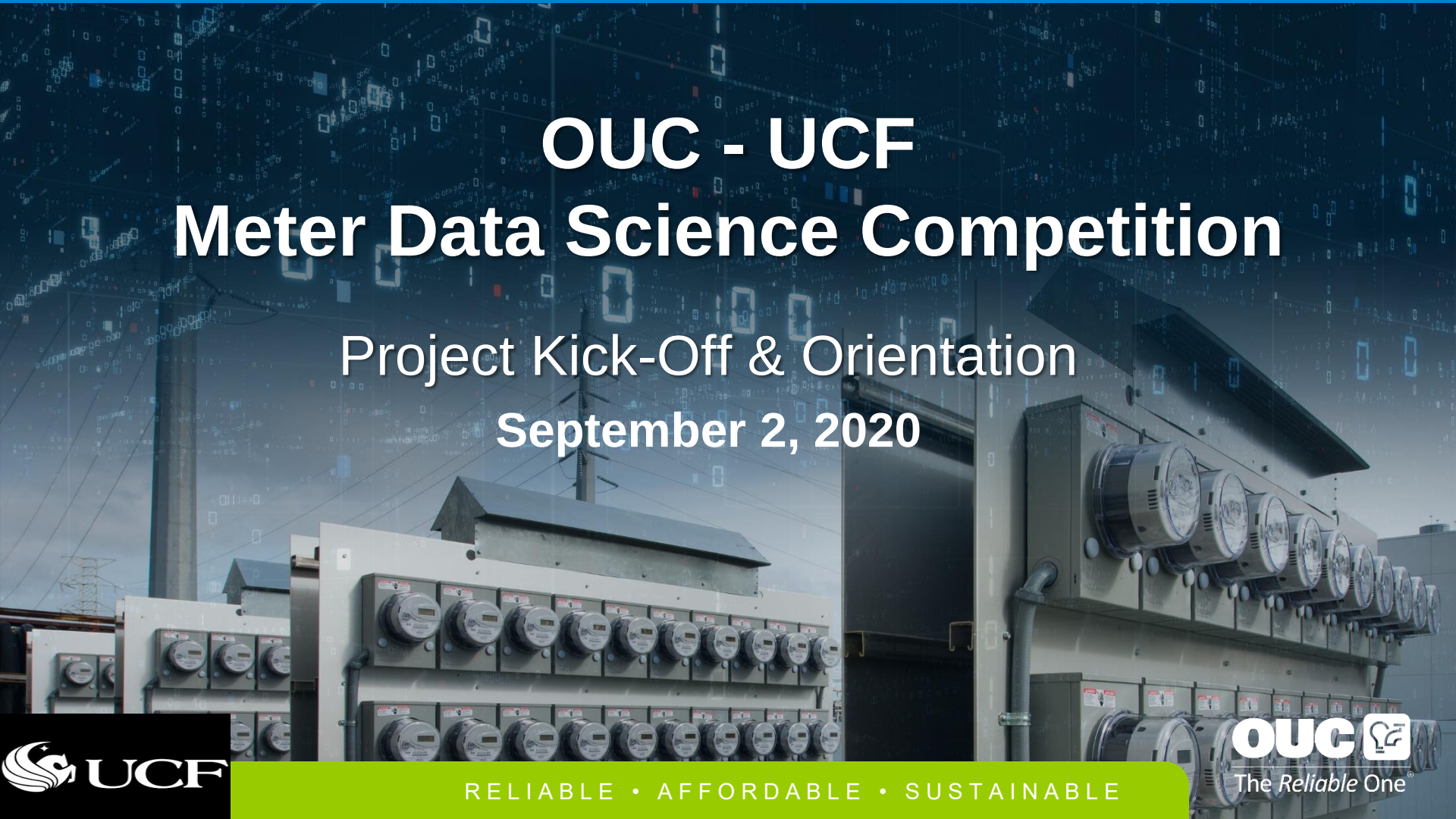


OUC - UCF
Meter Data Science Competition

Project Kick-Off & Orientation

September 2, 2020

UCF

RELIABLE • AFFORDABLE • SUSTAINABLE

OUC The *Reliable* One®

Today's Agenda

- OUC Team Introductions
- WebEx Logistics + Q&A Feature
- About OUC
- Competition Overview
  - Teams
  - Problem Statements (Use Cases)
  - Datasets (including 'Utility Ops/Jargon 101')
  - Structure (Tools)
  - Key Dates
  - Prizes
  - Points of Contact
- Final Questions

OUC Team

Eddie Fee – Director, Meter Services

- **Dawn Frye** – Manager, Smart Grid/Meter Data Management
- **Garr Williams** – Manager, Data & Analytics
- **Priscila Zardo** – Smart Utility Program Manager

Christin Caceres – Associate Data Analyst

Darren Reynolds – Analysis & Reporting Specialist

UCF Team

- **Shunpu Zhang, Ph.D.** – Chair & Professor of Statistics
- **Dr. Rui Xie** – Assistant Professor, Statistics & Data Science
- **Jennifer Branson** – Administrative Coordinator

WebEx + Q&A Logistics

- All student attendees have video automatically de-activated for this WebEx event.
- All student attendees have audio automatically muted for this event.
  - Only the event host can unmute student attendees.
- Questions can be typed in at any time during the presentation using the WebEx Q&A feature
  - Q&A panel should be on the right hand side of WebEx screen.
- Questions should be directed to 'All Panelists' (this is the default selection).

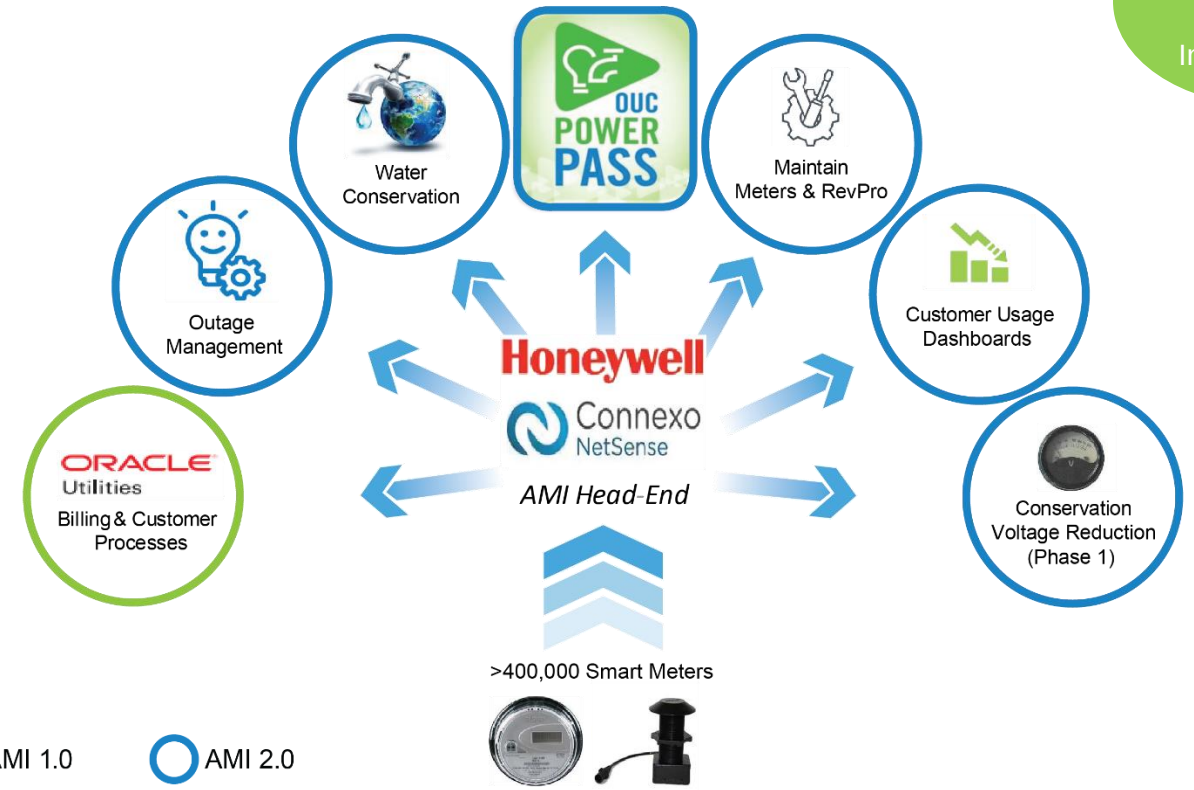
About OUC

OUC's Vision *is to be an innovative solutions leader and the partner of choice.*

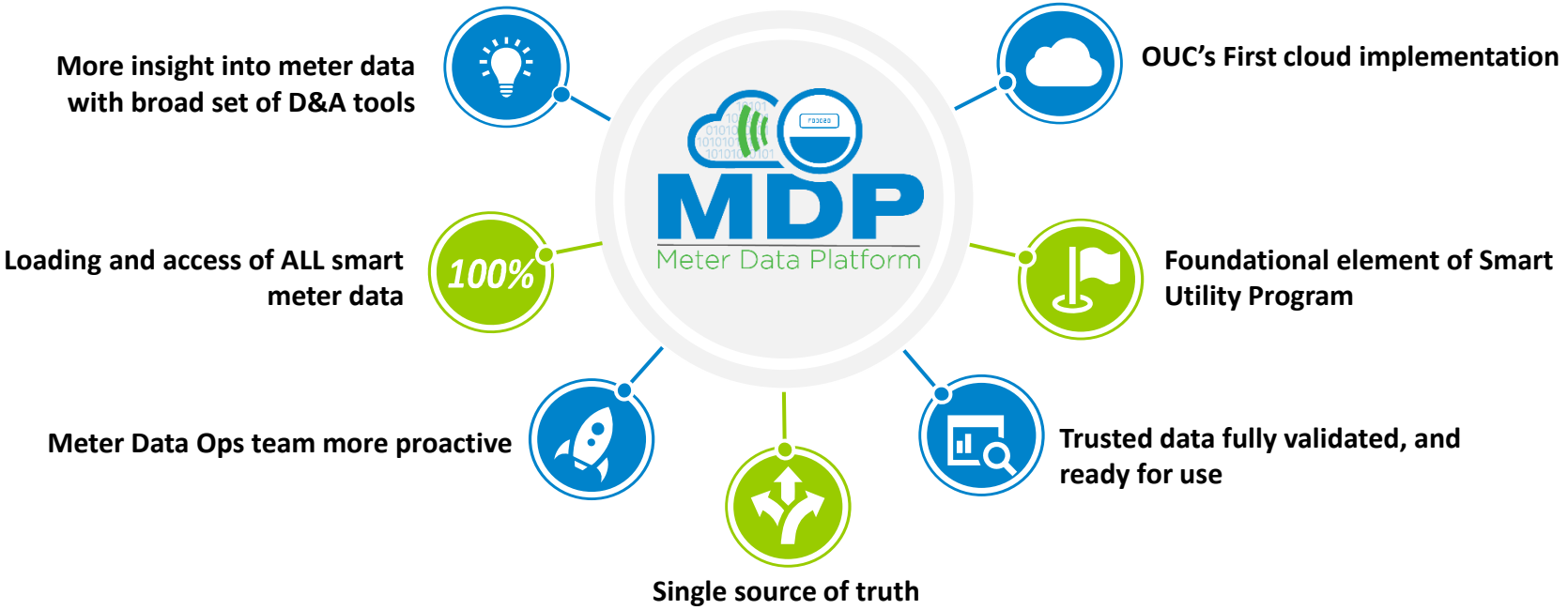
- '*Hometown Utility*' – providing electric, water, lighting & chilled water services
- Serve cities of Orlando & St. Cloud, and parts of unincorporated Orange & Osceola counties
- 2nd largest municipal utility in Florida
- 259,000 customers / 401,000 meters
- Ranked 1st in electric reliability since 1998 amongst all Florida utilities

OUC's Smart Meter Journey

AMI= Automated Metering Infrastructure



AMI 3.0 – Transition to Meter Data as an Asset



Meter Data Science Competition:

Overview

The Basics…

UCF student teams will get the opportunity to leverage real utility data sets and collaborate with utility ‘subject matter experts’ in order to help solve actual utility problems in a competitive format…

with cash prizes and bragging rights at stake!!

The Basics…

Teams

Students will ‘formulate’ teams

Minimum of (2), maximum of (4) students per team

Consider having cross-functional members for best results

UCF faculty members can assist with team formulation

Students must submit team member names by **9/11/20**

(to Rui.Xie@ucf.edu)

The Basics…

(1) of (2) unique problems (use cases) will be assigned

Regardless of the use case assignment, teams will:

- Create tools and models to address the findings and results of their use cases, consistent with OUC needs
- Document and present processes, justifications and instructions of tools and models used
- Present final findings and tools in layman's terms to OUC employees

Team Use Case Assignments will occur on (or before) **9/15/20**

Meter Data Science Competition:

Problem Statements

Problem / Use Case – 1 of 2 (EVs)

With the increased penetration of electric vehicles (EVs), OUC is looking to take a more proactive approach to supporting local EV infrastructure needs, leveraging revenue opportunities & anticipating impacts to the electric grid.

OUC needs the ability to disaggregate customer load (usage) in order to identify the addition of EVs within our service territory and...

- Predict future EV penetration by geographic area (planning for charging infrastructure deployment).
- Identify distribution transformers most heavily impacted by current & forecasted EV penetration.
- Offer EV rebates and target market other OUC programs and products (i.e. rooftop solar) to this customer segment.
- Extend the model used to identify EV load profile signature(s) for identification of other common, household loads.
- Understand how time-of-use and other pricing signals may change customers' EV charging behavior.

Problem / Use Case – 2 of 2 (Theft)

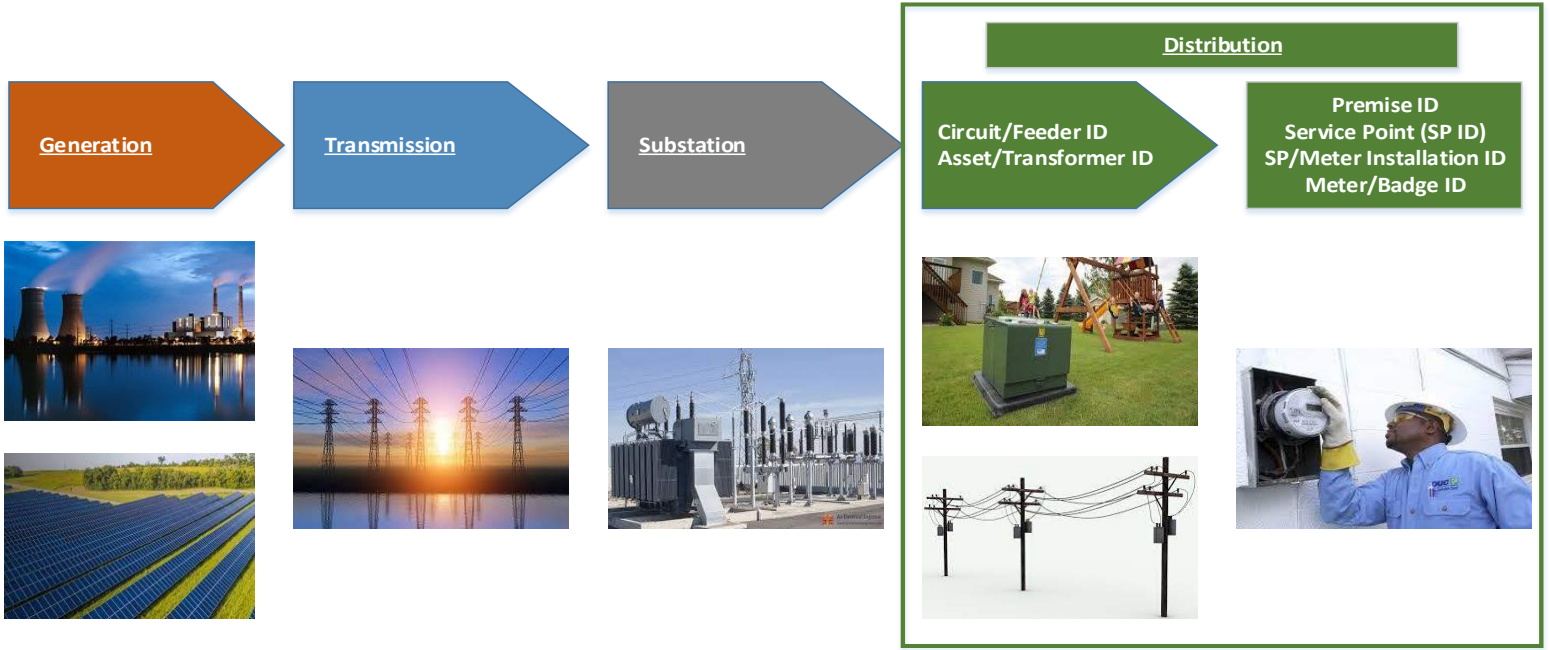
While OUC's smart meter events have proven effective in identifying the most common, simplest forms of electric theft/tampering…there are more complex types of theft/tampering that require advanced analytics to identify them.

OUC needs the ability to identify outliers in order to identify more complex electric theft/tampering that typically does not trigger a meter alarm and…

- Calculate & leverage electric-to-water usage ratios to identify outliers by region, subdivision, etc.
  - …or where water usage is not available, compare nearby, like premises to identify outliers
- Identify and incorporate other contributing factors (correlations) that increase the likelihood of theft/tampering at a particular premise, region, etc.
- Provide visualizations, scoring indexes and other outputs that allow OUC's Revenue Assurance team to effectively prioritize field investigations and create documentation to be used for accurately calculating revenue losses.

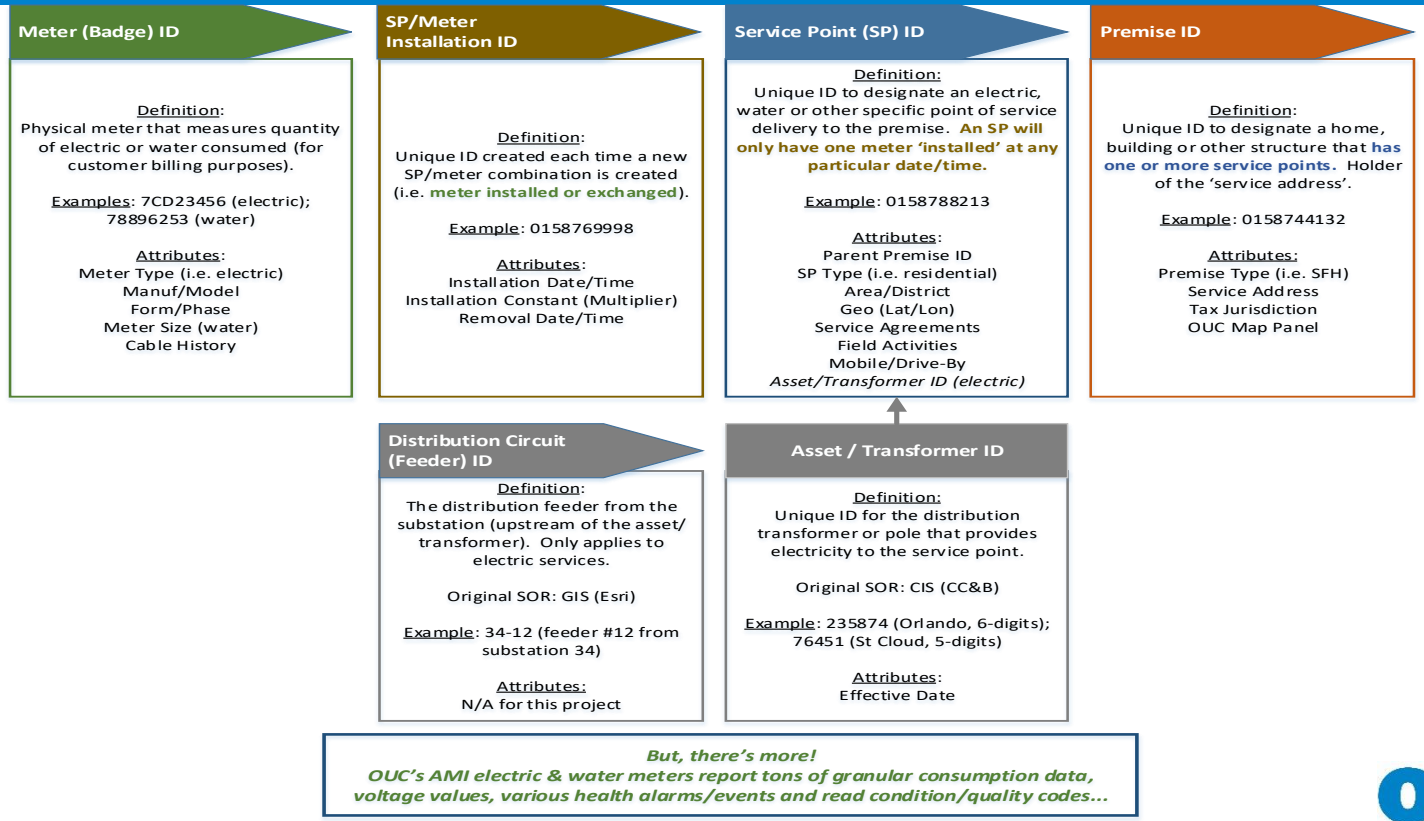
How Can Data Science & Analytics Solve These Problems?

Summary of a vertically-integrated utility



Note: Data model for water is limited, primarily to premise-to-meter/badge connectivity

How does this translate into utility data?



Datasets – from AMI meters

Usage/Consumption

- Electric:
  - Daily kWh & kW readings

  - Interval consumption (kWh unit of measure); 15-minute increments
- Water:
  - Daily gallon readings

  - Water interval consumption (gallon unit of measure); hourly increments
  - Only available for ‘network’ (not drive-by/mobile) area; ~2/3 of total water meter population

Datasets – from AMI meters

Operational

- Voltage interval values; 15-minute increments
  - Includes single and three phase data
- Various events/alarms/codes reported by AMI meters & modules
  - Meter/module health indicators
  - Read condition codes
  - Power quality checks
  - AMI network/LAN communication stats
  - PON (Power Out Notifications) & PRN (Power Restore Notifications)

Examples

Additionally, OUC will provide reference examples of previously, confirmed or known cases for either EV (Use Case #1) or Advanced Theft (Use Case #2) for students to utilize and reference in building of tools/models.

Structure (Tools)

OUC is limiting the use of tools for deliverables, to ensure success in being able to operationalize and maintain these solutions after the competition.

- Basic Tools
- Visualizations
- Data Science

Key Dates

September 3, 2020

OUC will provide copy of Kick-Off/Orientation slide deck (+Q&A)

September 11, 2020

Student Team Member names submitted to Dr. Rui Xie

September 15, 2020

UCF will assign teams 1 of 2 use cases

September 16, 2020

Competition Start

OUC shares all required data, reference examples & data catalog

Key Dates

January 8, 2021 (tentative)

Cut-Off Date for Submitting Questions

February 1, 2021

Submission Deadline

February 2021

(exact dates/location tbd)

UCF Student Team Presentations to OUC Team

March 18, 2021

Winners Announced @ the Big Data Analytics Symposium

***Monthly, virtual checkpoints will occur between the project start date and cut-off date for teams to ask the OUC team questions, in addition to consulting with the UCF liaison(s) throughout the project.*

Prizes

<u>Use Case 1 (EVs):</u>

1st Place - $2,500

2nd Place - $1,500

3rd Place - $500

<u>Use Case 2 (Theft):</u>

1st Place - $2,500

2nd Place - $1,500

3rd Place - $500

Points of Contact

General/Liaison (OUC)

Dawn Frye (DFrye@OUC.com)

Liaison/Reporting/Activities (UCF)

Dr. Rui Xie (Rui.Xie@ucf.edu)

Use Case #1 (EVs)

Christin Caceres (CCaceres@OUC.com)

Use Case #2 (Theft)

Darren Reynolds (DReynolds@OUC.com)

Questions