand Export

Generating this report will overwrite the last report generated on 6/14/2019 11:24:43 AM by Carleigh Gray.

End Date
07/12/2019 5:00 PM

Validated Only
NO

GENERATE

Excel spreadsheet showing the 'Hourly Demand Export' report. The spreadsheet displays data for various locations and services, including 'Asu Air Quality Study', '327 Academy St New Dining Facility SRV1', '327 Academy St New Dining Facility SRV2', '199 Jefferson Rd B', '355 Hunting Hills Ln', '419 Meadowsview Dr Apt', 'Boone Pointe 205', '450 New Market Blvd B', 'Asu Girls Softball Field Lights', 'Nathans Walk A-3', 'Nathans Walk A-6', 'Nathans Walk A-7', 'Nathans Walk A-8', '805 W Kong St House Meter', 'New High School Service-1', 'New High School Service-2', '585 W Kong St D-1', 'Corner of Dale St & State Farm Rd', '211-B North Water St', 'ASU Windmill', 'ASU New Field Hse', '717 Greenway Rd-D', '717 Greenway Rd-HM', and '717 Greenway Rd-C'. The data is organized by location ID, map #, service address, and day, with columns for 'Hr. Beginning' and 'Hr. Ending'.

We want to make sure our rates are accurate and fair to all customers...

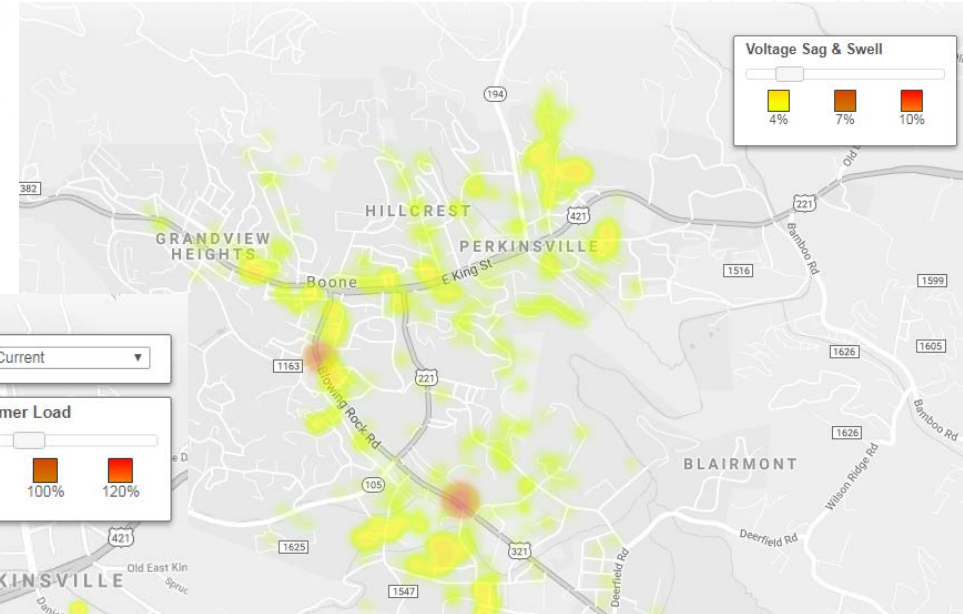
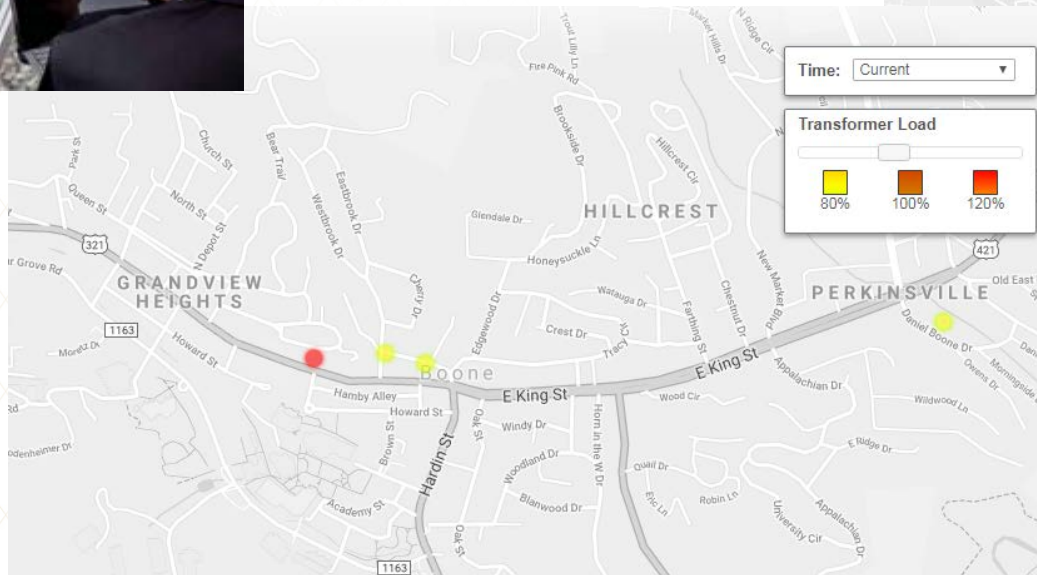


What's Next?

- Continued Academic Integration
- More accurate cost of service and rate case data through available AMI data.



Operations



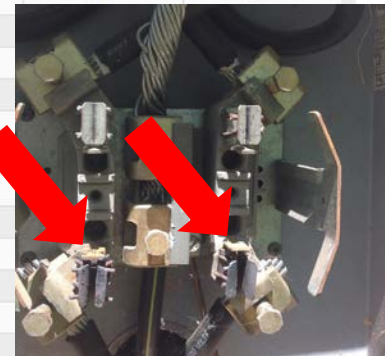
Meter Temperature

- Temps approaching +100F above ambient
- Bad or loose lugs/connections upon inspection
- Customers informed that repairs necessary

Meter Temperature Report

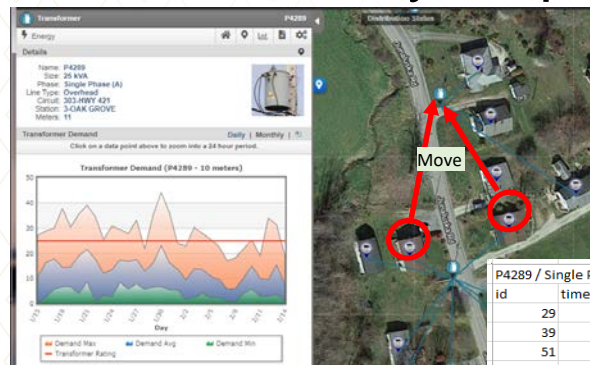
Show 25 entries Showing 1 to 25 of 7,468 entries

	Model	Serial	Meter ID	Customer	Address	Demand	Meter Temp	Ambient +/-
1	I210+C	74833105				0.0682 kW	134.3 F	+90.3 F
2	I210+S	74832288				0.1237 kW		
3	I210+C	74832288				1.7162 kW	89.6 F	+45.6 F
4	I210+	74716368				1.23 kW		
5	I210+C	74833095				0.0837 kW		
6	I210+	74884635				13.7651 kW		
7	I210+C	74833096				0.1906 kW		
8	I210+C	74832356				0.0878 kW		
9	I210+	74716396				0.146 kW		
10	I210+C	74832289				4.0989 kW		
11	I210+C	74833094				0.2096 kW		
12	I210+C	74833104				0.1696 kW		
13	I210+C	74833102				0.0391 kW		
14	I210+C	74833097				0.1373 kW		



Voltage Drop

- Voltage Report identified sag to 219-220 volts on five 240 volt services connected to same transformer
- Transformer found to be at 120-156% load
- 2 secondary drops moved to nearby under-loaded transformer



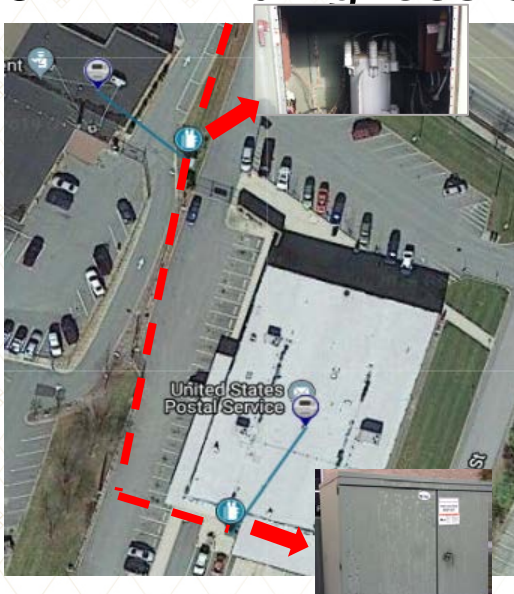
id	time	max dem	avg dem	min demand
29	1/21/2019 19:00	39.004	30.7	22.396
39	1/21/2019 9:00	38.818	35.2993	29.916
51	1/20/2019 21:00	35.476	30.5093	27.752
57	1/20/2019 15:00	35.192	33.499	31.806
6	1/22/2019 18:00	34.472	29.957	21.716
56	1/20/2019 16:00	34.006	28.36	23.312
31	1/21/2019 17:00	33.736	31.853	29.97
30	1/21/2019 18:00	32.228	22.202	16.732
59	1/20/2019 13:00	32.204	25.0233	21.37
61	1/20/2019 11:00	32.138	27.529	22.92
38	1/21/2019 10:00	32.126	30.5485	28.188
16	1/22/2019 8:00	31.936	29.77	27.604
40	1/21/2019 8:00	31.786	29.34	27.84
5	1/22/2019 19:00	30.202	27.8073	24.352

Label	Location	Transformer	Alert	Meter ID/Serial	Alert Start	Alert End	Total
1	Ik Rd & Univ Hall	TC83	Voltage Swell: 131V	67707157	1/8/2019	1/10/2019	51
2	Colley Road	P4289	Voltage Sag: 219V	74715780	1/22 8:15 AM	1/22 8:30 AM	2
3	Junaluska Rd	P4289	Voltage Sag: 220V	74715780	1/21 10:00 AM	1/21 10:45 AM	3
4	Junaluska Rd	P4289	Voltage Sag: 220V	74715780	1/21 9:30 AM	1/21 9:45 AM	1
5	Junaluska Rd	P4289	Voltage Sag: 219V	74715720	1/21 6:15 PM	1/21 6:30 PM	1
6	Junaluska Rd	P4289	Voltage Sag: 220V	74715779	1/22 6:45 PM	1/22 7:00 PM	1
7	Junaluska Rd	P4289	Voltage Sag: 220V	74715716	1/21 6:15 PM	1/21 6:30 PM	1
8	Carolina Ave	P4289	Voltage Sag: 219V	74715726	1/21 8:30 AM	1/21 8:45 AM	1
9	Junaluska Rd	P4289	Voltage Sag: 217V	74715727	1/10/2019	1/10/2019	32
10	Carolina Ave	P4289	Voltage Sag: 220V	74715728	1/10/2019	1/10/2019	22
11	Carolina Ave	P4289	Voltage Sag: 219V	74715730	1/21 8:30 AM	1/21 8:45 AM	1
12	Junaluska St	P7104	Voltage Swell: 249V	74715455	2/6 12:30 AM	2/6 12:45 AM	4
13	Fairing St	P7104	Voltage Swell: 250V	74715013	1/10/2019	1/10/2019	2
14	Johnson St	P4202	Voltage Swell: 250V	74685304	1/19 9:45 PM	1/19 9:00 PM	1
15	East Lane	PM1843	Voltage Swell A:130V B:124V C:123V	74718166	1/19 8:45 PM	1/19 9:00 PM	1
16	E King St 23400	C82,C416	Voltage Swell: 249V	74684936	1/23 11:00 PM	1/23 11:16 PM	6
17	7 Hwy 105	P7629	Voltage Sag: 219V	74684892	1/30 9:45 AM	1/30 10:00 AM	2
18	Univ Hall Dr SI	TC83	Voltage Swell: 130V	74691912	1/10/2019	1/10/2019	185
19	1 Bl Rk Rd	TC83	Voltage Swell A:131V B:128V C:128V	74634114	1/10/2019	1/10/2019	201
20	Bl Rk Rd 1	PM1914	Voltage Swell: 249V	75640354	1/10/2019	1/10/2019	93
21	Carolina Ave Tr	P7168	Voltage Sag: 219V	74685335	1/21 6:30 AM	1/21 6:45 AM	1



Transformer Right-Sizing

- Boone Post Office 300kVA to 75kVA
- Transformer average load now at ~50%
- 225kVA winding loss eliminated = \$



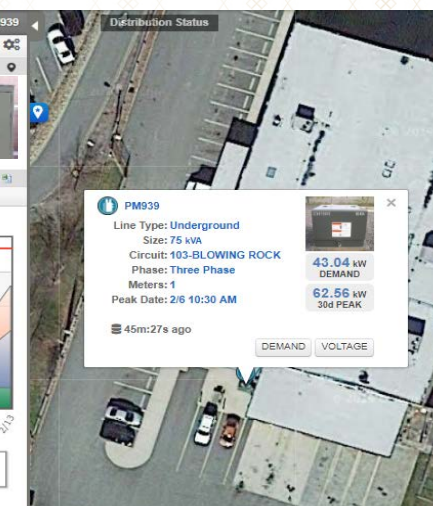
PM1523/Three Phase (ABC) / 75 kVA					
id	date	max dem	avg dem	min demand	
273	5/17/2018	89.52	42.7925	10.24	
259	5/31/2018	87.2	45.8222	10	
257	6/2/2018	86.88	45.2467	8.36	
241	6/18/2018	84.56	62.6589	8.88	
253	6/6/2018	84.4	39.131	10	
243	6/16/2018	83.76	51.8828	8.64	
245	6/14/2018	81.92	49.9331	8.56	
244	6/15/2018	81.36	50.8033	8.4	
246	6/13/2018	79.2	48.2286	9.92	
483	10/10/2017	78.8	54.8833	10.24	
258	6/1/2018	78.64	45.3258	10	
252	6/7/2018	78.16	46.6631	10.08	
248	6/11/2018	76.72	46.1438	10	
240	6/19/2018	76.4	45.8879	10.08	
230	6/29/2018	76.24	45.3692	7.28	
190	8/8/2018	76.16	42.0448	11.36	
195	8/3/2018	75.76	45.503	10.8	
167	8/31/2018	75.68	47.3617	11.12	
239	6/20/2018	75.6	48.0856	10	
218	7/11/2018	75.2	43.4011	10.8	
234	6/25/2018	75.04	41.32	9.6	
261	5/29/2018	75.04	43.3368	9.36	
182	8/16/2018	74.64	47.1565	10.72	

Daily Demand
Report 18 Month
History



PM1523/Three Phase (ABC) / 75 kVA					
id	time	max dem	avg dem	min demand	
61	5/17/2018 9:00	89.52	78.8	68.08	
60	5/17/2018 10:00	89.12	88.38	87.52	
59	5/17/2018 11:00	88.16	87.56	86.56	
56	5/17/2018 14:00	71.36	60.38	53.52	
33	5/18/2018 15:00	68.8	61.96	55.12	
31	5/18/2018 17:00	67.2	58.32	36.96	

Hourly Demand
Report
2 Day History



Lifespan No Load Loss Estimate:

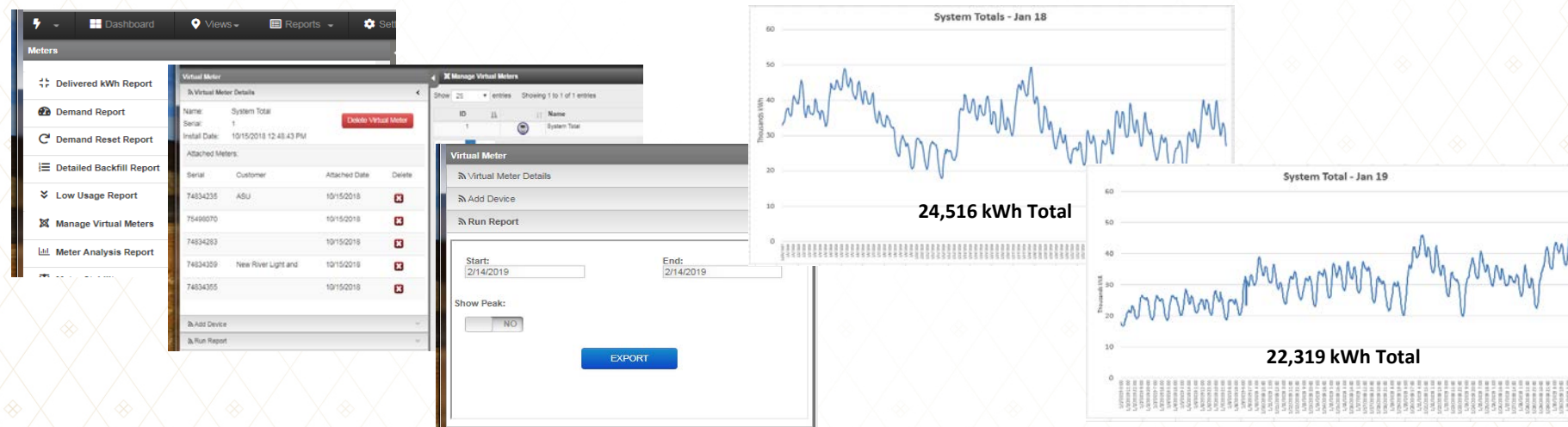
25yr lifespan
0.5% loss
225kva x .9pf = 202.5 kw
\$0.06/kwh
8,766hr/year

\$13,313 PV \$24,682 FV



Virtual Meters

- Jan 2018 - Used SCADA raw data & custom MSAccess database analysis
- Summer/Fall 2018 – Installed AMI meters at all 5 substations
- Jan 2019 – Used EcoOne virtual meter data
- Compare year over year and provide projected earning/cost based on MTD



Links

[NRLP Website](#)

[Customer Portal Introduction Video](#)

[ASU C.A.R.E. Center](#)

[E2e Project Article](#)

[ASU Energy Center](#)



Summary

- There are Positives and Negatives to implementing and AMI system
 - Classic “Dealing with change”
 - Identifying customer wants, needs, and greeds today and the future..
- Meter reading alone is NOT justification for AMI
- Staffing needs change significantly with the new technology
 - Fill new needs while finding the right place for existing staff.....
- Gains in customer information and outage notifications are helpful
- Data availability increases
- System Management – XFMRs, meters, voltage, etc.



Questions?

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Thank You

**Participate in conference discussions on Twitter:
#ECAC2019**



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