Seattle City Light
Outage Management System

May 2014

Objectives for this Presentation

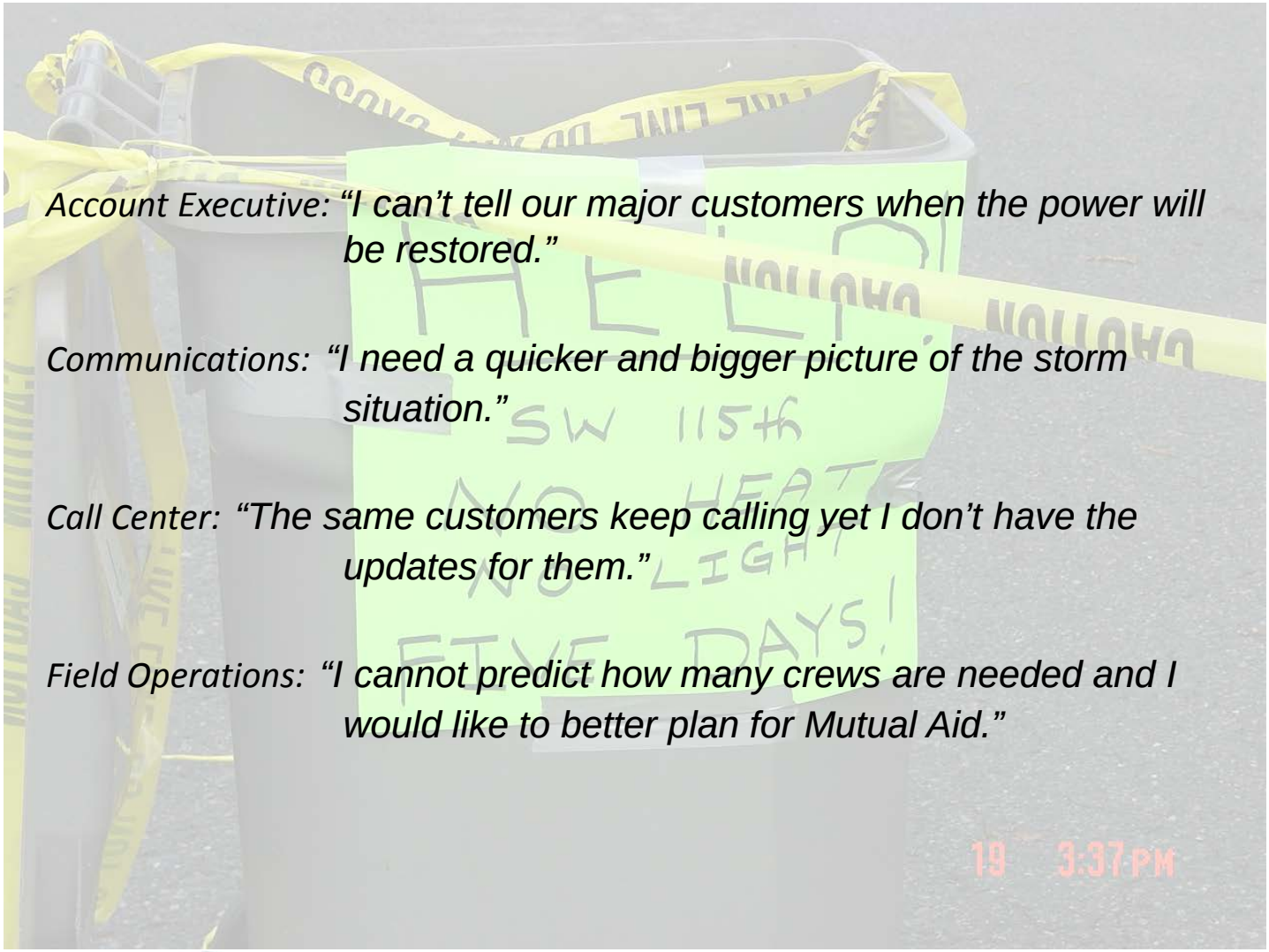
- Overview of the drivers for the Outage Management System
- Describe the system and the implementation
- Summarize the lessons learned
- Going forward

Seattle City Light

- **Service Area Population** 780,800
- **Service Area Size** 131.31 sq. mi.
- **Personnel** 1,811
- **Meters** 410,474
- **Customers**
  - **Residential** 362,572
  - **Non-Residential** 39,964

- **Major Substations** 15
- **Unit Substations** 5
- **Commercial and Industrial Substation Transformers** 57
- **Transmission Circuit Miles** 656
- **Distribution Circuit Miles** 2,308

Remember the Storm of 2006?



Account Executive: *"I can't tell our major customers when the power will be restored."*

Communications: *"I need a quicker and bigger picture of the storm situation."*

Call Center: *"The same customers keep calling yet I don't have the updates for them."*

Field Operations: *"I cannot predict how many crews are needed and I would like to better plan for Mutual Aid."*

Scope of Damage and Repairs

- 49% of customers lost power
- 65 feeders were down
- 89 poles down
- 34 miles of wire down

- 100 transformers replaced
- 40 line Crews mobilized and 10 tree crews
- 58,00 hours logged over 8 days for restoration operations

2006 Storm Event

Recommendations from post storm evaluation

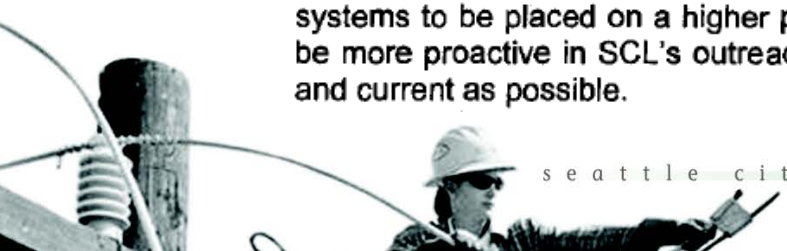
LT-1.1 Acquire and implement Outage Management System (OMS)

- Implementing an OMS has several advantages, both for day-to-day operations and during a major restoration. The benefits during the restoration include: integrated update of published restoration updates

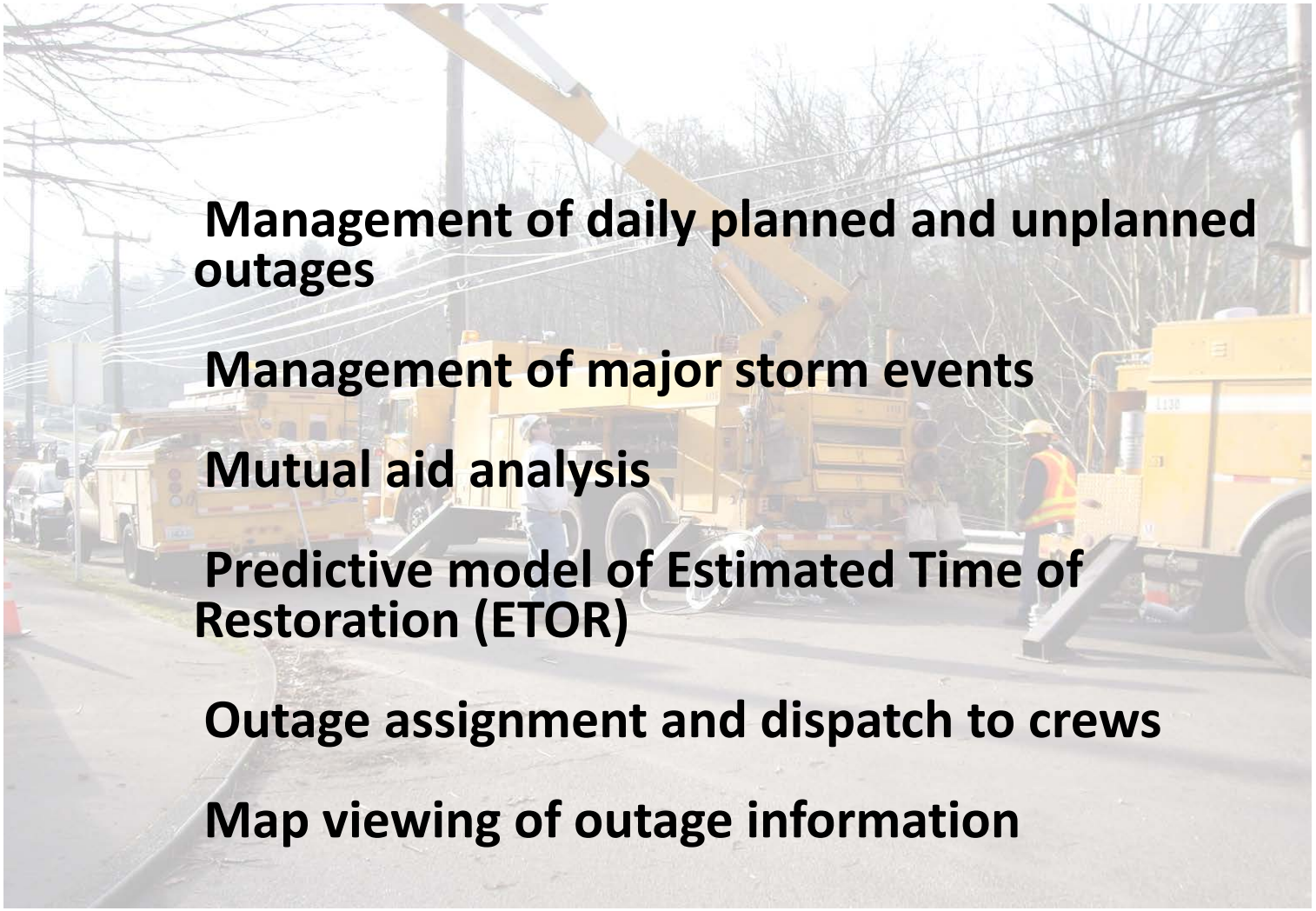
ESF-12	Department Operations Center	Establish a permanent Department Operations Center	SCL Division of Security and Emergency Management	12/
ESF-12	Outage Management System	Develop and implement an Outage Management System	SCL Division of Security and Emergency Management	
ESF-12	Identification of key customer's interdependencies,	Conduct joint review of key customer's emergency plans	SCL Account Executive Office	4/3

SPECIAL DISASTER MANAGEMENT COMMITTEE REPORT

- SCL needs to develop and implement an Outage Management System that can enable them to better identify specific areas of outage, and be able to inform customers when they can expect to see their power restored.
- Conduct joint review of key customers' emergency response plans in order to identify respective interdependencies, state of preparedness and response expectations.
- Review current Code 1 program that allows customers on medical support systems to be placed on a higher priority level of restoration, and specifically be more proactive in SCL's outreach efforts to ensure the list is as complete and current as possible.



Key Functionalities



- Management of daily planned and unplanned outages
- Management of major storm events
- Mutual aid analysis
- Predictive model of Estimated Time of Restoration (ETOR)
- Outage assignment and dispatch to crews
- Map viewing of outage information

Benefits of OMS

Internal Benefits

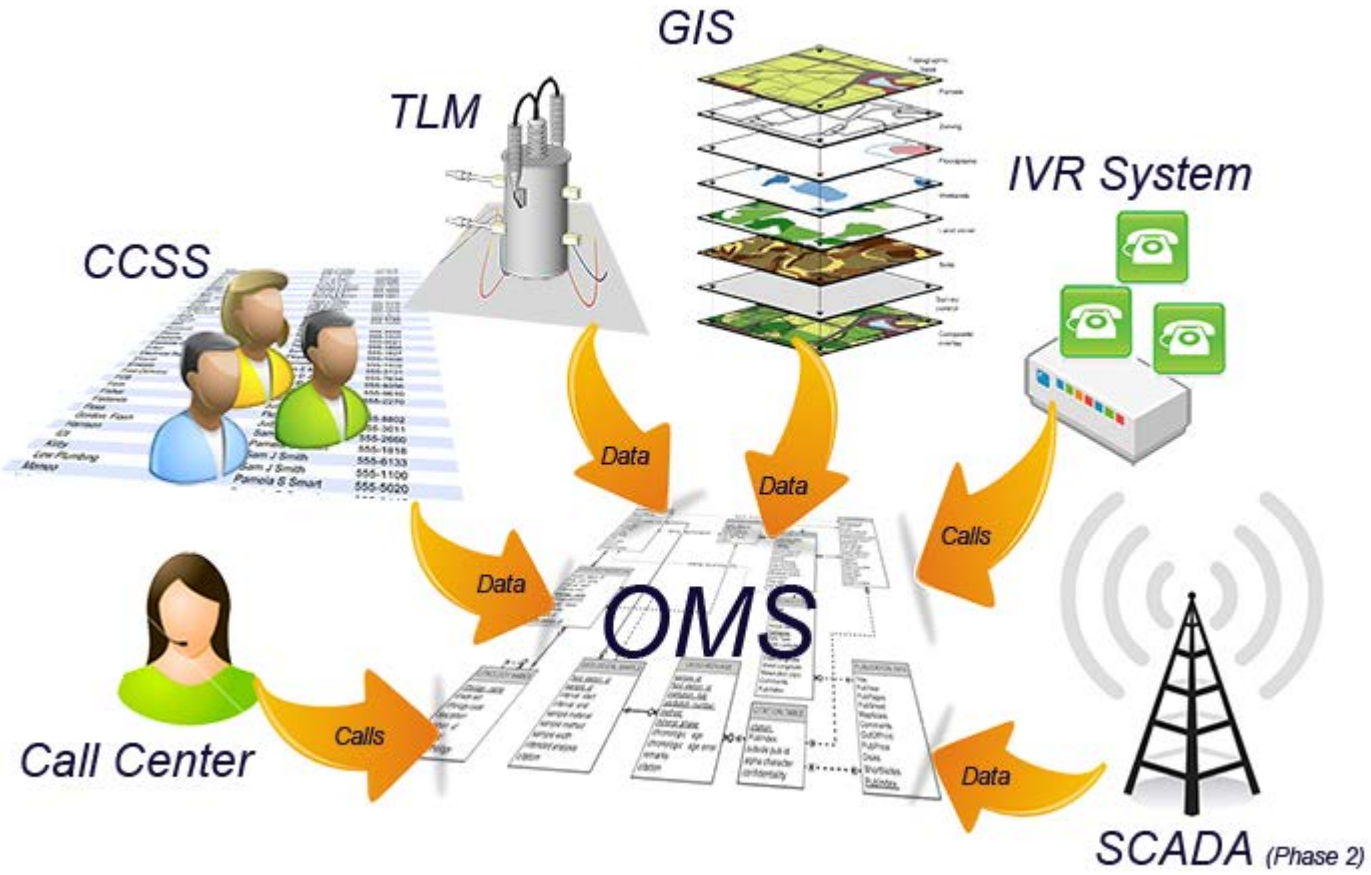
- Enables a Utility wide view of outage restoration activities
- Sorts and prioritizes outage information automatically
- Includes "predictive" engine to refine *ETOR
- Optimizes dispatch of crews

Customer Benefits

- Provides more current information about an outage or service call
- Provides improved *ETOR to customers
- Supports better use of the **IVR system for outage information
- Provides for customer call backs when requested
- Reduces restoration times for major storm events

** ETOR = Estimated Time of Restoration*
*** IVR = Interactive Voice Response*

Data and System Integration



Service Alerts for Major Customer

Major Customer Outage Notification

Generated by SCL Service Alert on **11-02-2010 18:48:16**

A Real Device Outage (RDO) has been detected on device **BKR2638** in the following location.

Region: S
Substation: SOUTH
Feeder: 2638

The following summary information was provided for this event.

Event Number: 2338
Outage Type: Real Device Outage (RDO)
Number of Calls Received: 0
Total Number of Customers Affected: 2
Critical Care Customers Affected: 0
Key Customers Affected: 1
Life Support Customers Affected: 0

Major Customer(s) Affected

Name	Address	Client Type	Contacts	Meter ID	Critical	Key	Life	Account Number
King County Transit	533 5TH AVE S UNIT TUNNEL	Undetermined	Phone Instructions: Phone Information: Sequence / Phone Number / Extension / Phone Type / Call Time: 1 / . / / Office / Anytime 2 / . / / Office / Anytime 3 / . / / Office / Anytime		N	Y	N	

Device Attribute(s)

Attribute ID	Attribute Name	Attribute Value

Group(s) Notified
SA_AEO, SA_DL_test, SA_EDO_CREW, SA_Triage

System Status Map

Capabilities Gained

- Outage map visible to all customers to see current outages, predictions for restoration time, and causes of the outage.
- The dispatchers update the OMS including the maps as the operators record device operations, record causes, and estimate restoration time.
- IVR provides outage status, estimated restoration time, allows them to report outages that go directly into the System, allows callbacks when power is restored.
- OMS provides faster outage information to users outside of the System Control Center to avoid calls to them during outages.
- Alerts go out instantly to Utility personnel as outage calls come in and the system groups outages to devices, thus predicting scope of the outages.

Some Challenges to the Project

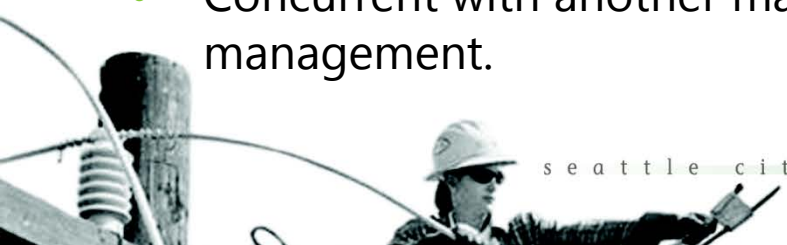
- Aggressive project schedule
- Many new technologies implemented eg, for the integration points, Service Oriented Architecture.

- City Light had 2 Geographical Information Systems one an ESRI system for the looped radial distribution system and a home gown system for the downtown network. Only one was implemented.

- The model build process takes an extensive amount of time due to an old integration and laborious extract, load and validation process.

- Inadequate BI tool, so system didn't provide viable reports; result redundant entries for the dispatchers.

- Concurrent with another major implementation for work and asset management.



Lessons Learned

- Training:
  - best developed with user involvement
- GIS incremental build
  - should have been tested earlier in the process.
- Staffing
  - determine who should manage further development of the process and the product after go live. Permanent position should have been created from business groups.
- Processes
  - Should be reviewed and continually improved e.g., the ETOR updating process.

More lessons learned

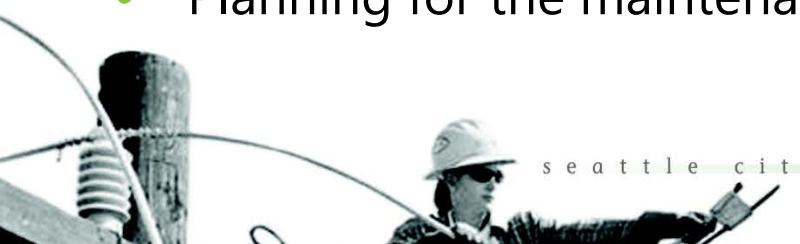
- Business Intelligence:
  - Verify the functionality that the vendor is promising early on in the project. You don't always get what you thought you were getting!
  - BI is technically challenging and it's hard to get vendor support with BI expertise.
  - BI should have been an integral part of the original planning
  - Reporting should have been part of project design work

Planned and Current Implementations

- Upgrade OMS to version 1.12 — *implement 2016*
  - Switching module
- Upgrade looped radial GIS — *implement 9/14*
- Upgrade Network GIS — *implement 12/14*
- Enterprise GIS: unify both systems — implement *2018*
- Energy Management System — *implement 2016*
- Mobile Workforce — *implement 2016*
- New billing system — *go live 10/15*
- Meter Data Management — *go live 10/15*
- Automated Metering Infrastructure — *implement 2017*
- Autocad Utility Design — *implement 2016*
- Substation Automation — *implement 2015-2020*

Challenges of Moving Technology Targets

- Challenge for internal resources
  - Will need more technical people and seasoned project managers
- Integrating the projects to minimize impact; planning for dependencies between them
- Budgetary strain
- Managing numerous vendors and contracts
- Planning for the maintenance of all these systems – how to staff?



Final Points

Your implementation date is just the beginning-the seed that you are planting to modernize your operations and better serve your customers

You need to continue to develop

your people

your technology

your business processes.