Construction Acceptance Tests

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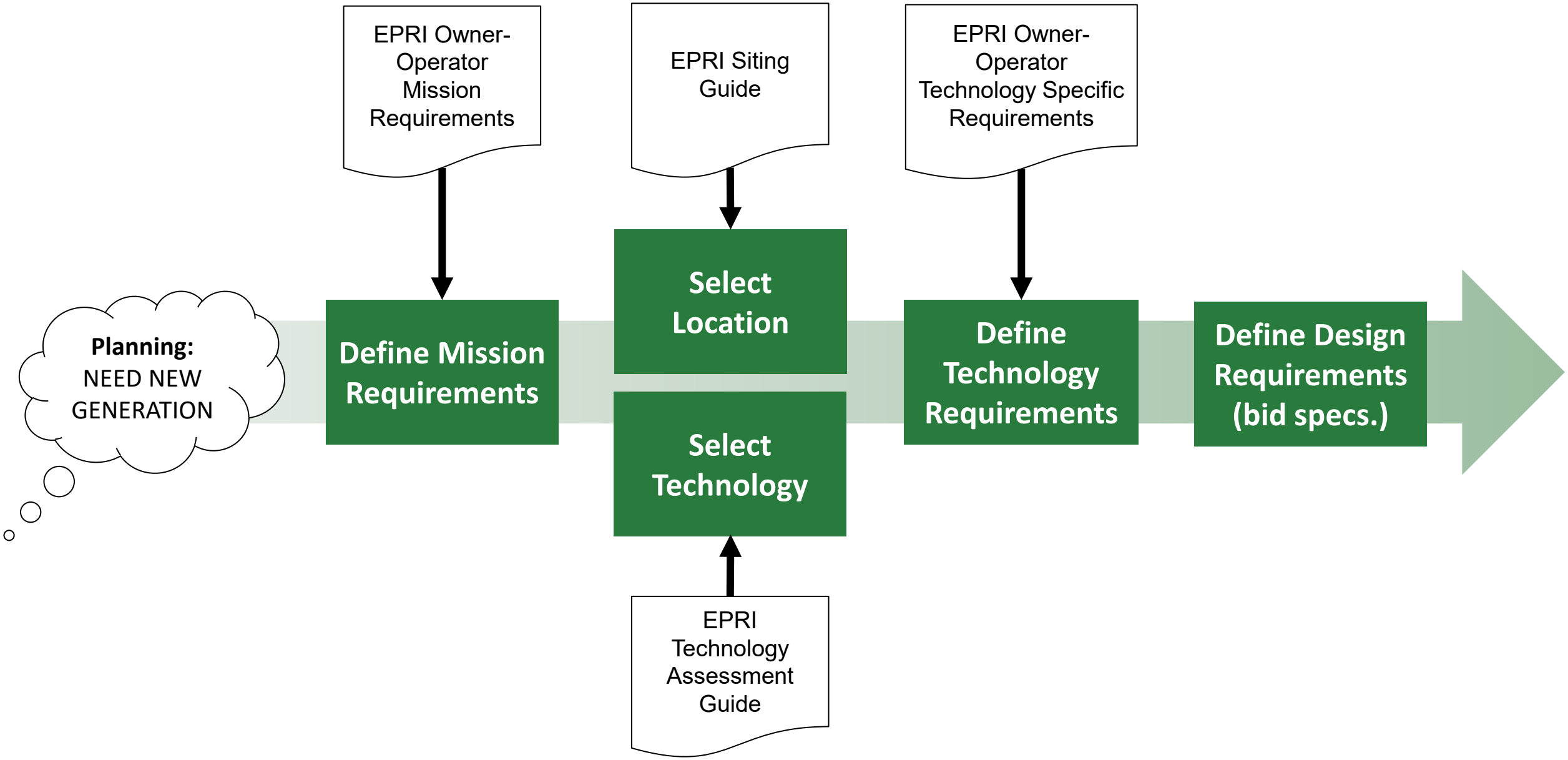

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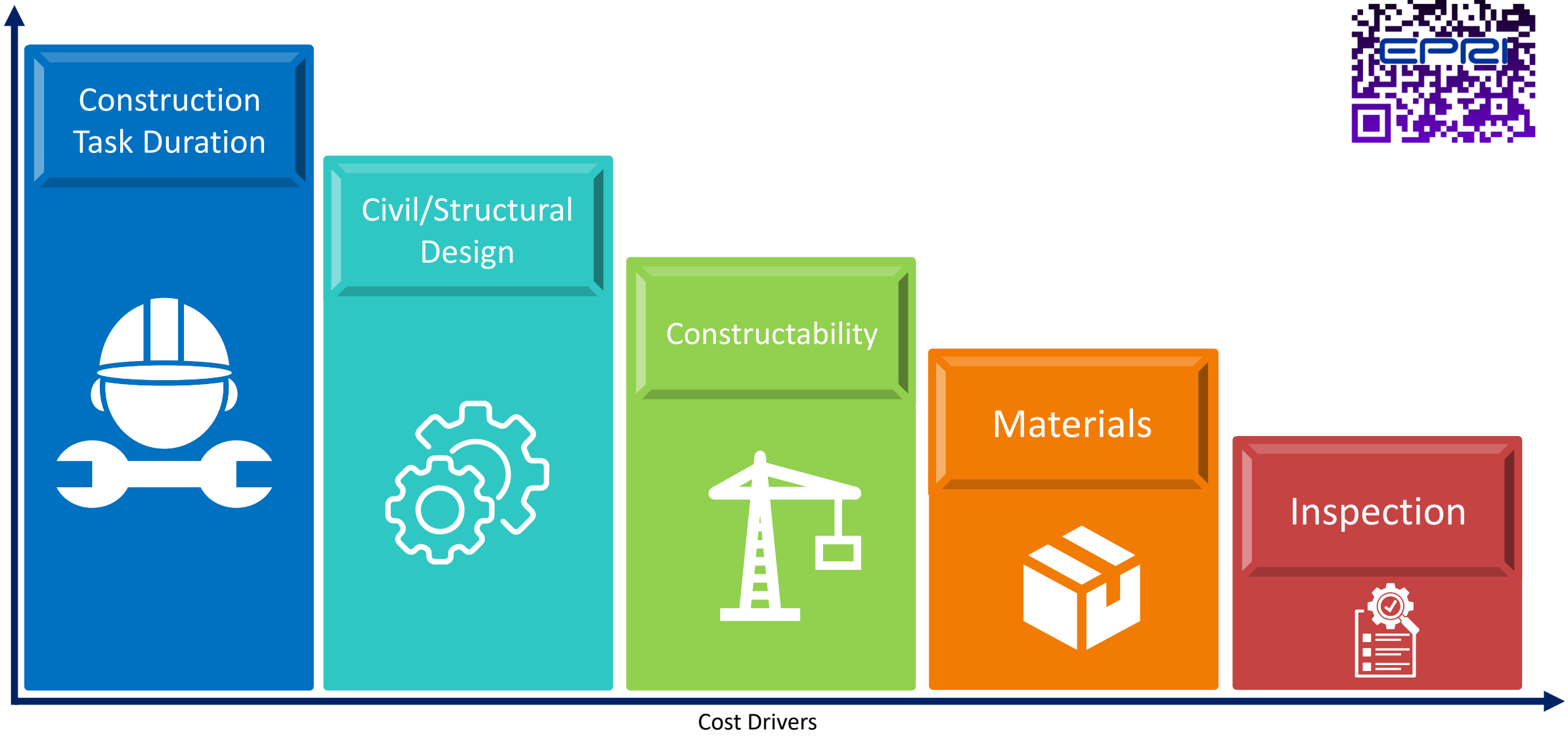
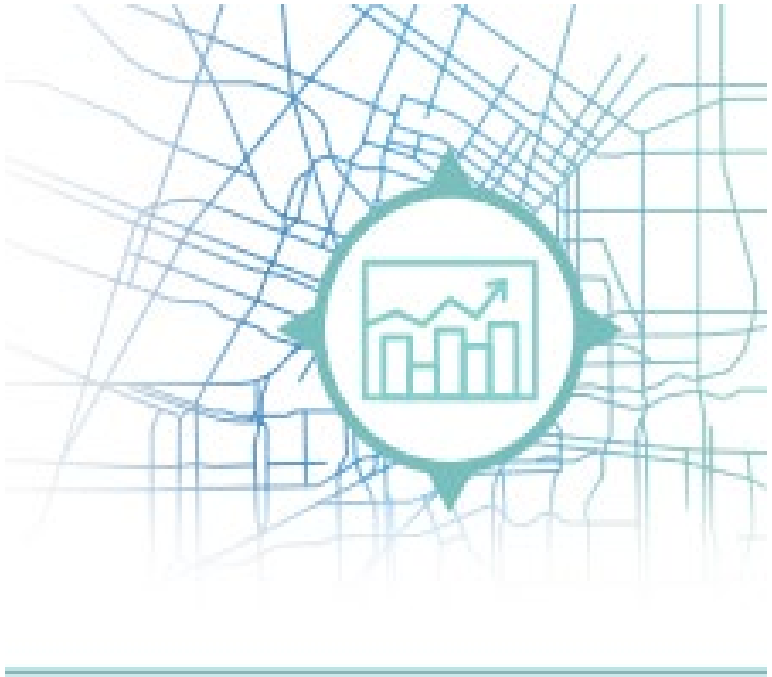


Construction and Commissioning Priorities – AR Roadmap

- **Nuclear Construction Culture**
  - Right-sized approaches for nuclear construction activities
  - Review processes to eliminate unnecessary or burdensome work that add little of no value to the project

- **Advanced Construction Technologies and Standardization**
  - Develop, enable and utilize new construction technologies
  - Perform construction demonstrations and tests to accelerate their deployment

- **Nuclear Construction Experience**
  - Compile construction guidelines that contain information on adequate division of responsibilities



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Construction Acceptance Tests (CATs)

- CATs: inspections, checks, and tests performed by the Construction team to confirm that structures, systems, and components (SSCs) meet design requirements before handing over to the Commissioning team.
  - They cover civil, electrical, mechanical, and instrumentation systems, ensuring the plant is built as designed.
- **Importance in Nuclear Projects**
  - CATs are a critical step in commissioning
  - Bridge construction and preoperational testing ensuring compliance with design and regulatory standards.
- **Why It Matters for SMRs**
  - SMRs rely on modular, standardized designs, making efficient CATs critical for consistency across units.
  - Proper CAT execution can reduce delays and lower costs of the SMR projects.
- **Today's Focus**
  - Explore key insights and recommendations from the EPRI report 3002021018 to help SMR vendors streamline CAT processes.

Key Insights from the EPRI report

- **CATs as Part of Commissioning**
  - CATs are a subset of the commissioning process, ensuring SSCs are constructed per design before turnover.
  - They typically occur before handover, but some tests requiring system operation happen post-turnover, needing coordination with Commissioning.
- **Importance of Early Planning**
  - Planning for CATs must start at project inception to define procedures, timing, and acceptance criteria.
  - Without early planning, projects risk omitted tests, incorrect test acceptance, or costly rework.
- **Turnover Process Challenges**
  - System turnover boundaries must be defined early using engineering diagrams and commissioning schedules.
  - Misaligned boundaries can delay CATs, impacting the overall project timeline.

Early planning of CATs is crucial to avoid delays and ensure SMR commissioning success

Key Insights from the EPRI report

- **Resource Allocation Issues**
  - Insufficient technical resources can create a backlog of CATs, delaying the project schedule.
  - Backlogs also delay test results, hiding issues until construction advances, leading to rework.
- **Multi-Disciplinary Coordination**
  - CATs often require multiple disciplines (e.g., piping, electrical) to release or participate in tests.
  - Miscommunication can cause delays, repeated tests, or non-conformances, such as missing a concrete pour card check.
- **OEM Data Gaps**
  - Incomplete or outdated manufacturer data can delay CATs, as requirements may change during equipment delivery.
  - This risks rework or retesting, impacting project timelines and costs.

SMR vendors must address resource, coordination, and data challenges to ensure CATs support efficient project execution

Key Recommendations

- **Establish Teams Early**
  - Set up Construction and Commissioning teams at project start to align on CAT planning and requirements.
  - Early involvement ensures all parties understand their roles, avoiding later conflicts.
- **Prioritize Rigorous Planning**
  - Develop detailed CAT plans at the project's outset, defining procedures, timing, and acceptance criteria.
  - Use Inspection and Test Plans (ITPs) to outline responsibilities and expected results, reducing errors.
- **Define Turnover Boundaries**
  - Establish system turnover boundaries early using engineering diagrams and commissioning schedules.
  - Clear boundaries align CATs with commissioning needs, preventing delays in SMR projects.

Early planning and clear roles are essential for SMR vendors to execute CATs

Key Recommendations

- **Ensure Resource Availability**
  - Allocate sufficient technical resources to prevent CAT backlogs and delays.
  - Adequate staffing ensures timely test completion, keeping SMR projects on schedule.
- **Enhance Multi-Disciplinary Coordination**
  - Coordinate across disciplines (e.g., piping, electrical) to ensure all parties are aligned for CATs.
  - Use tools like concrete pour cards to verify readiness, avoiding errors and non-conformances.
- **Verify OEM Data Completeness**
  - Confirm that manufacturer data is complete and up-to-date before CATs to prevent rework.
  - Regular updates with OEMs ensure SMR components meet testing requirements without delays.

SMR vendors can improve CAT success by focusing on resources, coordination, and data accuracy

Conclusion

- **Role of CATs**
  - CATs ensure SSCs are built to design specifications, forming a critical link between construction and commissioning.
- **Focus on Best Practices**
  - The report emphasizes early planning, clear roles and coordination as crucial to successful CAT programs.
  - These practices help avoid delays, reduce costs, and ensure regulatory compliance.
- **Support for SMR Projects**
  - For SMRs, CATs enable standardized, modular construction by ensuring consistency across units

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