Informational Briefing on proposed Small Modular Nuclear Reactors (SMNRs)

Oregon House Committee on Energy & Environment
Monday, May 10th, 2021

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Healthy Climate Program Director
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with video testimony from:

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About Oregon PSR (Physicians for Social Responsibility)

- Founded in 1981 by Oregon health professionals concerned about the threat of nuclear war: “Preventing what we cannot cure.” ~2,800 members today.
- Shared in the 1985 Nobel Peace Prize awarded to our international affiliate, International Physicians for the Prevention of Nuclear War
- Through public health education and advocacy, we seek a healthy, just, and peaceful world for present and future generations.

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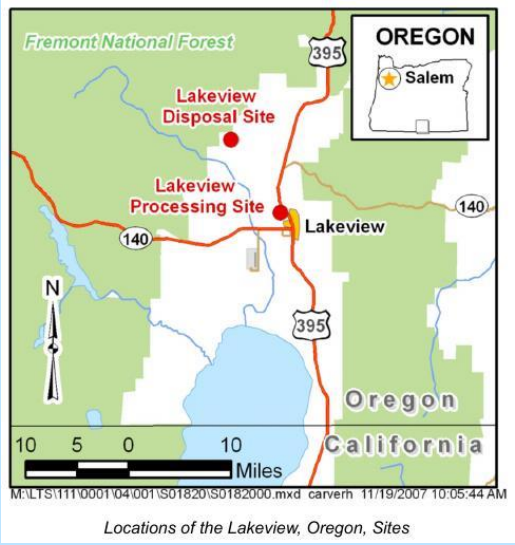


Locations of the Lakeview, Oregon, Sites

Oregon's History with Nuclear Fuel & Reactors

- Oregon voters approved Measure 7 in 1980, requiring that Oregon voters must be given the opportunity to approve or deny a new nuclear reactor before it can be sited in Oregon. The U.S. government must also establish a viable repository for long-term storage of waste.

- Radioactive waste at the now-decommissioned Trojan Nuclear Plant is still sitting near the banks of the Columbia River near Ranier, OR

- Lake County, OR ran a uranium mill in 1958-1961 that was remediated in the 1980's

- Many Oregon communities are downwind/downriver from the Hanford Site near Washington's Tri-Cities

Key points of concern regarding Small Modular Nuclear Reactors (SMNRs):

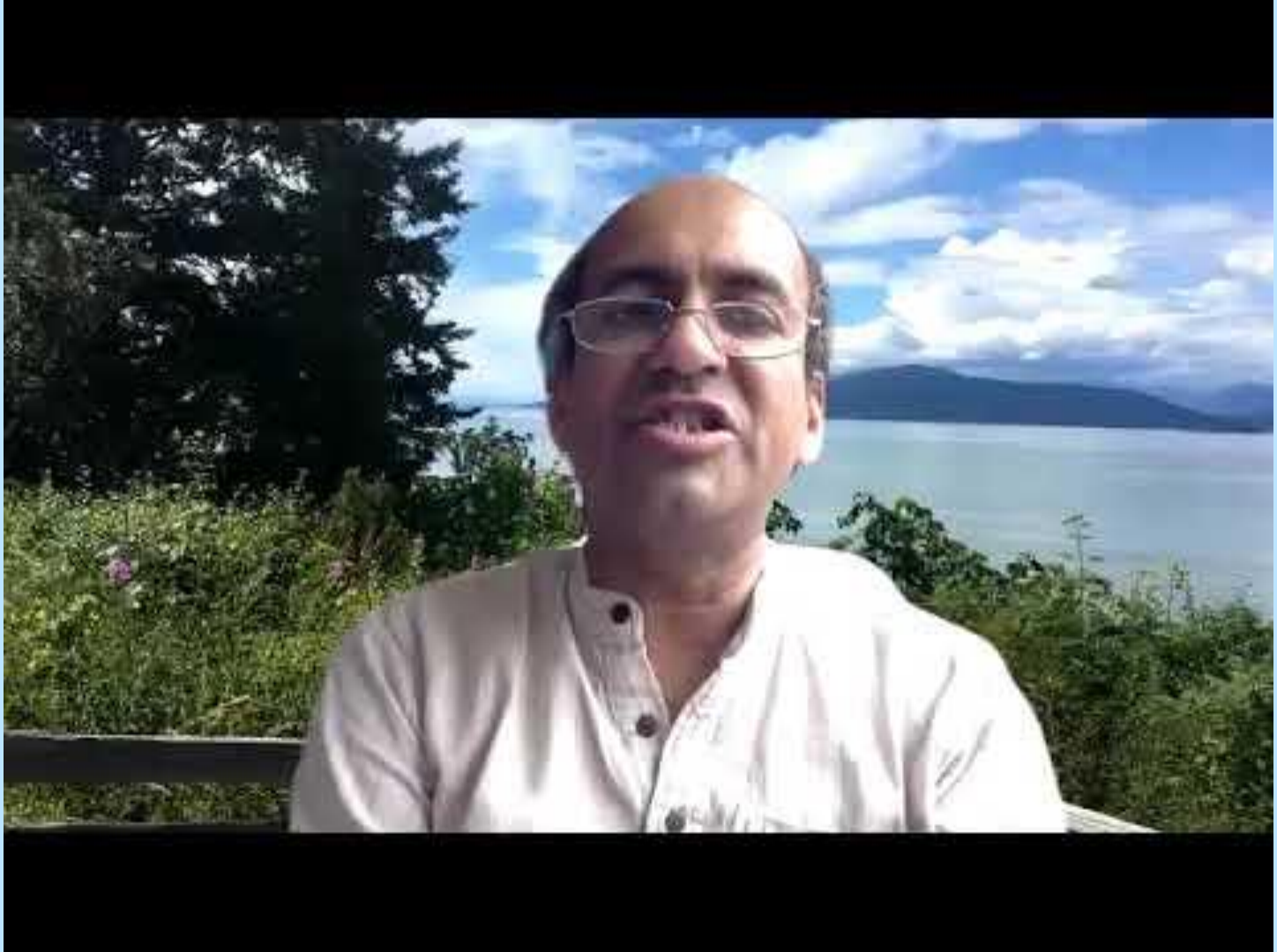
- ***Cost:*** SMNRs are prohibitively expensive and take money away from cost-effective clean energy sources.

- ***Delays:*** Nuclear reactors both big and small have been stalling out and folding in the United States for the past several decades.

- ***Waste:*** the U.S. still doesn't have a site for safe disposal of nuclear waste and will not for the foreseeable future. SMNRs create *more* radioactive waste per kilowatt of electricity generated than conventional nuclear reactors.

- ***Safety:*** NuScale's design has not yet been fully approved by the U.S. Nuclear Regulatory Commission and its unique design needs careful review.

- ***Environmental Justice:*** Uranium mining and orphaned waste has disproportionately impacted indigenous peoples and reactors offer few benefits.



Key points from Dr. Ramana, recapped:

- Small nuclear reactors have been promoted by the nuclear industry and U.S. government since the 1950's and have consistently failed due to being uneconomical. NuScale's design is not showing signs of being any different.

  NuScale Idaho pilot cost estimate: $4.2 billion (Feb. 2018) → $6.1 billion (July 2020)

- NuScale was originally supposed to have delivered its first operational reactor by 2015, but now they're estimating no sooner than 2029/2030 for their Idaho pilot project. Pending design reviews with the U.S. Nuclear Regulatory Commission may delay this even further.

- Any community that receives a small modular nuclear reactor will also be signing up for decades if not centuries of onsite high- and medium-level radioactive waste storage.

- All reactors are prone to accidents and disasters, and stacking multiple SMNRs means that one reactor failure could lead to a large accident, like the case in Fukushima in 2011.

UTAH TAXPAYERS ASSOCIATION
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PUBLICATIONS

New Information Disclosed in Meeting Closed to Public Points to Major Budget Commitments, Delay Risks in UAMPS Power Project

by Tax Watchdog | Aug 4, 2020 | News and Media | 0 comments

"We Need Public Hearings and We Need Public Votes": UTA Calls for Full Transparency and Accountability Ahead of September 14th Deadline; Parallels Seen to Ohio, Illinois and South Carolina Nuclear Controversies Where Public Was Kept in the Dark.

DeseretNews

UTAH POLITICS

Critics of planned nuclear power project urge Utah cities to pull out before it's too late

Utah Taxpayers Association warns it believes proposal is too costly, not transparent

By Amy Joi O'Donoghue | @Amyjoi16 | Aug 4, 2020, 5:05pm MDT

Oct 29, 2020
by Sonal Patel

ALSO IN THIS ISSUE
October 29, 2020

News

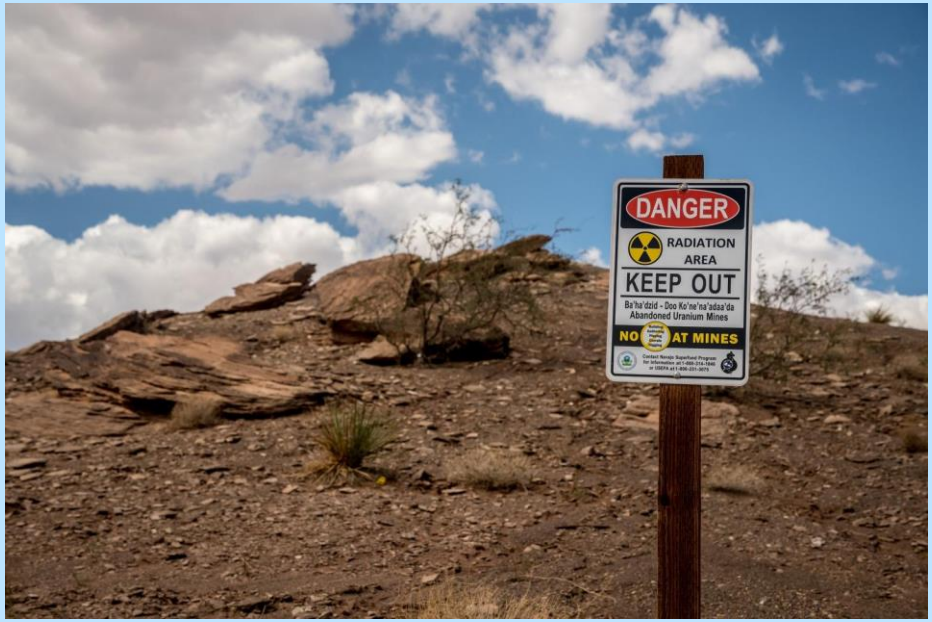
Shakeup for 720-MW Nuclear SMR Project as More Cities Withdraw Participation

Environmental Justice

- Indigenous communities worldwide have disproportionately borne the brunt of uranium mining and radioactive contamination to supply the nuclear fuel cycle. The vast majority of the 520 abandoned uranium mines on Navajo Nation lands have not been remediated.

- SMNRs stand to produce fewer jobs than wind and solar while costing significantly more, meaning that ratepayers stand to shoulder a cost and safety burden without much economic development.

- Proposed waste disposal efforts have almost exclusively targeted Black, indigenous, and Latinx communities.



3. How will your plant's staffing requirements compare to current plants?

Staffing levels for operations and security will be subject to review by the NRC and will be appropriate for safe and secure operations. The elimination of many systems due to the simplicity of the design and automation in the control and monitoring of the reactors will significantly reduce operator workload. The number of operators will be evaluated based on workload requirements and will be sufficient to achieve the same level of plant safety as for large, traditional designs. Similarly, integration of "security by design" principles, the below-grade placement and compact footprint of the NuScale plant adds intrinsic security; which will justify the use of a smaller security force than found in current large nuclear plants.

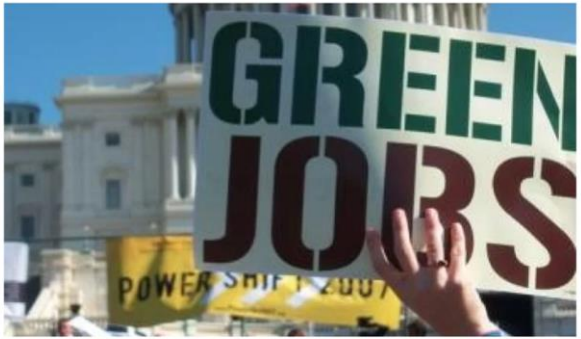
Source: https://www.nuscalepower.com/about-us/faq

gtm: Solar Grid Edge Storage Wind Trending Podcasts White Papers Webinars

Renewable Energy Would Create More Jobs Than Nuclear Power

The Union of Concerned Scientists weighs in on the nuclear vs. renewables debate.

ELLIOTT NEGIN | JULY 29, 2010



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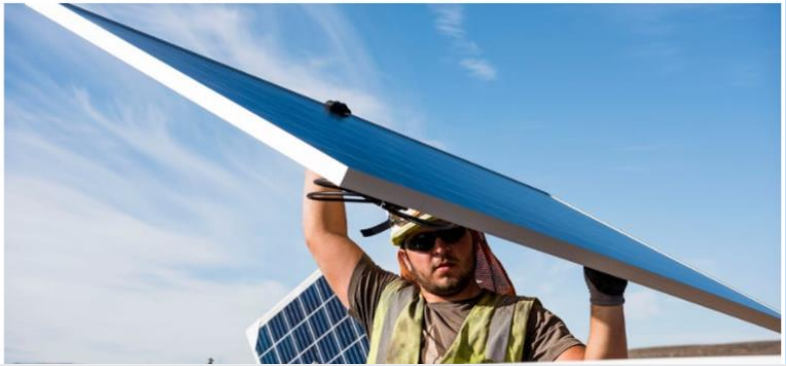
Renewable Energy Would Create More Jobs Than Nuclear Power

More U.S. jobs in solar than coal and nuclear combined

A new report from a think tank headed by former Energy Secretary Moniz reveals an additional 100,000 jobs with a part-time solar component, and hints at the political powerhouse that solar is becoming.

MAY 17, 2018 CHRISTIAN ROSELUND

EMPLOYMENT POLICY UNITED STATES



electrek Exclusives Autos Alt. Transport Autonomy Energy

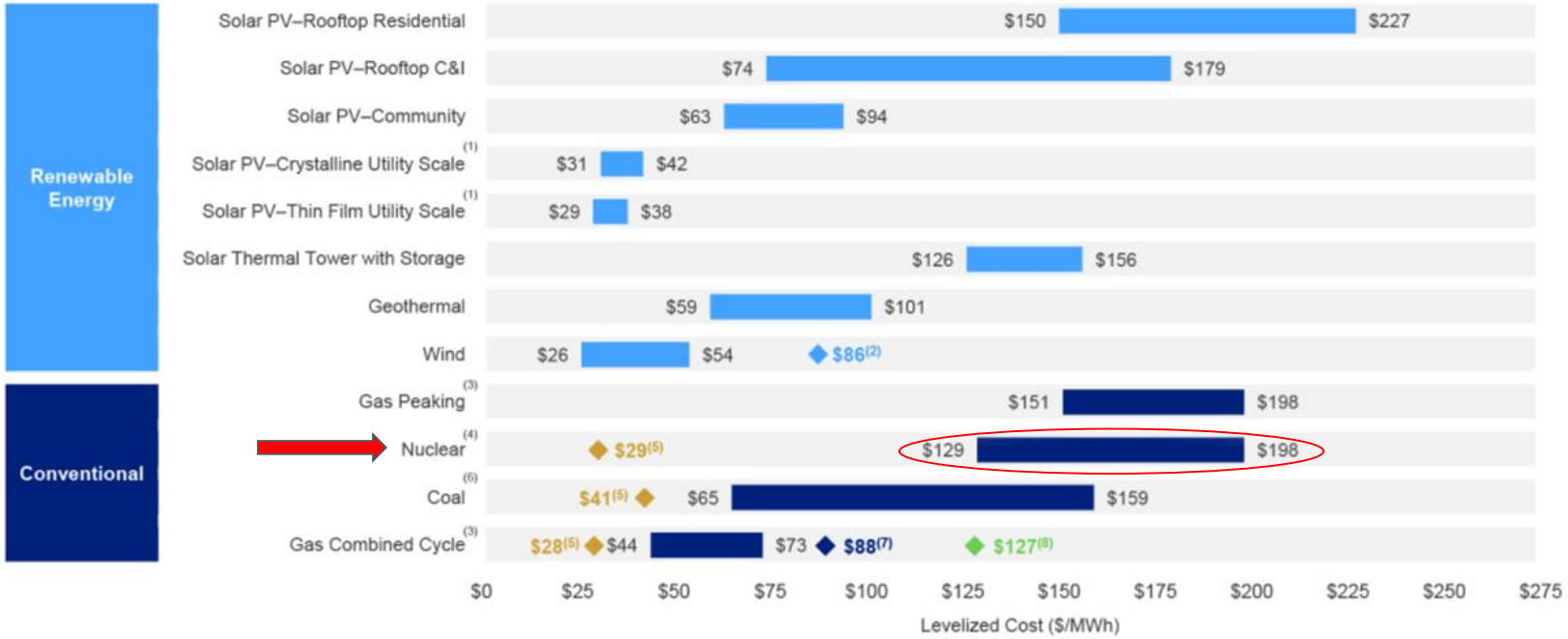
MARCH 22

Iowa's only nuclear power plant will be turned into a solar farm

Michelle Lewis - Mar. 22nd 2021 12:43 pm ET

Levelized Cost of Energy Comparison—Unsubsidized Analysis

Selected renewable energy generation technologies are cost-competitive with conventional generation technologies under certain circumstances



Source: *Lazard estimates.*

Note: Here and throughout this presentation, unless otherwise indicated, the analysis assumes 60% debt at 8% interest rate and 40% equity at 12% cost. Please see page titled "Levelized Cost of Energy Comparison—Sensitivity to Cost of Capital" for cost of capital sensitivities. These results are not intended to represent any particular geography. Please see page titled "Solar PV versus Gas Peaking and Wind versus CCGT—Global Markets" for regional sensitivities to selected technologies.

(1) Unless otherwise indicated herein, the low case represents a single-axis tracking system and the high case represents a fixed-tilt system.

(2) Represents the estimated implied midpoint of the LCOE of offshore wind, assuming a capital cost range of approximately $2,600 – $3,675/kW.

(3) The fuel cost assumption for Lazard's global, unsubsidized analysis for gas-fired generation resources is $3.45/MMBTU.

(4) Unless otherwise indicated, the analysis herein does not reflect decommissioning costs, ongoing maintenance-related capital expenditures or the potential economic impacts of federal loan guarantees or other subsidies.

(5) Represents the midpoint of the marginal cost of operating fully depreciated gas combined cycle, coal and nuclear facilities, inclusive of decommissioning costs for nuclear facilities. Analysis assumes that the salvage value for a decommissioned gas combined cycle or coal asset is equivalent to its decommissioning and site restoration costs. Inputs are derived from a benchmark of operating gas combined cycle, coal and nuclear assets across the U.S. Capacity factors, fuel, variable and fixed operating expenses are based on upper- and lower-quartile estimates derived from Lazard's research. Please see page titled "Levelized Cost of Energy Comparison—Renewable Energy versus Marginal Cost of Selected Existing Conventional Generation" for additional details.

(6) High end incorporates 90% carbon capture and storage. Does not include cost of transportation and storage.

(7) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Blue" hydrogen, (i.e., hydrogen produced from a steam-methane reformer, using natural gas as a feedstock, and sequestering the resulting CO_2 in a nearby saline aquifer). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is $5.20/MMBTU.

(8) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Green" hydrogen, (i.e., hydrogen produced from an electrolyzer powered by a mix of wind and solar generation and stored in a nearby salt cavern). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is $10.05/MMBTU.

Additional Reading:

- Report: Problems with UAMPS' Proposal to Construct NuScale Small Modular Nuclear Reactors *by M. V. Ramana, PhD* https://www.oregonpsr.org/report-uamps-nuscale-smrs

- Climate change and 'advanced nuclear' solutions *by Dr. Gregory Jaczko* https://thehill.com/opinion/energy-environment/539991-climate-change-and-advanced-nuclear-solutions

- I oversaw the U.S. nuclear power industry. Now I think it should be banned *by Dr. Gregory Jaczko* https://www.washingtonpost.com/outlook/i-oversaw-the-us-nuclear-power-industry-now-i-think-it-should-be-banned/2019/05/16/a3b8be52-71db-11e9-9eb4-0828f5389013_story.html

- Toxic Legacy of Uranium Mines on Navajo Nation Confronts Interior Nominee Deb Haaland *by Mary F. Calbert* https://pulitzercenter.org/stories/toxic-legacy-uranium-mines-navajo-nation-confronts-interior-nominee-deb-haaland

> *"Small modular designs are only promising to be cheaper than traditional reactors. Current estimates show they are more expensive than renewables, like wind and solar, even with storage and without subsidies."*
> -- Dr. Gregory Jaczko, chairman of the U.S. Nuclear Regulatory Commission from 2009 to 2012

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