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

February 7, 2017

MEMORANDUM

TO: **Council Members**

FROM: **Charlie Grist and Kevin Smit (Council Staff)**
Mark Rehley (Northwest Energy Efficiency Alliance)

SUBJECT: **Energy Efficiency Emerging Technology**

BACKGROUND:

Presenter: Charlie Grist

Summary: Nearly half of the energy efficiency (EE) potential identified in the Seventh Power Plan was from new EE measures. Many of these measures were not significant in previous plans and could be considered "emerging technologies (ET)." In addition, the Council developed and emerging technology scenario that took a high level look at emerging technologies beyond what was included in the supply curves. The Northwest Energy Efficiency Alliance is a key focal point for EE emerging technologies in the Pacific Northwest. Mark Rehley of NEEA will provide information regarding NEEA's role in this area, and will briefly discuss some exciting new EE emerging technologies.

Relevance: Past and future Power Plans rely on energy efficiency as the preferred and primary resource. Emerging EE technologies play a key role in keeping the EE pipeline filled with new EE opportunities. The Seventh Power Plan Action Item MCS-4 calls for broader collaboration in the region on EE emerging technology, to be led by NEEA.

Workplan: C.1. Prepare for 8th Plan, Conservation

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Emerging Technologies in Energy Efficiency

Northwest Power and Conservation Council

Power Committee Meeting

February 14, 2017

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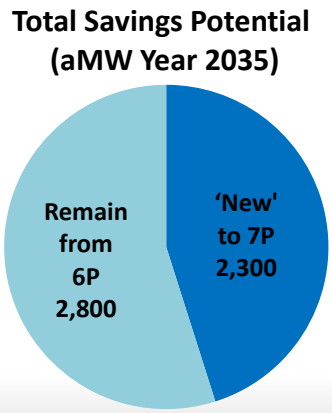
Context

- Power Plans revisited every five years
- New power system conditions
- New generation and conservation options
- Pace of emerging tech adoption has big impact
- 35 years of EE accomplishments has not obliterated assessments of remaining EE

What's New Potential in 7P?



- About 3o new measures
- Nearly half of potential
- Key new technology
  - SSL & Controls ~50%
  - HVAC ~25%
  - Electronics ~15%
  - Plug loads
  - Behavioral
  - New applications of old

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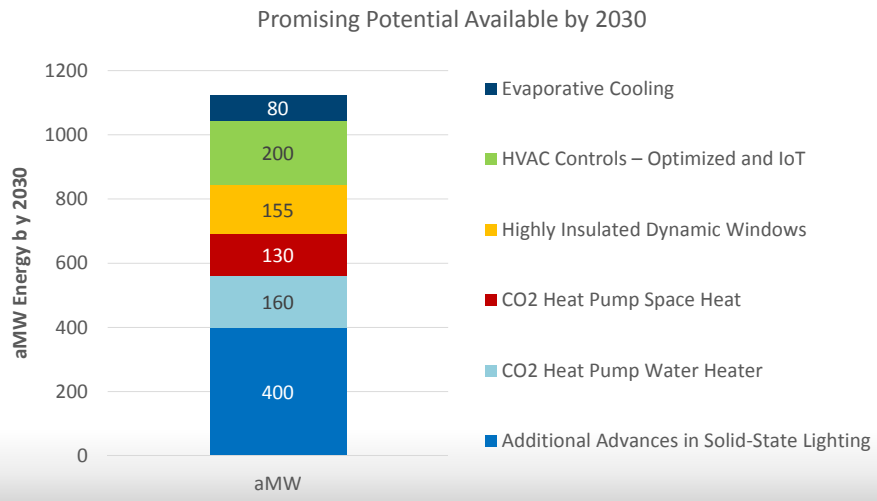
Promising – But Not in 7P Supply

(not "… similarly available & reliable")



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Conservation ET Data

Emerging Technology	2025			2030			
	aMW	MW (winter)	TRC Net Lev Cost ($/MWh)	aMW	MW (winter)	TRC Net Lev Cost ($/MWh)	Required Conditions
Additional Advances in Solid-State Lighting	200	400	$0-$30	400	800	$0-$30	Continued tech improvement, resource availability
CO_2 Heat Pump Water Heater	110	200	$100-150	160	300	$90-140	UL approval; U.S. market development
CO_2 Heat Pump (space heat)	50	160	$130-170	130	350	$110-160	Best suited for hydronic heating, need research and development (R&D) for U.S. applications
Highly Insulated Dynamic Windows - Commercial	20	130	$500+	35	200	$300	Intensive R&D effort needed to bring down cost; slow ramp due to window replacement schedule
Highly Insulated Dynamic Windows - Residential	80	230	$500+	120	350	$400	
HVAC Controls – Optimized Controls	140	230	$90-120	200	350	$80-110	Significant developments expected in next 5 years
Evaporative Cooling	50	0*	$100-130	80	0*	$90-120	Need R&D on configurations & applications in PNW
Distributed Photovoltaics	800-1400	0*	$70-280	2200 - 4000	0*	$60-250	High penetration may require additional integration costs and distribution system upgrades.

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Lots of People Working ET

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7P Action Item (MCS-4)

Develop a regional work plan to provide adequate focus on emerging technologies to help ensure adoption

- *Tracking new measures in 7P*
- *Identify actions to advance promising new tech*
- *Increase adoption of ET with low market shares*
- *Scan for new technology*

Develop work plan by mid 2016 with updates every two years

Recommend NEEA as Facilitator:
Regional Emerging Technology Advisory Committee
RETAC

Status of MCS-4

- NEEA and the region have been very responsive
- Completed action item in a budget-constrained environment
- Recently approved new RETAC charter that included language from MCS-4
- Great example of ongoing regional collaboration

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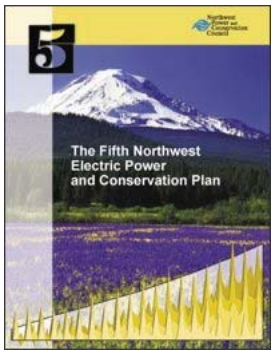
Power Planning Impacts on Regional Action

Mark Rehley, Senior Manager
Emerging Technology & Product Management



Northwest Energy Efficiency Alliance

Power Plan Impacts



SEVENTH NORTHWEST POWER PLAN

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RETAC

Regional Emerging Technology Advisory Committee

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RETAC 1.0 versus 2.0

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7th Plan Emerging Technologies

SEVENTH NORTHWEST POWER PLAN

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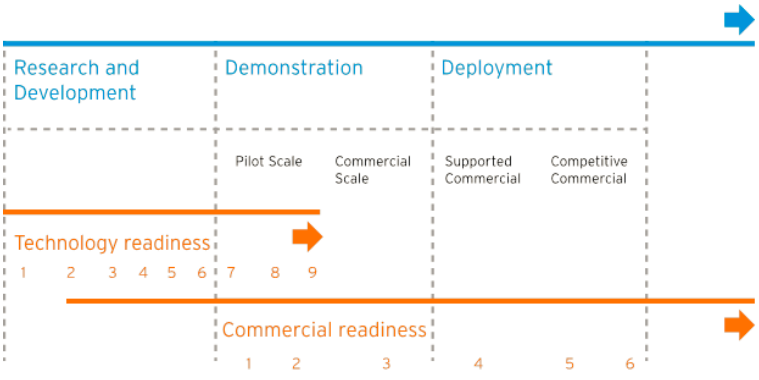
RETAC 2.0

- Regional View
- Consistent Approach
- Readiness Assessment



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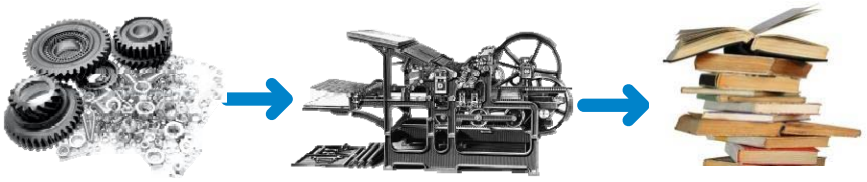
Pipeline Flow

FIRST STEP

Technologies	Products	Applications



	Measures	Measure Applications
100s	10s	1000s

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Example: TV Product Evolution

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What's Coming in 2017?

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neea
Thank You!
TOGETHER We Are Transforming the Northwest
Avista
Bonneville
Cascade Natural Gas
P.U.D. Chelan County
Clark Public Utilities
EnergyTrust of Oregon
Grant PUD
Idaho Power
NorthWestern Energy
NW Natural
PACIFIC POWER
PGE
PSE Puget Sound Energy
Seattle City Light
Snohomish County PUD
Tacoma Power