OREGON HOUSING & COMMUNITY SERVICES Multifamily Energy Program

ALL-ELECTRIC NEW CONSTRUCTION

Date: September 26, 2019

Presenter: Nick Young, Association for Energy Affordability



USING GOTOWEBINAR

Open and close your....

Questions will be taken at the end of the presentation.



REGISTER FOR UPCOMING TRAININGS

Thursday, October 24, 2019, 12pm:

Pushing the Envelope in Existing Multifamily | REGISTER NOW



MEET THE TRAINER



Nick Young Association for Energy Affordability



OR-MEP & All-ELECTRIC

The OHCS Multifamily Energy Program (OR-MEP) provides incentives for energy efficiency measures that results in ELECTRIC SAVINGS

Qualifying Energy Efficiency Measures

The OHCS Multifamily Energy Program provides incentives for energy efficiency measures that results in electric savings, including the following:



All-electric projects can maximize the most incentives!

OHCS PDM: 2018 UPDATE

Dec 2018: All OHCS funded projects must build to Solar Ready & Electric Vehicle (EV) Ready specifications*

*Find details in the PDM Update 2018-R1, Ch 7.1 Sustainable Development Standards





EV Ready Requirement

A minimum of 10%, but no less than one on-site parking space must be designed and constructed to be EV-Ready.



Note: Projects that will not have any on-site parking are exempt.

AGENDA

- Why Electrify?
- Heat Pump Basics
- Water & Space Heating
- Appliance Options
- Renewables Integration



WHY ELECTRIFY?

BENEFITS OF ALL-ELECTRIC BUILDINGS



WE MUST ELECTRIFY



ELECTRIFICATION IS ALREADY HAPPENING

Growing number of multifamily developments choosing to pass on gas.



WHAT TO ELECTRIFY?



HEAT PUMP BASICS

WHAT IS A HEAT PUMP?



WHAT IS A HEAT PUMP?

It moves heat from one place to another using refrigerant

Just like an air conditioner or refrigerator

WHAT'S SO GREAT ABOUT HEAT PUMPS?







Can utilize on-site solar PV and act as a thermal battery



Improve air quality – no local emissions



Improve safety – no gas lines in building

REFRIGERANT CYCLE



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ELECTRIC WATER HEATING

HEAT PUMP WATER HEATERS: RESIDENTIAL





SPLIT Heat Pump Water Heater

COMBINED Heat Pump Water Heater



HEAT PUMP WATER HEATERS: COMMERCIAL

















HEAT PUMP WATER HEATERS

KEY CONSIDERATIONS

SIZING: Optimal sizing will likely have <u>more storage</u> than a gasbased system

- Engineer should NOT use same sizing parameters as gas hot water system
- Engage with heat pump manufacturer to obtain sizing recommendations

LOCATION: Individual systems may be locatable inside a unit with no outside air

• Always confirm with manufacturer

LOCATION: Larger or central systems will need access to outside/garage air

• Many can be ducted if space is tight

POINT-OF-USE ELECTRIC WATER HEATERS



POINT-OF-USE ELECTRIC WATER HEATERS

Can significantly increase electrical service/panel requirements.

Should only be used at fixtures used very infrequently and with very low flowrates. e.g. common area restrooms, but <u>not apartments</u>

ELECTRIC SPACE HEATING

SPACE HEATING: HEAT PUMPS







Ducted Heat Pump

Mini-Split Heat Pump (Ducted or Ductless) Packaged Terminal Heat Pump (PTHP)

SPACE HEATING: HEAT PUMPS

REMEMBER! With heat pumps, you also get

COOLING!

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SPACE HEATING: HEAT PUMPS







Variable Refrigerant Flow

Packaged Rooftop Heat Pump

Heat Recovery Chiller

SPACE HEATING: ELECTRIC RESISTANCE





Electric Baseboard

Electric Wall Heater (w/ Fan)

Note: OR-MEP does not incentivize the installation of electric resistance heating system as it is considered the baseline, standard code heating system.

KEY CONSIDERATIONS

- Electric resistance heating <u>3-4x less</u> <u>efficient</u> than heat pumps.
 - Significantly higher energy consumption and emissions
- Should have very good envelope and ventilation to <u>reduce</u> <u>loads first</u>.
- Would require separate cooling system.

QUESTION BREAK

ELECTRIC COOKING

ELECTRIC COOKING





Radiant



Resistance

Induction



ELECTRIC COOKING







Resistance

Induction

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WHAT'S SO GREAT ABOUT INDUCTION?

- Fastest response time of any heating type (faster than gas!)
- Boils water in ½ the time of any other heating type
- Extremely precise heat control down to very low levels
- Less waste heat = less overheating of kitchen
- No open flames, and only pan gets hot = SAFER



INDUCTION – YEAH, BUT WHAT ABOUT...

Cost

- Induction currently not the cheapest ranges available
- More affordable induction options exist
- Prices should come down as adoption increases

Compatible Cookware

- Pots and pans do need to be ferromagnetic
- Cast-iron and many others with sandwich bottom
- Many affordable options available





Utopia Kitchen Nonstick Frying Pan Set - 3 Piece Induction Bottom - 8...

\$**26**99

ELECTRIC LAUNDRY (DRYERS)

ELECTRIC CLOTHES DRYERS – RESIDENTIAL







Heat Pump Dryer

Electric Resistance Dryer Combo Washer + Resistance Dryer

ELECTRIC CLOTHES DRYERS – COMMERCIAL





Electric Resistance Dryer

Electric Heat Pump Dryer (Not yet available in US)

ELECTRIC TRANSPORTATION

ELECTRIC VEHICLE CHARGING

- The EV revolution is here, and new buildings need to be ready for it.
- Many state and local requirements for EV charging.
 - Oregon Executive Order 17-20 requires EVready construction by 2022 in residential & commercial code.
- Consider sizing electrical service and infrastructure for all-EV future to reduce service upgrade costs down the road.



QUESTION BREAK

WHAT ABOUT RENEWABLES?

SOLAR PV VS. SOLAR THERMAL



Solar Photovoltaic (PV)



Solar Thermal



SOLAR PV VS. SOLAR THERMAL

Solar Photovoltaic (PV)	Solar Thermal
No moving parts	 Moving parts (pumps & fluid)
 Can offset 100% of all loads for small buildings 	 Can only offset at most 60-70% of hot water load for any building
 PV-only simplifies building – just one renewable system 	 PV + thermal complicates building – two renewable systems
 Does not impact heat pump water heating design 	 Requires careful integration with heat pump water heating design
 Should be monitored for performance 	 Should be monitored for performance

SOLAR PV VS. SOLAR THERMAL

Generally, Solar PV-only is the best approach for all-electric buildings.

Note: OR-MEP does not incentivize the installation of renewables including solar PV and solar thermal.

ELECTRIC INFRASTRUCTURE

JUST (A BIT MORE) ELECTRICITY

- All-electric buildings eliminate gas costs: main extensions, meters, interconnection fees, and in-building infrastructure.
- With all systems powered by electricity, projects will need larger electrical service.
- Consult with an electrical engineer early-on and ensure they know that project will be all-electric.



THE ALL-ELECTRIC FUTURE IS NOW

All-electric buildings are better for our health and the environment



Buildings must electrify to reduce climate impacts



Cities in CA, WA, & MA have passed, or are considering bans on gas in new construction



As cities and states move away from gas, new gas infrastructure could become a stranded asset before it is paid off



As more buildings move off of gas, fewer and fewer customers will share burden of fixed system costs, increasing gas rates considerably



We should electrify new buildings now to avoid future retrofit costs

THANK YOU FOR ATTENDING

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