



**RIC 2014**  
**Small Modular Reactor Licensing:  
Issues in Environmental Reviews  
Unique to Small Modular Reactors**

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**Agenda**

- Background
- Application Scenarios
- Purpose and Need
- Cumulative Impacts
- Need for Power
- Alternatives
- Cost-Benefit Analysis

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**Background**

- NRC staff considered potential differences for SMRs in draft ISG-027
- Addressed same resource areas as large reactors
- Differences discussed in draft ISG-027 are driven primarily by:
  - Number of units initially being licensed vs. number of units planned
  - Purpose and need
  - Smaller size of units

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### Application Scenarios

- Four scenarios postulated in ISG-027
- Applicant may initially request licenses for fewer units (e.g., 4) than it plans to build eventually (e.g., 8)
- Scenarios and guidance answer:
  - How many units are addressed as direct impacts?
  - How many units are addressed in cumulative impacts?
  - How are the need for power, alternatives, and cost-benefit analyses affected?

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### Purpose and Need

- The stated purpose and need for the project drives the need for power and alternatives analyses
  - SMR purpose and need may look very different from a large reactor
    - May be tied to a specific load
    - May be tied to energy policy and goals
    - May be for replacement of older fossil units
    - Still must include the need for electricity
  - Purpose and need cannot be overly restrictive

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### Cumulative Impacts

- In most respects, unchanged from current practice for large reactors
- Future units that are “reasonably foreseeable” are included in cumulative impacts
- ISG-027 says reasonably foreseeable could mean:
  - Applicant provides tentative dates for operations
  - Applicant includes in siting study

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### Need for Power

- Analysis methods mostly unchanged from those used for large reactors
- Analysis will only address units for which licenses have been requested
- Need for power analysis is focused by the stated purpose and need

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### Alternatives

- Alternatives must meet the purpose and need
- Energy alternatives will only consider the number of units for which licenses have been requested
- Energy alternatives could be:
  - Limited, e.g., if proving out SMR technology
  - Expanded if renewables might meet purpose and need as a small reactor

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### Alternatives (continued)

- Cumulative impacts are considered for alternative sites
- Sites must be able to support proposed units and “reasonably foreseeable” units
- Search for alternative sites could be:
  - Limited, e.g., if powering a specific facility
  - Expanded because of smaller footprint and/or less or no water use

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### Cost-Benefit Analysis

- Will consider only the proposed units – those for which licenses have been requested
- Can include other, non-quantified benefits:
  - Fuel diversification
  - Ability to add units to follow load growth
  - National security and defense
  - Demonstration of technology

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### Summary

- SMRs will require some adjustments to environmental reviews
- Pay extra attention to purpose and need
- ISG-027 provides guidance to the staff
- Applicants should engage NRC staff early to identify and resolve any concerns

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