



IAEA

International Atomic Energy Agency
Atoms for Peace and Development

Industrial Involvement Major elements: (7) Supply Chain Management and Preparation for Procurement Process

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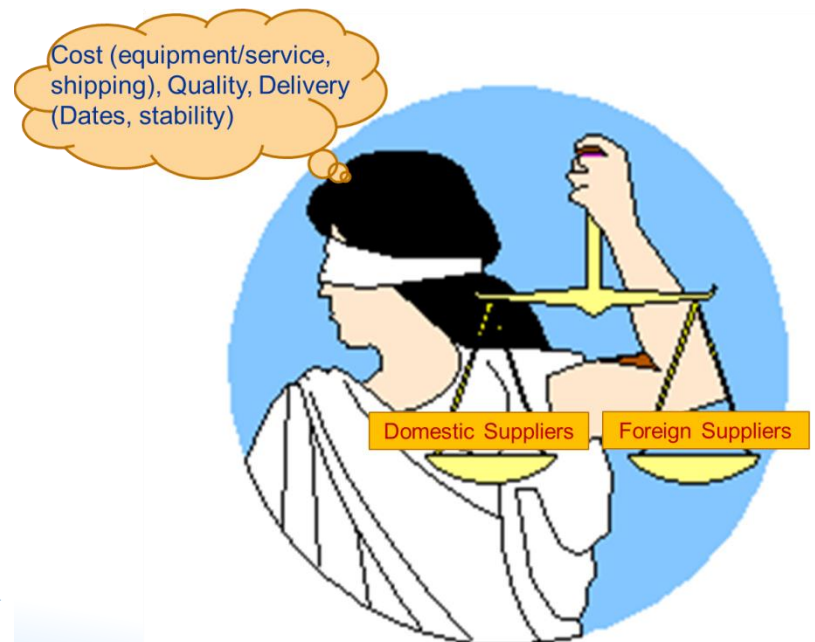
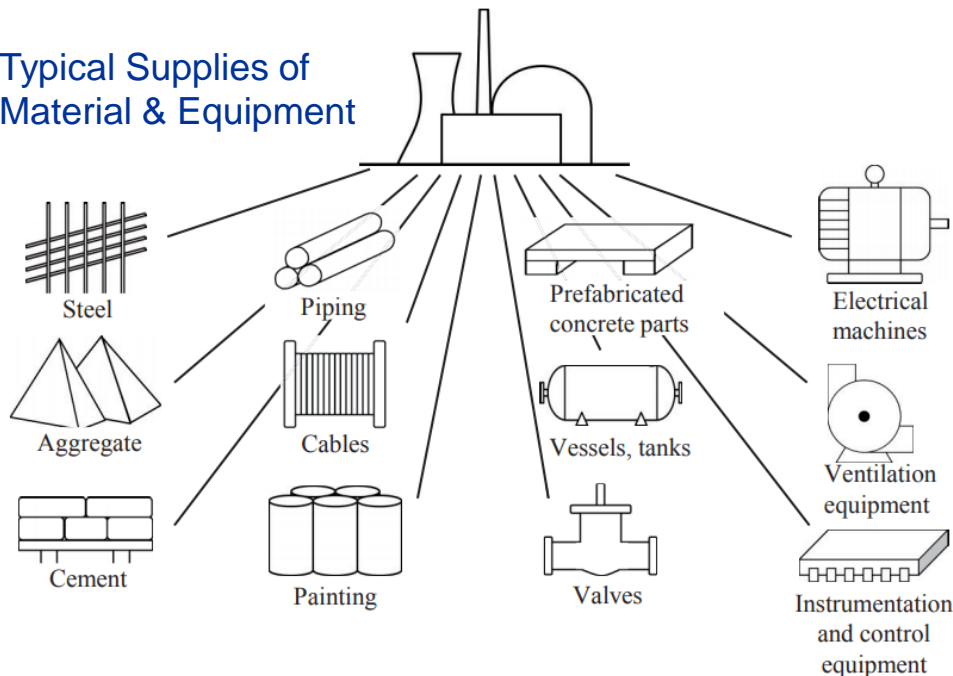
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Supply Chain and Partnerships

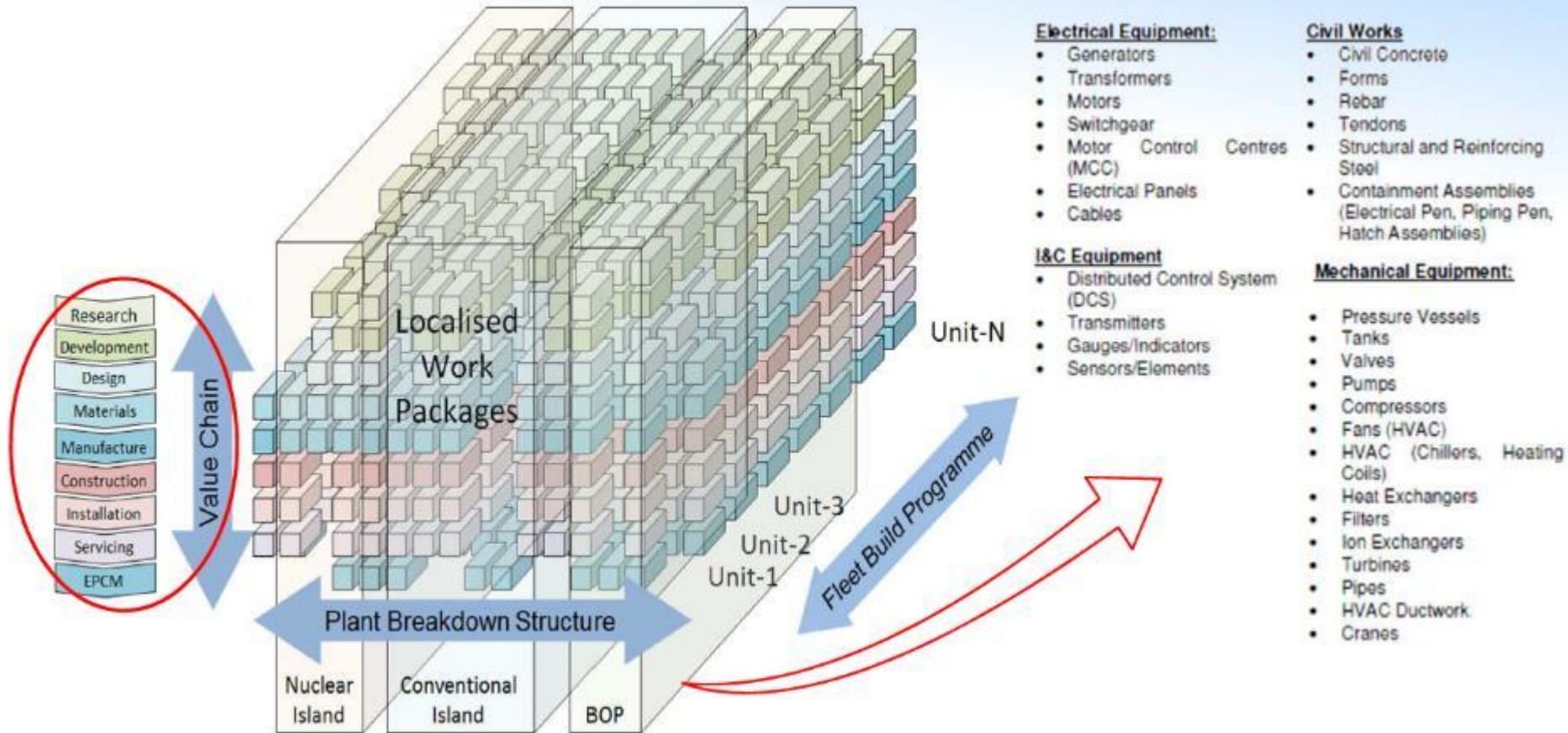
□ For the **First NPP Project**,

- Supply Chain is created by EPC contractor (with inputs & supports from owner/operator), usually in **Phase 3**.
- After construction, owner/operator will take over some aspects of the supply chain from the EPC contractor.

Typical Supplies of Material & Equipment



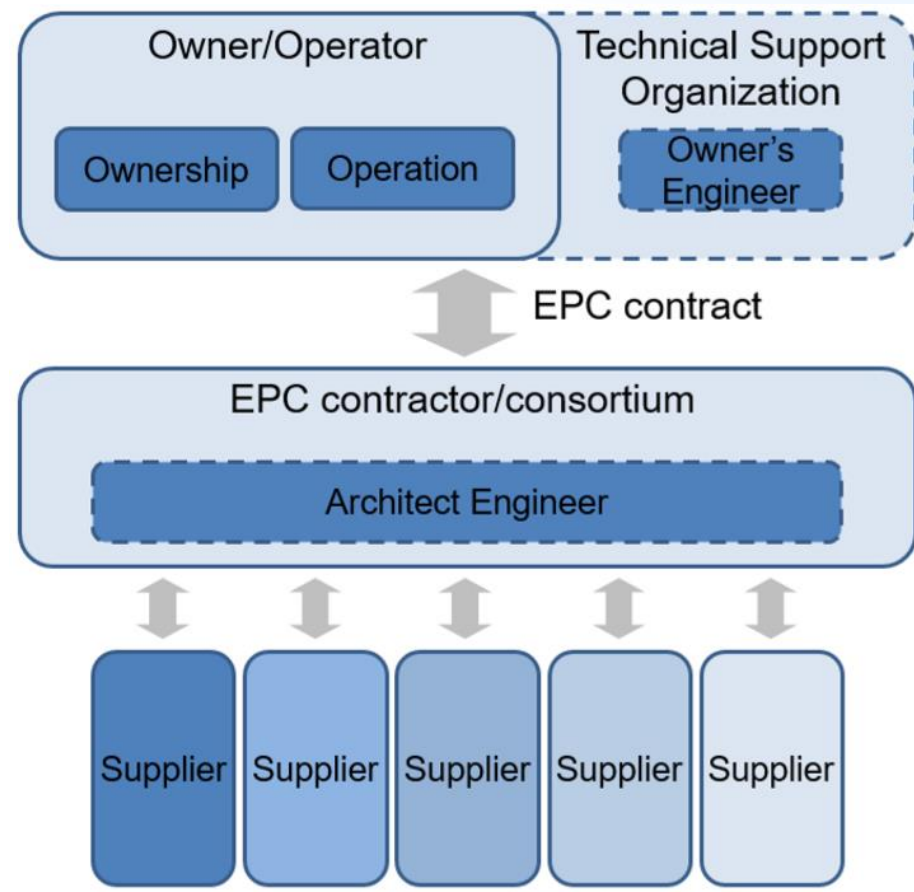
Understanding the equipment and service requirements



- ❑ To establish your own localization strategy, a thorough understanding should be achieved on general requirements (regulations, standards, codes, guides etc.) for equipment and services required for NPPs.
- ❑ It'd be helpful to do breakdown analysis in value-chain or plant structure.

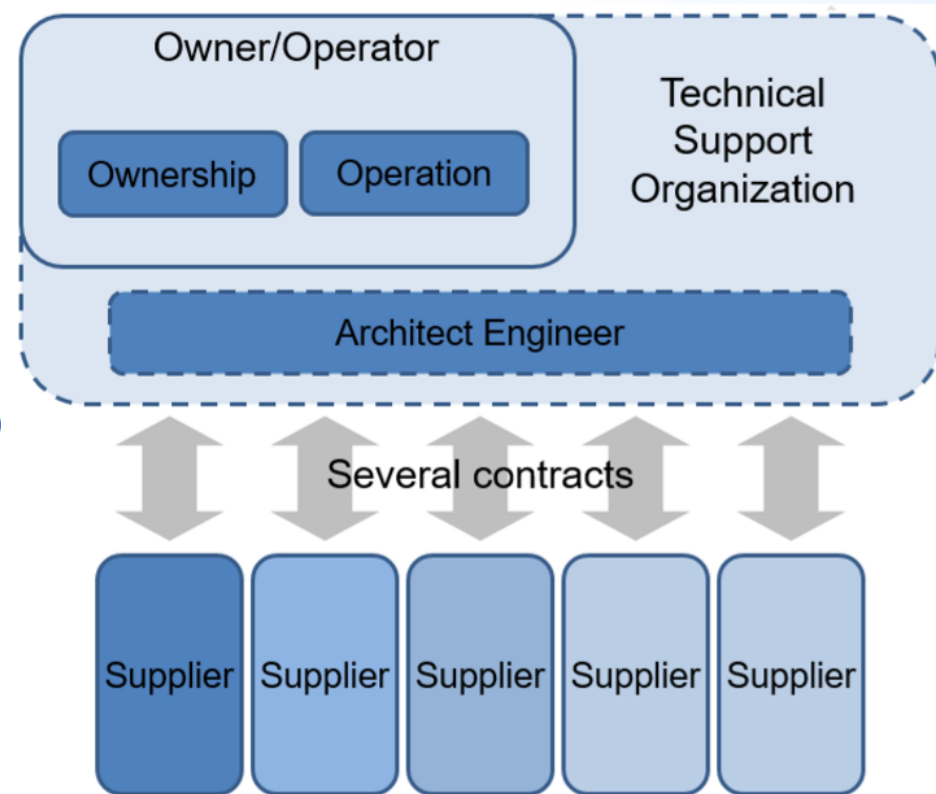
Structure of O/O in Turnkey Project

- O/O is responsible to oversee EPC contract.
- EPC contractor is responsible for adapting design, managing procurement & construction schedule.
- SCM during construction is EPC contractor's responsibility.
- O/O has to ensure that proper controls are applied.



Structure of O/O in Split-package Approach

- O/O is responsible for EPCM (Engineering, Procurement, Construction & Management).
- O/O has to manage supply chain, and plays a role of architectural engineer (TSO may support it)
- Appropriate for looking to build a fleet of NPPs of similar design, and/or to achieve tech-independence.



Ref. Example of “Bid Evaluation Template”



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Criteria	Weight (%)	Vendor 1	Vendor 2	Vendor 3
Technical: Understanding of scope of work	10	5: Appears supplier cannot provide refuelling support	9: All bid areas responded to, with minor exceptions taken	8: Need for seismic analysis capability not included in bid
Technical: Experience of key personnel	10	7: General manager assigned to project was formerly construction manager of Bredonia ^a nuclear power plant	2: No managers with former experience at Bredonia nuclear power plant	5: Some Bredonia nuclear power plant experience Civil/seismic area appears weak
Technical: Knowledge of Bredonia nuclear power plant design basis	8	9: Original nuclear power plant supplier Has all design information except for minor site implemented modifications	8: Some former Bredonia nuclear power plant engineers on staff Well experienced technical staff on a variety of similar plants	7: Several former Bredonia nuclear power plant engineers on staff
Technical/quality: Performance history with previous projects	10	9: Good performance on previous projects and good external references	6: Some performance issues on previous projects; however, projects completed satisfactorily	4: No track record; new consortia just formed
Commercial: Compliance with terms and conditions	10	10: No requested changes to framework terms and conditions	7: Minor changes to terms and conditions requested (subject to negotiation)	1: Numerous unacceptable changes to terms and conditions requested
Total	100			

Note: Bid evaluation of a nuclear power plan project in the fictitious country of Bredonia.

Source: IAEA “Procurement Engineering and Supply Chain Guidelines in Support of Operation and Maintenance of Nuclear Facilities” (IAEA Nuclear Energy Series NP-T-3.21, 2016) p.68

“Procurement” in the Milestones Approach (1) (Seen from NEPIO)

Phase	NEPIO Functions	NEPIO Activity
1	Develop relevant stakeholders' understanding of the requirements for purchasing NPP services	<ul style="list-style-type: none">✓ Identify the <u>unique requirements</u> associated with purchasing services for pre-project activities;✓ Identify <u>potential issues related to services</u> for Phase 2 activities (both national and foreign suppliers);✓ Organize meetings with the appropriate government stakeholders to explain the <u>need for NPP services procurement</u>

“Procurement” in the Milestones Approach (2)



Phase	NEPIO Functions	NEPIO Activity
2	Verify the availability of required procurement capabilities	<ul style="list-style-type: none">✓ Ensure that the owner/operator and the regulatory body have <u>procurement capabilities</u> for the pre-project services required in Phase 2;✓ Check the existence of the <u>specific procurement procedures</u>;✓ Check the inclusion of the <u>applicable quality standards</u> in the service specifications.
3	Ensure that procurement capabilities for the owner/operator are being developed	<ul style="list-style-type: none">✓ Ensure that processes for procurement are being developed, in particular for the <u>urgent procurement of additional supplies and equipment</u> as needed in emergency situations.

Supply Chain Issues (1)

(seen from subcontractors/suppliers)

- ❑ Similar sectors' experience (e.g. petrochemical) helps you, but NOT automatically applicable to nuclear industry.
- ❑ Sometimes the highest barrier to entry is “culture” rather than “technology”. (it may take years to master QA/QM practice after months formal trainings, especially for a SME of craftsmanship)
- ❑ It'd be critical to understand potential vendors' policies in your battlefield such as:
 - 1) **Threshold of “In-house” or “Outsourcing”** (note: it is NOT public information, which is different by parts even in the same tech-field like welding)
 - 2) **Priorities of suppliers' condition** (Financial stability first? “ISO9001”-holder? Potential Management Skills or simply cost?)

Supply Chain Issues (2)

(seen from subcontractors/suppliers)

- ❑ It'd be critical to estimate long-term “Investment & Return” scenarios in your battlefield. The factors may include:
 - 1) **Continuity of orders** (Construction? O&M?)
 - 2) **Geography of NPPs** (Inside/outside of your country?)
 - 3) **Scale of Development** (Machinery? Documents? HR?)

- ❑ It is advisable to grasp competitiveness of localization from the vendors' viewpoints such as:
 - 1) **Labor Resources with Reasonable Cost**
 - 2) **Small Footprint in Supply-Chain Management**
 - 3) **On-time responses in Technical Services incl. O&M**
 - 4) **Opportunities for Local Government Support**
 - 5) **Knowledge of Local Business & Culture**

Summary

- ❑ Supply chain in NPP looks too complex, so it would be advisable to stick to national capacity survey as well as dialogues with intl' vendors. "Selection and concentration".
- ❑ NEPIO's role has changed as program developed, as same as potential local suppliers'. Keep track on your own strategy. (refer to IAEA Tech-doc and/or a set of national industrial involvement policies)
- ❑ The highest barrier to entry can be "culture" rather than "technology". Expect that it may take years to master it.
- ❑ It is advisable to grasp competitiveness of localization from the vendors' viewpoints such as reasonable cost, on-time response in tech services, opportunities for gov support.



Thank you so much!

Practical Viewpoints from a certain expert



- ❑ Effective supplier development and assessment is vital to establishing an effective supply chain which will deliver the business.
- ❑ Treat supplier selection as an assessment not an audit, use the outputs as an opportunity to develop the supplier not punish them.
- ❑ This not about setting a bar that they must jump over its about showing them how to jump over that bar.
- ❑ Licensees should have a well developed assessment process which is consistently applied by suitably qualified and experienced personnel.