solestiss

Iowa Nuclear Supply Chain Development

Task Force Meeting #4, intro and updates

Presented to the Iowa Nuclear Energy Task Force

Solestiss is a nimble startup with 300 years' experience across the nuclear value chain

Our team members have held leadership roles across the nuclear energy and power generation ecosystem

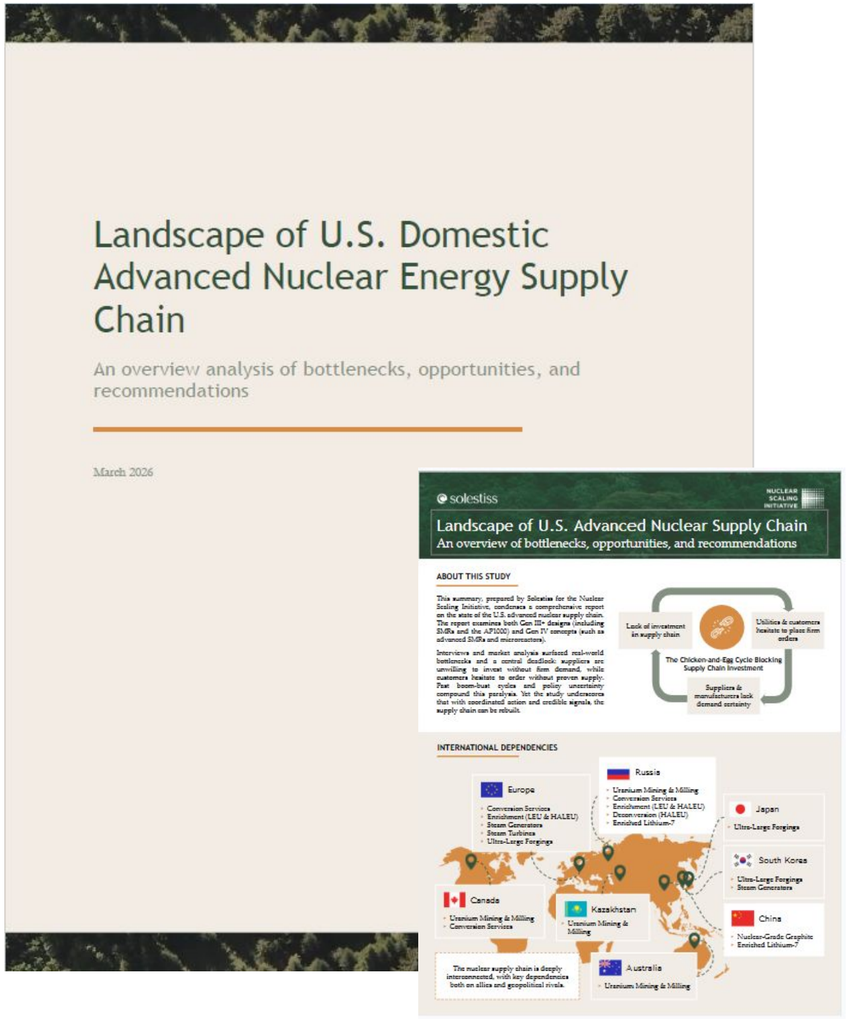
Utilities,	Suppliers,	EPCs,	and more…

And we have unmatched experience in bringing new nuclear projects from initiation to operations

7 former executives	**20+** gigawatts	**8 advanced** reactor designs	**25+** megaprojects
from top utilities, EPCs, OEMs and the NRC	nuclear project development experience, i/c **11+ GW FOAK**	with direct design, regulatory, and/or build oversight experience	of experience in the energy sector

We recently completed a comprehensive study of the U.S. nuclear supply chain, including identifying gaps to scaling and opportunities for growth

- Assessment of the U.S. domestic supply chain readiness to support nuclear scale-up in partnership with the Nuclear Scaling Initiative
- Scope: fuel cycle, manufacturing, labor & services, policy and regulatory environment
- Approach: industry research and 40+ stakeholder interviews across the value chain
- Focused on identifying capacity gaps, bottlenecks, and sequencing needs for 10+ GW U.S. deployments
- Outcome: shared baseline to inform coordinated action across industry and government



Solestiss will inform its supply chain recommendations by assessments of both national needs and IA manufacturing and service capabilities

Solestiss Approach

1 Nuclear Supply Chain Opportunities Assessment

- Identify supply chain requirements for building a nuclear power plant in IA, including distinction for what is needed locally
- Identify national-level supply chain constraints to substantially expanding nuclear power capacity

2 Iowa Nuclear Ecosystem Development

- Develop a baseline summary of current in-state nuclear suppliers and potential adjacency suppliers
- Identify supply chain elements for IA to develop in support of nuclear new builds, locally and/or nationally; and barriers to developing

3 Task Force Supply Chain Recommendations

- Recommend short-list of most effective public policy incentives and regulatory mechanisms to support IA nuclear ecosystem
  - To support in-state projects
  - To support national nuclear power build-out

The supply chain opportunity identification will be rooted in several assumptions to ensure focus on highest potential pursuits

Iowa Nuclear Supply Chain
Opportunity Assessment Assumptions

- Prioritize supply chain opportunities to serve current commercially available reactor technologies and thus expected to be most prevalent in next ~10 years: Westinghouse AP1000[1] and GVH BWRX-300[2] (both considered "Gen III+")

- Focus on structurally constrained supply markets (e.g., N-stamp manufacturing) rather than short-term bottlenecks that may be addressed through advanced procurement planning (e.g. heavy-lift cranes)

- Supply chain with a global supply base from U.S. ally countries (e.g. uranium enrichment) not prioritized – assume 'need for power' will be prioritized over full domestic supply chain requirements

1) *Reactor deployed at Vogtle 3&4 in 2023-24*
2) *First project deploying in Darlington, Ontario, start of construction 2026*

The nuclear supply chain is a diverse mix of generic power generation and nuclear specific components

Nuclear Power Plant Value Chain

Construction & Site Development	Turbine Island	Nuclear Island	Supporting Components, Technologies	Fuel Cycle	Operations & Back-End
▸ Civil works, concrete, steel, large-scale construction ▸ Heavy equipment ▸ EPC capabilities ▸ Skilled trades and project management	▸ Turbines, generators ▸ Heat exchangers ▸ Balance of plant systems ▸ Electrical and mechanical equipment	▸ Reactor vessel ▸ Steam generators ▸ Safety systems and control systems ▸ Nuclear-grade components (NQA-1 / ASME N-stamp)	▸ Instrumentation & control (I&C), sensors ▸ Advanced materials, specialty components ▸ Inspection, testing, and manufacturing technologies	▸ Uranium mining, milling, and conversion to fuel-ready material ▸ Enrichment and fabrication into reactor fuel assemblies ▸ Used fuel management, storage, and long-term disposal or recycling	▸ Maintenance and outage services ▸ Waste management and storage ▸ Decommissioning

Red indicates most critical constraint to scaling nuclear power – next ~10 years, current incumbent reactor technologies (Gen 3+)

The most critical nuclear power supply chain constraints are a mix of specialized equipment and labor resources

Nuclear Power Plant Supply Chain Constraints

Limited large, nuclear-grade component capacity

- Reliance on a small number of global suppliers for **heavy forgings** (key step in reactor pressure vessel)
- Especially pronounced for **ultra-large forgings** utilized for traditional, GW-scale nuclear power, e.g. Westinghouse AP1000, less so for SMR forgings
- Additionally, downstream machining steps (e.g. **machining, finishing, welding, heat treatment, and nondestructive examination**) even more constrained

Specialized workforce – nuclear specific and general mega-project

- Multi-layered labor constraints from construction through to operations
- Most notable nuclear specific gaps: **nuclear grade welders, pipefitters, electricians**, I&C technicians , and reactor operators
- In addition, there is competition for limited **project management personnel, construction supervisors, and project controls** specialists

Nuclear-qualified supplier base is thin

- Declining number of **NQA-1** and **ASME N-stamped** suppliers
- Gaps in **advanced manufacturing, I&C, and testing** capabilities
- High cost and complexity to enter nuclear supply chain
- Over-reliance on a small pool of qualified vendors

Potential opportunity for IA

Forging supply expansion most likely from handful of incumbents but **IA machining capacity could be leveraged**

Significant opportunity for **existing workforce** and for growth w/**training and apprenticeship programs**, but geographic flexibility will be a constraint

Potential for existing IA capacity to qualify/certify, requires more exploration

There are at least three in-state suppliers to the U.S. nuclear power value chain

Paxton & Vierling Steel (Carter Lake, IA)

- Structural steel fabrication and complex metal assemblies
- Support of large infrastructure and industrial projects
- Capabilities relevant to construction and balance-of-plant components

Nuclear Projects:

- Hanford DOE / DOD Lab
- DOD Integrated Water Treatment Unit
- Vogtle Units 3 and 4

Emerson – Fisher Valves (Marshalltown, IA)

- Control valves and flow management systems
- Eenergy and industrial sectors
- Products applicable to nuclear and non-nuclear plant systems

Nuclear Projects:

- Pickering Nuclear Station
- Wolf Creek Nuclear Operating Corporation
- Manufactured nuclear qualified pressure transmitters in over 300 reactors and 23 countries.

Corrosion Control Services (Davenport, IA)

- Specialized in diaphragm seals and corrosion-resistant components
- Experience in industrial and process applications
- Relevant to fluid systems and harsh operating environments

Nuclear Projects:

- Tennessee Valley Authority – Watts Barr
- Wisconsin Electric Power Company - Point Beach
- Wolf Creek Nuclear

Considering the lens of both company and plant relevance, Iowa has several potential nuclear supply chain growth opportunities

IA Nuclear Supply Chain Growth Framework

Addressable Nuclear Plants	*Addressable companies*		
	Grow existing IA nuclear supply base	**Diversify current IA suppliers into nuclear**	**Attract new nuclear company into IA**
Duane Arnold	**First priority:** re-establish local supply base for DA	**Growth Op:**current non-nuclear suppliers expand into nuclear	**Growth Op:** attract a new supplier to IA to support nuclear new build / services in IA and beyond
IA New Build	**Growth Op:** current non-nucleear suppliers grow to support additional plants		
Other U.S. Plants	**Growth Op:** current nucleear suppliers grow to support additional plants	**Growth Op:** current non-nucleear suppliers grow to support additional plants	

Appendix

Current Bottlenecks of US Nuclear Ecosystem

	Core Bottlenecks	Severity	Ease of Addressing
Fuel Cycle	▸ No commercial-scale HALEU enrichment or deconversion facility ▸ Fragmented TRISO fuel designs hinder standardization ▸ No certified transport packages for HALEU ▸ Market deadlock prevents investment despite DOE funding	**High:** International dependence on enrichment from Russia & Europe	**Formidable:** New facilities are often multi-billion dollar investments
Heavy Manufacturing & Major Components	▸ No U.S. capacity for ultra-large forgings ▸ Machining, welding, and finishing are primary constraints ▸ Shrinking pool of ASME N-stamp certified suppliers	**Medium-Low:** Reliant on allies for ultra-large forgings; Domestic capability exists for SMRs	**Achievable:** Domestic large-forging capacity not required; Investments in machining capacity needed
Supporting Components & Advanced Technologies	▸ Long qualification timelines for advanced materials ▸ NQA-1 QA burden blocks entry for high-quality commercial suppliers ▸ Dependence on China/Russia for graphite and enriched Li-7 ▸ Limited support for adoption of digital or modular technologies	**Medium:** Some key materials still tied to geopolitical risk	**Challenging:** Industry-driven QA reform could accelerate supply expansion; Lithium-7 remains a challenge
Workforce & Human Capital	▸ 5:1 retirement-to-entry ratio in skilled trades ▸ Gaps in welding, QA, construction management, and craft labor ▸ Weak apprenticeship and credentialing pathways ▸ Persistent stigma around trades and underinvestment in CTE	**High:** Affects all parts of supply chain & construction	**Achievable:** Successful models exist for workforce development.

While many bottlenecks are surmountable, fuel challenges present the most strategic risk.