Ms. Shannon Coleman
Municipal Energy Agency of Nebraska
Attn. IRP
8377 Glynoaks Drive
Lincoln, NE 68516
MEAN_IRP@nmppenergy.org

May 12, 2022

This is a public comment on MEAN's draft Integrated Resource Plan.

First and foremost, the practice of allocating wind energy from all of MEAN's energy resource mix to a few select communities (namely Aspen, Glenwood Springs and Gunnison) at the expense of all the other communities contracted to MEAN is an insult to the citizens of all these communities. By greenwashing the books to portray these communities as "100% Renewable" (or 73.8% renewable in the case of Gunnison) lacks in ethics and evades the real crises we all face with respect to your polluting and expensive energy generation saddled upon the ratepayers. The fact remains that a kilowatt-hour of energy consumed in Gunnison results in approximately half a kilowatt-hour of expensive and polluting fossil fuel energy to be generated on the grid to backfill energy consumption in these privileged communities. This approach demonstrates that the management of MEAN have no interest in serving their customers with the highest quality and cleanest energy options, rather they prefer to coast along collecting inflated paychecks and shirking their duties to offer viable and competitive energy solutions through the lens of a triple bottom line. Colorado energy providers such as Xcel and Tri-State have shown what serious and respectable energy providers can accomplish despite the rhetoric of denial provided by MEAN. During my years working at the Alaska Energy Authority, I always worked for the best interests of our communities. I cannot say the same for MEAN.

While MEAN management has done nothing to garner nor deserve my respect and I will advocate defection from MEAN for all member communities, I offer this analysis of easy and affordable options where MEAN could make earnest improvements in the energy mix they offer to their customer base.

I am interested in the potential for finding renewable resources that have the best possible match with the peak demand in the MEAN system. The analysis assumes the peak demand as reported in MEAN's new draft Integrated Resource Plan.

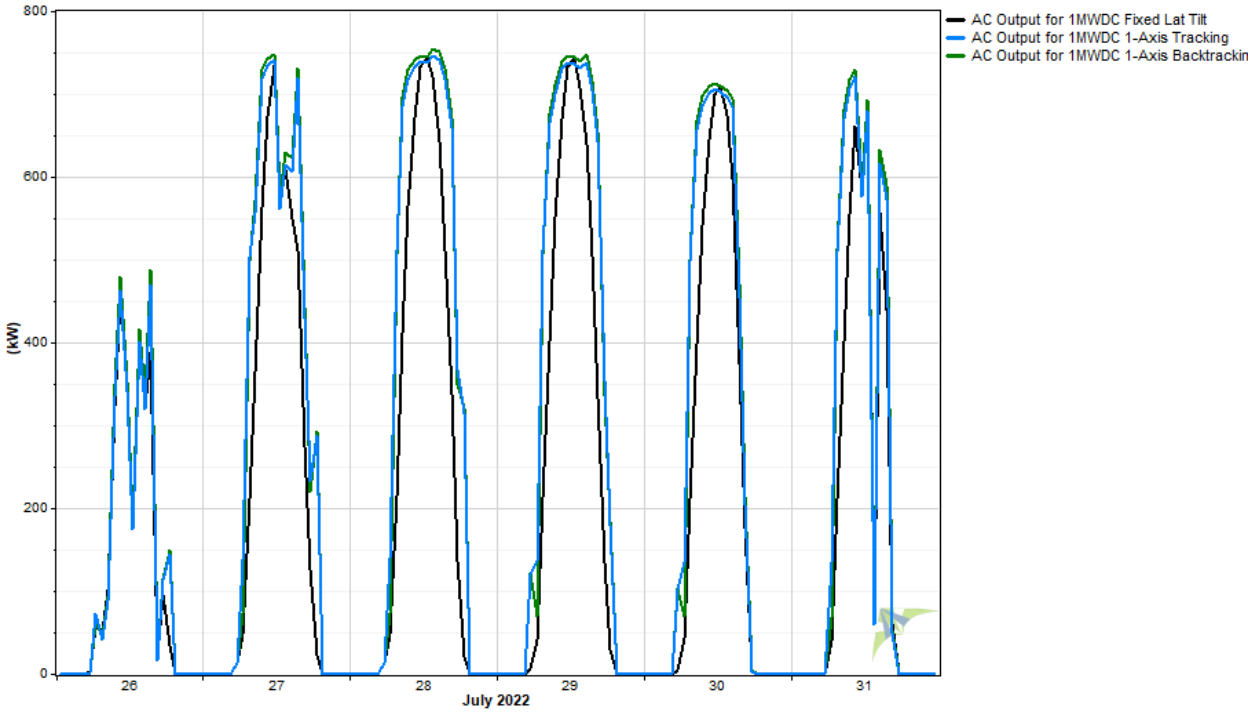
> *Peak Demand (Reporting Period)*
> *Highest Hourly Summer (Jun. – Sept.) Peak Demand (MW) 477.0*
> *Highest Hourly Winter (Dec. – Mar.) Peak Demand (MW) 399.0*
> *Date of Highest Hourly Peak Demand (mm/dd/yyyy) 07/28/2021*
> *Hour of Highest Hourly Peak Demand (hh AM/PM) 05 PM*
> *Peak Demand (Historical)*

All-Time Highest Hourly System Peak Demand (MW) 536.1
Date of All-Time Hourly System Peak Demand (mm/dd/yyyy) 07/23/2012
Hour of All-Time Hourly Peak System Demand (hh AM/PM) 04 PM
Number of Customers/Meters (Year End of Reporting Period)
Number of Residential Customers 84,066
*Number of Commercial Customers 18,238**
Number of Industrial Customers 419
Other (Specify):

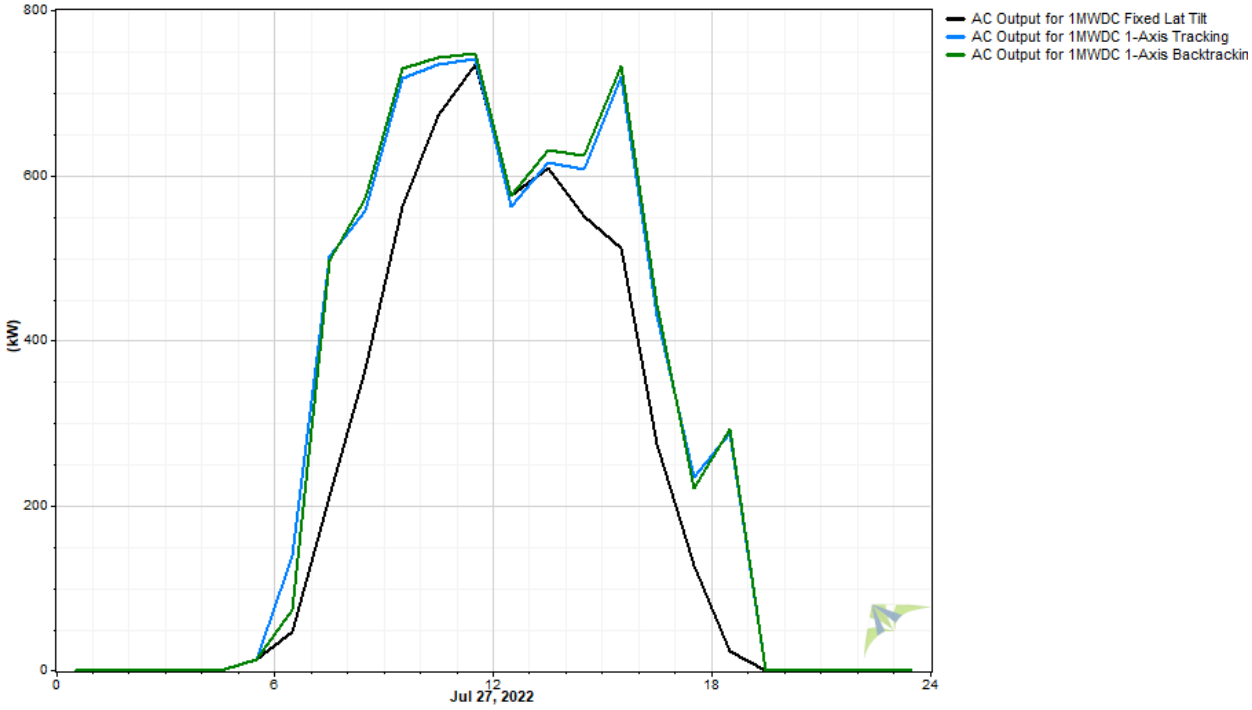
These times are Central Time Zone. The following data and graphs represent Mountain Daylight Time.

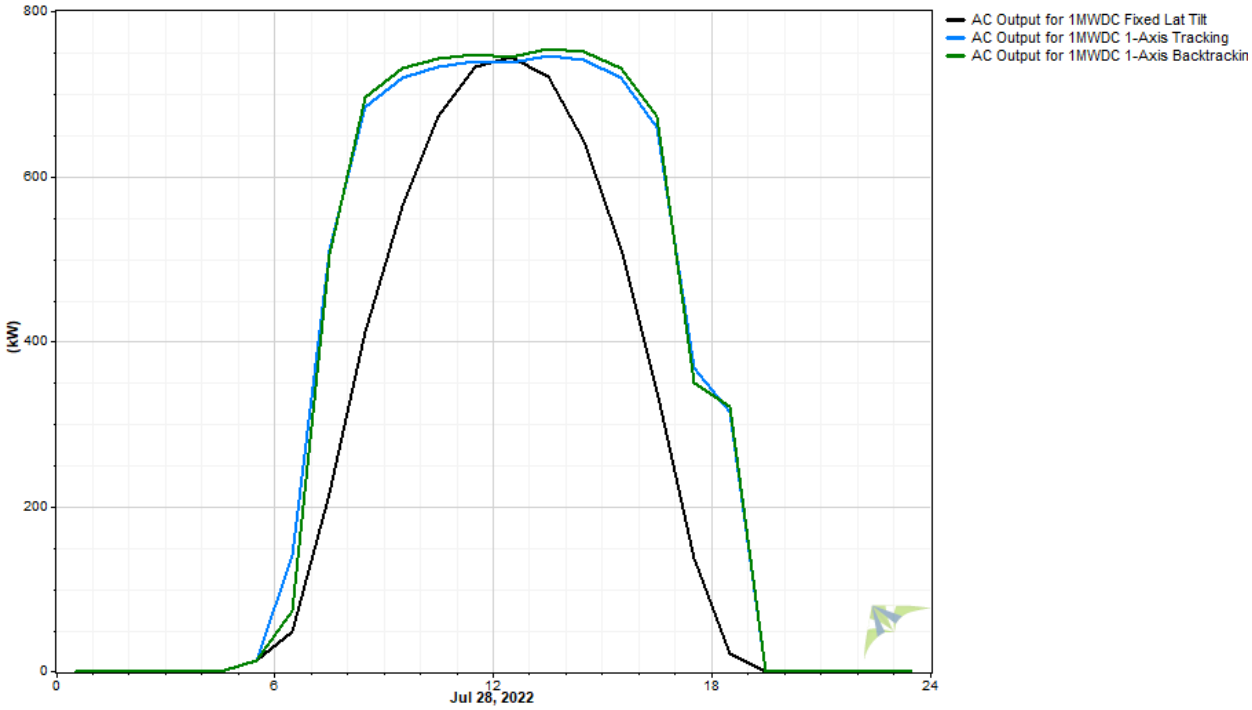
This approach assumes a focus on potential resources which could be located in communities served by MEAN. For modeling purposes, I chose Delta, Colorado, toward the western end of the communities MEAN serves.

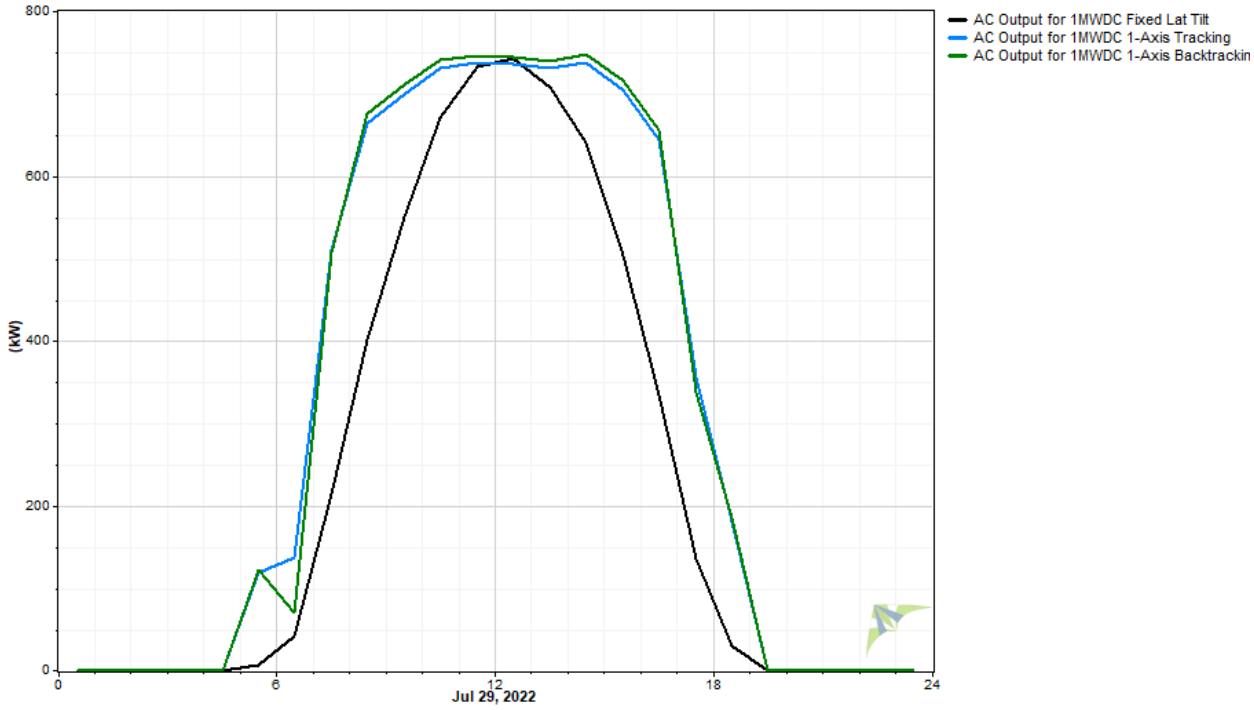
I modeled a 1-megawatt DC solar array (making it easy to use as a benchmark for 5-, 10-, 25-megawatt or larger systems) in Delta, CO in three configurations (fixed-south facing latitude tilt, 1-axis tracking and 1-axis backtracking). This figure shows energy output in kW for the three configurations. Tracking definitely produces more energy than fixed arrays during mornings and afternoons. The model (using TMY data from the National Solar Resource Database from hourly satellite observations) assumes afternoon cloud cover on some days.



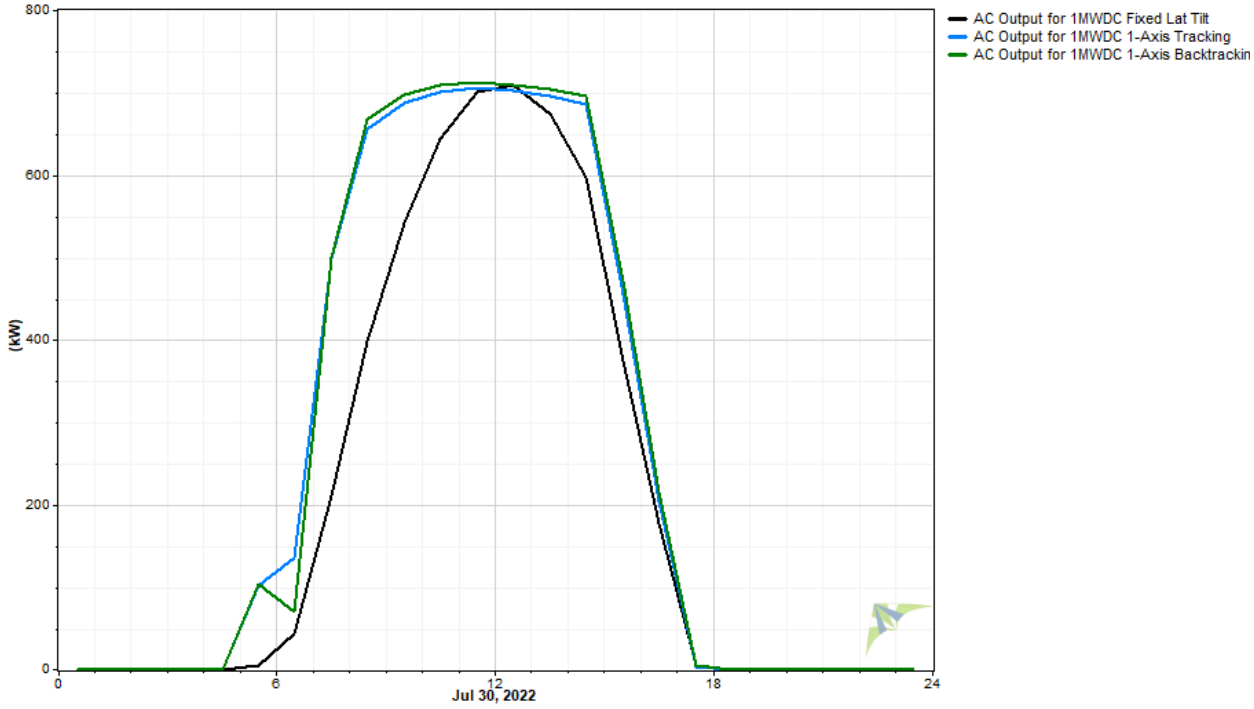
Here are a few day-by-day plots for better resolution of afternoon production. Note that 1800 hours represents the average output from 1800-1859 Mountain Daylight Time.

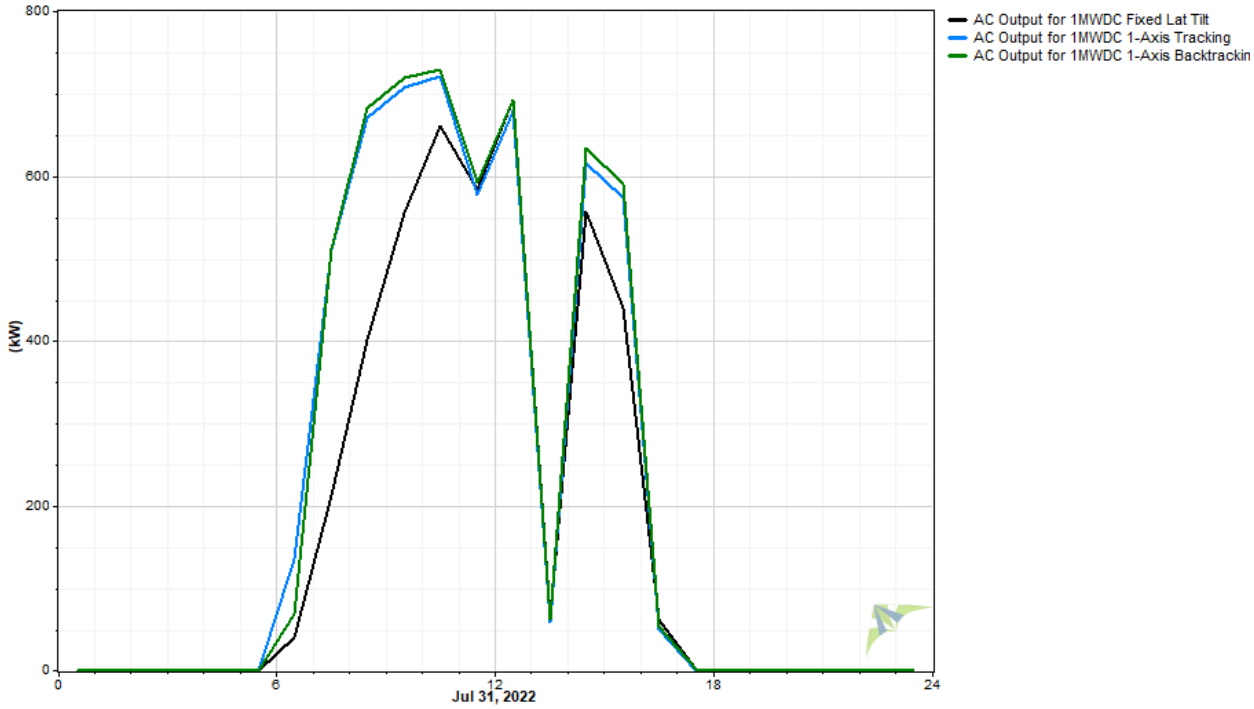






This day reflects cloud cover from 2:30pm on.





From this analysis, the simple answer is that with tracking and backtracking on single N-S oriented trackers, there is significant power generation after 4pm Central Time (this would be 3pm on the above graphs).

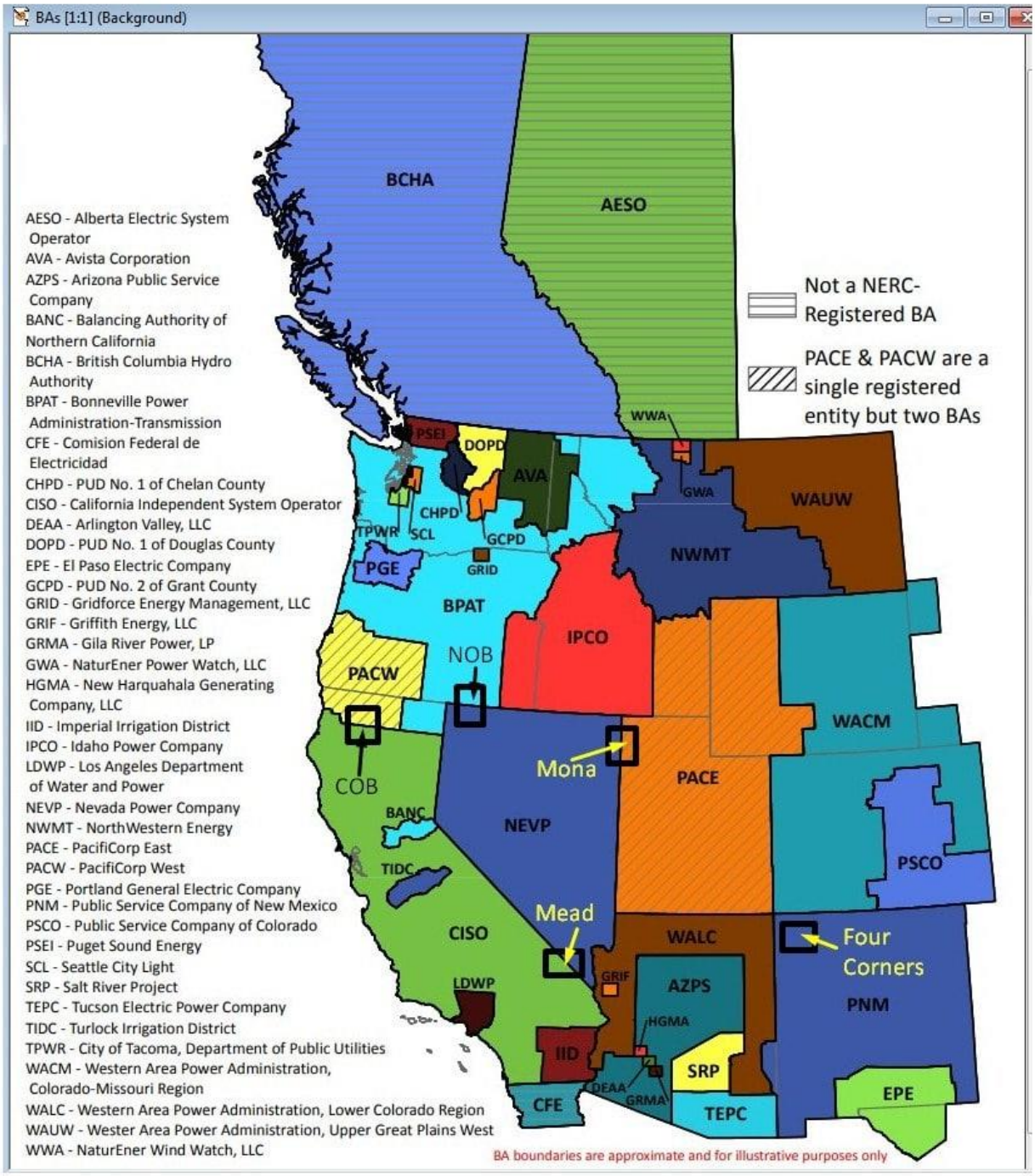
A KEY QUESTION

There is a question as to how difficult it might be to transmit power from this hypothetical solar facility in Delta, Colorado to MEAN customers father east, in for example Nebraska or Iowa.

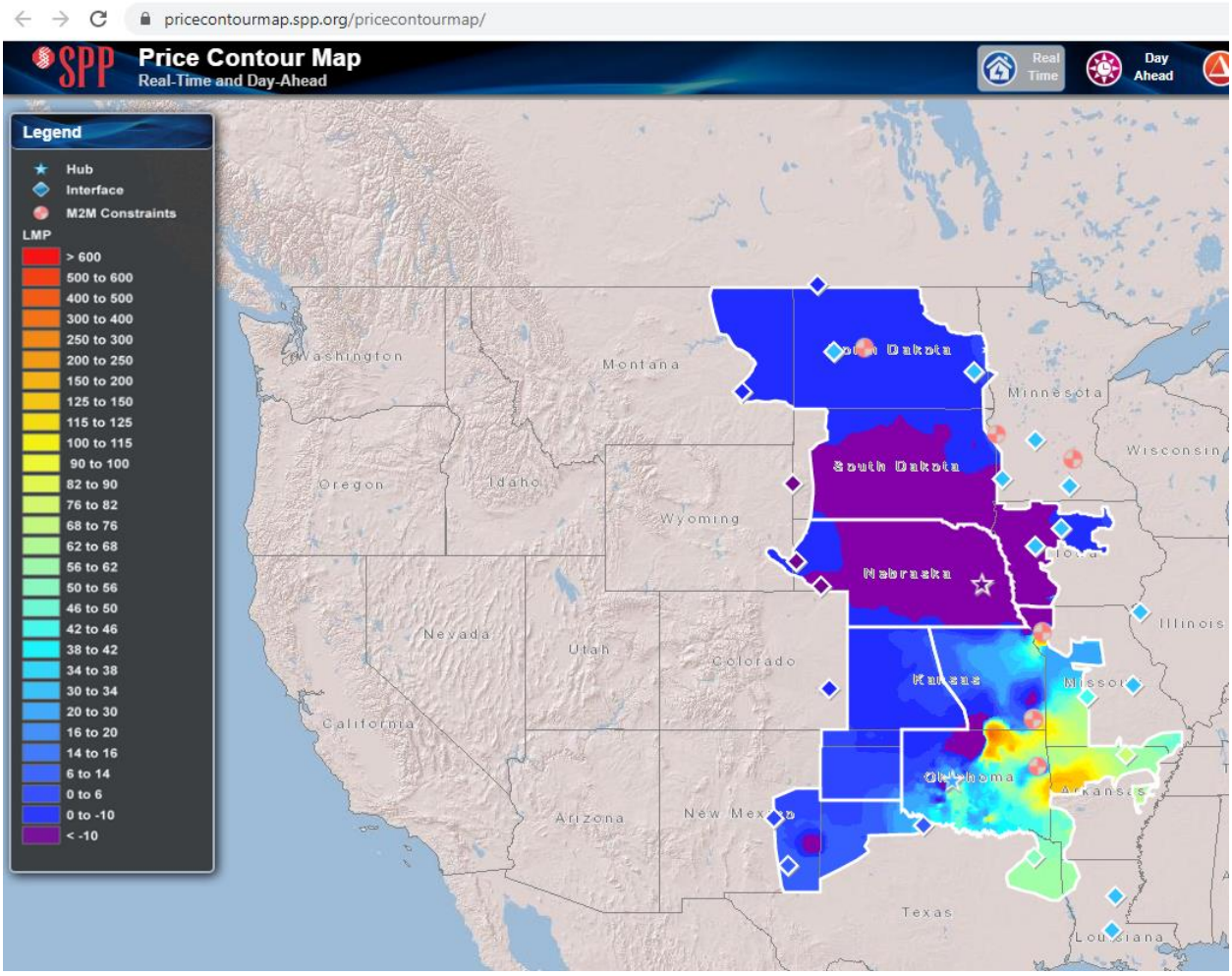
If that proves very difficult, it still seems reasonable to consider solar farms sized to produce energy to serve the MEAN load in Colorado, especially in western Colorado, such as Glenwood Springs, Delta, Aspen, Gunnison, and Oak Creek. Colorado customers farther East such as Fort Morgan, Haxtun or Yuma might also benefit. It is also possible to develop or contract out independent power producers to build solar and wind generating facilities in eastern Colorado where solar and wind resources are abundant, land leases are affordable and the agricultural communities desperately need diversified income streams to weather the persistent drought.

But meeting the summer late day air conditioning driven demand in Nebraska and Iowa requires some analysis of the reality that Delta and Gunnison are located in the WACM (WAPA CO-Missouri Region) part of the WECC.

Ansergy Power Hubs



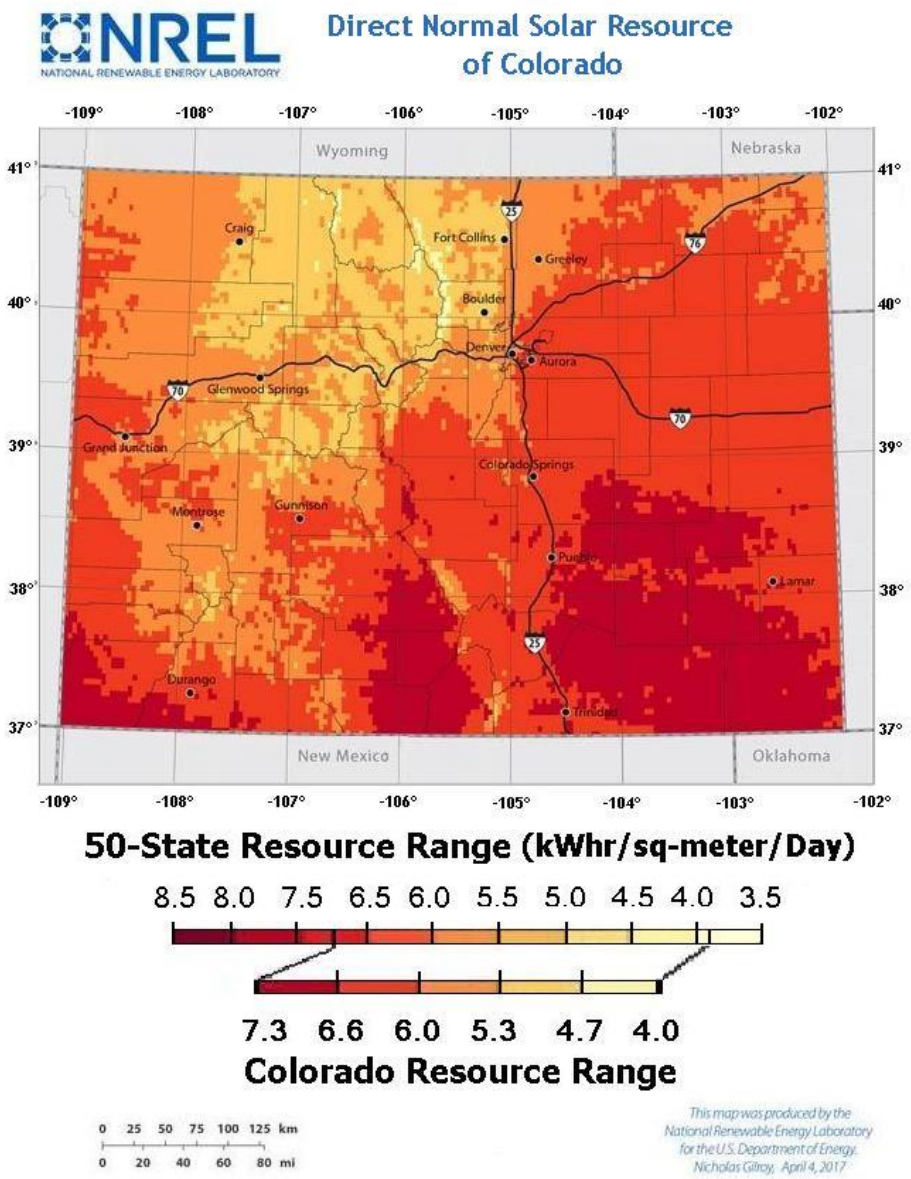
According to WECC, the Southwest Power Pool began expanding into CO starting in 2019.



Last July, the SPP approved the RTO West expansion, so perhaps this will really open up transmission into the WECC region and allow for power to move freely between CO and NE. https://www.spp.org/western-services/rto-west/ https://www.spp.org/western-services/western-rc-services/

MEAN is said to be very good at solving transmission problems. I think MEAN should be trying to solve the problem of transmitting energy from the west end of its system to customers farther east. An even easier approach is to issues RFPs for clean and affordable energy generation within Nebraska and elsewhere within the Southwest Power Pool.

It does seem that the Delta/Gunnison/Glenwood Springs area has significant solar potential.

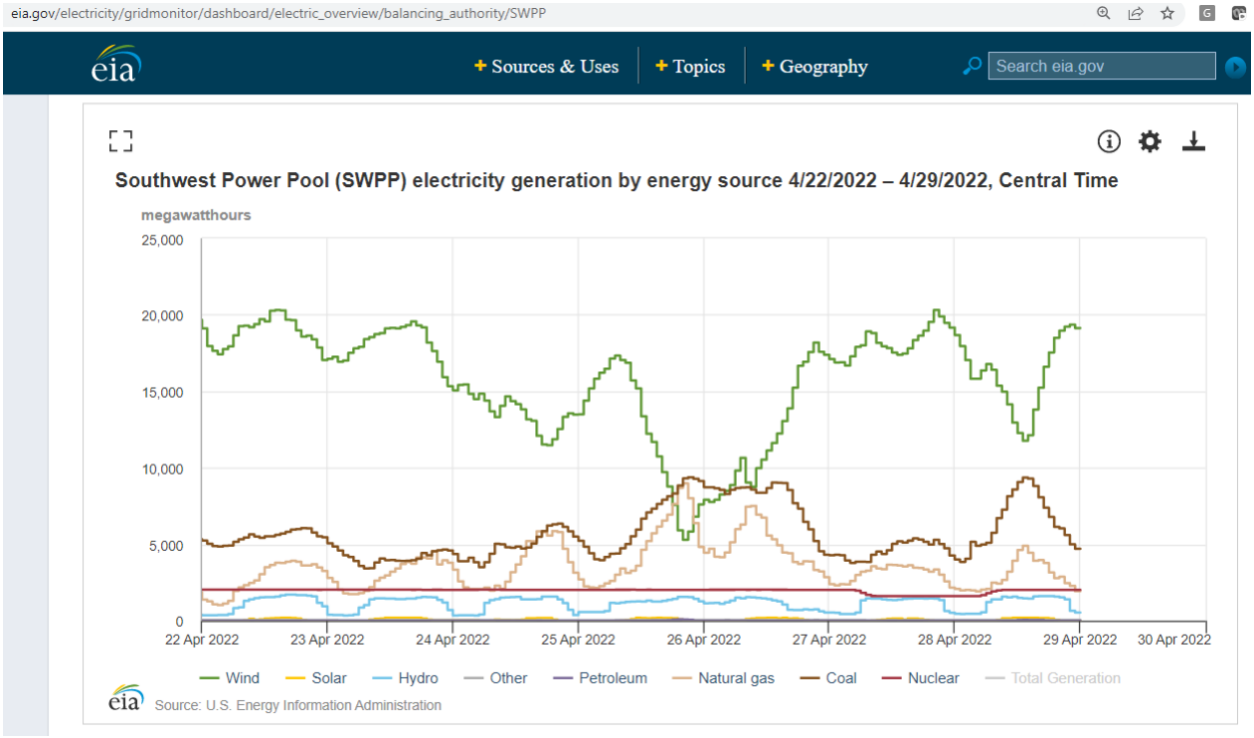


Solar development in Delta or Gunnison could backfill power needed on an expanded SPP RTO West. It could offset the need for coal generation in CO or MEAN's territory to support that part of the load for the expanded RTO.

A couple of other comments:

- Given that today, wind energy is the second-ranked energy generation source (33.1% of total generation) across the SPP (https://www.spp.org/about-us/fast-facts/), MEAN should at least be in line with that level of generation.

- Since the 2019 energy generation within all of Nebraska was 17.3% renewables (mostly wind), why isn't MEAN providing its customers with 17.3% or better of their power mix as renewables?



I suggest that MEAN take a closer look at these ideas to see if it can increase the contribution of renewables to its overall power supply. While I am justifiably highly critical of MEAN's management and strategies, I also believe strongly in both self-correcting and allowing others to self-correct. MEAN has it within their power to be a great company. Many others have blazed the trail of energy technology that you only need choose to follow. You have the opportunity to make real and meaningful positive impacts with your customers. Will you shed your atavistic ways or deny the realities of energy production in the 21st century?

Sincerely,

Rich Stromberg

Rich Strömberg
Professor, Clark School of Environment and Sustainability, Western Colorado University
Research Faculty, Alaska Center for Energy and Power
Director, Equitable Solar Solutions™ at Coldharbour Institute