

# NW Ductless Heat Pump PROJECT



## Dual Benefits to the Single Zone Application

Mattias Järvegren, Clallam County PUD

# Dual Benefits to the Single Zone Application

## Utility Perspective

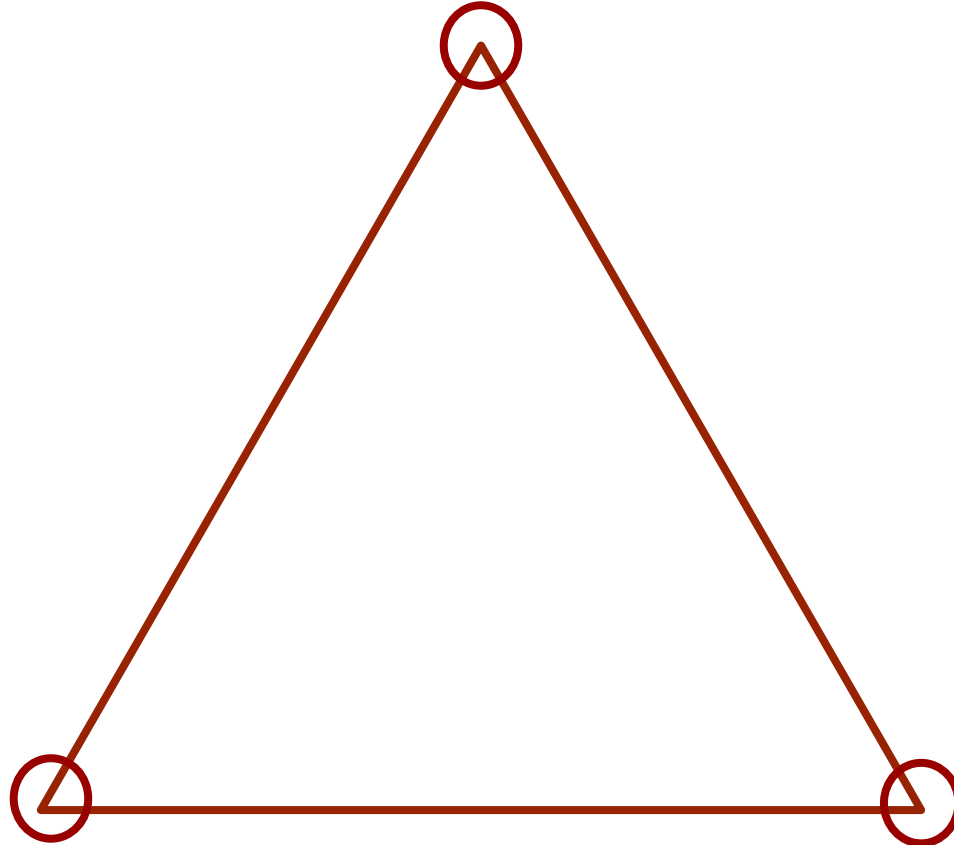


**Mattias Järvegren**  
Utility Services Advisor II  
PUD No. 1 of Clallam County

# Utility / Community Partnership

**Customer**

Energy Savings



**Utility**

Energy Savings

**Contractor**

Business Profit

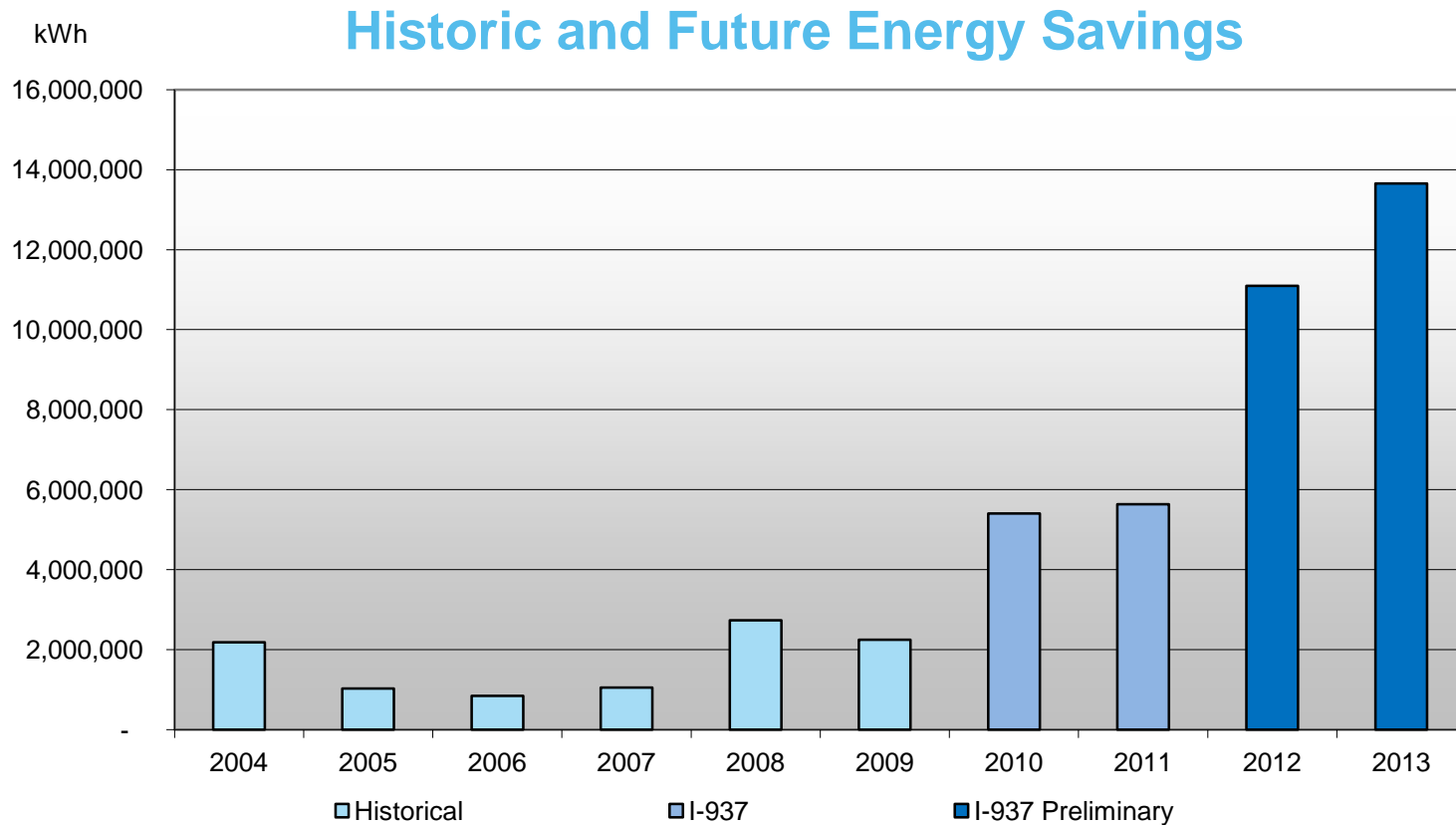
**NW Ductless Heat Pump PROJECT**



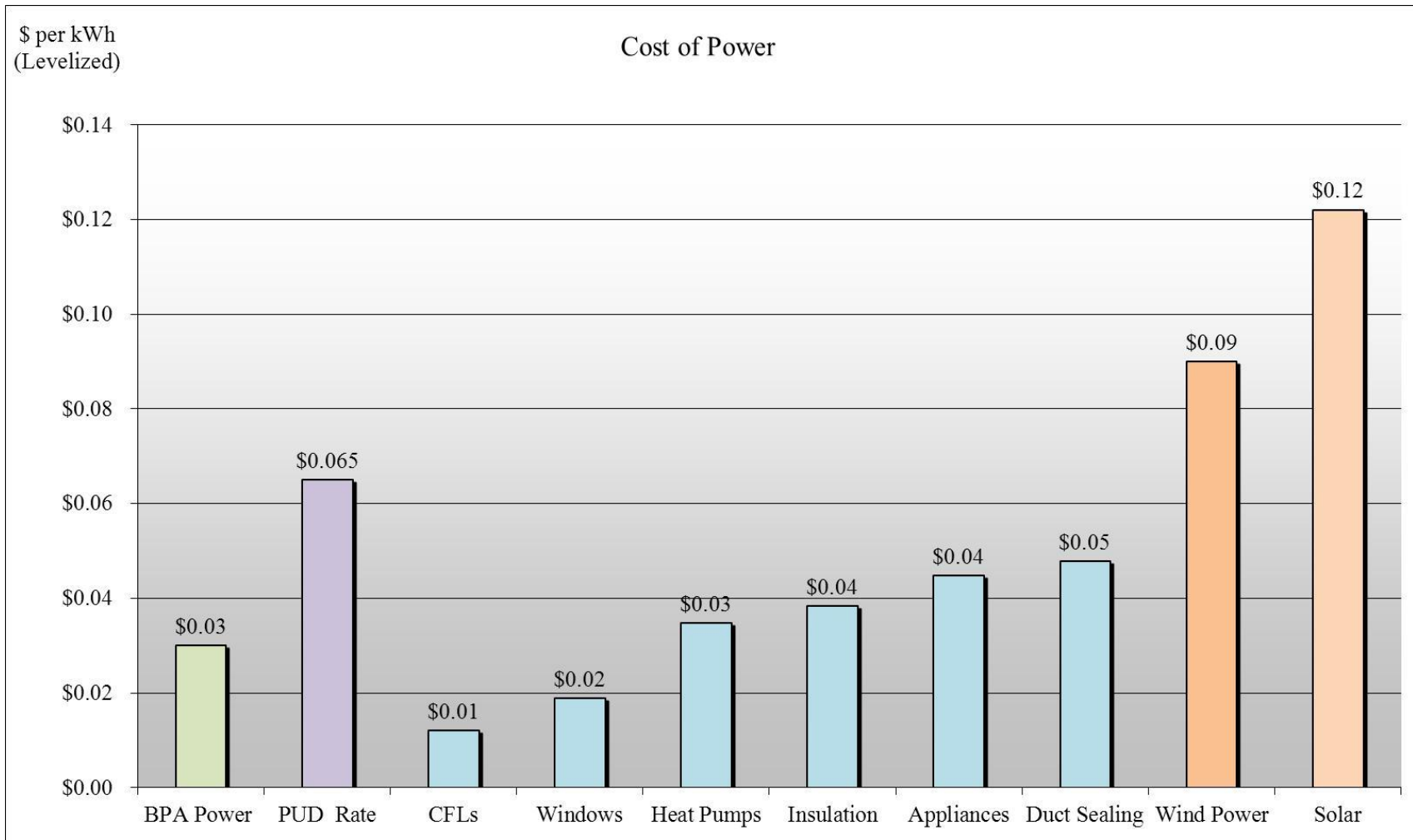
# Energy Independence Act (I-937)

## Conservation Requirement

- Create a 10 year conservation potential assessment (CPA)
- Acquire a 1/5 of potential in 2 years



# Lowest Cost Energy Resource



Estimates subject to change and market conditions.

# Utility / Community Partnership



**NW Ductless Heat Pump** PROJECT



# Utility / Community Partnership

## One ductless heat pump installation

- ~\$4,000 per install
  - ~3,500 kWh annual savings to the customer
  - ~3,500 kWh annual savings to the Utility
- 

## PUD No. 1 of Clallam County's Service Territory

- ~26,000 residential electric accounts
- ~35% electric resistance zonal heating systems
- ~9,100 homes with electric resistance zonal heating systems

# Utility / Community Partnership

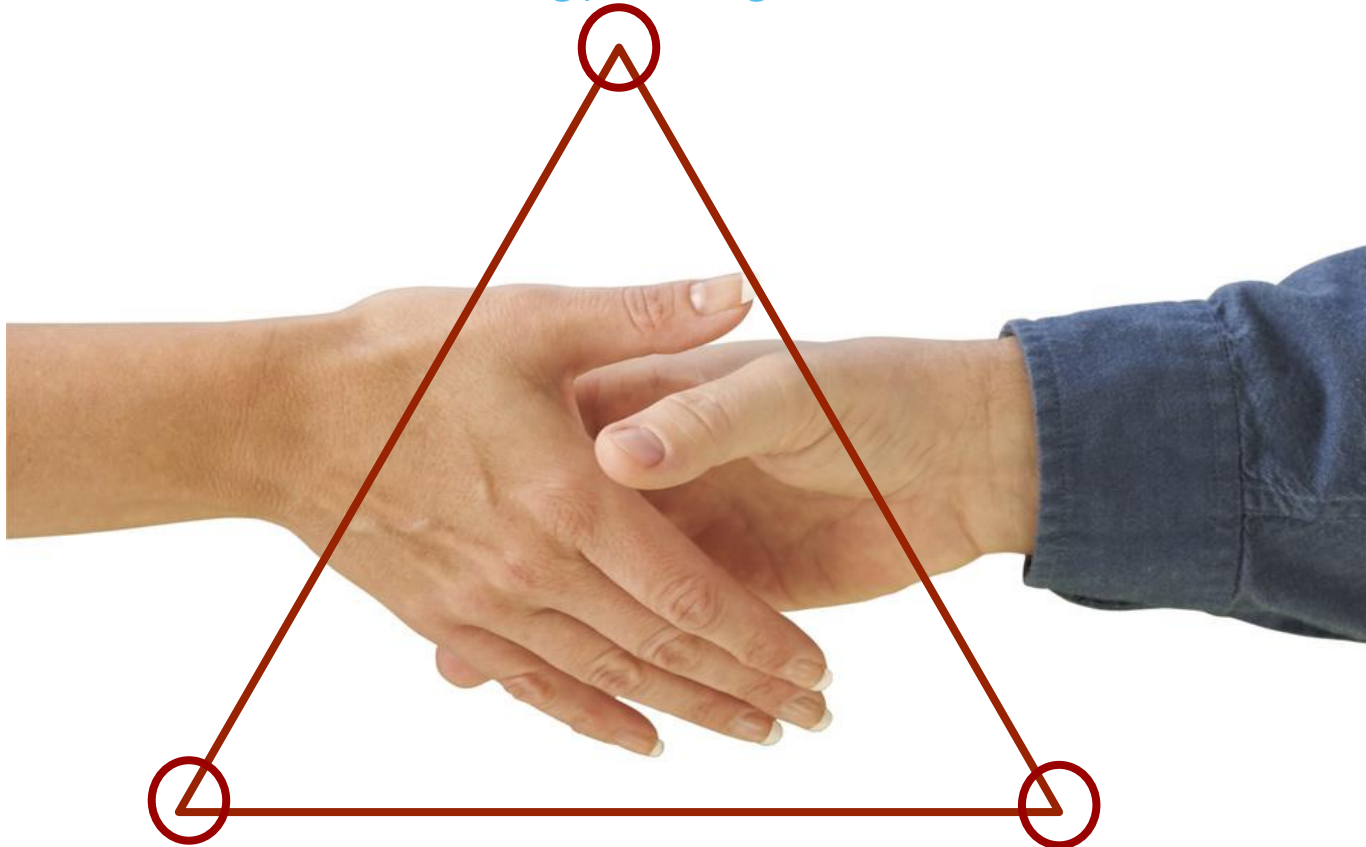
## PUD No. 1 of Clallam County's Service Territory

- ~7,280 Ductless heat pump installations (80% of electric resistance homes)
- ~ 25,480,000 kWh annual savings (@ 3,500 kWh annual savings per install)
- ~\$29,120,000 in sales (@ \$4,000 per install)

# Utility / Community Partnership

**Customer**

Energy Savings



**Utility**

Energy Savings

**Contractor**

Business Profit

**NW Ductless Heat Pump PROJECT**



# Thank you

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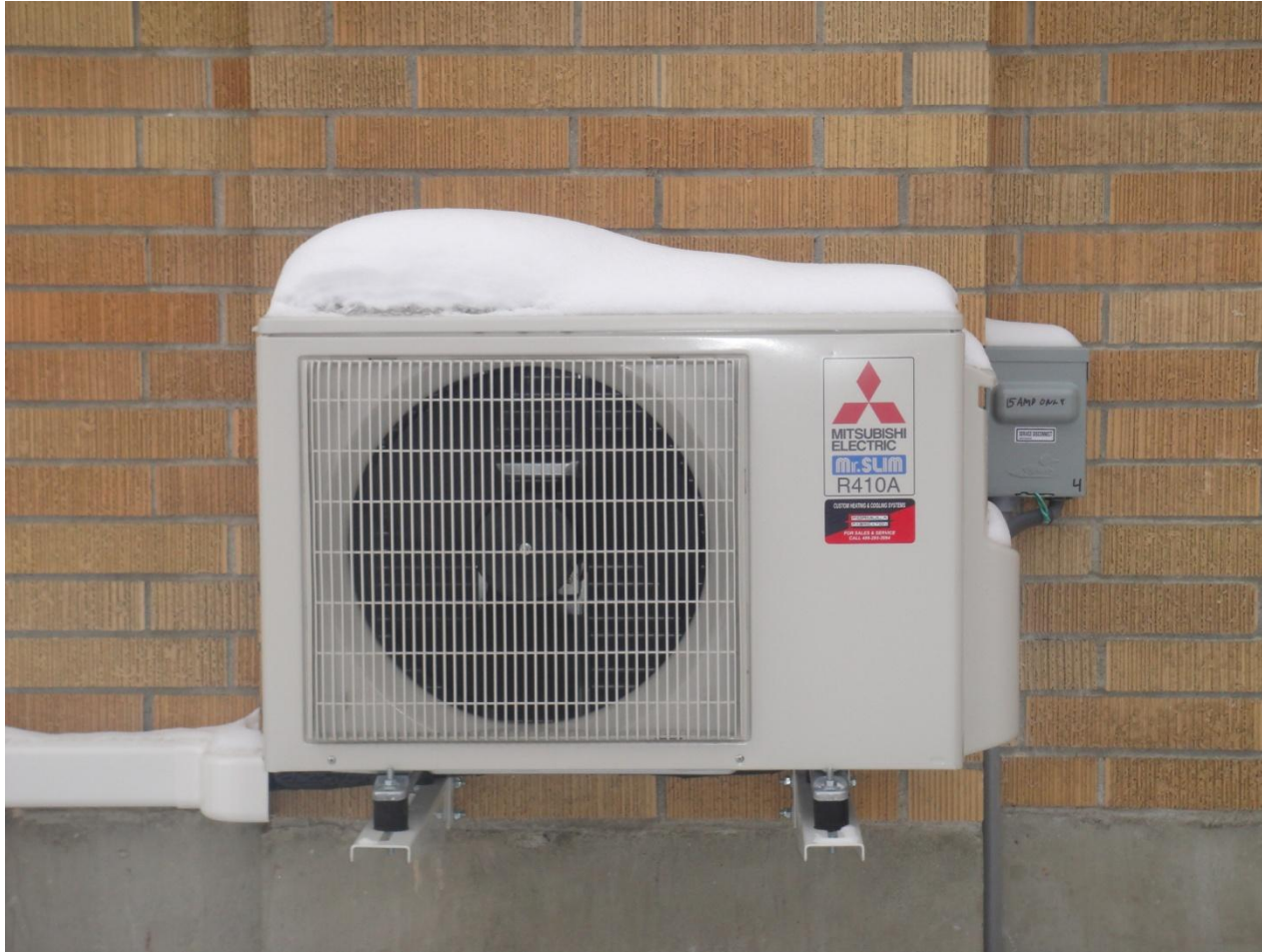
## NW Ductless Heat Pump PROJECT



# Dual Benefits to the Single Zone Application

Frank Sweedman, Formula Fabrication

# DHP SUB FREEZING APPLICATION



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# DRAIN PAN FREEZE UPS



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# ICE BUILD UP INSIDE DHP

**ICE BUILD UP HITTING FAN  
CREATES A LOUD NOISE**



**BUILD UP CAN BURST COIL  
AND WARP CABINET**





# DEFROST OVERFLOW

**NW Ductless Heat Pump** PROJECT



# SUB FREEZING TEMPERATURES REQUIRE A DRAIN PAN SOLUTION



# IMPROPER EQUIPMENT PAD



# EQUIPMENT PAD COMPARISON

## BACK SIDE



## FRONT SIDE



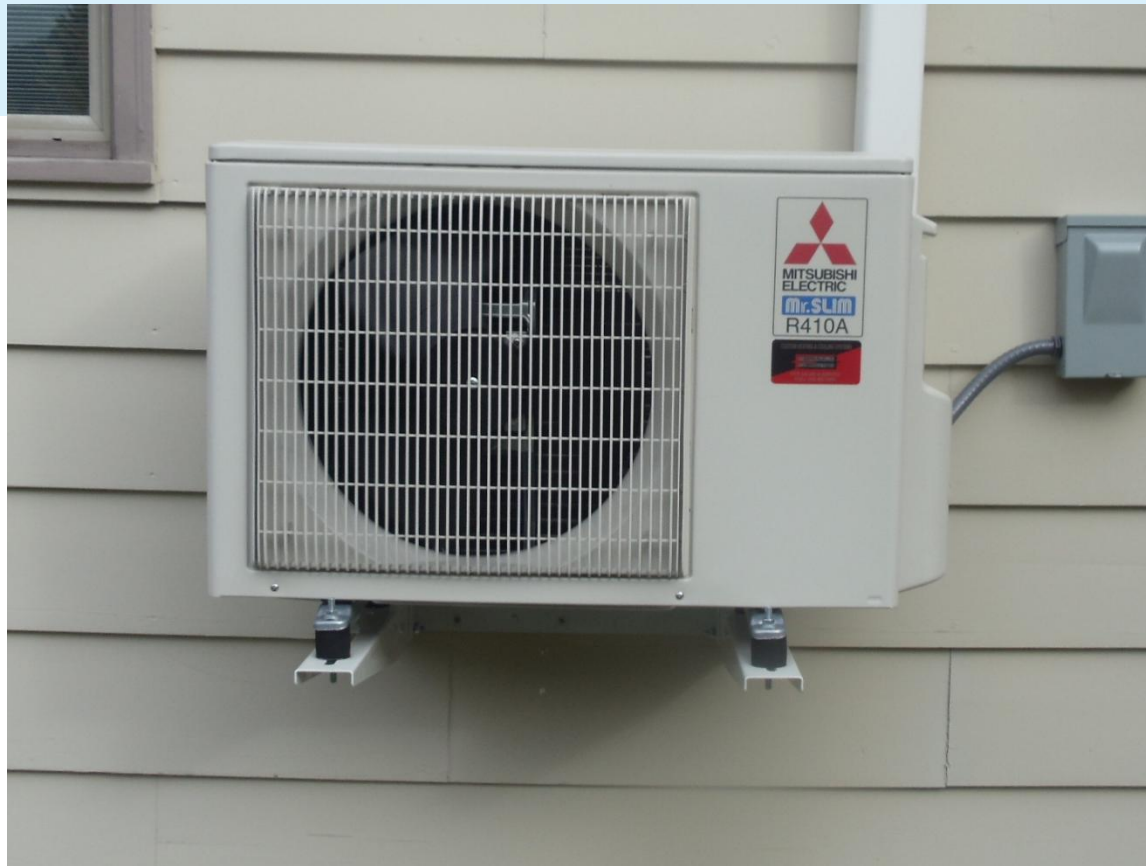
# SOLID EQUIPMENT PAD APPLICATION

- PROPER INSTALLATION PREVENTS FROST HEAVING FROM DEFROST CYCLE
- PADS WITH REINFORCED RIBS NOT RECOMMENDED
- LARGER BEARING SURFACES SOLID PAD RECOMMENDED



# HANGING BRACKETS AND VIBRATION DAMPERS





**PROPER EQUIPMENT AND A  
PROPER INSTALLATION MAKES  
VERY HAPPY REPEAT CUSTOMERS  
WHO REFER OTHERS**

**NW Ductless Heat Pump PROJECT**



## NW Ductless Heat Pump PROJECT



# Dual Benefits to the Single Zone Application

Jeff Pratt, The Heat Pump Store

# Dual Benefits of Single-Zones?

**Keep adding...**

I'll give you **4** that I think about...

# The Case for Single-Zone DHPs:

## Just the ones that start with C:

- » Cost effectiveness
- » Cost of capacity
- » (Can't get no) Satisfaction
- » Consumer issues

# The Case for Single-Zone DHP Applications

## Cost-Effectiveness

In the market, the MARKET will decide. My guess is that IDHPs (inverter-driven heat pumps) of all types will win the fuel wars and will go everywhere. All housing types. Even the 8-headed monsters have a good chance in the market. ;-)

As an energy efficiency measure, Cost-Effectiveness will decide. Based on today's costs, it looks like the energy savings available in homes with the “old electric heat” will justify the cost of a single-zone DHP, but no more.

# The Case for Single-Zone DHP Applications

## Cost of Capacity (Max @ 47F)

### Single-Zone

Preferred Model	Capacity (BTU/hr @ 47F)	Wholesale Cost (est.)	Cost per Capacity
Mr. Slim GE12	18,100.00	\$1,175.0	\$0.065
Mr. Fu 24RLXFW	36,200.00	\$1,775.0	\$0.049

### Multi-Zone

Preferred Model	Capacity (BTU/hr @ 47F)	Wholesale Cost (est.)	Cost per Capacity
Mr. Slim MXZ B20 (GE9xGE9)	22,000.00	\$2,180.0	\$0.099
Daikin 3MXS24 (CTXS12xCTXS12)	31,100.00	\$2,400.0	\$0.077

# The Case for Single-Zone DHP Applications

## (Can't get no...) Satisfaction

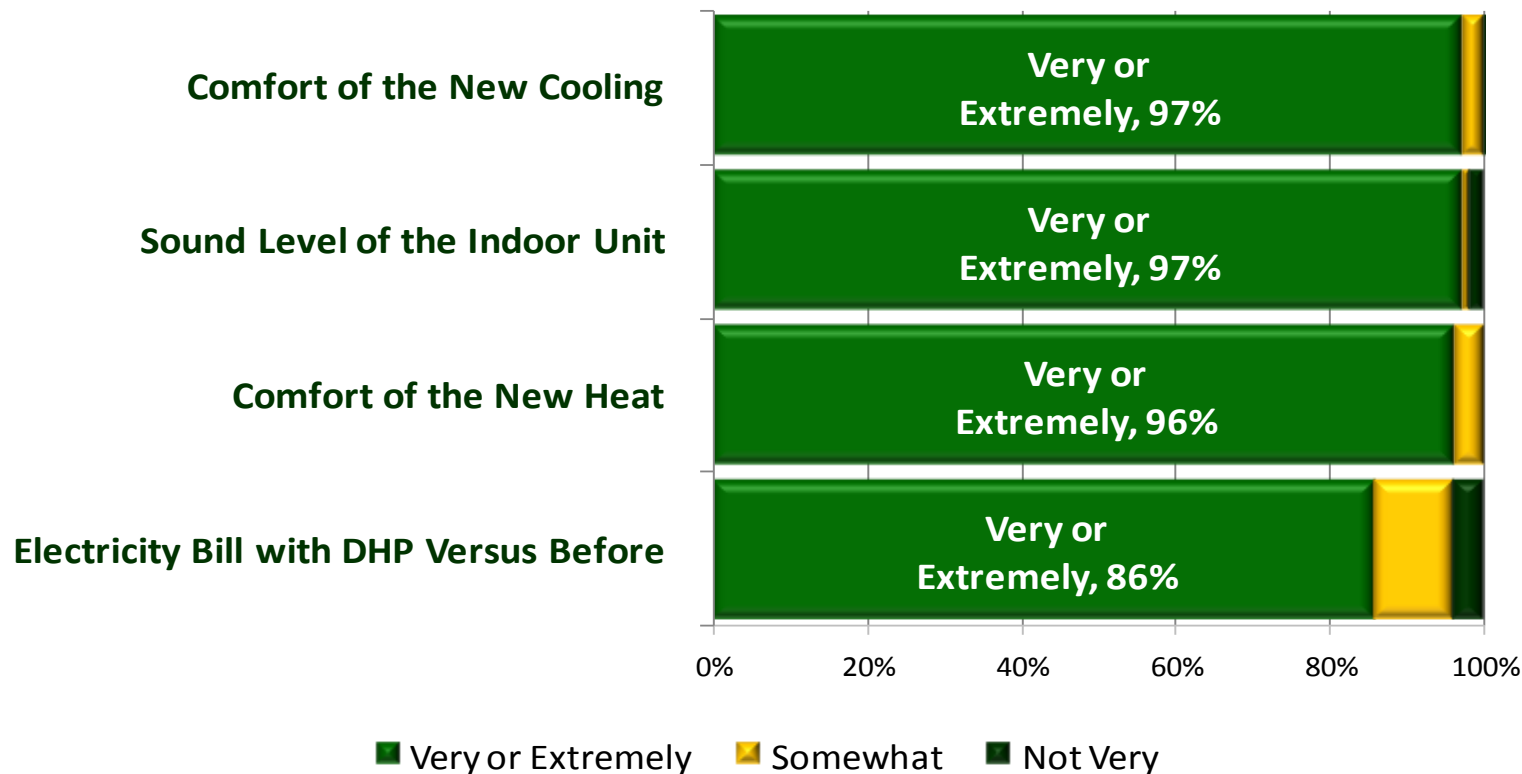
People of all walks of life are really tired of some aspect of their heating “system”... Think about it:

- Do you REALLY LOVE how much your current heating and AC system cost to install? Cost to operate?
- Do you LOVE the comfort (all zones all the time)?
- How bout the Convenience (got wood, pellets, propane, oil)?

People of all walks of life **are WAY satisfied** with their single-zone ductless heat pumps...

# The Case for Single-Zone DHP Applications

## How satisfied were you with...?



**Source:**

Marjorie McRae, Research Into Action  
EEBA/NEEA Presentation

# Cost of Heat in the Northwest

## Satisfaction ;-)

HEATING SYSTEM TYPE	COST PER UNIT OF FUEL	SYSTEM EFFICIENCY	DELIVERED COST (per million BTUs)
Ductless Heat Pump	\$0.07	250%	\$ 8.20
Heat Pump	\$0.07	200%	\$ 14.65
Natural Gas High Efficiency Furnace	\$1.22	92%	\$ 14.73
Pellets (wood)	\$180.00	70%	\$ 16.07
Natural Gas Stove / Fireplace	\$1.22	60%	\$ 20.33
Electric Resistance Heat	\$0.07	100%	\$ 20.51
Wood	\$175.00	60%	\$ 24.31
Natural Gas Furnace	\$1.22	70%	\$ 24.90
Fuel Oil Hydronics	\$3.75	85%	\$ 33.65
Propane Stove / Fireplace	\$2.59	65%	\$ 43.31
Fuel Oil Furnace	\$3.75	70%	\$ 55.46
Propane Furnace	\$2.59	70%	\$ 57.45

**Source:**

Marjorie McRae, Research Into Action  
EEBA/NEEA Presentation

# The Case for Single-Zone DHP Applications

## Customer Issues

### Single-Zones

Systems Installed	Service Calls (2011)	Nuisance Calls (2011)	Customer Issues (2011)
<b>454</b> (72%)	<b>5</b> (1.10%)	<b>7</b> (1.54%)	<b>12</b> (2.64%)

### Multi-Zones

Systems Installed	Service Calls (2011)	Nuisance Calls (2011)	Customer Issues (2011)
<b>177</b> (28%)	<b>3</b> (1.69%)	<b>6</b> (3.39%)	<b>9</b> (5.08%)

**N = 631** (2006-2011)

# Go Ductless! (Go Single-Zone!)

