



# Electrification Impacts to Sales and Load

**Integrated Resource Plan Advisory Committee**

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# Target Result of Electrification Case

2021 IRP Sales and Load Forecast most probable outcome

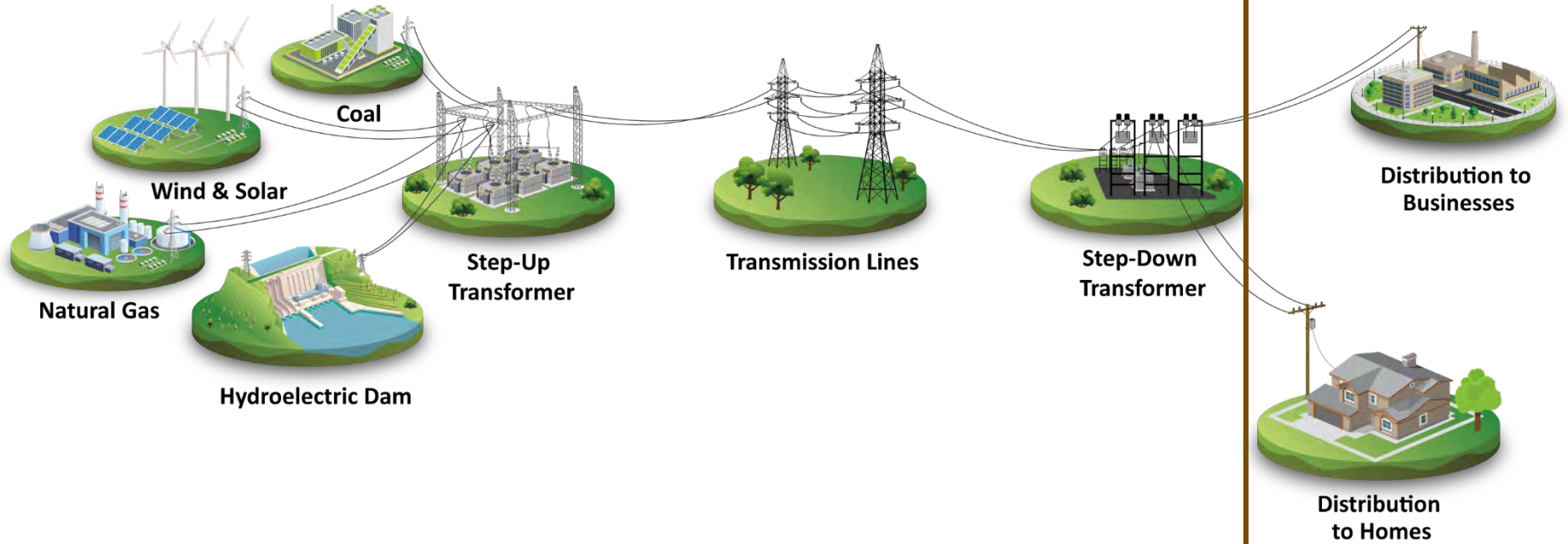


- “What if” case to stress test base
- Find balance of aggressive electrification adaptation case, with some governors
- Discover seasonal and/or annual peak and sales impact



# Scenario Architecture

## Electrification



# Scenario Architecture

## Electrification

Two Additional Pillars

(1) Building

(2) Transportation



Distribution to  
Businesses



Distribution  
to Homes

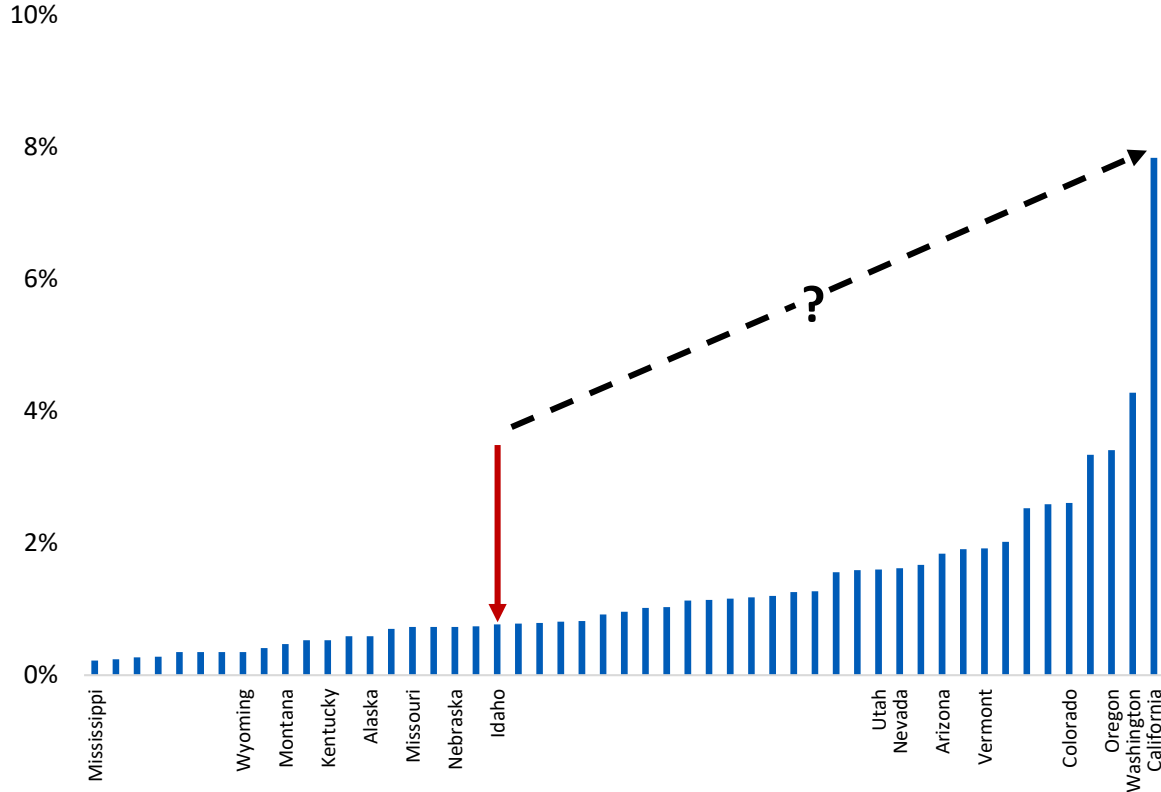


Base Load Forecast



# Transportation

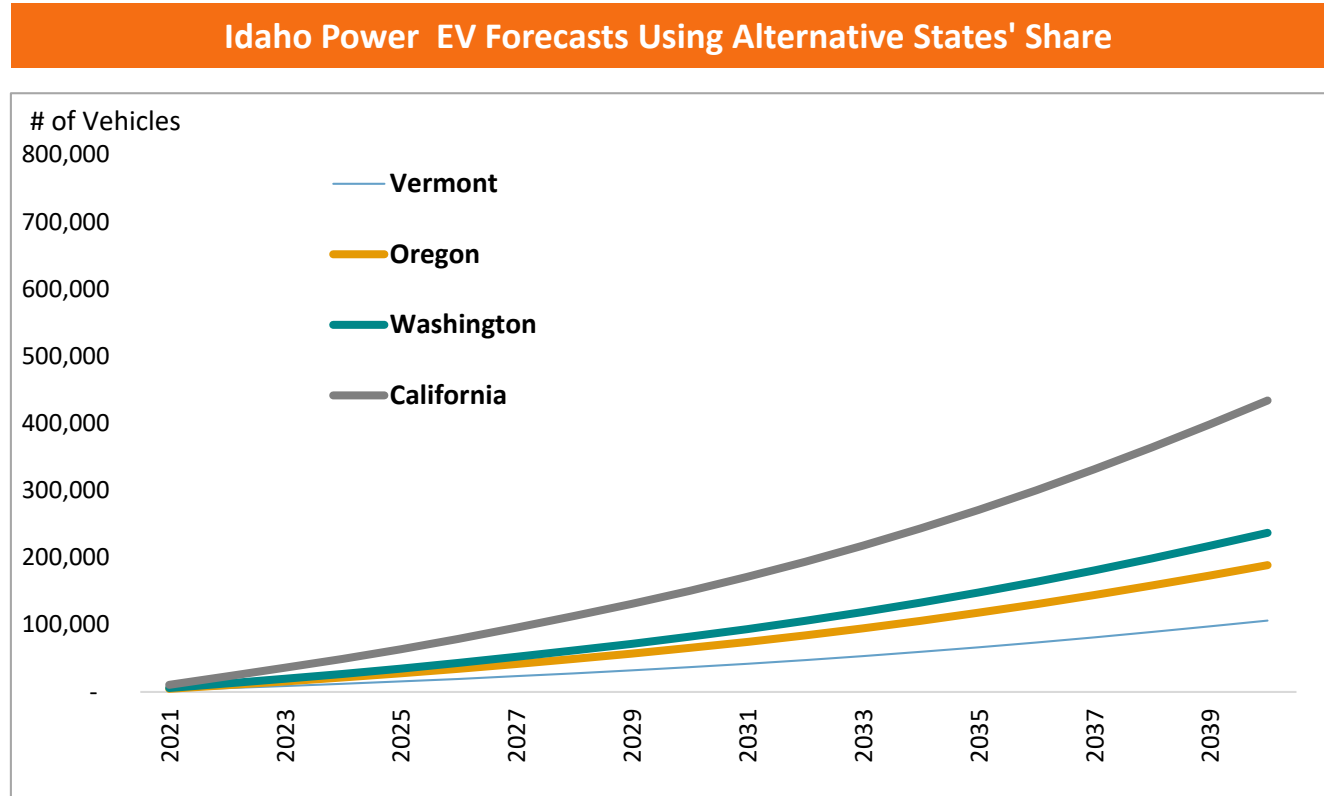
## EV Market Share by State



- Primary technology: electric vehicles
- Current proposed base state in 2040:
  - 50,000 electric vehicles in service area
- Target penetration in 2040:
  - 500,000 electric vehicles in service area

# Target Diagnostic Test

- **Question:**  
Could we even get to 450,000 more?
- **Diagnostic:**  
Use current state share curves conformed to Idaho Power



# Economic Choice Distinctions



**Alternative Fuel and Vehicle Incentives:** The California Energy Commission (CEC) administers the Clean Transportation Program offering financial incentives to businesses, vehicle and technology manufacturers, workforce training partners, fleet owners, consumers and academic institutions with the goal of developing and deploying alternative and renewable fuels and advanced transportation technologies. The CEC adopts an annual [Investment Plan](#) for the program establishing funding priorities and opportunities and outlining how program funding will complement public and private investments.

**Low Emission Truck and Bus Purchase Vouchers:** Through its Hybrid and Zero Emission Truck and Bus Voucher Incentive Project (HVIP) and Low NOx Engine Incentives, the California Air Resources Board (ARB) provides [vouchers](#) to eligible fleets to reduce the cost to purchase qualified electric and hybrid trucks and buses at the time of purchase. Vouchers are available on a first-come, first-served basis and range from \$2,000 to \$315,000 depending on vehicle weight and type. Only fleets that operate vehicles in California are eligible. Voucher amounts vary depending on whether the vehicles are located in a disadvantaged community.

**Plug-In Hybrid and Zero Emission Light-Duty Vehicle Rebates:** Pursuant to [California Health and Safety Code](#) 44274 and 44258, the Clean Vehicle Rebate Project (CVRP) offers rebates for the purchase or lease of qualified vehicles. Qualified vehicles are those light-duty ZEVs and PHEVs that ARB has approved or certified. Under the program, ARB offers rebates of up to \$4,500 for FCEVs, \$2,000 for BEVs, \$1,000 for PHEVs, and \$750 for zero-emission motorcycles. Rebates are available on a first-come, first-served basis to individuals, business owners, and government entities in California that purchase or lease new eligible vehicles.

**Residential EVSE Financing Program:** [Property Assessed Clean Energy \(PACE\) Loss Reserve Program](#) financing authorizes property owners to borrow funds to pay for energy improvements, including purchasing and installing EVSE. The borrower repays the financing over a defined period of time through a special assessment on the property. Local governments in California are authorized to establish PACE programs. Property owners must meet certain requirements, including agreeing to a contractual assessment on the property tax bill, having a clean property title, and being current on property taxes and mortgages. Financing limits are 15% of the first \$700,000 of the property value and 10% of the remaining property value.

**Zero-Emission Transit Bus Tax Exemption:** Zero-emission transit buses are exempt from state sales and use taxes when sold to public agencies eligible for the [Low Emission Truck and Bus Purchase Vouchers](#). This exemption expires Jan. 1, 2024.

**EV Rebate:** SCE's Clean Fuel Reward Program offers [rebates of up to \\$1,000](#) to residential customers who purchase or lease an eligible new or used EV. Residential account holders may apply on behalf of a EV owner in their household. Note that this incentive expires Dec. 31, 2020.

**EVSE Incentives for Commercial Customers:** PG&E's EV [Fast Charge Program](#) covers the costs and manages construction of electrical infrastructure necessary to install DC fast chargers. The program also offers a rebate of up to \$25,000 per charger for those sites located in disadvantaged communities.

**EV Rebate:** PG&E offers [rebates of \\$800](#) to residential customers who purchase or lease an eligible EV. Residential account holders may apply on behalf of an EV owner in their household or their tenant in a multifamily household with the vehicle owner's permission.

**EVSE Incentives for Medium- and Heavy-Duty Fleets:** PG&E's [EV Fleet Program](#) offers competitive incentives to facilitate the installation of EVSE for medium- and heavy-duty vehicle fleet to support organizations in electrifying their fleet operations. PG&E offers dedicated electrical infrastructure design and construction services and reduced costs for electrical infrastructure work. Sites located in disadvantaged communities may be eligible for a rebate covering a portion of costs to purchase a charger.

**EV Time of Use (TOU) Rate:** PG&E offers discounted residential [TOU rates](#) for electricity used for EV charging during off-peak hours.

**EV Rebate:** MCE offers a [rebate](#) for the purchase or lease of a new EV for income-qualifying customers. To be eligible for the rebate, an applicant must live in MCE's service area, be an MCE customer, and meet at least one of the qualifying income requirements.

**EVSE Rebate:** Azusa Light & Water offers a [\\$150 rebate](#) to customers for the purchase of an Energy Star certified Level 2 EVSE.

**Used EV Rebate:** The Los Angeles Department of Water and Power offers [rebates up to \\$1,500](#) to residential electric customers for the purchase of eligible used EVs.

**EV Charging Rate Reduction:** Bear Valley Electric Service offers three [EV TOU rates](#) to customers enrolled in the Transportation Electrification Pilot Program.

**EV Infrastructure Charging Rate Reduction:** San Diego Gas & Electric offers three EV [TOU rates](#) to customers using a single meter or requiring the installation of a second meter.

# Economic Choice Distinctions

STATE OF OREGON



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**EV Rebate:** Oregon's [Clean Vehicle Rebate Program](#) provides rebates up to \$2,500 for purchasing or leasing EVs. Rebates vary depending on battery capacity. Oregon residents who meet low- or moderate-income requirements are eligible for increased rebates up to \$5,000.

**EVSE Installation Rebate:** Central Lincoln offers residential and commercial customers a one-time [rebate](#) of for purchasing a Level 2 charger. To qualify, the EVSE must have been purchased on or after July 1, 2018.

**EVSE Rebates:** Eugene Water & Electric Board offers [rebates for installing Level 2 chargers](#) up to \$500 for residential customers and \$1,000 for commercial customers.

**Transportation Electrification Grants:** Pacific Power provides [grants](#) for up to 100% of the costs to study, plan and deploy transportation electrification technologies and projects.

**EV Charging TOU Rate:** Portland General Electric offers a TOU [rate incentive](#) for customers with an EV.

**EV Registration Incentive:** Emerald People's Utility District customers are eligible for a [\\$100 incentive](#) for registering their new or used EV with the Oregon Department of Motor Vehicles.



**EV and EVSE Sales and Use Tax Exemption:** EVs and EVSE are eligible for a [sales and use tax exemption](#). Vehicles and EVSE must have been purchased after Aug. 1, 2019

**AFV Emissions Inspection Exemption:** AFVs powered exclusively by electricity and other alternative fuels are exempt from state emissions control inspections. PHEVs that obtain a U.S. Environmental Protection Agency fuel economy rating of at least 50 miles per gallon during city driving are also exempt from these inspections. [Rev. Code Wash. 46.16A.060](#).

**EVSE Grants:** The Washington State Department of Transportation (WSDOT) awards grants to support EVSE deployment projects along the state's highway corridors. [Find information about current funding opportunities](#).

**Green Public Transit Grant Program:** WSDOT's [Green Transportation Grant](#) program provides funding to transit authorities to electrify fleets and install electric vehicle infrastructure among other green transportation projects.

**Commercial Alternative Fuel Vehicle and Fueling Infrastructure Tax Credit:** Businesses are eligible to [receive tax credits](#) for purchasing new alternative fuel commercial vehicles and installing alternative fueling infrastructure.

**Nonresidential EVSE Grants:** Pacific Power offers non-residential customers [grants](#) on a quarterly basis covering up to 100% the costs of purchasing and installing EVSE.





# Final Assumptions and Results

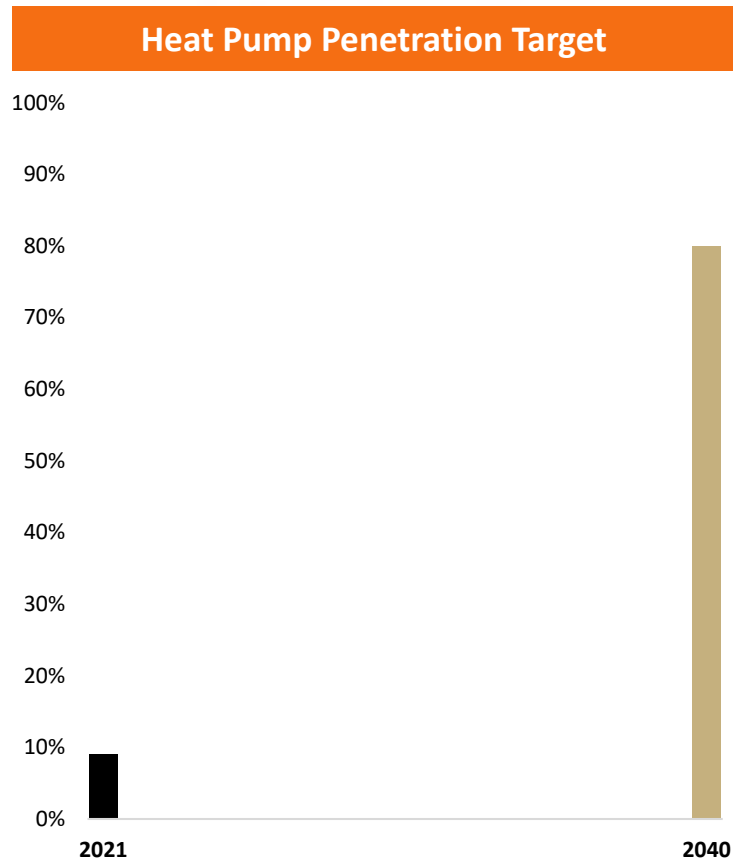
- Customers agnostic to economic choice
- Residential and commercial split
- Simplistic by design, assumes traditional charging
- **Pushes up system coincident peak demand by 2040 by +150 megawatts (MW)**

# Buildings

- Primary technology: residential heat pumps

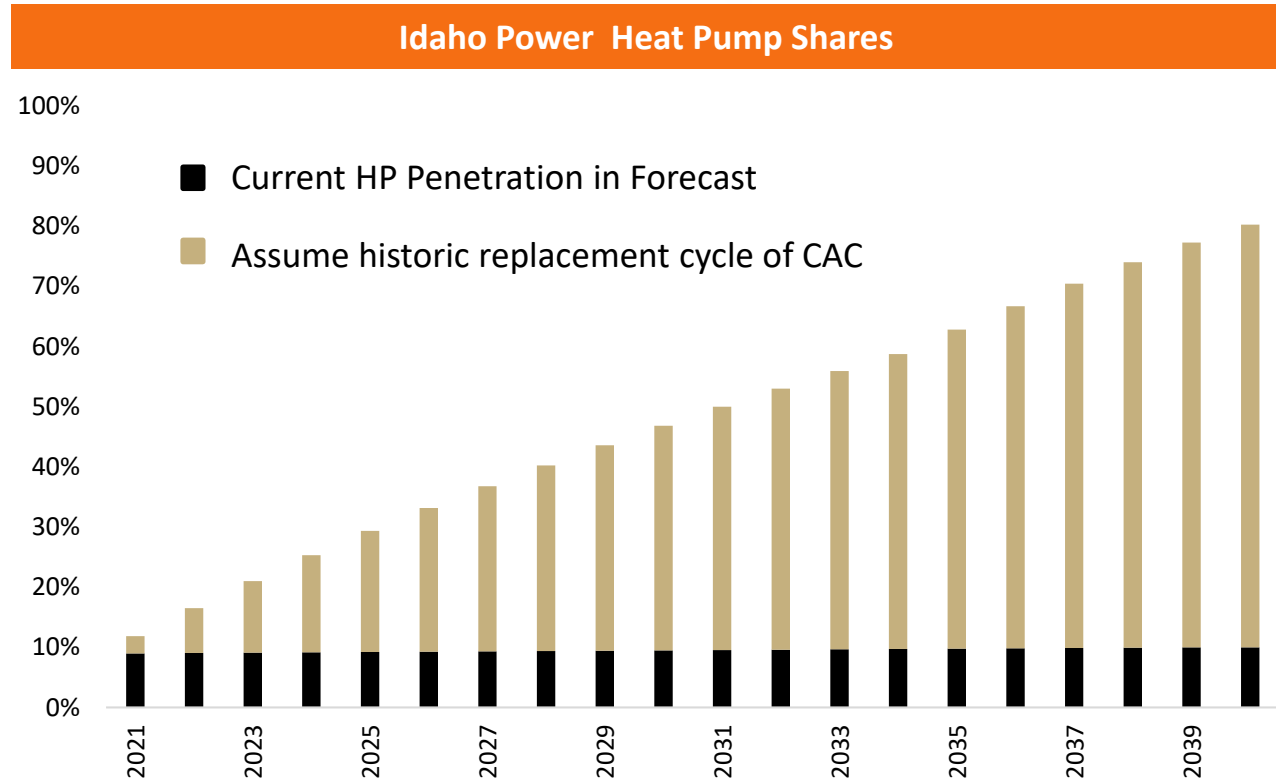
(with general assumption on electric water heaters)

- Current base state:
  - 2020 ~9% of residential customers
- Target penetration:
  - 2040 80% of residential customers



# Target Diagnostic Test

- **Question:**  
Could we even get to 80% penetration?
- **Diagnostic:**  
Leverage replacement cycle of central air conditioners (CAC) with Heat Pumps (HP)



# Economic Choice Considerations

## Capital:

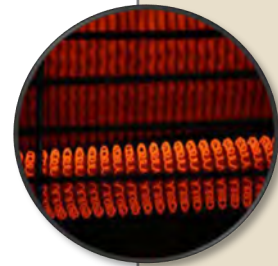
- Switch-over costs for customer capital outlay could be substantial.

## Operational:

- Current assessment of natural gas, cost to heat home in winter with electricity could exceed natural gas.

## Additional:

- Costs (impacts) from electric heat strips for extreme weather scenarios not included.



# Final Assumptions and Results



- Assumes customers agnostic to economic choice even at market average Seasonal Energy Efficiency Ratio (SEER) central air conditioner to market average SEER heat pump.
- General assumptions on electric water heaters.
- All assumptions are tied to Idaho Power end-use penetrations and Applied Energy Group (AEG) Unit Energy Consumption (UEC) curves.
- **Seasonal differential still +550 MW (summer to winter). Winter peak grows up to 4% per year under 50<sup>th</sup> percentile weather.**