



Nuclear Energy Policy Challenges

June 2016





A megawatt is not a megawatt

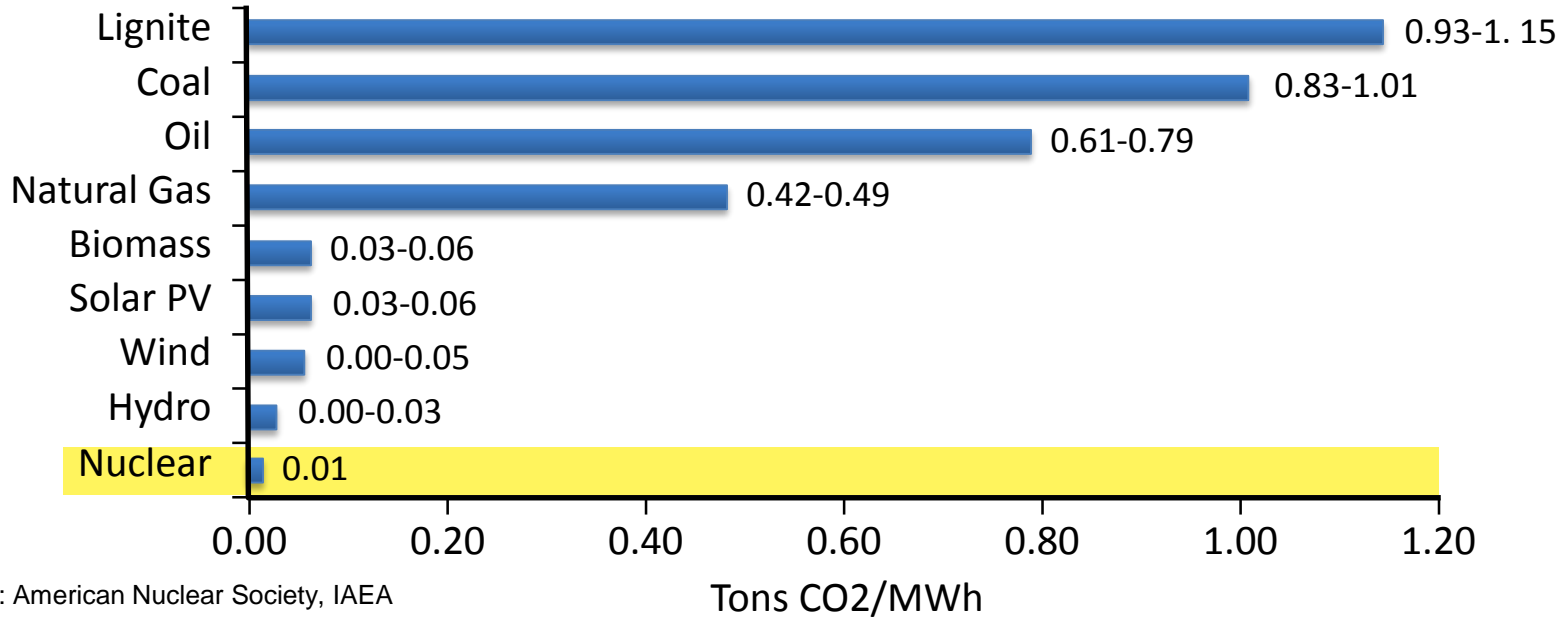
Generation Type	Capacity Factor	Carbon-free?	Dispatchable?
Solar PV	25%	YES	NO
Onshore Wind	36%	YES	NO
Offshore Wind	37%	YES	NO
Biomass	83%	*	YES
Advanced Combine Cycle Natural Gas	87%	NO (about 1/2 carbon of coal)	YES
Advanced Nuclear	90%	YES	YES

*EPA has viewed biomass as carbon free but is reviewing this determination



Nuclear Power is the lowest carbon source of electricity

Lifecycle Greenhouse Gas Intensity



Source: American Nuclear Society, IAEA

*Building North Anna 3 instead of a similarly sized natural gas facility is equivalent in avoiding carbon emissions of removing nearly 1.4 million cars. **(18% of registered vehicles in VA)** off the road each year*

*North Anna 3 instead of a comparable coal unit is the equivalent of removing more than 2.6 million cars. **(34% of the cars registered in Virginia)***

Calculations assume 100 percent capacity factors

Source: Virginia Department of Motor Vehicles, U.S. EPA

Three policy challenges for U.S. nuclear power

- Retirement of existing nuclear units before the end of their currently licensed life—problem in nominally deregulated states
- License extension of existing nuclear units beyond 60 years
- Construction of new units (challenging in regulated states, near impossible in deregulated states)

Dominion has 4 nuclear units in Virginia



North Anna Power Station

Unit 1 - 948 MW
Unit 2 - 944 MW



Surry Power Station

Unit 1 - 838 MW
Unit 2 - 838 MW

North Anna and Surry provide high-paying jobs for more than 2,000 company professionals - **Average salary >\$82,000**

Dominion has 2 nuclear units in CT, decommissioning one in Wisconsin



Millstone Power Station

Unit 1—retired 1998
Unit 2 – 869.5 MW
Unit 3 – 1,210 MW



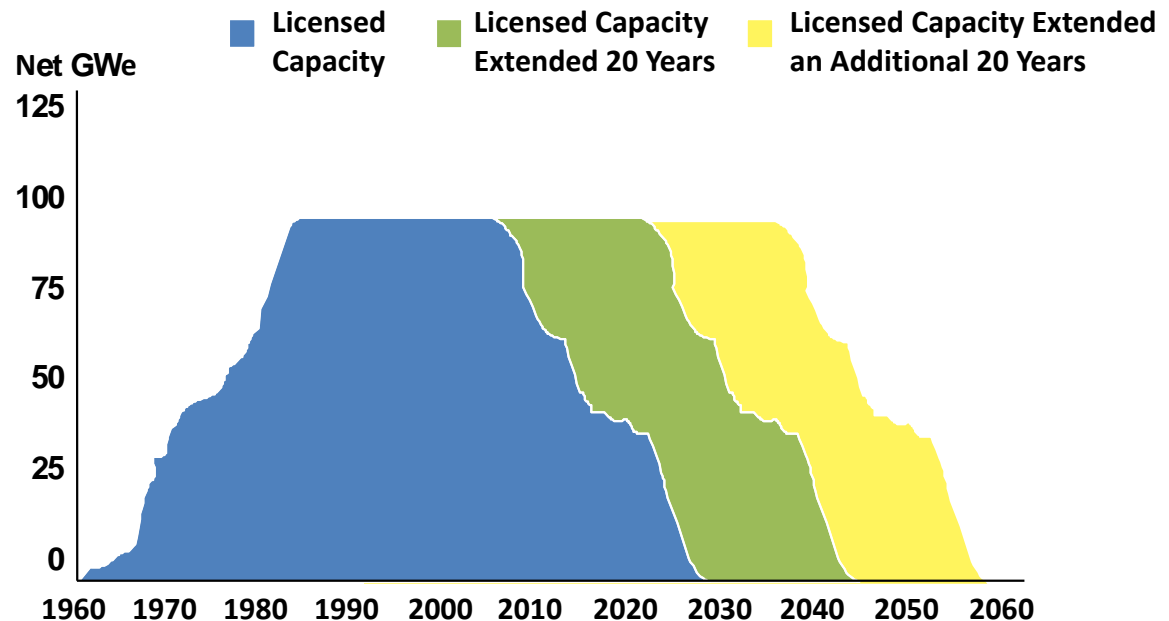
Kewaunee Power Station

One Unit--556 MW
Relicensed through 2033
Permanently shut down 5-7-13

Millstone employs more than 1,000 professionals;
Kewaunee employed approximately 550 professionals

Working with regulators on additional license extensions

- Surry is the fleet pilot—approach makes sense for regulated units
- Project Scope
 - Gather technical data to assess feasibility
 - Determine necessary upgrades to operate
 - Implement upgrades consistent with risk benefits
- Financial Analysis
- Preliminary Results:
 - Life Extension beyond 60 is technically viable
 - Technical areas of focus identified
 - Ratepayer NPV: Substantial benefit to ratepayers
 - Surry 20 year extension vs. new combined cycle plant
 - Early project being funded and staffed



North Anna 3 economic benefits

Average Annual Economic Impacts from Construction and Operations (in millions of 2013 \$)

	Contribution to VA Economy	Personal Earnings	Jobs Supported
Construction	\$1,162.6	\$570.6	9,210
Operations*	\$246.6	\$165.3	1,514

