Washington State Legislature

Joint Select Task Force on Nuclear Energy
Final Report
December 15, 2014

Background

According to the federal Energy Information Administration, there are currently 65 commercially operating nuclear power plants with 104 nuclear reactors in 31 states around the country. These plants generate about 19 percent of U.S. electricity each year.

The Columbia Generating Station (CGS) near Richland, Washington, is the Pacific Northwest's only commercially operating nuclear power plant. CGS is operated by Energy Northwest, a not-for-profit joint operating agency. The entire output of CGS is marketed by the Bonneville Power Administration. According to the most recent state fuel mix report, CGS supplied about 4.7 percent of the electricity used by retail customers in the state in 2012. CGS's federal operating license is set to expire in December 2043.

In 2013, the legislature appropriated $500,000 in the capital budget to study the manufacturing of small modular nuclear reactors (SMRs) in the Tri-Cities.[1] During the 2014 legislative session, the Senate Energy, Environment & Telecommunications committee heard a bill proposing the creation of a legislative task force to study nuclear energy in the region.[2] While the bill did not pass, its substantive provisions were added to the supplemental operating budget.[3]

Under the budget provisions, an eight-member legislative taskforce was required to study the generation of nuclear energy in the region. It was to hold no more than four meetings, with two of those meetings in Richland, Washington. Any findings and recommendations were due December 1, 2014.

Appointments to the task force were completed in May 2014, and the first meeting of the task force was on July 9, 2014, in Olympia, Washington. The second meeting of the task force was on September 25, 2014, in Pasco, Washington. The task force toured the NuScale Power facilities in Corvallis, Oregon on November 7, 2014. The final meeting of the task force will be held on December 3, 2014, in Olympia, Washington.

[1] ESSB 5035 (2013), section 1077(7) (TRIDEC Development of Small Modular Reactor Proposal).
[2] SSB 5991 (2014).
[3] ESSB 6002 (2014), sections 101 and 102; Appendix A.

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Task Force Members

Senator Tim Sheldon, Chair
Senator Sharon Brown
Senator Marko Liias
Senator John McCoy
Senator Doug Ericksen (Alternate)

Representative Jake Fey, Vice Chair
Representative Shelly Short
Representative Norma Smith
Representative Sharon Wylie
Representative Richard Debolt (Alternate)

Senate Task Force Staff

William Bridges, Counsel
Lindsey Lasher, Committee Assistant

House Task Force Staff

Nikkole Hughes, Analyst
Rebecca Lewis, Legislative Assistant

Meeting & Tour Schedule

First Meeting ***July 9, 2014*** ***Olympia, WA***

Agenda

- Christine Todd Whitman, Co-Chair, Clean and Safe Energy (CASEnergy) Coalition, and former U.S. Environmental Protection Agency administrator and New Jersey governor
- Election of officers
- Overview of proviso and task force responsibilities
- Member discussion

Brief Summary

- Task force elected Sen. Sheldon as chair and Rep. Fey as vice chair.
- Christine Todd Whitman discussed the importance of nuclear energy as part of a diverse energy portfolio and job opportunities in the nuclear industry.
- Chair invited Jim Gaston, General Manager, Energy Services and Development, Energy Northwest, to give a brief introduction of Energy Northwest.
- Task force members discussed the possibility of a tour of NuScale Power in Corvallis, Oregon.

Distributed Materials and Meeting Minutes:
http://www.leg.wa.gov/JointCommittees/NEJSTF/Pages/Meetings.aspx

TVW:
http://www.tvw.org/index.php?option=com_tvwplayer&eventID=2014070031

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Second Meeting ***September 25, 2014*** ***Pasco, WA***

Agenda

- U. S. Department of Energy Program for Small Modular Reactor Licensing Support
  - Ray Furstenau, Office of Nuclear Energy, U.S. Dept. of Energy
- Nuclear Energy Industry Today and Projected for the Future
  - Paul Genoa, Dir. of Policy Development, Nuclear Energy Institute
- Panel: Unsolved Problems with Nuclear Power
  - Gerry Pollet, Ex. Dir., Heart of America Northwest
  - Charles K. Johnson, Dir. of the Joint Task on Nuclear Power of Oregon and Washington Physicians for Social Responsibility
- Challenges & Opportunities for Nuclear Generation in the Region
  - Brent Ridge, V.P., of Corporate Services and CFO, Energy Northwest
- Overview of New Nuclear Technologies
  - Dale Atkinson, Chief Operating Officer and Chief Nuclear Officer, NuScale Power
- Estimate of Cost of Power from New Nuclear Resources (SMRs and Others)
  - Dale Atkinson, Chief Operating Officer and Chief Nuclear Officer, NuScale Power
- Economic Development Opportunities for the State of Washington: Assembly of Nuclear Components in the TriCities
  - Gary Petersen, V.P. Tri-City Development Council (TRIDEC)
  - Mike Lawrence, Chairman, TRIDEC's Mid-Columbia Energy Initiative
- Comments from Local Community Leaders
  - Dawn Alford, Dir., Nuclear Technology Program, Columbia Basin College
  - Keith Moon-Young, Chancellor, Washington State University
  - Ed Brost, General Manager, Franklin PUD
  - B. C. Smith, Business Agent, Washington Building Trades
  - Wanda Munn, American Nuclear Society
  - Carl Holder, Chair, Eastern Washington Section, American Nuclear Society

- Task Force Business
  - Questions from Task Force Members
  - Next steps
  - Next Meeting
  - Corvallis – NuScale Tour

- Public Hearing

Brief Summary

- Ray Furstenau, U.S. Dept. of Energy, said the federal government is supporting SMR technology because of enhanced safety features, reduced capital costs, the ability to meet electric demand growth incrementally, potential non-electric uses such as desalination, and potential international markets.

Brief Summary (continued)

- Paul Genoa, Nuclear Energy Institute, reviewed domestic and global nuclear developments, the impacts of nuclear power plant retirements, and nuclear energy's role in a carbon constrained economy.
- Gerry Pollet, Heart of America Northwest, testified that CGS is not cost effective for NW ratepayers and that serious waste and security issues surround nuclear power.
- Charles Johnson, Oregon and Washington Physicians for Social Responsibility, challenged the safety and economics of SMRs.
- Brent Ridge, Energy Northwest, reviewed the history and future of Energy Northwest and stated that nuclear energy is clean and economical.
- Dale Atkinson, NuScale Power, gave an overview of nuclear power and explained the workings and future of NuScale Power's SMR.
- Gary Petersen and Mike Lawrence, TRIDEC, reviewed the feasibility of siting an SMR at Hanford and pointed to the economic opportunities assembling SMRs could bring to the Tri-cities.
- Local community leaders (i.e. Dawn Alford, Columbia Basin College; Keith Moon-Young, Washington State University; Ed Brost, Franklin PUD; B. C. Smith, Washington Building Trades; Wanda Munn, American Nuclear Society; and Carl Holder, American Nuclear Society) testified in support of nuclear power, the siting of an SMR at Hanford, and assembling of SMRs in the Tri-cities.
- Seventeen persons supported nuclear power and were in favor of assembling SMRs in the Tri-cities.

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TVW:
http://www.tvw.org/index.php?option=com_tvwplayer&eventID=2014090070

Tour of NuScale Power November 7, 2014 Corvallis, OR

Agenda

- Welcome, Introductions, Agenda Review
  - Dale Atkinson, Chief Operating Officer and Chief Nuclear Officer, NuScale Power
- NuScale History, Technology, Testing Programs
  - Dr. Jose Reyes, Chief Technology Officer, NuScale Power
- Program WIN (Western Initiative for Nuclear) Plan, Schedule Overview
  - Chris Colbert, Chief Strategy Officer, NuScale Power
- Potential Role of NuScale in Washington State
  - Dale Atkinson, Chief Operating Officer and Chief Nuclear Officer, NuScale Power
- Control Room Simulator Tour

Agenda (continued)
- NIST (NuScale Integral System Test Facility) Tour
- Summary
  - Dale Atkinson, Chief Operating Officer and Chief Nuclear Officer, NuScale Power

Distributed Materials:
http://www.leg.wa.gov/JointCommittees/NEJSTF/Pages/Meetings.aspx

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Third Meeting ***December 3, 2014*** ***Olympia, WA***

Agenda
- Review of task force activities
- Discussion of task force recommendations

Distributed Materials:
http://www.leg.wa.gov/JointCommittees/NEJSTF/Pages/Meetings.aspx

TVW:
http://www.tvw.org/index.php?option=com_tvwplayer&eventID=2014120032

Brief Summary
- Senator Sheldon distributed two documents: (1) a position statement of the Energy Northwest executive board and (2) a letter from Mark E. Reddemann, CEO, Energy Northwest, to Sen. Tim Sheldon.
- Task force activities were reviewed and discussed.
- A recommendation to continue the taskforce was adopted.

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TVW:
http://www.tvw.org/index.php?option=com_tvwplayer&eventID=2014120032

Recommendation

It is recommended that the legislature continue the Joint Select Task Force on Nuclear Energy, and that the chair and vice chair of the task force will work with task force members during the session to draft a new budget proviso. When renewed, the task force should have a heightened focus on the following issues:

- Life cycle cost of SMRs.
- Potential of manufacturing SMRs in the state using existing assets (e.g. companies, sites, and work force resources).
- Potential national and international markets for exporting SMRs.
- Economic opportunities of manufacturing SMRs or their components in Washington, including any supply chain effects.
- Whether SMRs will be used to augment or replace existing energy resources.
- Effect of SMRs on the electrification of developing counties and the relationship to national security and energy independence.
- Permitting of SMRs in Washington and the creation of a model permit.
- Impact of an SMR build out on I-937.
- Whether nuclear power should be included as an eligible renewable resource under I-937.
- Incentive packages for the construction of SMRs in Washington.
- Incentive packages for the deployment of SMRs and other nuclear technologies in Washington.
- Impact on carbon levels by replacing natural gas and coal with nuclear power.

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Appendix A

ESSB 6002 (2014)

Sec. 101. 2013 2nd sp.s. c 4 s 101 (uncodified) is amended to read as follows:

FOR THE HOUSE OF REPRESENTATIVES

. . .

The appropriations in this section are subject to the following conditions and limitations: A joint select task force on nuclear energy is created to study the generation of energy in the region through the use of nuclear power. The task force must report any findings and recommendations to the legislature by December 1, 2014.

(1) In its deliberations, the task force must consider the greatest amount of environmental benefit for each dollar spent based on the life-cycle cost of any nuclear power technology. Life-cycle costs must include the storage and disposal of any nuclear wastes.

(2) The task force must consist of eight members that serve on the legislative standing committees with primary jurisdiction over energy issues. The president of the senate shall appoint two members from the majority caucus, two members from the minority caucus, and an alternate. The speaker of the house of representatives shall appoint two members from each caucus and an alternate.

(3) The members of the task force shall select from among their members a chair and other officers as the task force deems appropriate.

(4) The task force must hold no more than four meetings, with two of those meetings in Richland, Washington.

(5) The task force must be staffed by senate committee services

and the office of program research of the house of representatives.

(6) The task force terminates December 15, 2014.

Sec. 102. 2013 2nd sp.s. c 4 s 102 (uncodified) is amended to read as follows:

FOR THE SENATE

. . .

The appropriations in this section are subject to the following conditions and limitations: A joint select task force on nuclear energy is created to study the generation of energy in the region through the use of nuclear power. The task force must report any findings and recommendations to the legislature by December 1, 2014.

(1) In its deliberations, the task force must consider the greatest amount of environmental benefit for each dollar spent based on the life-cycle cost of any nuclear power technology. Life-cycle costs must include the storage and disposal of any nuclear wastes.

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Appendix B

Comments Submitted by Task Force Members

Comments of Senator Sharon Brown

Serving on the Joint Select Task Force on Nuclear Energy has been a great privilege. The Task Force received diverse testimony from experts and the public, deliberated on important questions involving nuclear technology, and carefully evaluated the opportunities inherent in fostering Washington's relationship with the nuclear industry. In sum, I believe the Task Force's work confirms that nuclear power must play a key role in strengthening our state's economy, ensuring that we have long-term plans for generating affordable electricity, and realizing our commitment to clean energy.

I endorse the Task Force's recommendations, but I write separately to highlight particular actions that we must take in order to make Washington the leading state for nuclear jobs and energy production.

Seizing Opportunities for Economic Development

The nuclear industry holds tremendous promise as an economic engine for Washington. The Columbia Generating Station provides hundreds of jobs and has been a cornerstone of the economy in the Tri-Cities for many years. The Task Force had the good fortune of hearing about the nuclear industry from CGS employees, who obviously take great pride in their work and the benefits their power plant provides to their community and the state.

The Task Force also learned about the exciting work that NuScale Power is undertaking to develop cutting-edge technology that will propel the nuclear industry through the twenty-first century. In a short period of time, NuScale has received significant private investment, to the point that the company now employs hundreds of people who are working to bring small modular reactors from prototype to plant. And each of those plants, which will be capable of producing from 50 to 600 MWe, is a potential source of employment for Washington workers.

The nuclear industry is poised to grow, but there is much that Washington must do to get ready to reap the benefits of that growth.

First, it is critical that we give our universities the tools they need to prepare the next generation of nuclear professionals. I know we can achieve this goal. Washington is home to many energy professionals and educators who are eager to impart their knowledge, skill, and expertise to students who understand the potential of nuclear power. But the state must do more to make a formal commitment—both in policy and resources—to developing the nuclear workforce. That is why I am dedicated to working with institutions such as Washington State University to establish

educational programs that will tap into our state's existing knowledge base to make Washington the top destination for energy education.

At the same time, the regulatory agencies within state government must be fully on board with facilitating the development of the nuclear industry in Washington, or else I fear we will miss important economic opportunities. I believe policymakers should examine the pros and cons of creating a state officer who will be responsible for evaluating, coordinating, and promoting policies that will help the nuclear industry grow here. Such an officer would serve as an ambassador of sorts for the state, and would signal that Washington is a serious partner.

Moreover, the state's decision-makers must understand that state policies, including the way we choose to levy taxes, affect industry decisions about whether and when to do business in Washington. Legislators must keep open minds about policies that are designed to create a friendlier business climate for the nuclear industry. For better or worse, Washington is competing with other states that are already showing interest in emerging nuclear technologies. We, therefore, must review our current policies to make sure we are not putting our state at a disadvantage, and we must make sensible adjustments to those policies where we can.

These actions will help Washington take bold first steps toward making the nuclear industry an important and growing sector of the state's economy.

Committing to Affordable and Reliable Power

While the economic opportunities are exciting, nuclear power production also will provide real benefits to the state in terms of keeping electricity affordable and reliable. It is widely known that Washington consumers enjoy comparatively inexpensive electricity as a result of the state's extensive use of hydropower. But hydropower does not provide all of Washington's electricity, and the difference is being made up in other sources. Nuclear energy is an important part of that mix that allows for the production of energy in a cost-effective and consistent manner which is not influenced by factors beyond human control, such as the weather.

I believe the state would benefit if it prioritized public awareness about the importance of nuclear energy production. We already have state programs dedicated to advocating for alternatives to burning fossil fuels. Nuclear energy should receive equal attention and effort, and the legislature should determine how best to make that happen.

Another practical solution to encouraging the expanded use of nuclear energy lies in the Energy Independence Act, also known as I-937. The EIA will become an increasingly influential driver of many utilities' decisions for acquiring electricity, pushing them away from traditional sources and toward government-mandated "eligible renewable resources." Yet the EIA does not address nuclear energy's place in the plan. As long as the EIA is with us, the law must be flexible enough to ensure that baseload electricity will be both reliable and affordable. Nuclear energy provides baseload power unburdened from the climate concerns that are presented by the burning of coal

and natural gas. The EIA must be amended to recognize this benefit of nuclear energy, and to encourage the use of nuclear generation in the future.

Welcoming a Future for Cleaner Energy Production

In addition to bringing jobs and reliable electricity production to Washington, nuclear power can help our state improve the environment. Using nuclear reactors to produce electricity is a large-scale, carbon-free method of generation that can substitute for fossil fuels. No other technology—except hydropower—can make that claim. Everyone is looking for a way to bridge the gap between energy security and environmental responsibility. Nuclear is the answer.

There are concrete things we should be doing as a state to help usher in a clean energy era that involves nuclear power. I recommend that state agencies begin coordinating their resources and expertise to accomplish three tasks:

> (1) Determine under current state law what actions would be necessary in terms of permitting and other approvals to build small modular reactor plants in Washington;
>
> (2) Locate five sites across the state that might be suitable for small modular reactor plants—e.g., the Hanford Site, or the TransAlta facility in Centralia; and
>
> (3) Develop recommendations for making changes in state law that would make siting small modular reactor plants in Washington as easy as possible, while maintaining reasonable safeguards for public health and safety.

We need to start planning now if Washington is going to be at the forefront of emerging technology. It is not too early to begin that work.

Finally, I understand that successfully embracing nuclear power will involve concurrent commitments from both the state and federal government. For too long the federal government has dithered on the national problem of nuclear waste disposal. That is why I will formally ask Energy Secretary Moniz and members of the incoming 114th Congress to show leadership and work together to move ahead with the development of national nuclear waste repository sites. I trust that they will commit themselves to that job, but there is no better way to help spur them on than by demonstrating that Washington is faithfully pursuing nuclear power as a centerpiece of our state's economy and energy policy.

I sincerely thank the Task Force members for their participation in our group's important work, and for their thoughtful consideration of these comments. We can help put Washington in a strong position to create economic stability, produce affordable and reliable electricity, and preserve our state's beautiful environment. I look forward to working together with you to accomplish those remarkable goals.

Senator Sharon Brown

Washington State Legislature

Comments of Representative Norma Smith

As we continue to investigate whether increased nuclear power production is a viable, cost-effective means of further reducing Washington's use of carbon-emitting fossil fuels, it is critical that we gain greater insight on the life-cycle costs. This information is necessary when considering the potential benefits, rate impacts, and environmental considerations for the money spent on any nuclear power technology. It is my recommendation that the following areas be addressed:

1. What does it cost to decommission an SMR at the end of its operating license?
2. Who is responsible for that cost? Ratepayers of Energy Northwest, the presumptive operator of SMRs in Washington, or State taxpayers generally?
3. Presumably the terms of the federal operating license would form the basis for estimated years in the operating life cycle of each SMR unit. Will the life cycle cost analysis, therefore, take into account a range of payback periods from 20 to 60 years, since this period of safe and licensed operation is not yet set by federal regulators?
4. Setting aside carbon impact, how does the cost of siting, operating, maintaining, and decommissioning a series of SMRs compare with siting, operating, maintaining, and decommissioning a similar MWh output natural gas plant?
5. Some have proposed that SMRs should displace diesel generators at the vitrification plant, which could use up to 45,000 gallons of diesel a day. We need to know more about that proposal. Why is it that the electric load for the vitrification plant cannot be served by current hydroelectric or nuclear generation in the area?