

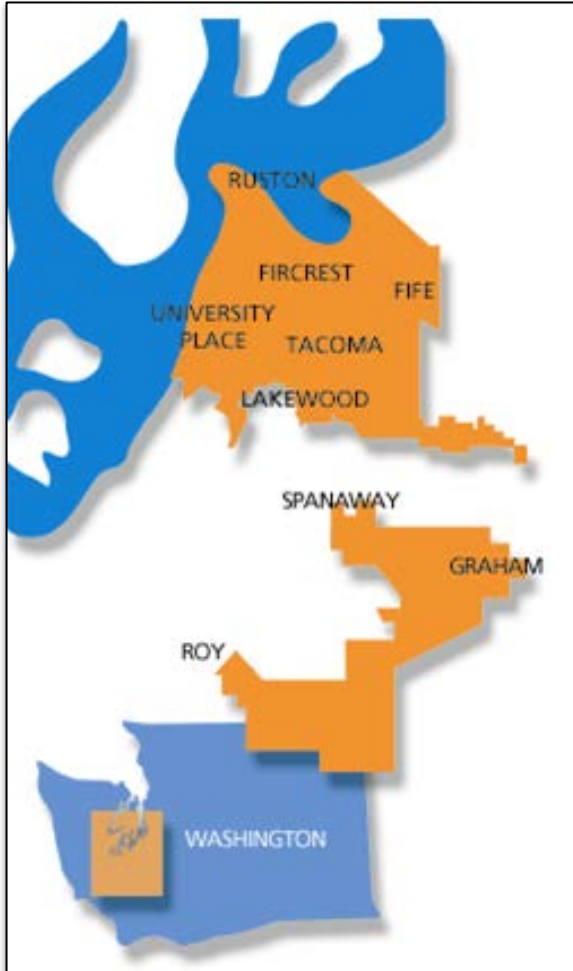
Low-Income DHP

The Tacoma Power Experience

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About Tacoma Power



Hydro utility

- TP owned generation + BPA purchased power
- Long power supply
- Low avoided cost

Fractured service territory

- Nine bordering utilities

Over 150,000 Residential Customers

- Significant number of electric heat customers
 - 23% baseboard
 - 13% electric furnace
 - 2% plug-in electric resistance
- Over 30% low income

Analysis of cost escalation

Initially ductless heat pumps were an immature market

- Not a lot of contractors or customers familiar with technology
- Contractors prefer “whole house solutions”
- DHP price established by incumbent whole house ducted heat pump option


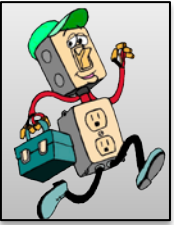

Prices rose as demand increased

- Technology was good – anecdotal observation indicate customers are willing to pay \$3,000 out of pocket to install a ductless heat pump
- High incentives available from multiple sources

Prices remain high as market has matured

- Contractors are able to sell expensive systems (multiple heads, large size)
- Prices remain high absent cost control mechanism
- Compared to other Puget Sound utilities, Tacoma Power DHP installations tend to be one ton, single head units installed in smaller homes; HSPF and manufacture/model mix similar to other Puget Sound utilities

What should a DHP cost?

		Item	Cost
Materials		Ductless Heat Pump ¹ <ul style="list-style-type: none"> • LG LSU121HSV2 / LG LSN121HSV2 • 12,000 BTU 20 SEER • Inverter Driven 	\$1,230
		Misc Installation Parts ¹ <ul style="list-style-type: none"> • Line-hide • Electrical breaker • Wire 	\$200
Labor		Electrician + overhead ² <ul style="list-style-type: none"> • Four hours at \$87.87 / hour 	\$350
		HVAC Tech + overhead ^{2,3} <ul style="list-style-type: none"> • Eight hours at \$81.43 / hour 	\$650
		Sales and office support + overhead ³ <ul style="list-style-type: none"> • Eight hours at \$45.00 / hour 	\$315
Permits		Mechanical Permit	\$110
		Electrical Permit	\$50
Total			\$2,905
20% profit			\$580
Total with sales tax (9.9%)			\$3,831.75

¹<http://www.acwholesalers.com/>

²Washington State prevailing wage * 3.0 for contracted electrician

³Washington State prevailing wage * 2.1 to cover health insurance, tools, taxes, and overhead costs

⁴Estimated wage * 3.0 to cover health insurance, taxes, and overhead costs

Tacoma's Program

Contractor driven program – with restrictions

- DHP must be installed in main living area and displace <500 ft² of electric heat
- Marketing literature focuses on the \$3,800 “out the door” cost
- Contractors must offer customers a \$3,500 “basic installation”
- Costs over \$3,500 must be itemized on the customer's invoice

Provide unique incentives

- Low income grant (Tacoma Power pays 100%) – first in the region
- \$2,850 zero interest, seven year loan (finance amount is limited)
- \$800 rebate (\$1,200 summer special promotion in 2014)

Unexpected results

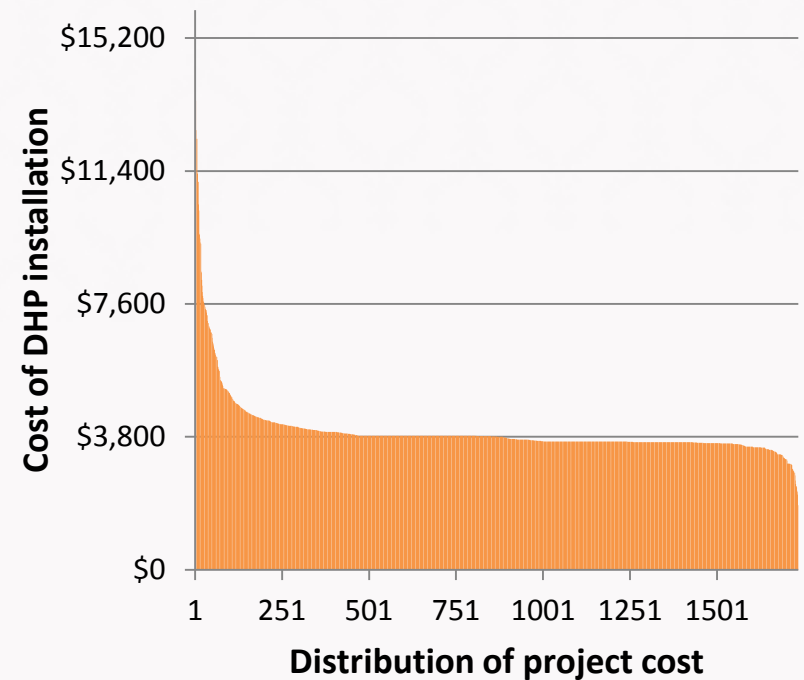
- Loan option has put downward pressure on DHP prices (over 35% use loan)
- Average installation = \$3,440 (minus non-energy upgrades)
- Cross-program contractor partnerships (e.g. Window and DHP contractors)
- Deep savings

DHP program results

Program performance has met expectations

Year	Low-Income Projects	Standard Projects
2012 (July program launch)	110	56
2013	200	224
2014	248	469
2015 (year to date)	173	244

Ductless Heat Pump costs under Tacoma Power's program



Future program challenges

The market must work creatively to meet cost needs

- Industry pressure for multi-head systems and whole house solutions
- Some contractors are optimized to sell basic DHP installations, others are not

TRC cost effectiveness

- Dropping wholesale power prices have always put pressure on DHP TRC
- Reduced savings by the RTF will likely render DHPs not cost effective

Standard displacement installations are the future

- Low income installations are expensive – demand exceeds funds
- Displacement theory seems difficult for customers to grasp and trade allies to sell

DHP sales at retailers

- Adapting TP's \$3,500 basic installation to fit retail
- DIY installs will be important part of any retail sales effort

Occupant behavior

Observations from Tacoma Power's new construction DHP study

- All participants saved energy
- Some participants were better at saving energy with their DHP-Hybrid system
- In two cases participants “put up” with dysfunctional heating systems
- Some did not turn on baseboards in living area due to fire concerns – some heated with a plug-in heater to compensate
- Customers did not maintain filters

Could poor use of DHP-Hybrid systems be the cause of lower savings?

- Multiple cases where customers are not properly using controls
- Poor home furnishing arrangement

What is Tacoma doing?

- Push survey to remind customers to maintain system and optimize controls
- Video inspections to reduce contractor costs

Questions?

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