

SCTE ISBE CABLE-TEC
EXPO'16

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Enterprise Wide Metrics for Telecommunications Operators

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 #CableTecExpo

Essential Knowledge for Cable Professionals™

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SCTE Energy 2020 Goals

- **Improve Energy Consumption 20% on a unit basis**
- **Improve Energy Cost 25% on a unit basis**
- **Optimize Critical Facilities and Data Centers by 20%**
- **Reduce Grid Dependency by 10%**

Energy KPI's?



Metrics Needed to Measure Progress

- **MSO Baseline Group created for this task**
- **Metric focus = Meaningful + Simple**
- **Group Developed and agreed metrics + data collection process**
- **Industry Performance to be published**
- **Process Documented in EMS-030**

Improve Energy Consumption 20% on a unit basis - Consumption Metric

- Similar to SCTE 211 and 213
- Standards based (GRI G4-EN5)
- Reported by AT&T, LGI and others
- Improvement when number goes lower

$$\frac{\text{Total kWh in year}}{\text{TB Throughput in Year}} = \frac{\text{kWh}}{\text{TB}}$$

Consumption Metric

Total kWh in Year

- Includes ALL MSO Usage
- Most data found in utility bills
- Estimation needed for
 - Un-metered OSP PS's
 - Shared facility space
- SCTE 212 provides guidance

TB Throughput in a Year

- Network Routers primary source for data
- Tracked for operational purposes
- Estimation for Broadcast included
- Challenge is counting everything, but not double-counting!

Improve Energy Cost 25% on a unit basis

- Cost Metric

- Typically not reported
- Limited precedent
- Focused on financial options
- Chose to use % Opex as Energy Cost is Opex
- Improvement as number goes lower

$$\frac{\text{Total Energy Cost in Year}}{\text{Total Operating Expense}} = \%$$

Cost Metric

Total Energy Cost in Year

- Includes cost for all consumption
- Tracked in company financial accounts
- Fallback to utility bills
- Includes all benefits of off-grid and off-sets

Total Operating Cost

- Tracked by company as part of financial reporting
- Use Opex as defined by GAAP, and used in EBITDA calculations
- For public companies, this is available in company annual reports

Optimize Critical Facilities and Data Centers 20% - Facility Optimization Metric

- Individual Facility Metrics Common
- Variety of options
- Metric Agreed with E2020 Facility Classification Group
- Similar to SCTE 213 sub metric
- Lower is better

$$\frac{\text{Total Critical Facility kWh in year}}{\text{Primary Service Units}} = \frac{\text{kWh}}{\text{PSU}}$$

Facility Optimization Metric

Total Critical Facility Energy in Year

- Subset of Total Consumption
- Includes Company Data Centers
- May need to estimate shared facilities if not separate meter
- SCTE 212 provides guidance

Total Primary Service Units

- Tracked by company as part of financial reporting
- Sum of Internet, Telephone, and Video units
- Includes residential and commercial customers
- For public companies, some form of this available in company annual reports

Reduce Grid Dependency by 10% - Off-grid Metric

- About being green and improving reliability
- Reporting total off-grid capacity built typical
- If %, includes off-grid and grid purchased green

$$\frac{\text{Total Off-grid Capacity Built}}{\text{Total Power Capacity}} = \%$$

Off-grid Metric

Total Off-grid Capacity Built

- Solar, Fuel Cell etc. capacity in MW
- Separate from the grid
- Must be connected and/or connectable to company facility
- Green certificated and/or off-set do not count

Total Power Capacity

- Total kWh number in consumption metric converted to average MW power demand across the year
- SCTE 213 provides guidance on conversion if needed

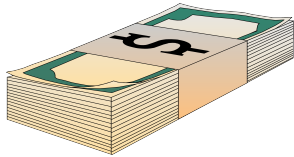
Metrics to Track Goal Progress

Data Collected

Total kWh	Off-grid MW
Total Electricity Cost	Total PSU's
TB Data Thru-put	Total OPEX
Critical Facility kWh	

Metrics

Energy Consumption = kWh/TB
Energy Cost = Energy Cost as % Total OPEX
Optimize Facilities = Critical Facility kWh/PSU
Grid Dependency = % of Total Energy Capacity (MW) from Off-grid Sources



Challenges

- Companies have experience collecting data and calculating metrics/KPI's for Operations, Network Performance, etc.
- Just not for Energy Performance
- Greatest challenge is energy data availability

Network Availability

Average Customer Care Call Time

ARPU

Average Mbps

% Calls Answered in 20 sec

% Faults Solved w/o Truck Roll

Installs/day

Truck Rolls

Challenges

Consumption

- Number and type of bills
- Estimating Un-metered OSP PS's

Throughput

- Where in company to find it
- What to include and what not
- Avoid double counting
- Estimating Broadcast

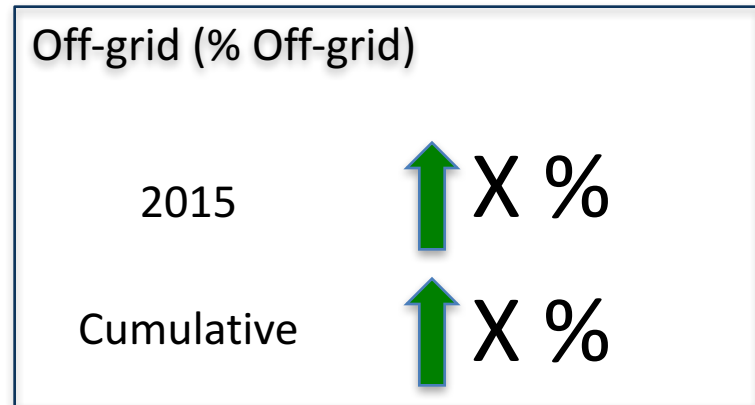
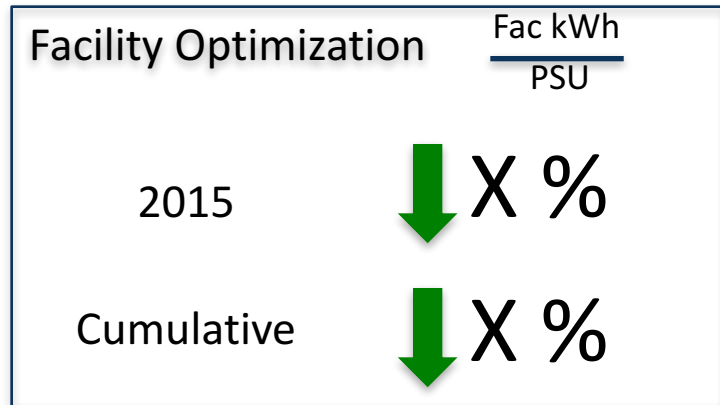
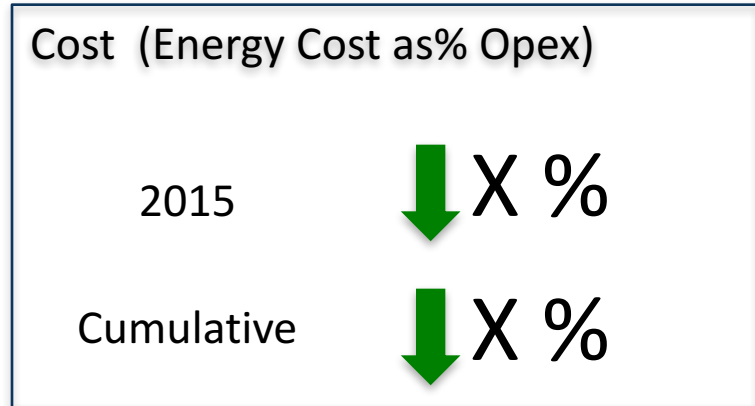
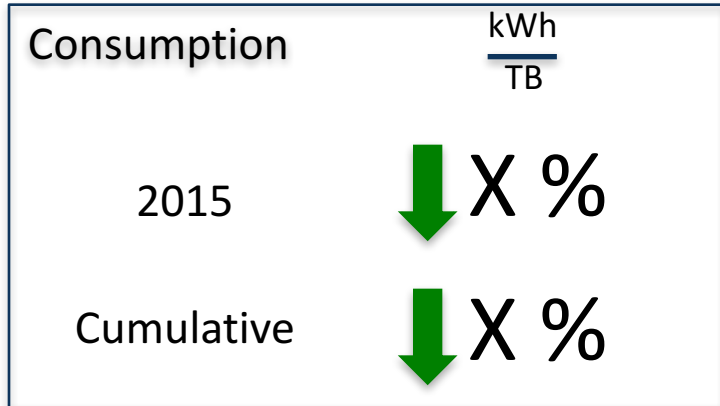
Facilities

- Separating facility usage from total
- Separating usage in shared usage facilities

Off-grid

- Finding all implemented and planned
- Determining true off-grid vs. off-set

Dashboard



Evolution

- Initial Four Metrics good starting point
- Metrics evolve as more and different data becomes available
 - Facilities: Rack, Square Feet, Average PUE, Consolidation metric etc.
 - Off-grid: Green Certificated, % Green
 - Financial Cost per kWh, Revenue related, etc.
- Sustainability world moving to Carbon based goals and metrics
 - Carbon Intensity, CUE, Carbon/user, etc.
- Carbon provides ability to aggregate all forms of energy usage (electricity, fuel, etc.) into single goal and metric

198

Billion Pageviews ?

+15% ▲

4,486

-4% ▼ Pageviews per kWh

44

Power GWh ?

+19% ▲

INFRASTRUCTURE

ENERGY SUPPLY ?

CLEAN ENERGY

0.7 %

DATA CENTER EFFECTIVENESS ?

PUE

1.57

-2% ▼

INFRASTRUCTURE LOAD ?

ACTIVE BUYERS

131

Million

+13% ▲

GRID

99.3 %

WUE

2.91

L / kWh

-8% ▼

SERVERS

52,533

+19% ▲

CUE

1.08

kg CO2e / kWh

+4% ▲

POWER

20.2

MW

+19% ▲

BUSINESS KPIs

REVENUE ?

PER ACTIVE BUYER

\$12.04

-2% ▼

COST ?

PER ACTIVE BUYER

8 %

+8% ▲

CARBON ?

PER MILLION ACTIVE BUYERS

184

Tonnes

+21% ▲

PER SERVER

\$29,981

-7% ▼

PER SERVER

2 %

+2% ▲

PER SERVER

0.46

Tonnes

+15% ▲

PER MWH

\$35,617

-7% ▼

PER MWH

2 %

+2% ▲

PER MWH

0.55

Tonnes

+15% ▲

Questions?



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