Northwest **Power** and **Conservation** Council

August 8, 2017

MEMORANDUM

TO: **Power Committee**

FROM: **Charlie Grist, Manager Conservation Resources**
Kevin Smit, Senior Analyst

SUBJECT: **Update on Action Plan Item MCS-2 – Distribution System Efficiency**

BACKGROUND:

Presenters: Charlie Grist, Manager, Conservation Resources, Council Staff
Tony Koch, EE Engineer, Bonneville Power Administration

Summary: Mr. Grist will provide background and a summary of Action Plan Item MCS-2. Mr. Koch will provide more detail about distribution system efficiency measures, a summary of the BPA program, the program successes and challenges, and program goals.

Relevance: Distribution system efficiency was a significant new measure in the Sixth Power plan and continues to show strong remaining potential in the Seventh Plan. However, utility uptake of this measure has been slow. So action item MCS-2 was adopted to help increase participation by setting out a schedule to assess potential, identify barriers and to develop effective programs or performance standards.

Workplan: A.1 Implement Seventh Power Plan – Conservation

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

Background: The Seventh Power Plan identified over 180 average megawatts of potential for distribution system efficiency. The measures are aimed at reducing losses in the distribution system from the substation through the end-use, while maintaining voltage tolerance standards. A suite of modern efficiency measures was identified in the Sixth Power Plan based on a NEEA initiative than demonstrated significant cost-effective savings. Bonneville has offered a comprehensive distribution efficiency program since 2010 with some success. But uptake has been much slower than anticipated due to significant institutional and technical barriers. Utilities that have completed distribution efficiency measures are typically pleased with the results for both energy and capacity savings.

MCS-2 Action Plan Item

7th Plan Action Item on Distribution System Efficiency

Power Committee Meeting

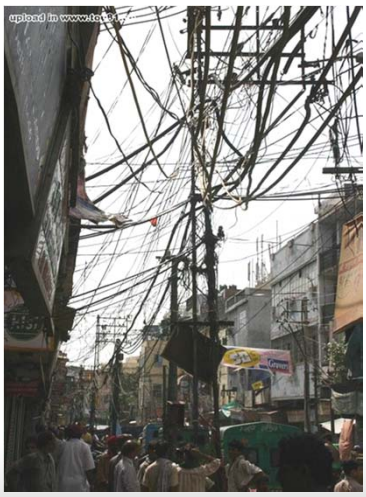
Charlie Grist
August 15, 2017

Goal of MCS-2

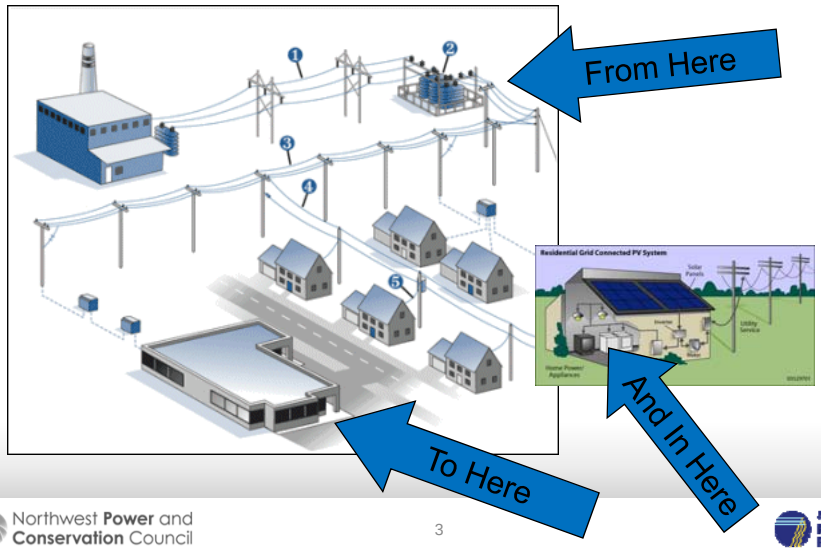
MCS-2: Develop Program to Assess and Capture Distribution Efficiency Savings

EE potential is significant, but achieving it has been difficult.

The goal of MCS-2 is to find ways to move beyond the low achievement rates.



Energy & Capacity Savings from Improved Regulation of Feeder Voltage



How MCS-2 Came to Be

- Potential exists and is utility-specific
- Both institutional and technical barriers
- Long lead time for projects
- Clear role for BPA technical assistance to utilities
- Next Step: Proceed utility-by-utility to identify and capture where cost-effective and quit where not

Seventh Plan Potential is Significant

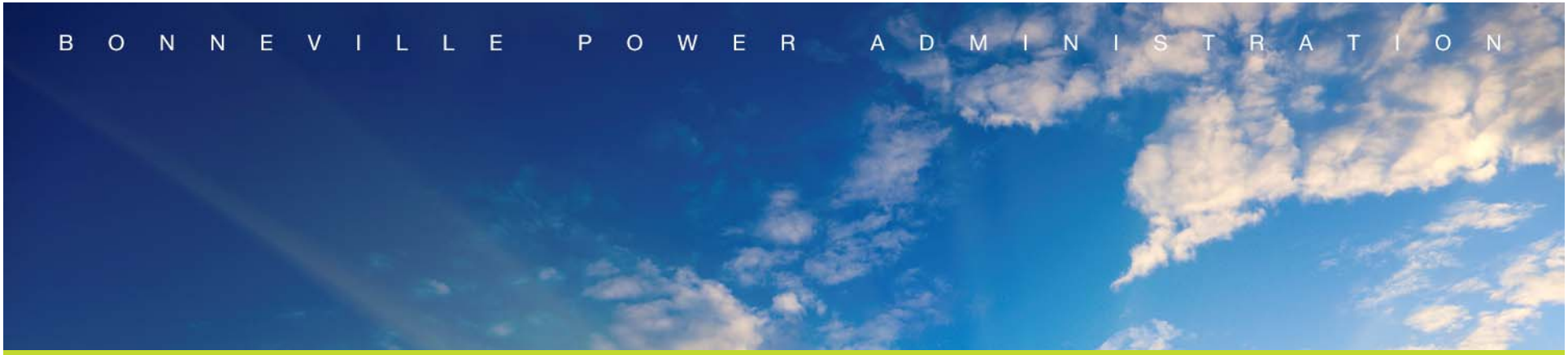
Measure Category	CE Potential (aMW)
Reduce system voltage (CVR)	**83**
Minor system improvements (VAR management, phase load balancing, and feeder load balancing)	**50**
Major system improvements (voltage regulators on 1 of 4 substations, and select reconductoring on 1 of every 2 substations)	**55**
Total	**187**

- Cumulative Savings 2010-2016 = 7.3 aMW
- Current Pace about 1.2 aMW per year

MCS-2

- In 2017:
  - Develop plan to assess potential savings
  - Identify barriers
  - Develop assistance for utilities or develop performance standards
- Assess potential savings, resource needs, and begin programs for one-third of utility customers and utility load by 2021

- Tony Koch of BPA will provide an update of the BPA program.



BPA's Involvement in Distribution Efficiency Improvements (2010 - 2017)

Tony Koch

August 15, 2017

What is DEI?

Electric Utility Distribution Efficiency Improvements

1. Hardware changes: re-conductor, power transformers, capacitors, etc.
2. CVR (conservation voltage reduction), same as VO (voltage optimization)
   - Lowering system voltage improves end-use efficiency. Utilities incur the project cost, but 90% of voltage optimization savings occur behind the customer meter

What is DEI?

BPA Calls It….

ESUE = Energy Smart Utility Efficiency

- BPA's acronym for DEI
- Same measures involved

BPA ESUE Program

Custom Project Incentives

Hardware improvements (reduction of line losses) or VO measures are incentivized by custom project

Hardware Measure

Hardware improvements have a 35 year life and get $0.35/kWh

Relying on utilities

Operating without a technical consultant since 2017 means higher reliance on utility distribution engineering staff

ESUE History

2010-2014

BPA introduced and actively marketed voltage optimization (annual budget $600k)

Result of efforts was dry holes; less than a quarter of identified projects were implemented

- BPA funded 18 technical studies at 16 utilities
- BPA funded 7 regional technical trainings
- BPA participated in all major applicable conferences including the 2011 Roundtables, 2012 EFX, 2012 Engineers and Operators Conference

ESUE History

2015-2016

BPA adjusted our strategy to align with utilities most likely to implement (annual budget $125k)

5-6 utilities pursued voltage optimization during this period

ESUE History

2017-2018

BPA is maintaining support for utility initiated projects

4 Utilities currently pursuing Voltage Optimizations

4+ Additional utilities currently pursuing distribution hardware improvements

ESUE History

We've saved nearly

2 aMW

between 2010-2017

Barriers to Achievement

Technical potential exists

But there are a number of barriers in implementing and reporting these projects

Operational discomfort

Certain Engineering Distribution managers are uncomfortable operating the voltage in the lower half of the bandwidth

Extreme financial pressure

Reduction in revenues for energy sales combined with steady BPA rate increases have placed extreme financial pressures on many utilities

Utility Interest / Cultural Barriers

Utilities without load growth

Utilities carry the cost, costumers benefit (although not evenly, making it hard to market). Utilities with tier 1 headroom, account for voltage optimization as loss revenue.

Load Density

Less dense load requires more system investment to lower voltage. Rural utilities have lower return on investment.

Larger utilities with energy efficiency targets

(I-937 in WA) will include voltage optimization in their portfolio when traditional EE programs are insufficient.

DR and EE Overlap

More interest in DVR measures

- Given several DR pilot offerings from BPA in the past several years (with capacity payments), several utilities have taken an interest in executing DVR measures (reducing voltage for DR)

Either/or but not both

- A given substation can either participate in CVR or DVR but not both simultaneously

Less CVR

- The interest in DVR has removed utilities from executing CVR

Documentation

Lack of Reporting

Re-conductor projects are being done, yet not being reported

Need to bridge the gap

Gap between utility engineers and utility energy efficiency program staff

Additional Constraints

Staff Constraints

Prioritizing work efforts

- Respond to utility initiated VO projects (custom project support)
  - No formal technical support budget nor contract in place

What's next for BPA

We're working on the barriers we know exist…

Focus on what's already happening

Provide support to complete custom projects and report savings that are happening

Continued utility support

Ongoing technical support

Customer service account planning