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XMP Distributor Platform Update and Discussion

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Topics

- Share the initial program concepts
- Platforms why and how are they successful
- Gain understanding of your questions, concerns, and insights
- Looking to gain utility support outside Pacific Northwest
- Research Plan outline (if we have time)

Overview of today's conversation

- Target Small Savers
- Deliver Significant Savings
- Initial Products (Small pumps and Circulators)
- Leverage:
 - DOE Rule Makings
 - Trade Associations (Labeling)
 - Existing Infrastructure and Relationships
- General understanding of Platforms
- Index savings over time

Target products that are small savers and challenging to reach products

Custom Projects

Cost Effective

High customer touch solutions

Big Savers

Key accounts

≠ Midstream Platform

Savings for Pumps & Circulators

Commercial & Industrial

Clear Water Pumps -Savings potential

- 3400 measures* ~ estimated savings potential 25-50 aMW (Pacific Northwest Region)

Circulator Pumps Savings

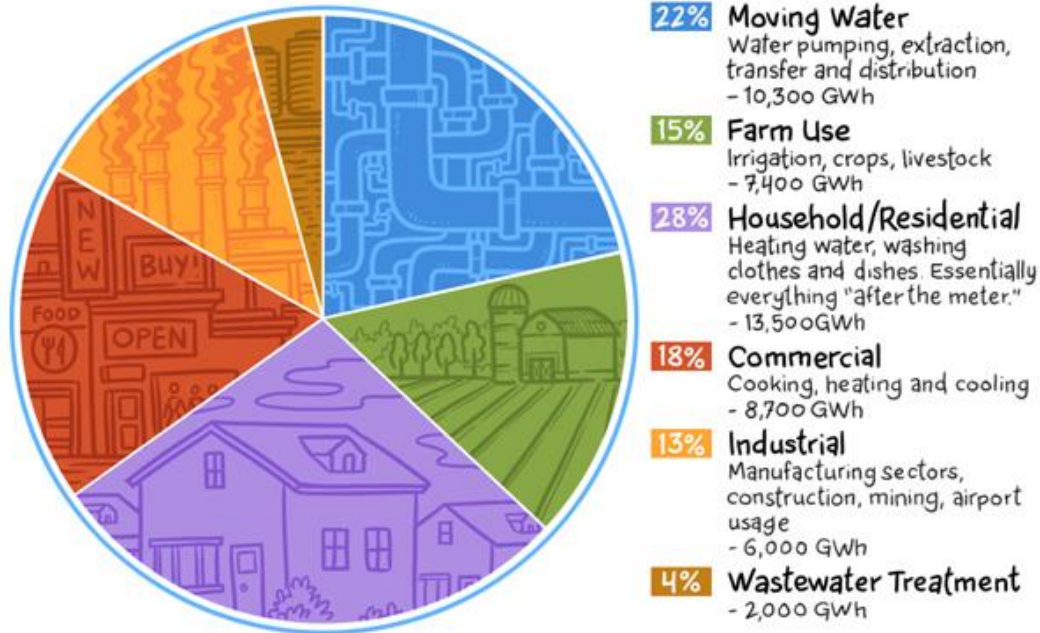
- 100 Measures* ~ estimated savings potential 45 aMW (Pacific Northwest Region)

* RTF UES – Available now as “planned” with research plan looking for funding

California Executive Summary

WATER-RELATED ENERGY USE

Nineteen percent of California's electricity goes to water-related uses



Market Problem Statement

- Pumps are the second most common machine after the motor and are found in all segments
- Long measure life potential
 - This is the first time the DOE has set standards and a rating system which will allow customers to easily compare water pump efficiencies and establish a baseline
 - EUL = 15 years
- Efficiency Levels: EL2 to EL5 improves efficiency 2-8% from baseline of EL0, Per DOE pump survey data
- Pumps are a potential source of improved productivity, plant reliability, and energy cost reduction because of their commonality

How does the Product flow: California Product Overview

Product Description:

- Upgrade clean water pumps above DOE Energy Conservation Standard under Title 10 Section 431.462 <http://www.ecfr.gov/cgi-bin/retrieveECFR?n=pt10.3.431#sp10.3.431.y>

Market Overview:

- The new standards are expressed as a Pump Energy Index (PEI). Under the adopted standards, a pump model would be compliant if its PEI rating is less than or equal to the adopted standard.
- DOE assumed that equipment with efficiencies in the base-case (EL0) that did not meet the standard level under consideration would “roll up” to meet the new standard level (EL1).
- The PG&E Midstream Deemed measure will be for products above new standard (EL1) or above Industry Standard efficiency.

Manufacturers: All

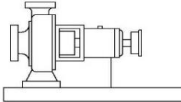
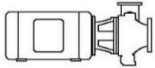

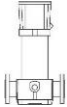

Pumps follow a variety of delivery channels, even within a single manufacturer. In general, pump manufacturers do not sell products directly to end users.

Distribution Channel	Market share
Distributor -> Contractor -> End-User	70%
Distributor -> End-User	17%
OEM -> End-User	8%
End-User	2%
Contractor -> End-User	1%
Other	2%
Weighted Average Markup	100%

Target Customer:

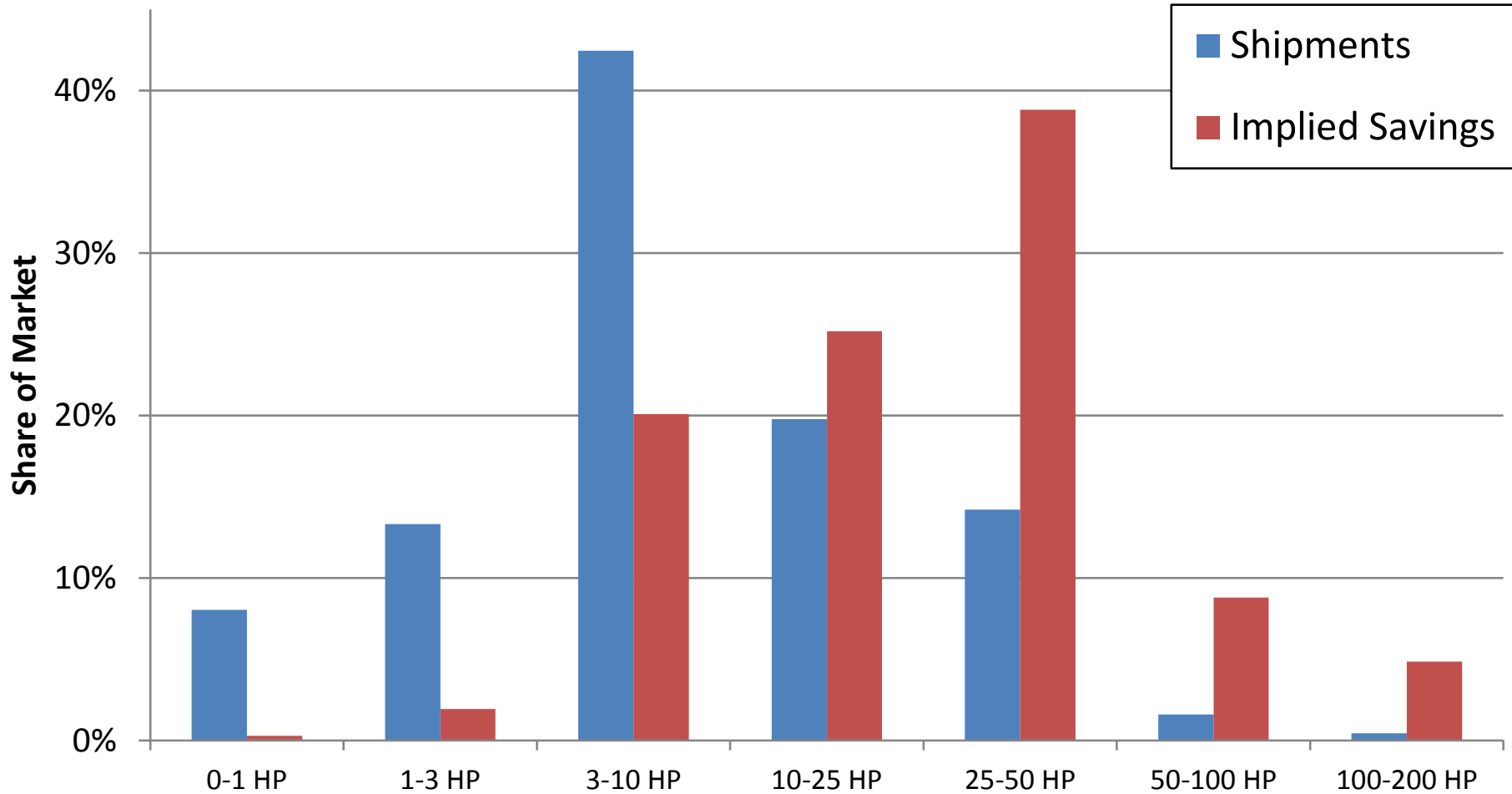
- Clean water
- Commercial - HVAC & DHW (domestic hot water)

HI Energy Rating Program Scope of Products – Same as DOE Pumps 1-200hp Clear Water

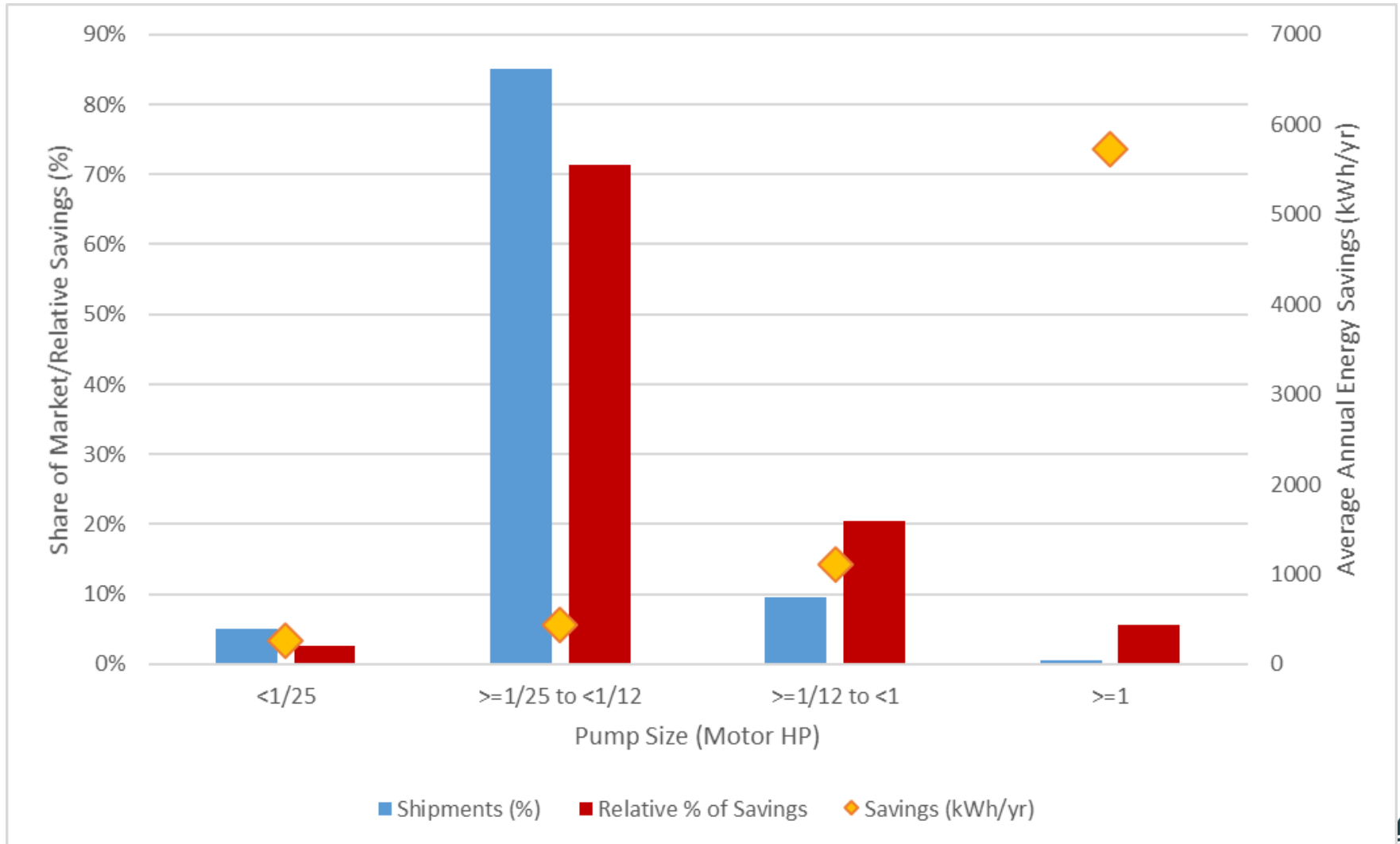
Diagram	Nomenclature (DOE) / [Industry]	Scope Refinement
	End Suction Frame Mount (ESFM) / [OH0, OH1]	<p style="text-align: center;"><u>Included</u></p> <ul style="list-style-type: none"> • Clean Water Pumps • BEP Pump Power Input : 1 – 200 hp • BEP rate of flow: 25 gpm or greater • BEP head: 459 ft or less • Temperature: 14 – 248 °F
	End Suction Close Coupled (ESCC) / [OH7]	<ul style="list-style-type: none"> • Nominal Speeds (RPM): 1800 (1440-2160) & 3600 (2880-4320) • Radial Flow (n_s less than 5000)
	In-line (IL) / [OH3, OH4, OH5]	<p style="text-align: center;"><u>Excluded</u></p> <ul style="list-style-type: none"> • Non-clean water designs (API, ASME, Slurry, Wastewater, Etc.) • Nuclear controlled • Mil Spec • Magnetic Driven • Fire Pump • Sanitary (3-A std)
	Radially Split multi-stage vertical in-line diffuser casing (RSV) / [VS8]	<ul style="list-style-type: none"> • Self-priming • Prime Assist • Circulators • Pool Pumps • ST [VS0] with a bowl diameter > 6.0"
	Submersible Turbine (ST) / [VS0]	

Market Distribution by Pump Size

(includes ESCC, ESFM, IL; does not include RS-V and VT-S)



Circulators



DOE's Efficiency Rating for Products

MEF



PEI



U-Factor



SEER, IEER, AFUE, ...

HSPF



R-value



UEF

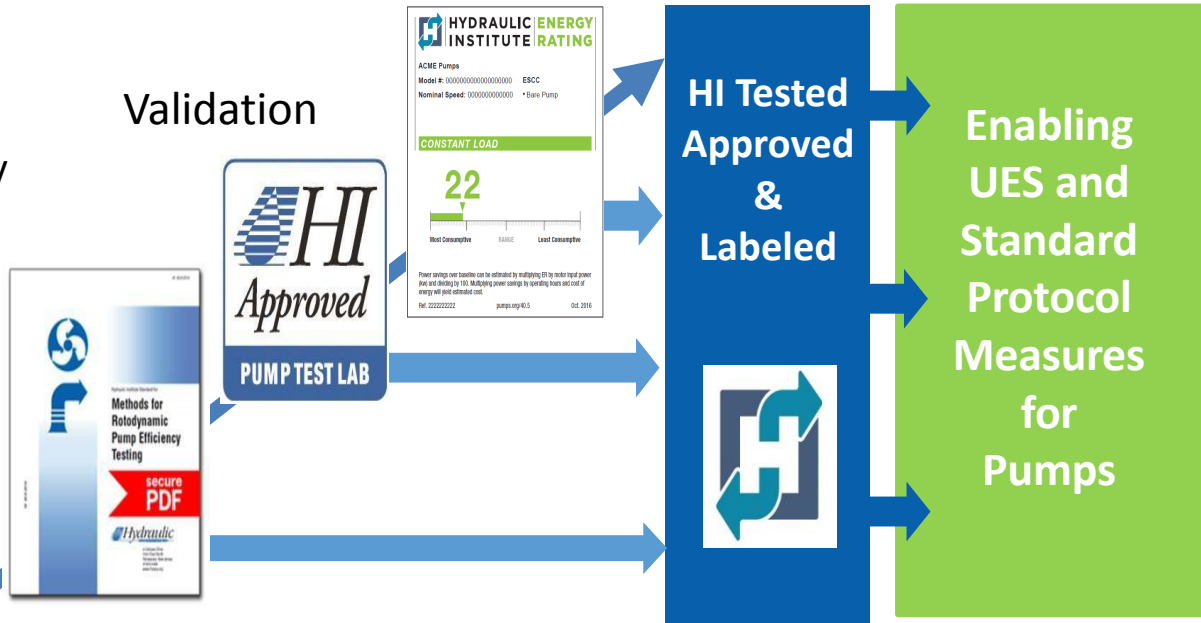


Hydraulic Institute Program Alignment With Pump Energy Conservation Standard

Listed pumps and data available

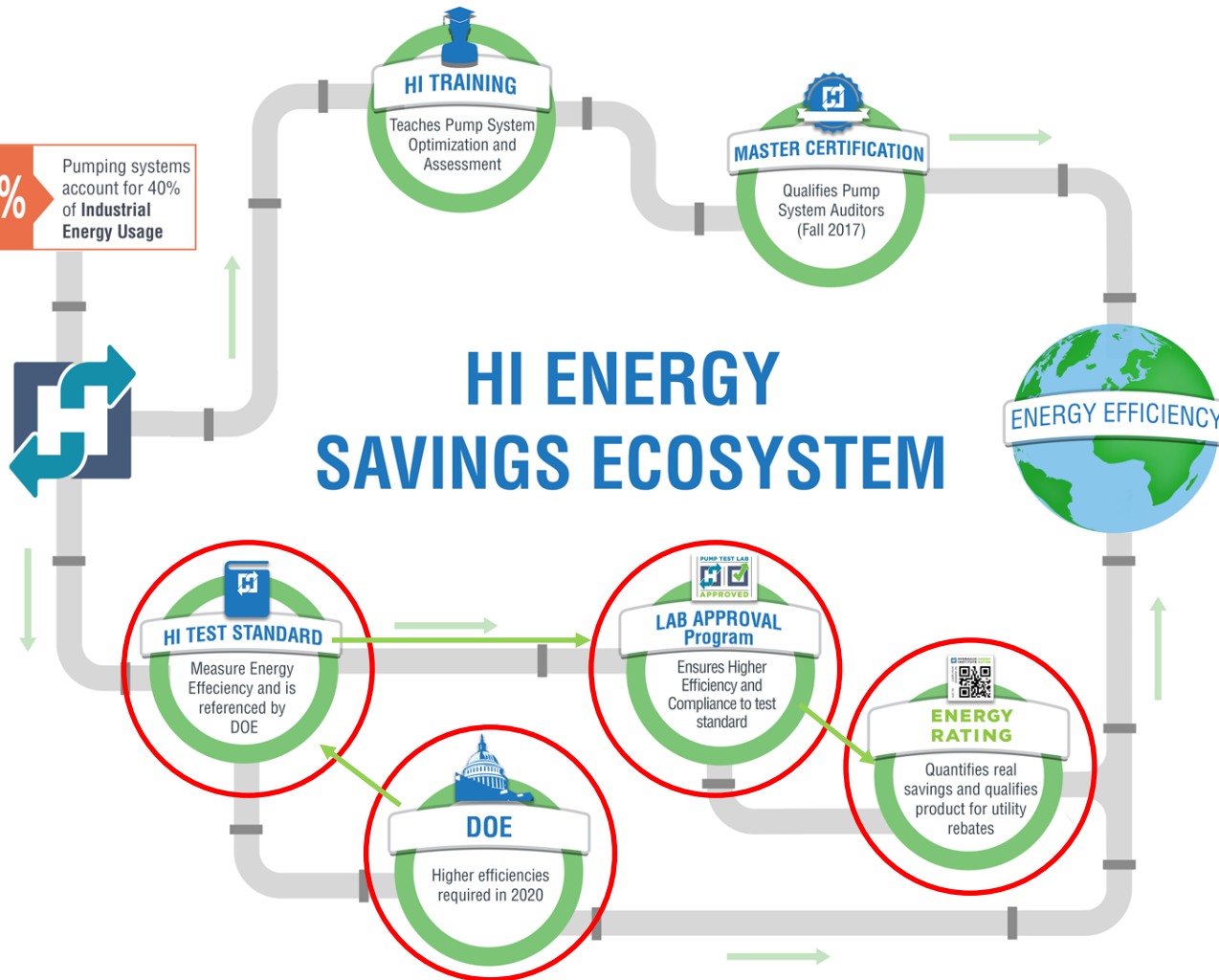
Incorporated by Reference

DOE regulation & Technical Support Document



Added Value

40% Pumping systems account for 40% of Industrial Energy Usage



The HI Ecosystem provides parallel paths to energy efficient pumping systems!

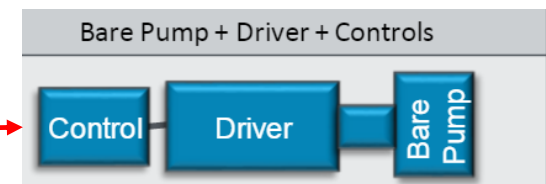
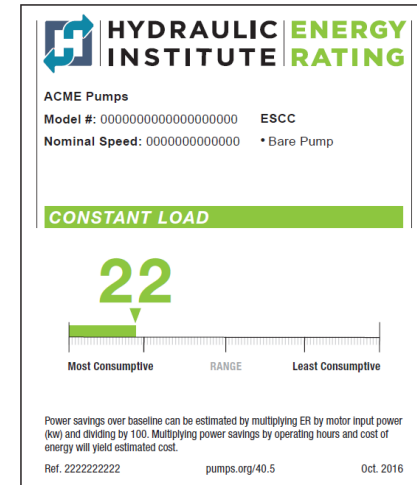
HI Energy Rating Program

Goals of the Program – Build on DOE Regulations

1. Develop a rating system for bare pump and extended products
2. Suitable for utility programs to enable deemed incentives.

Provide additional value by:

- Third party lab approval
- Provide data required for deemed incentives
 - In reliable, consistent, simple, searchable and easy to use format
- Managed by HI with input and feedback from utilities to meet your needs
- **Certificate program for value added to a bare pump in the commerce stream. ****Missed by DOE regulation******



Why Platforms?

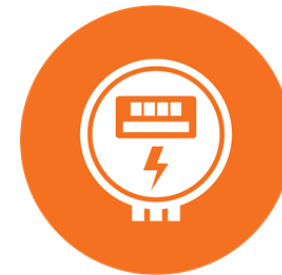
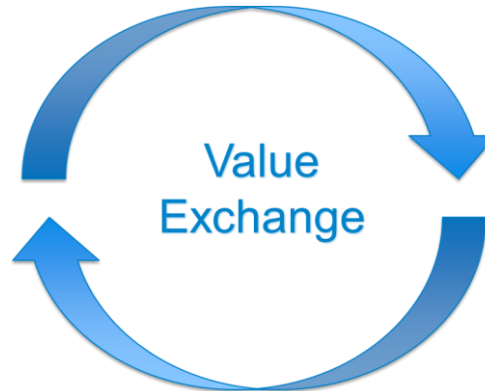


- Support Utility goals
- Access to market trends and data
- Cost effective solution for small savers
- Provide nimble response to changing markets
- Influence markets
- Value exchange between Utilities and Market actors

What value is exchanged?



Distributors
Manufacturers
Other Market Actor



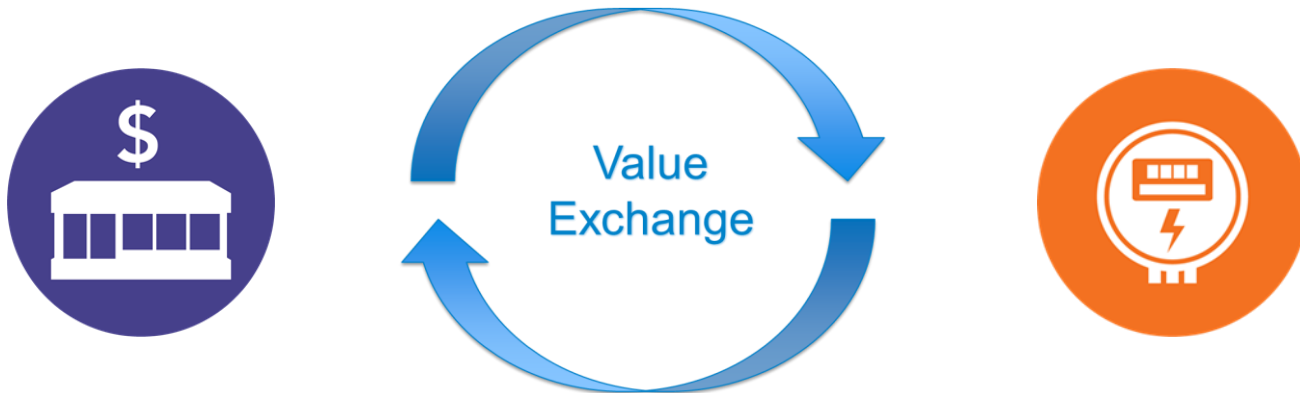
Small Savers
Access to new markets
Economy of scale

- ✓ Scale
- ✓ Simplified engagement
- ✓ Improved profitability

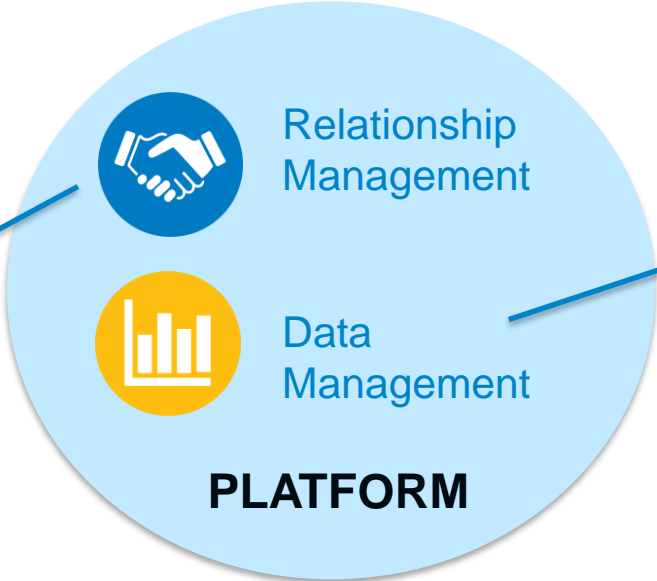
- ✓ Cost-effective savings
- ✓ Speed to market
- ✓ Market insights

A system to enable efficient exchange of value between supply chain partners and utilities

What are the components?



Market context and strategy
Corporate-level relationships
Master service agreements



Data requirements and security
Data collection and processing
Data analytics and reporting

How to utilize and grow the platform?



A successful platform has...

1. **Gravity:** Attracts users
2. **Connection:** Facilitates exchange of information
3. **Flow:** Fosters co-creation of value

More users + more participation
=
More co-created value

How programs may utilize the platform



Data access

- Market analysis
- Program planning
- Savings validation



Distributor and sales channel relationships

- Support program interventions (distributor training)
- Identify, test and vet new opportunities
- Leverage market relationships to extend reach

RETAIL PLATFORM

ASSETS

- Universal Participation Agreement
- Data administrator agreement
- ENERGY STAR engagement



CHALLENGES

- Current agreements are “RPP-centric”
- Current data administrator
- Ability to scale

NEXT STEPS

- Expand platform flexibility
 - Modify existing agreements
 - Develop data alternatives

DISTRIBUTOR PLATFORM

ASSETS

- Distributor relationships & business practice knowledge
- Toolkit of interventions for maintenance products
- Data exchange, processing, storage, and dashboards

CHALLENGES

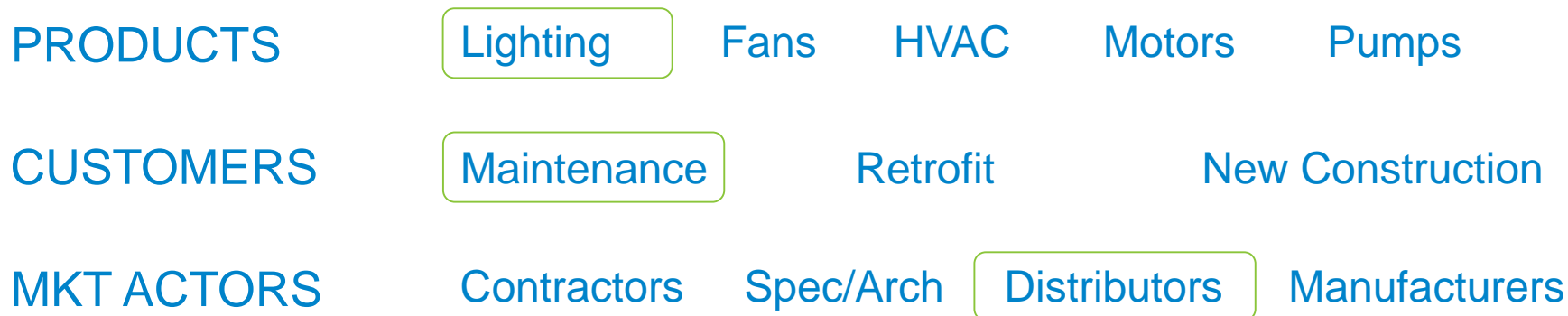
- Establishing funder support
- Maintaining sufficient value to keep distributors interested
- Leveraging data to deliver value

NEXT STEPS

- Distributor analysis, followed by targeted outreach
- Product savings assessments
- Funder outreach
- Refined vision and roadmap

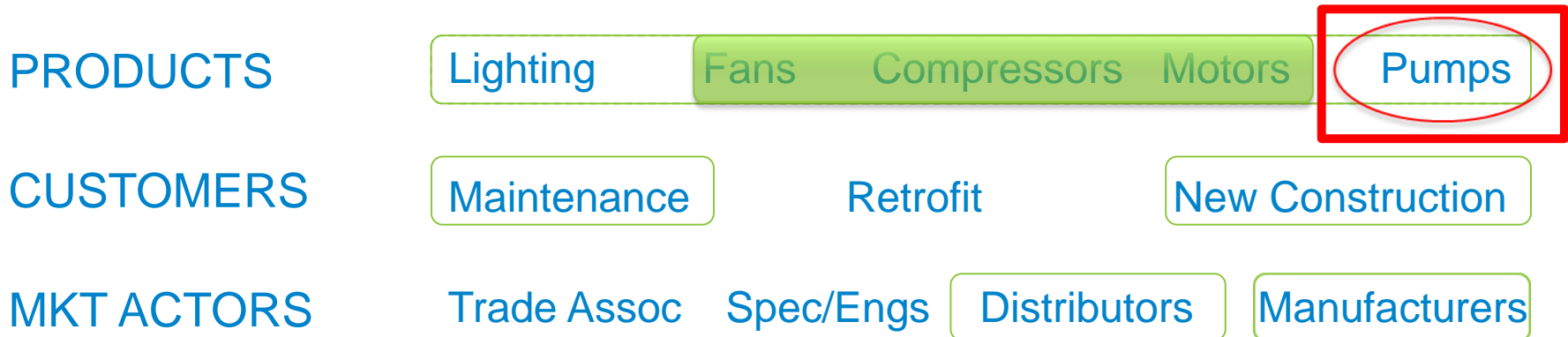
Current Distributor Platform

- Agreements, interventions, relationships with distributors developed to deliver Reduced Wattage Lamp Replacement
- To realize benefits of investment, NEEA and Distributors are looking for ways to extend this relationship



Extension of Distributor Platform

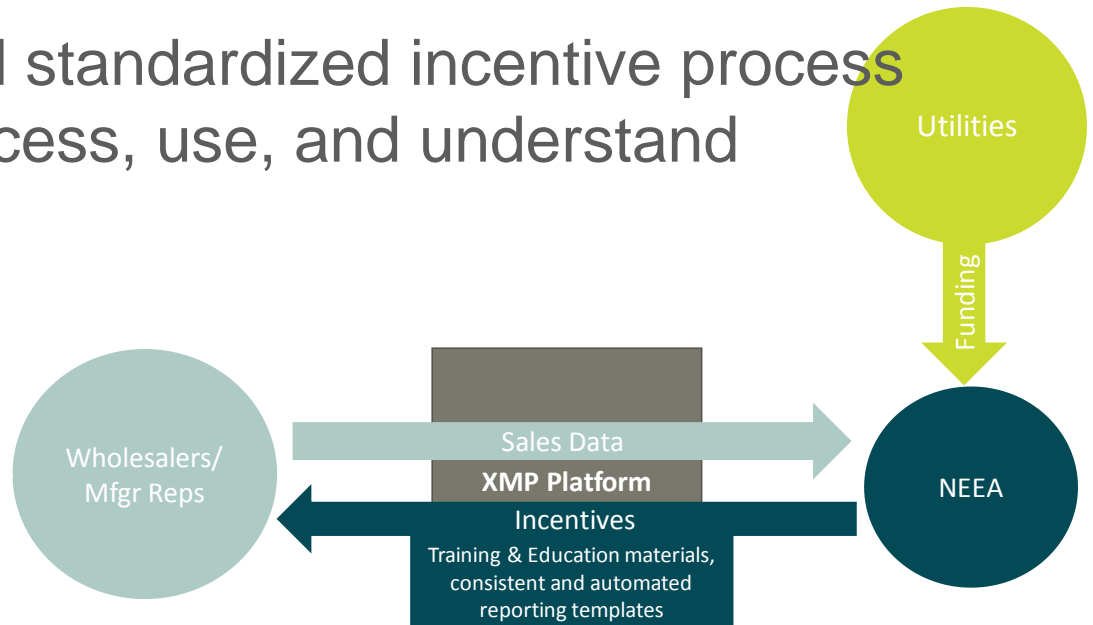
- Platform supports broad portfolio of products, customer types, program types.
- Distributor-focused: Builds on tools and relationships we've developed with regional distributors via RWLR and other Trade Association partners.
- Leverage DOE rule makings and National labeling programs.
- Leverage RTF for savings values
- Focus on small savers that are challenging to reach



XMP Development

- NEEA is partnering with utilities to develop a midstream intervention approach that will provide:
 - Direct incentives to allow distributors to offer more efficient pump at lower cost to customers
 - Spiffs and stocking incentives to increase stock of efficient pumps
 - Consolidated and standardized incentive process that is easy to access, use, and understand

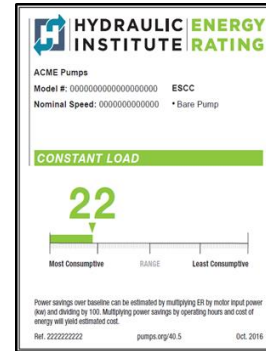
We are interested in contact information for PNW sales network (manufacturer representatives and wholesalers)



Long Term Vision Schematic



Regional
Technical Forum



CONFIDENTIAL MEET
Bare Pump, 2000 RPM

MODEL DAY 6 - FOR COMPRESSED AIR

Item	Value	Unit	Notes
1	1.00	Flow	100
2	1.00	Flow	100
3	1.00	Flow	100
4	1.00	Flow	100
5	1.00	Flow	100
6	1.00	Flow	100
7	1.00	Flow	100
8	1.00	Flow	100
9	1.00	Flow	100
10	1.00	Flow	100
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100	1.00	Flow	100

CAGI
Compressed Air & Gas Institute

Mid-stream Platform



Thanks for your time

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TOGETHER We Are Transforming the Northwest



Discussion, Insights and Feedback

- What other Utilities should be brought into the discussion?
- Any issues with using data aggregators?
- What are additional value exchanges not listed?
- Data collection and transaction challenges?
- Insights? Thoughts? Feedback?

Resource Discussion questions

- **Role for platform management** – who manages it?
- **Data administration** – what is NEEA's & Funders desired role and capability?
- **Centralization** – at what scale might it make sense to manage platforms together, or centralize systems to one?
- **Data strategy** – who drives it?
- **Market analysis and insights** – what is NEEA's desired role and capability? how to do we capitalize on this core value of the platform?
- **Product Selection:** Stage gate or throttling on what products? (Crawl, walk....run)
- **Support:** Request to go forward? RPAC, Initiative Start

Update on Pumps Incentives

- In the past year, RTF has approved **deemed Planning measures** for C&I Pumps and Circulator Pumps
- These measures allow utilities to offer incentives in the PNW for the next three years (sunset date Dec 21, 2019)
 - Other utilities (PG&E, Xcel, etc) are pursuing measures based on the RTF's analysis
- By the sunset date, the must pursue **research** to verify and improve the savings estimates and convert them to **Proven measures**
 - The RTF also approved a research plan to do this



Note: the Regional Technical Forum is a regional body in the PNW that reviews and approves energy efficiency savings on behalf of the region. For more info, see: <https://rtf.nwcouncil.org>

Summary of RTF Measures

- RTF recently approved two sets of measures for pumps
- Both were designed to be applied at the distributor/wholesaler level

Item	Efficient C&I Pumps	Circulator Pumps
Scope Summary	1-200 hp ESCC, ESFM, IL, RSV, and ST pumps	1/40 - 5 shaft hp circulator pumps
Key Measure Identifiers	<ul style="list-style-type: none"> • Applications: Agricultural irrigation, Commercial, Municipal & Industrial • Efficiency Descriptor: PEI or ER • Speed control case: presence of variable speed drive in baseline and/or efficient case 	<ul style="list-style-type: none"> • Applications: Commercial hydronic heating, commercial DHW recirc, residential hydronic heating, residential DHW recirc • Efficiency Descriptor: PEI or technology description (efficient controls)
Estimated Potential	~25-50 aMW	~35-50 aMW

Research Plan

- NEEA is pursuing research plan to validate Efficient C&I Pumps and Circulator Pumps savings estimates
 - Based primarily on existing data

Potential Sources	Detail
Utilities	Custom Measures
Pump owners & operators	Building and process automation systems
Existing studies	e.g. DOE Motor System Market Assessment, WSU Motor Database
Technical assistance providers	e.g. Industrial Assessment Centers, WSU
Cities and municipal water districts	Municipal water conveyance data

We are interested in any metered pump data you have!

- Goal is sample of ~ 400 – 500 pumps
 - Multiple sectors
 - National in scope

And funding partners for research

Research Plan Outline

- Primary purpose of research is to verify energy savings estimates from more efficient pumps
- Primary approach is to:
 1. Collect as much existing pump data as possible from **pumps in a variety of sizes, types, and applications**
 2. Analyze available data (adding new sites as necessary) to understand (for each pump size/type/application):
Annual **operating hours** at each load point and **Input power** at each load point
Also need pump characteristics and application information to look at energy savings by pump application, control type, etc.

Pump sample frame, sample size, and strata

A blue rectangular box containing the text "Pump sample frame, sample size, and strata". A blue arrow points from the left side of the box to the text "pumps in a variety of sizes, types, and applications" in the first step of the research approach.

Data request

An orange rectangular box containing the text "Data request". An orange arrow points from the left side of the box to the text "Annual operating hours at each load point and Input power at each load point" in the second step of the research approach.

Pump Sample Frame and Strata

Commercial & Industrial Pumps

Need pumps from all applications; mix of pump types (as applicable), CL and VL pumps and range of HP sizes for each application

Some applications need to account for regional differences

Application	Total Sites/ Samples	Notes
Commercial: condenser and cooling tower	35	Mix of CL and VL pumps, range of HP sizes; may vary based on region
Commercial: chilled water loops	35	Mix of CL and VL pumps, range of HP sizes; may vary based on region
Commercial: heating	35	Mix of CL and VL pumps, range of HP sizes; may vary based on region
Commercial: domestic hot water circulation	35	Mix of CL and VL pumps, range of HP sizes
Commercial: pressure boost	35	Mix of CL and VL pumps, range of HP sizes
Agricultural irrigation	35	Mix of CL and VL pumps, range of HP sizes; may vary based on region
Industrial	80	Mix of CL and VL pumps, range of HP sizes
Municipal water distribution/treatment	35	Mix of CL and VL pumps, range of HP sizes
Totals	325	

Pump Sample Frame and Strata

Circulator Pumps

Need pumps from all applications; mix of control types (as applicable) and range of HP sizes (as applicable) for each application

Sector	Application	Controls	Size	Notes
SF or small MF	HH	Single-speed, pressure, adaptive pressure, temperature	20	Need mix of control types. Same site could be used for different controls. May vary based on region.
	DHW Recirc	Aquastat, learning, on-demand	15	Need mix of control types. Same site could be used for different controls.
	Unknown	Any	5	
Central MF	HH	Single-speed, pressure, adaptive pressure, temperature	20	Need mix of control types. Same site could be used for different controls. May vary based on region.
	DHW Recirc	Aquastat, learning, on-demand	15	Need mix of control types. Same site could be used for different controls.
	Unknown	Any	5	
Commercial	HH	Single-speed, pressure, adaptive pressure, temperature	20	Same site could be used for different controls. May vary based on region.
	DHW Recirc	Aquastat, learning, on-demand	15	Same site could be used for different controls.
	Unknown	Any	5	
Total			120	



Necessary Data

Commercial & Industrial and Circulator Pumps

New or existing sites where the following information is available

Data Type	Specific Data	Reason
Pump Characteristics	Pump & Motor Nameplate Information, Application, Pump Control Type	Need to know pump size, PEI/ER, application, pump control
Logged Data	12 months of power, speed, and/or flow data	Need to develop load profile, operating hours, and determine annual energy use

Questions?

For more information on XMP or to support the research study, contact:

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or

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For more information on the research study or supply data, contact:

Sarah Widder

swidder@cadeogroup.com

503-660-4216



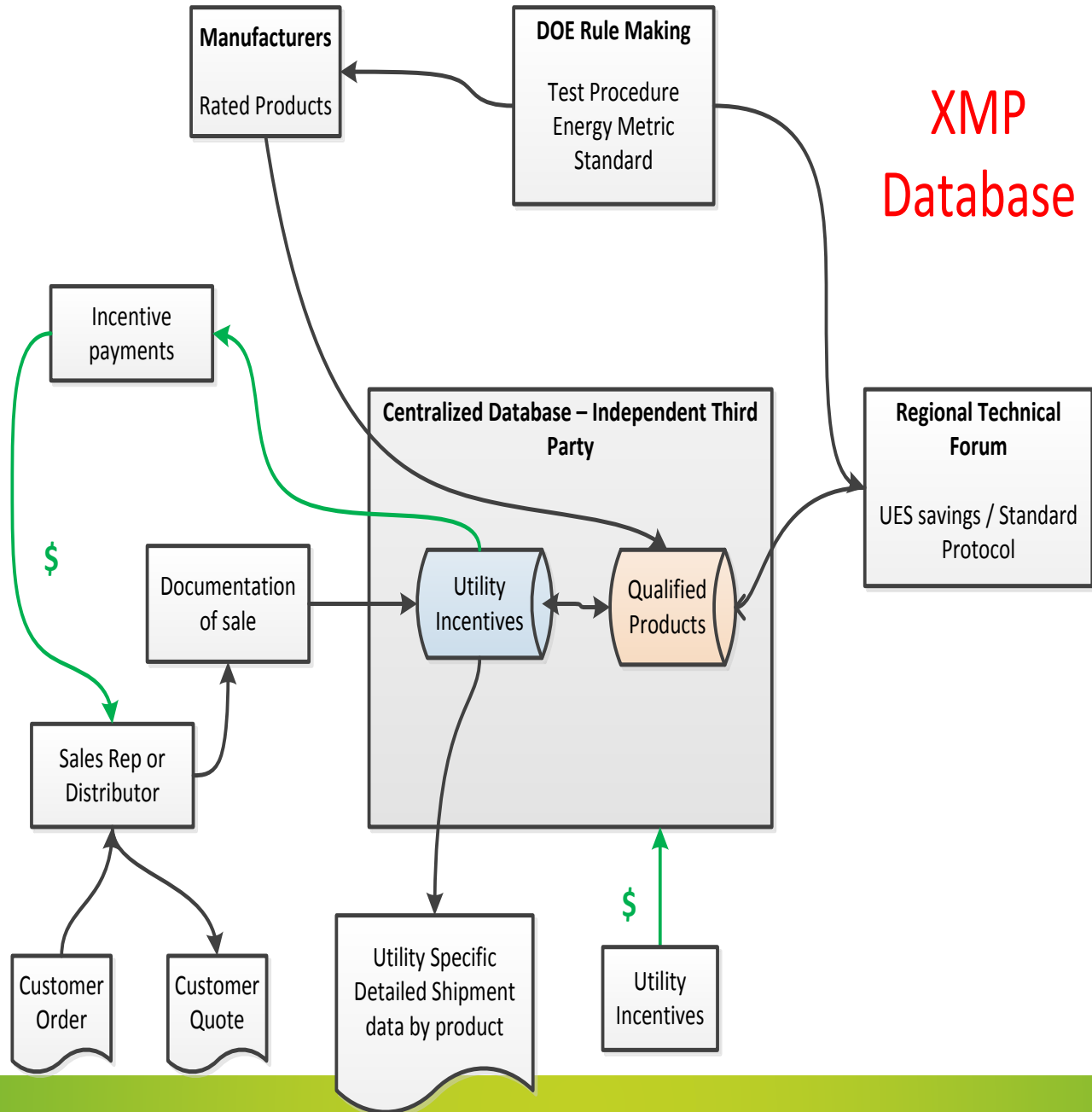
Who is Participating in EMPLI / XMP

- Spawned out of DOE Rule makings ACEEE convened broad group of stakeholders to focused on energy savings systems versus components
- Key element was a label to compare performance
- Organized into three groups for:
 - Fans
 - Pumps
 - Compressed air

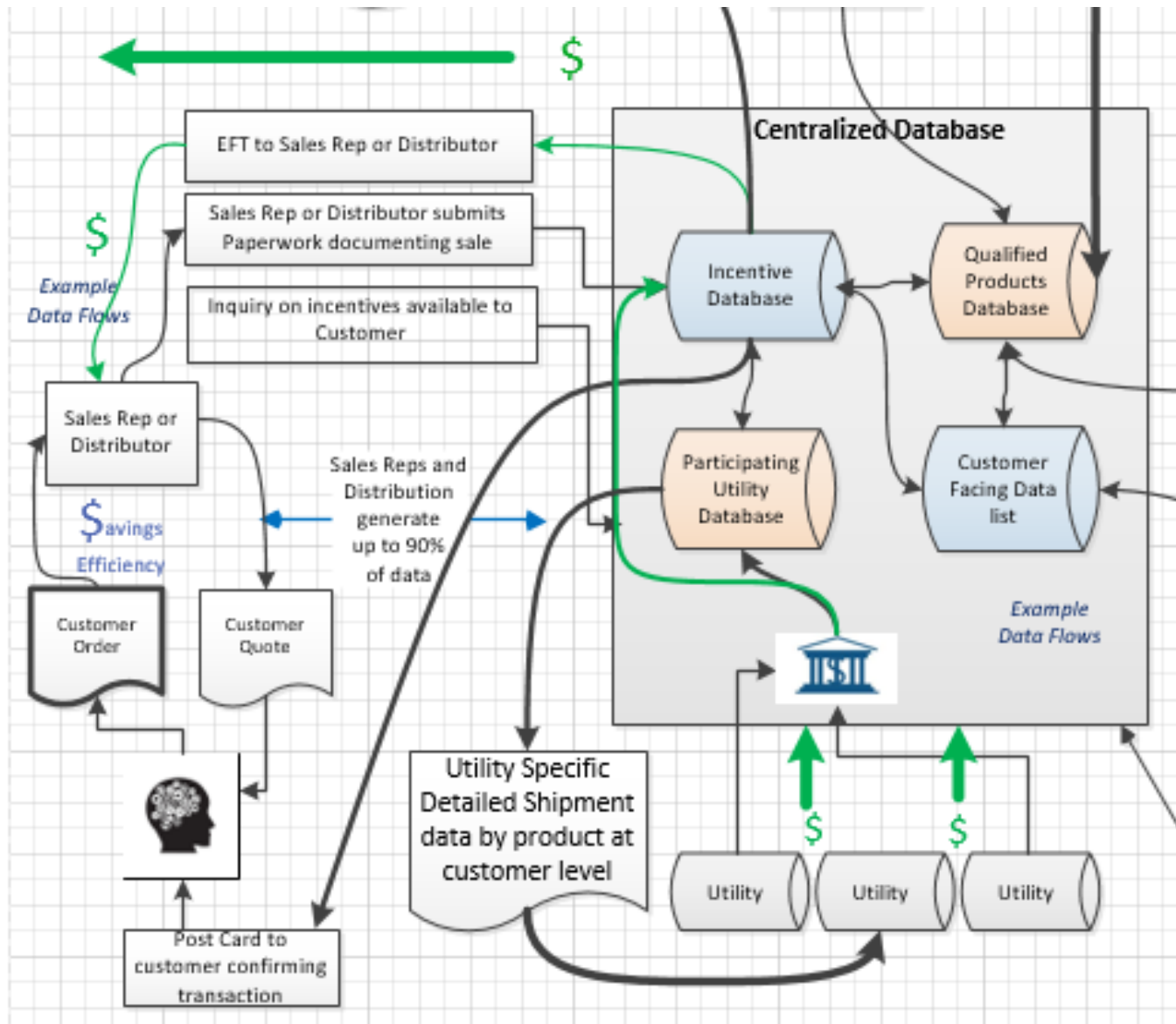


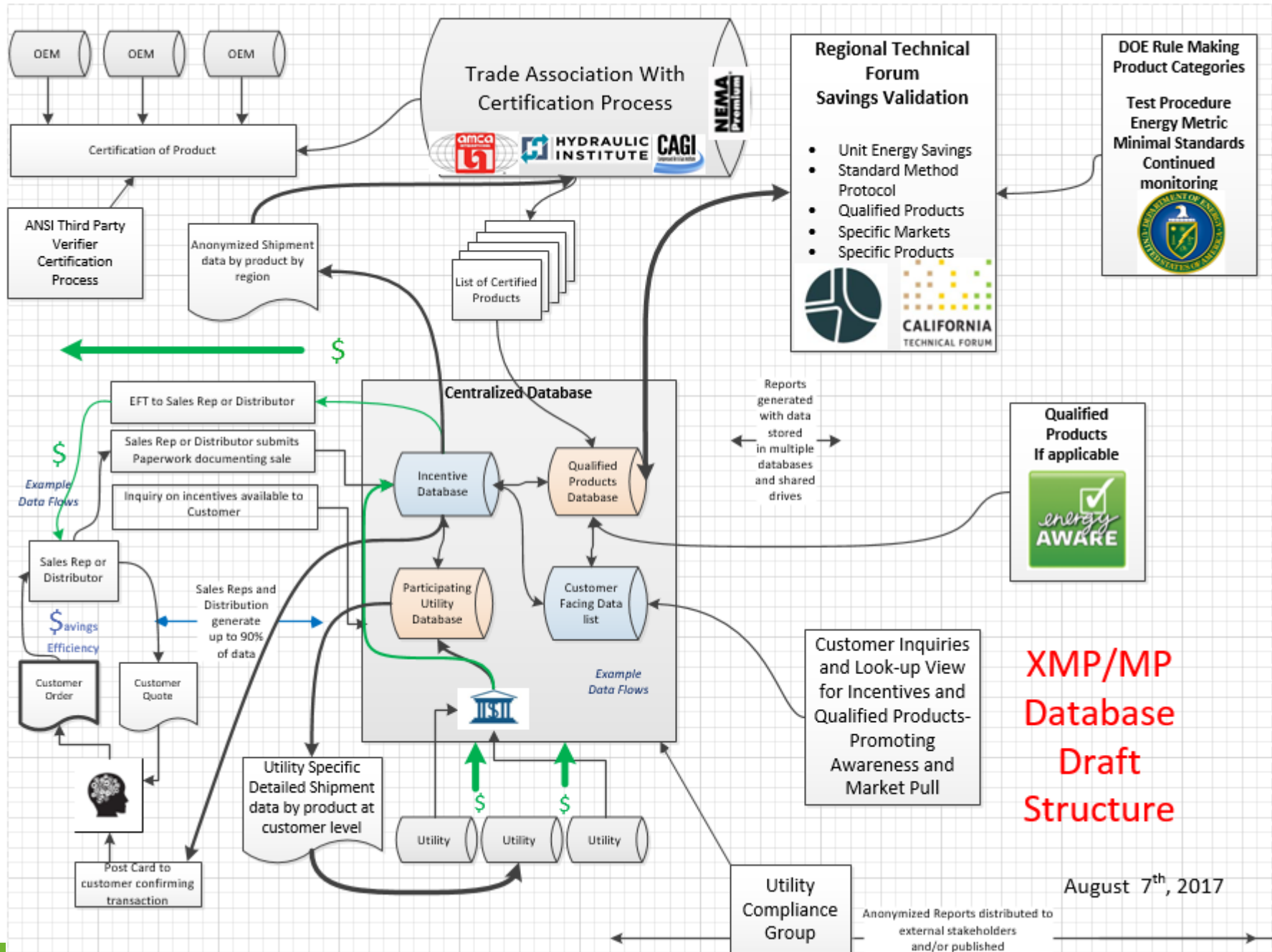
Numerous Utilities
Across the US

39 - Background



**XMP
Database**

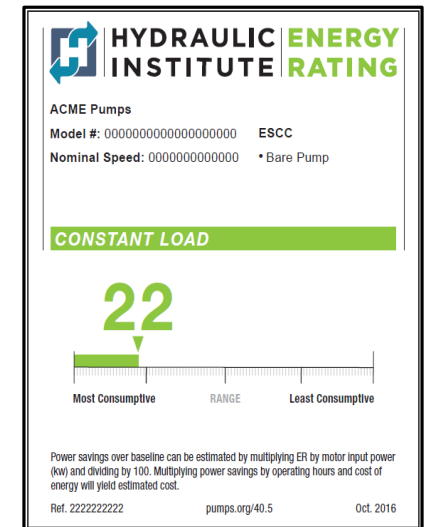
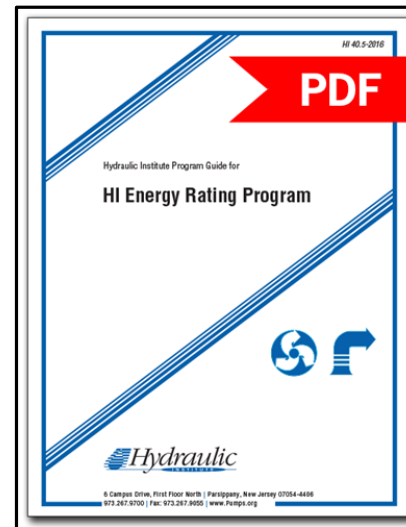




The HI Energy Rating Program

HI 40.5-2016 Program guide for HI Energy Rating Program – Defines:

1. Scope of program – Aligned with DOE
2. Eligibility & how to participate
3. The HI Energy Rating & Labels
4. Testing & Listing of Pumps
5. Proper Use
6. Certificate Program
7. HI Energy Rating Portal & Database



Certificate Program

The ER certificate option is only applicable when a motor and/or control is added to a pump listed in HI's database. Utilizes HI calculator and HI database



ER Listed in HI database then Calculate ER with driver or Calculate ER with driver & control

Due to the dependence of ER-listed models, the certificate portion of the Program will be launched subsequently.

Serialized certificate will be produced that can be used for deemed incentives

- Pump manufacturers
- Pump distributors/ reps/ packagers
- End users
- Incentivizes the use of listed bare pumps



***“Try not to be a man of success,
but rather try to become a man
of value”***

Albert Einstein