



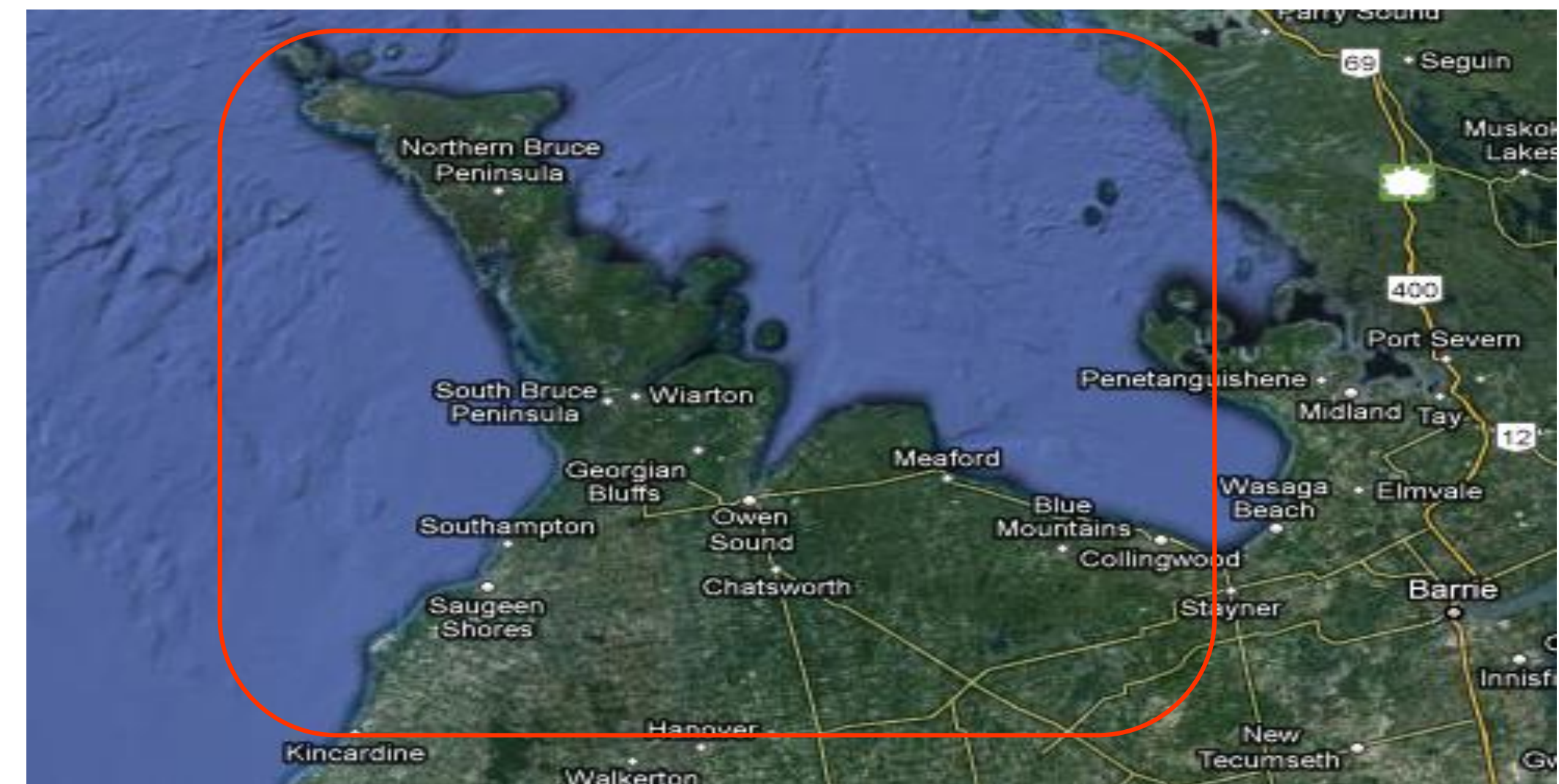
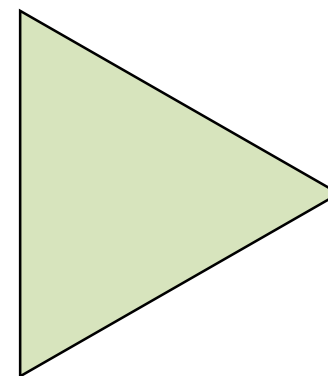
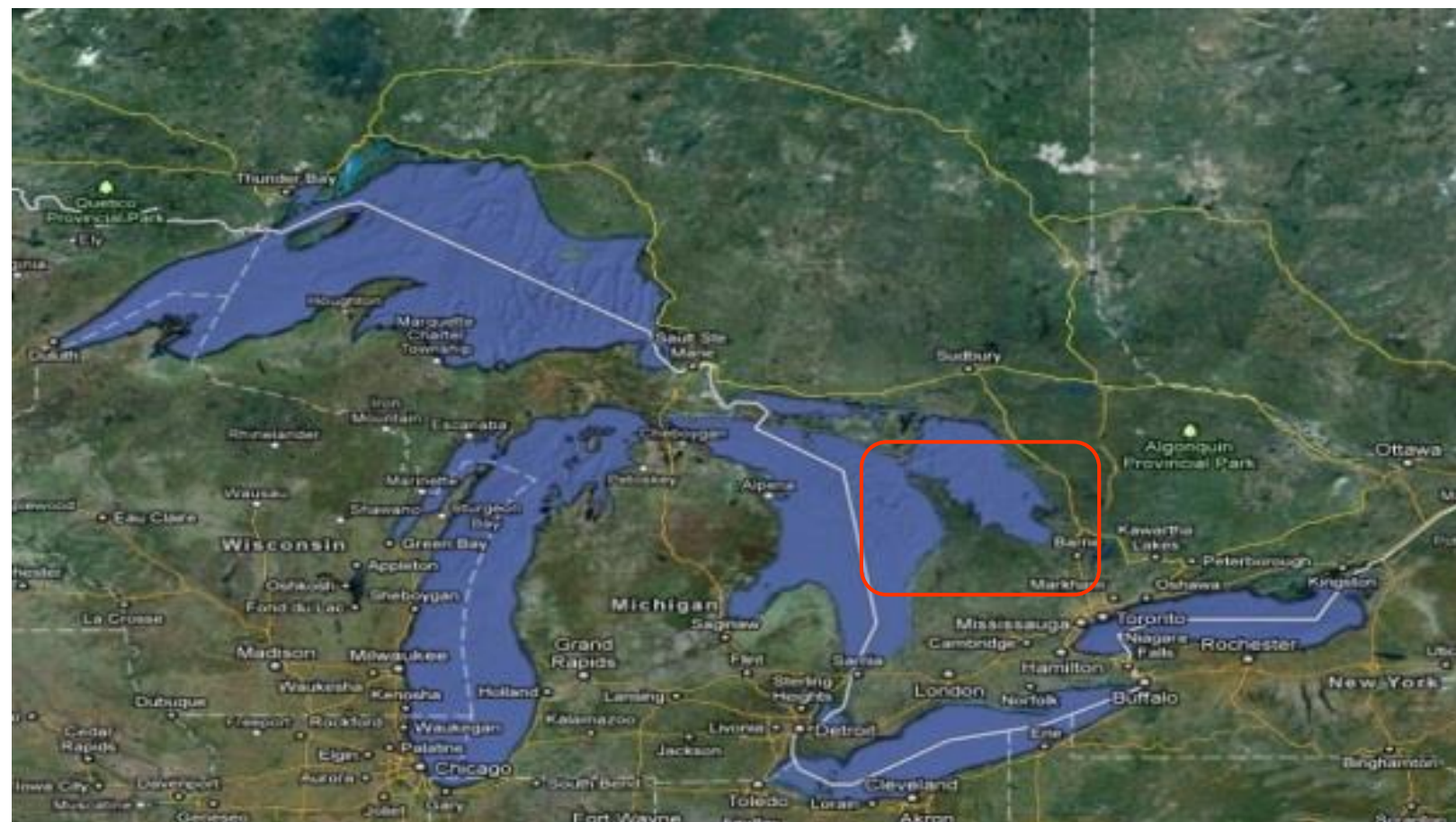
BUILDING A SMARTER GRID



Distribution Modernization

Ryan Boudreau, P.Eng

- In 2010 we embarked on a journey to build an **Advanced Distribution System (ADS)** in the **Owen Sound** area.
- This was a trial of modern technologies in one pilot area, so we could learn how to best modernize the rest of the Dx system.
- Owen Sound had the “goldilocks” mix of customer density, weather, terrain, and DG types.



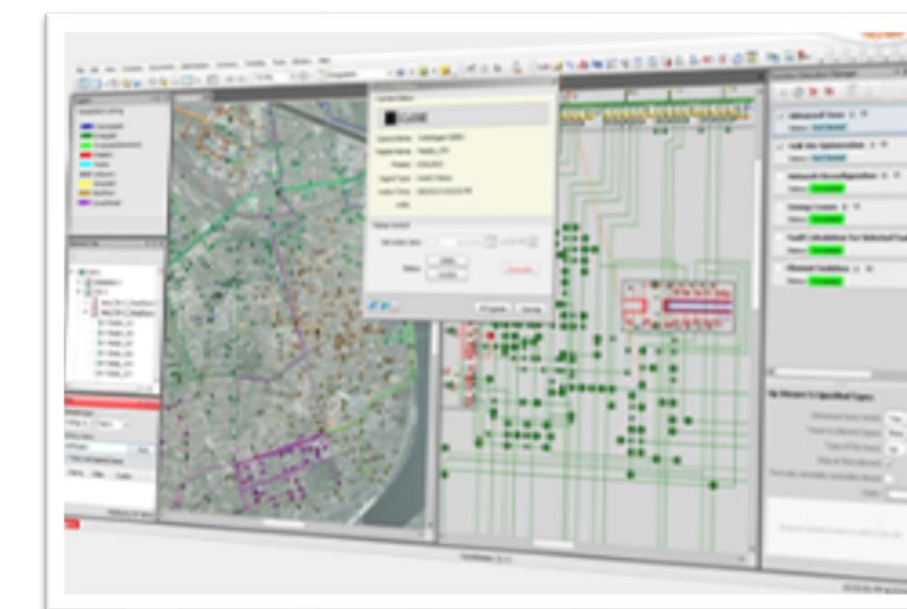
Owen Sound Pilot

We Built / Deployed...

- A **DMS** for the OGCC
- **WiMAX** for communication
- An **IEC 61850 substation**
- **Line sensors** from multiple vendors
- **Remotely operable switches and reclosers** from multiple vendors
- A few other technologies including modules for control of **DGs and load shedding**.



27 kV Gridshield Recloser
w/ RER620 Controller



44kV Joslyn VBM Switch



Old Controller New Controller
44 kV Regulating Station Controller Upgrade

- **DMS** works great, but requires a critical mass of devices to be truly useful
- **WiMAX** worked, but it was very expensive to build a private communication network exclusively for Dx Modernization
- **61850 substation** was challenging: It requires new processes and a change in methodology, but could be a highly economical alternative for the future.

- **Line sensors** do have value, mostly as fault locating devices. Voltage precision leaves something to be desired.
- Sectionalisation (via **remotely controllable switches** and **reclosers**) can have a significant positive effect on reliability!
- Not all products pan out (44kV reclosers are not performing acceptably)

1. Complete final scope from ADS

- Final **vendor** selection for future Distribution Automation (DA) products
- Build up **Standards** and **Procedures** to support the rollout of DA devices province-wide
- **Upgrade the DMS** as it has already reached end-of-life
→ *5yr lifespan is normal for IT assets*
- Leverage **AMI data** for operations and Asset Management purposes.
- Add a **DERMS (Distributed Energy Resource Management System)** product to provide:
 - Real-time capacity management on our grid
 - The ability to accept new requests to connect without requiring the expensive addition of grid capacity – increases capacity factor of existing assets!

2. Deploy new Dx Mod assets, 3 categories:

- **Enable our existing smart devices into the DMS**
 - D60 relay fault data, existing electronic reclosers.
 - These are one-time investments.
- **Replace end-of-life assets with modern, DMS-capable versions.**
 - Cobden, Mattawa, Viper reclosers in DSs ...
- **Deploy sensors and remotely operable switches and reclosers using a Worst Performing Feeder model.**
 - At least 30 feeders each year.



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2018 At a Glance (Draft Schedule)



Standards,
Work Practices,
Procurement

Retrofit of 148 Existing Reclosers for 27.6 & 44kv

37 27.6kV Reclosers & Self-Healing

Leamington

S&C Aldutirupter
6801M 44kV Switches

Cobden

Automation

21 Reclosers &
142 New Switches
on WPFs

S&C Intelliteam Trial

Mattawa

Fault
Location

375 Sentient
Line Sensors

331 New CFCIs
On WPFs

Update to 400 GE D60 Relays (Fault Magnitude)

DMS 3.2 Network
Model Validation

Integration of Smart
Meter Data into ORMS

System
Enhancements

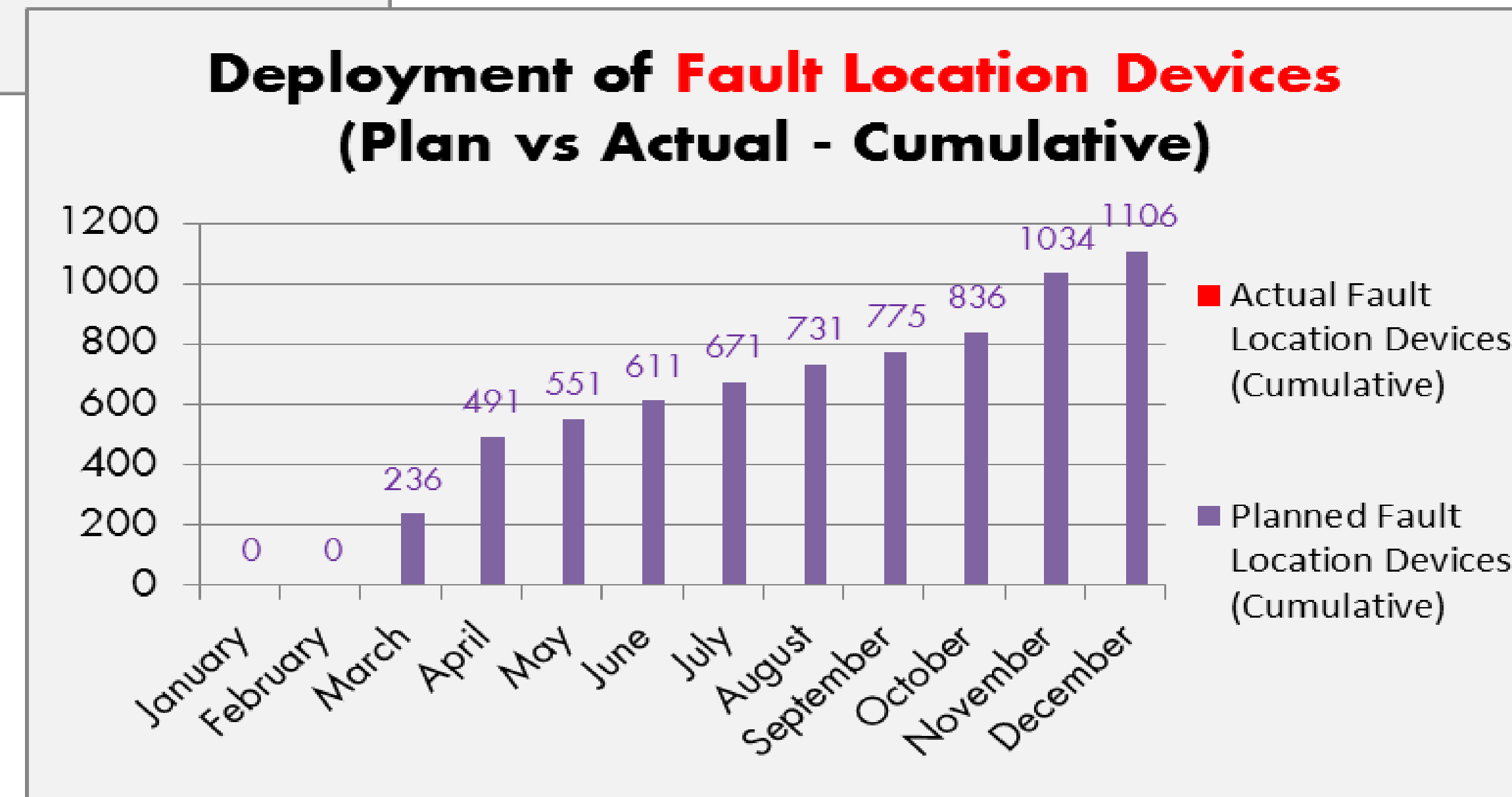
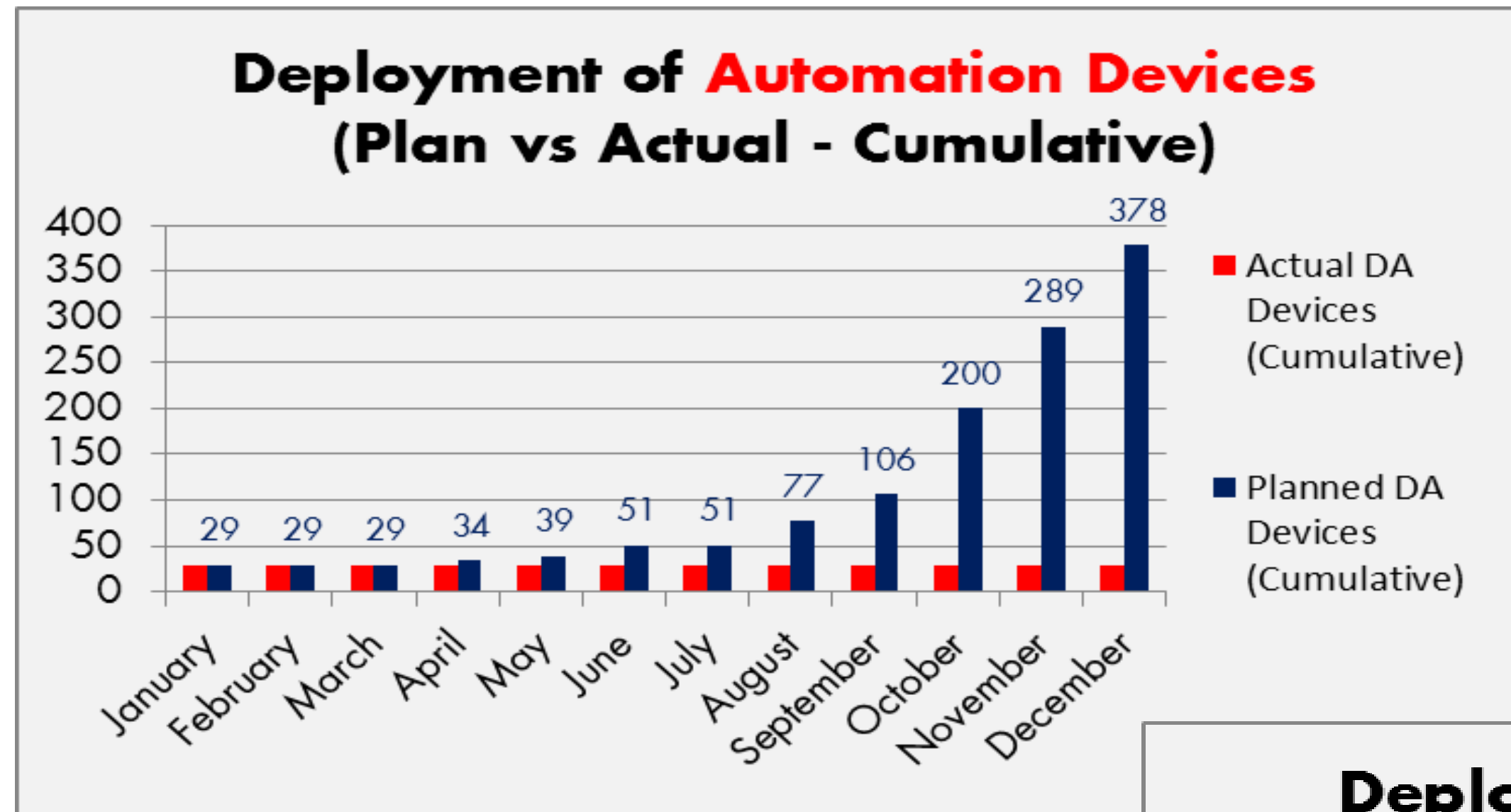
DMS Upgrade to 3.7

DERMS & Connection of Leamington Greenhouses



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2018 Draft Schedule: Month over Month





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Future Plans

Deploy new Dx Mod assets and enable advanced technology:

- Deploy a **mobile DMS** so field crews can see live status of devices.
- Deploy **battery storage microgrids** at selected site to improve reliability and customer service.
- Enable **FLISR (Fault Location, Isolation, and Service Restoration)** in closed-loop (automatic) mode within the DMS.
- Look for opportunities to integrate “**Grid Edge**” devices, such as **Electric Vehicle battery chargers**, into the DERMS or DMS.
- Leverage the **future AMI communications network** for communications between DA devices and the DMS.

THANK YOU



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