COALITION FOR COMMUNITY SOLAR ACCESS

VCE VIBRANT CLEAN ENERGY

VOTE SOLAR

LOCAL SOLAR FOR ALL

WHY LOCAL SOLAR FOR ALL COSTS LESS:
A NEW ROADMAP FOR THE LOWEST COST GRID

RESULTS SUMMARY | JANUARY 2021

REPORT HIGHLIGHTS

Expanding Local Solar + Storage Saves $473B by 2050

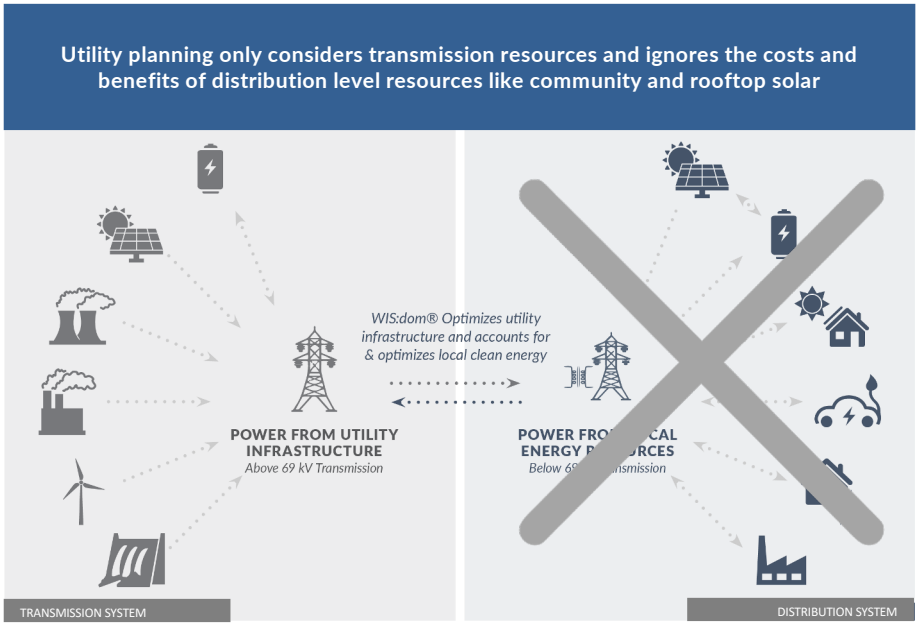
...and Creates Over 2M More Jobs

The Cleanest, Lowest Cost Grid Requires 223 GW More Local Solar by 2050

More Local Solar Unlocks the Full Potential of Utility-Scale Solar and Wind

Utility Planning Models Were Designed For A Century-Old Utility System

- Utility planning has historically focused on forecasting demand and building the needed utility-scale supply and delivery infrastructure from a narrow set of resource options, with a myopic focus on short-term costs.
- **These models play a critical role in developing integrated resources plans and setting electric rates, however current models are missing fundamental data.**
  - **Data inputs are not exhaustive** - hourly time slices, no high-resolution climate and weather data, no policy lens, T&D costs are rarely considered or simply an afterthought
  - **Not taking a total system planning approach** - not all resources are being considered and they don't account for total system costs and benefits
  - **Not integrating and optimizing for local solar + storage**



WIS:dom®-P: Total System Planning Tool

+ **WIS:dom-P is a state-of-the-art, fully combined capacity expansion and production cost model**, developed to process vast volumes of data.
+ **It simultaneously co-optimizes for: (1) Capacity expansion requirements (generation, storage, transmission, and demand-side resources); and (2) Dispatch requirements (production costs, power flow, reserves, ramping and reliability).**
+ **WIS:dom-P is a total system planning tool** that provides:

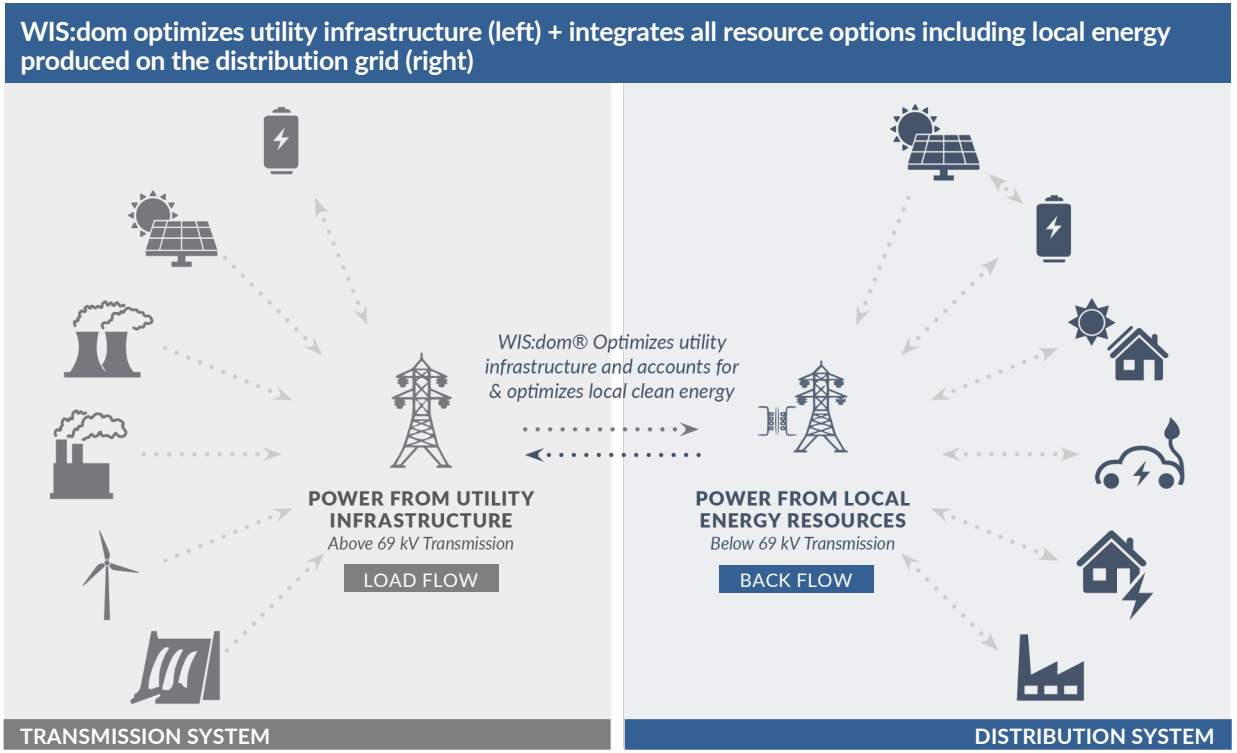
1. **MORE & BETTER DATA PROCESSING**

2. **TOTAL SYSTEM PLANNING COORDINATION**

3. **LOCAL CLEAN ENERGY INTEGRATION & OPTIMIZATION**
(added functionality for this project)

Integrate & Optimize For Local Solar

- WIS:dom-P co-optimizes and coordinates the utility-scale electricity grid (left) with the distribution grid (right) to find the overall least system cost.
- **Co-optimize and coordinate means** it considers distribution infrastructure requirements and determines when leveraging local solar + storage to serve local load and/or reduce peak load, could lessen the need for some distribution infrastructure and forego additional utility-scale generation and transmission buildout.



A local & clean
electric grid is a lot less expensive than you think.

In fact, it's the most cost-effective option.

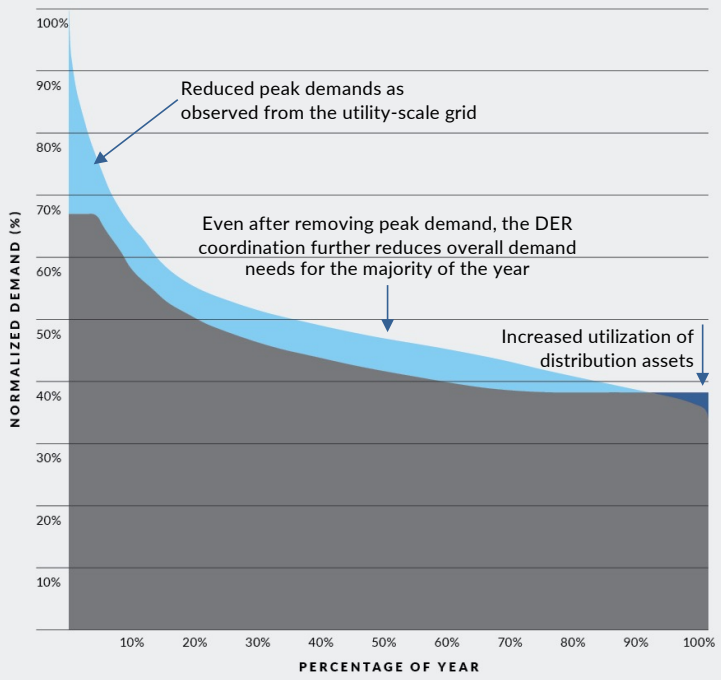
The savings & additional benefits would be enormous.

BY 2050: 223 GW OF NEW LOCAL SOLAR | $473B SAVINGS | OVER 2M JOBS

What Did WIS:dom Build & Why?

- Conventional wisdom would predict the model choosing continued build out of "lower cost" per unit utility-scale resources and transmission infrastructure with unidirectional flow from supply to load.
- Modeling that **ENABLES COMMUNICATION** between both sides of the grid (transmission & distribution) with WIS:dom demonstrates an ability for local solar and storage to reshape load, as observed from the utility-scale grid (i.e., above 69 kV).
  - One consequence of this co-optimizing and coordinating utility-scale with distributed-scale is the reduction of volatility in the demand as observed by the utility-scale grid.
  - A second consequence is a dramatic drop in the peak demand requirements as observed by the utility-scale grid — *~16% reduction in peak by 2050 attributed to local solar + storage.*
- The result is more local solar + storage reduces net demand and smooths overall demand to enable access to lowest cost utility-scale generation – more utility wind and solar and less fossil firming capacity.

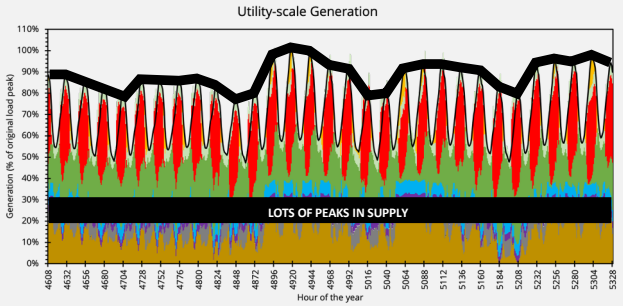
DER Altered Load Duration Curve (example state)

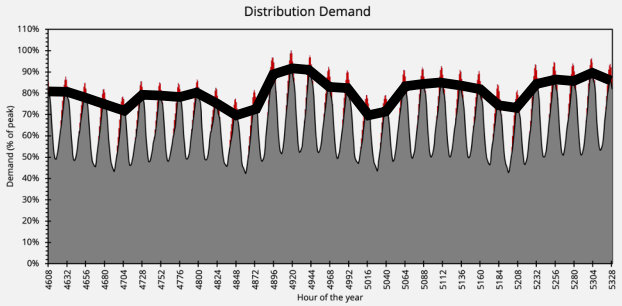


Eases Stress On The Bulk Power System

UTILITY-SCALE GENERATION ⟷ **DISTRIBUTION DEMAND**

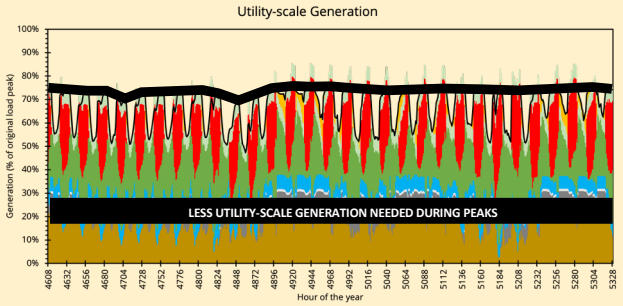
BAU
(summer month in sample state)

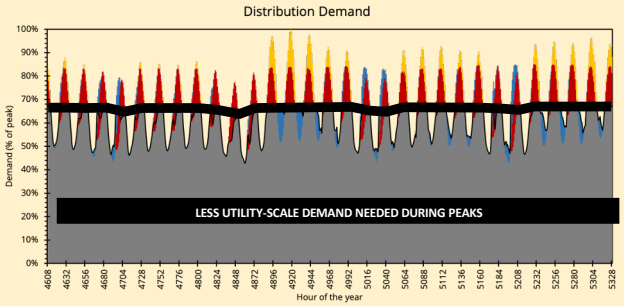




- Demand is sharp and spikey and supply ramps up and down to meet peaks
- More firming capacity and peaker plants are required to meet demand at times of the day when customers are using the most electricity
- Distributed solar + storage have minimal impacts on “shaping load” and meeting system needs

DER
(summer month in sample state)



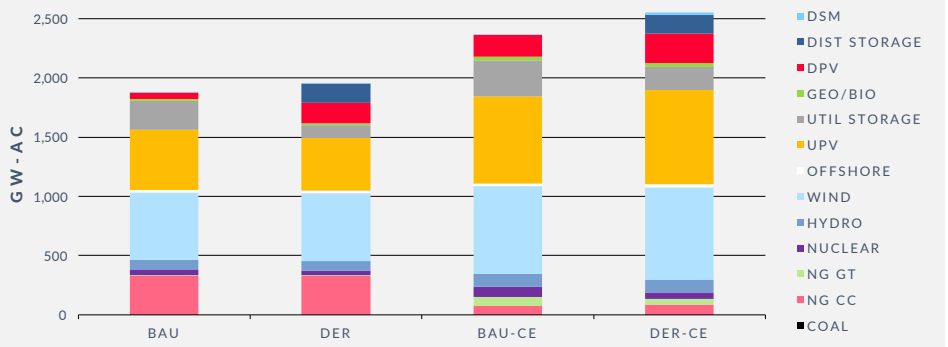


- Demand is smooth because local solar + storage can be deployed at peak times and reshapes load from the perspective of the utility grid (above 69kV)
- Permanently eases stress on system during critical peak hours & reduces how much bulk-scale power is needed to serve the distribution grid
- Less bulk power = less money on expensive peaker plants and firming capacity thus overbuilding the system

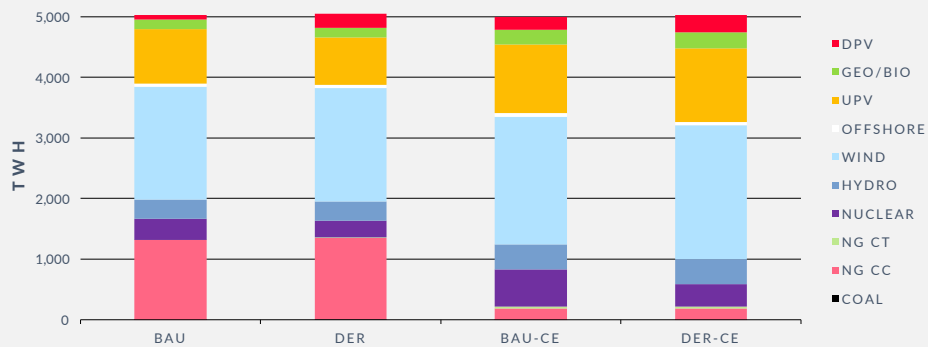
Total Capacity & Generation By 2050

- To meet capacity and generation needs by 2050 in the most cost-efficient manner, local solar + storage play a major role.
- In addition, utility-scale solar and wind account for over 50% of capacity and generation needs across all scenarios. That's because when you retire firming capacity and peaker plants & have better control over demand, it allows the grid to focus on deploying the cheapest electrons, regardless of when or where power is produced.
- By 2050, DER and DER-CE scenarios see total utility-scale solar capacity of 443-798 GW and utility-scale wind capacity of 596-802 GW.
- **TAKEAWAY:** ~$0.03 per kWh utility-scale solar and wind is possible at-scale and lowest cost when you also scale local solar and storage.

Installed Capacity (GW) by Scenario (2050)

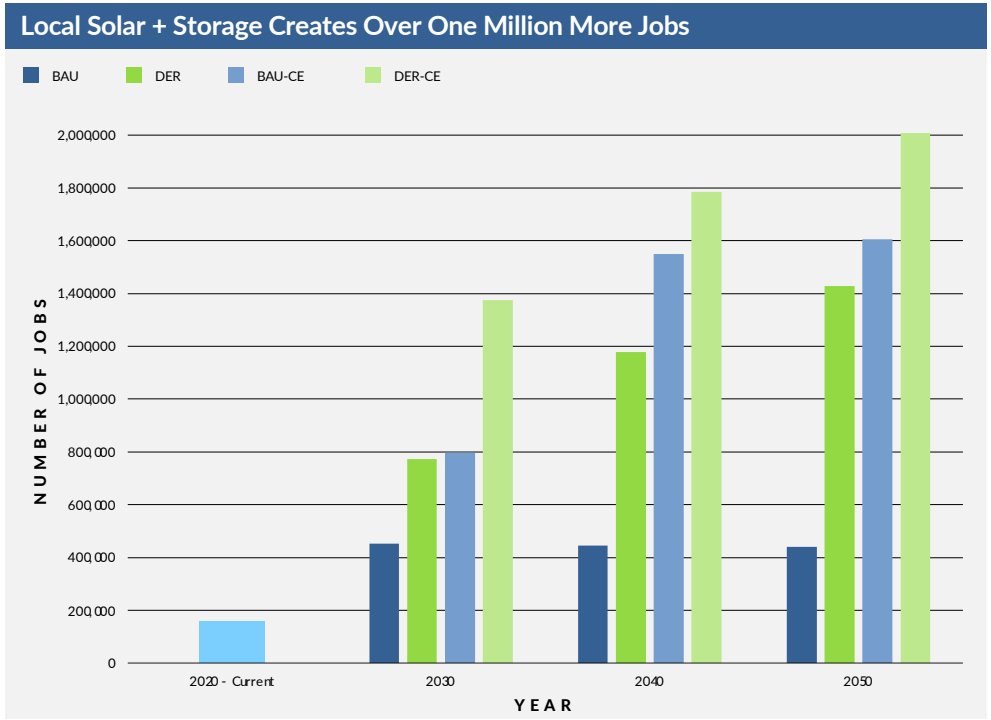


Technology Generation Share (TWh) by Scenario (2050)



Local Solar + Storage Creates Over One Million More Solar Jobs By 2050

- Integrating, optimizing, and growing local solar + storage results in 1.4 million DPV jobs by 2050 and over 2 million if there are clean electricity targets.
  - This includes direct and indirect jobs but does not include induced jobs (e.g. the ripple effect of direct economic impacts).
- Local solar creates more jobs on a per MW basis compared to utility-scale electricity generation.
  - This is largely a result of more construction and operations jobs that result from distributed energy facilities.
  - DPV has an average job/MW-ac ratio of 8.3 compared to UPV's job/MW-ac ratio of 3.3*.



Actual ratios vary by state and are tied to basic assumptions from NREL's JEDI and the IMPLAN modeling tools, adjusted further by actual jobs numbers provided in the Solar Foundation's annual solar jobs report.

MORE INFO: LocalSolarforAll.org

Questions