

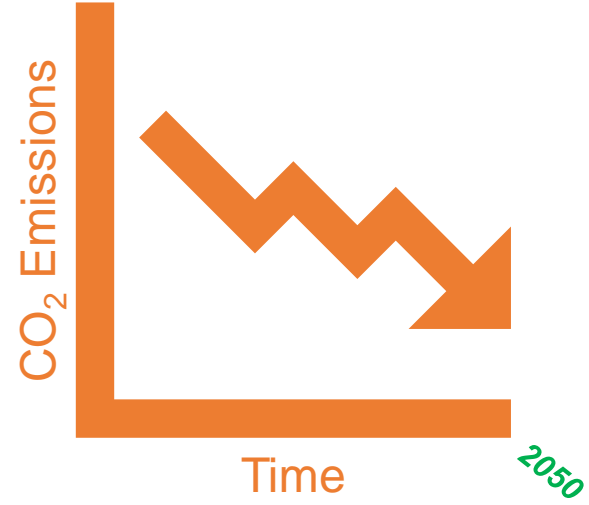
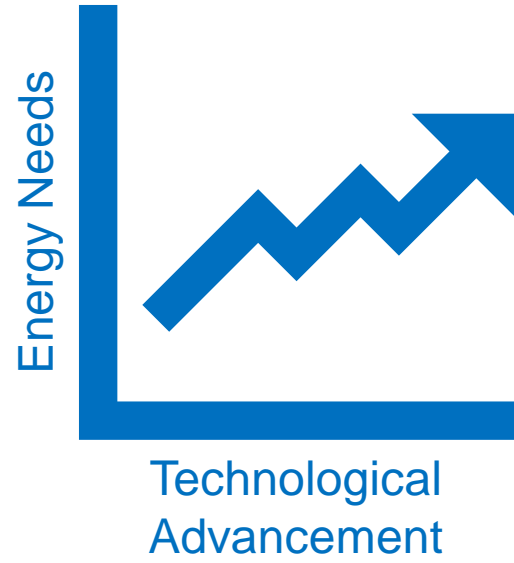
Advanced Tools for Advanced Reactors

Why Computer Codes Are Essential to Ensure Access to
a Clean, Reliable, and Sufficient Energy Supply

Robby Renfrow

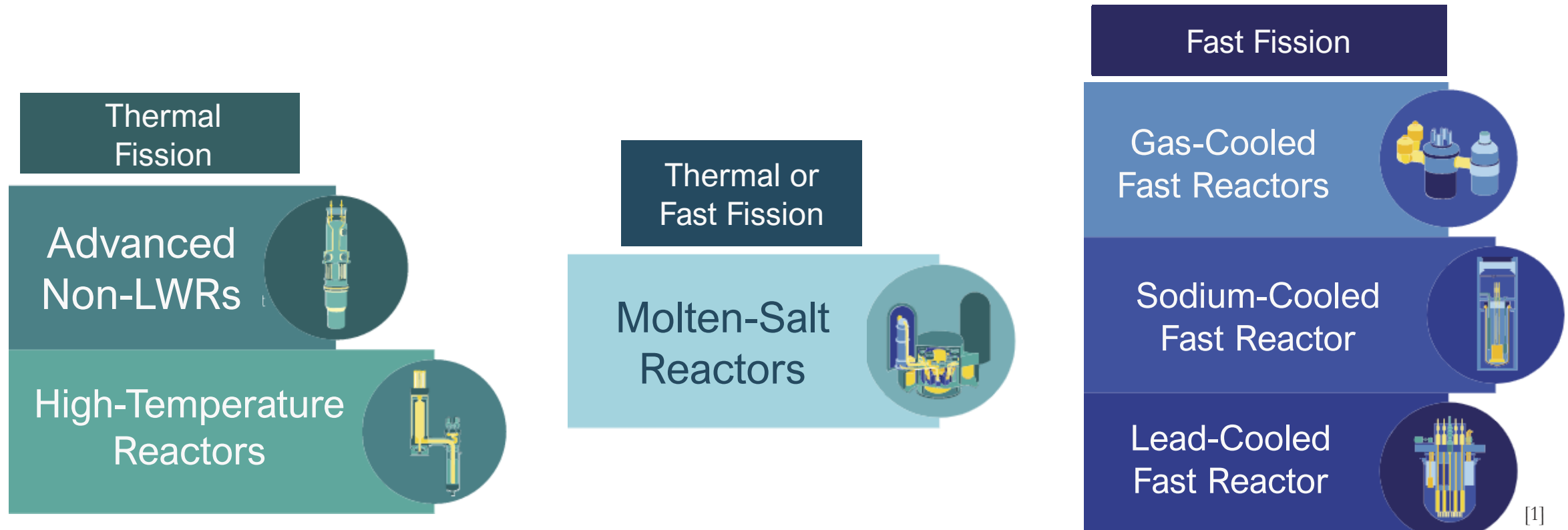


Advanced nuclear could be the solution to the world's biggest issues



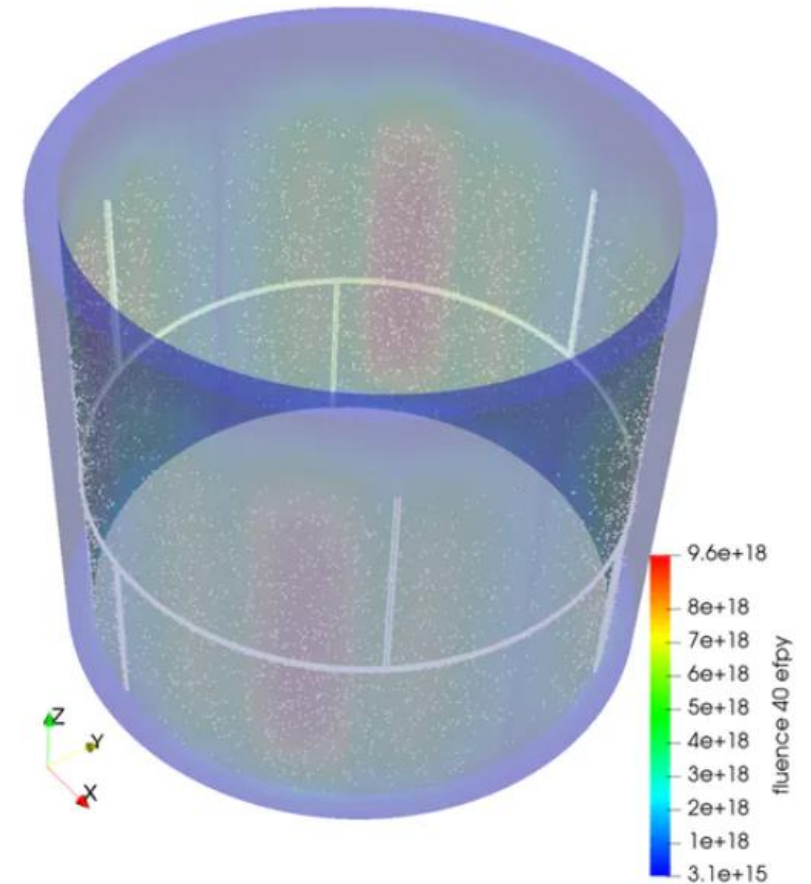
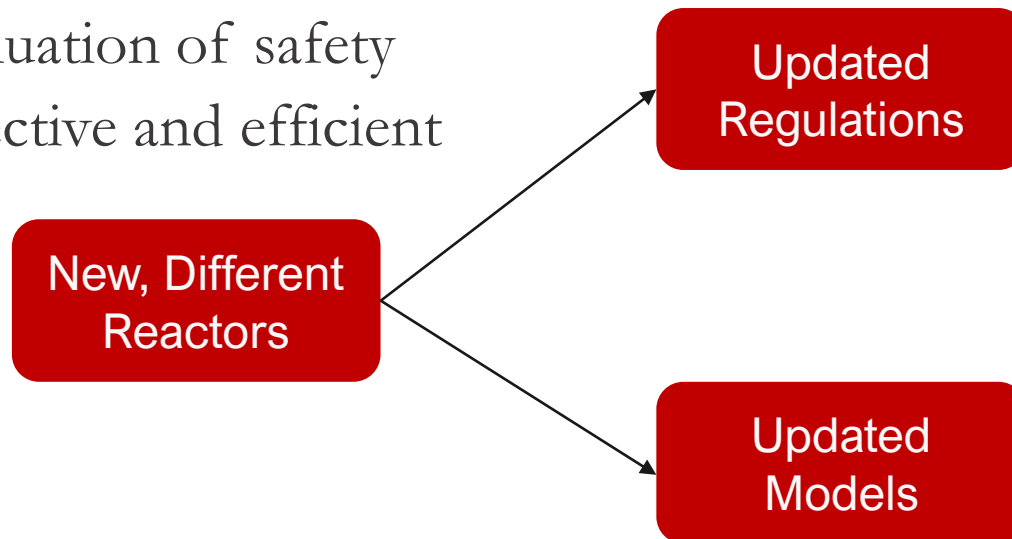
Background: Advanced Reactors

- Advanced reactors gain legitimacy in last decade
- Complexity is a double-edged sword
- Need for new regulatory framework – current is prescribed to LWRs



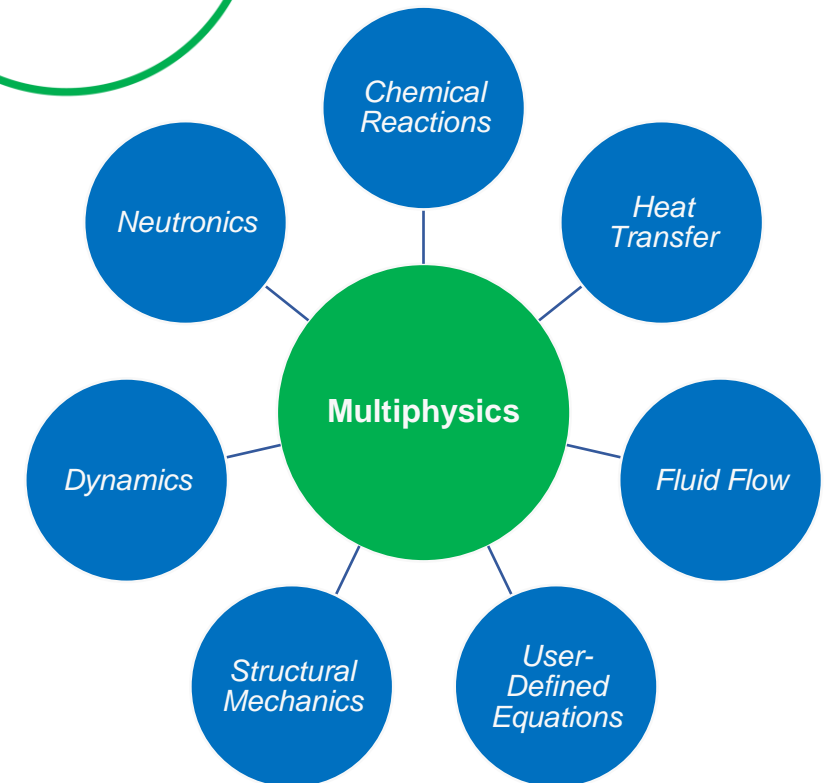
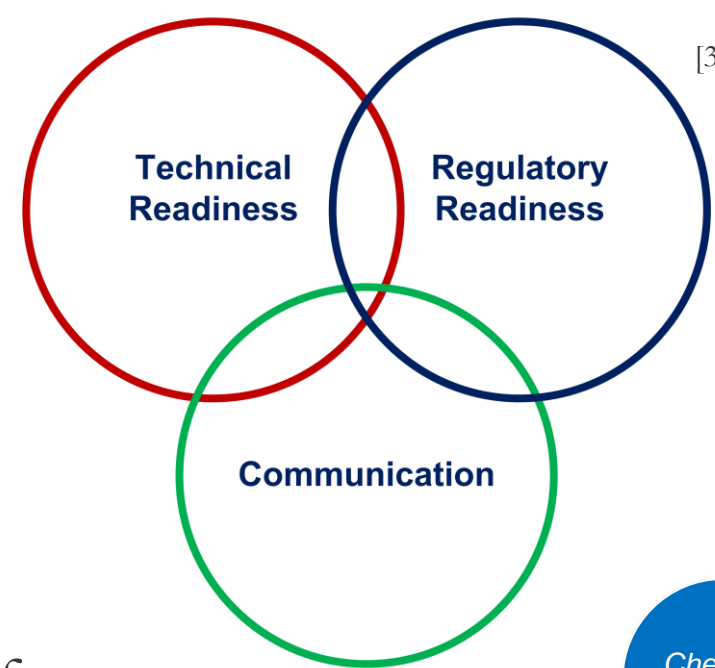
Background: Recent Policy Changes

- Enaction of NEIMA 2019
 - Title 10 CFR Part 53
 - Modernize licensing framework for non-LWRs
- Role of M&S in nuclear regulation
 - Always has been integral
 - Evaluation of safety
 - Effective and efficient



M&S Policy Analyzed

- NRC Vision and Strategy Document
 - “Ensuring adequacy of analytical tools”
- Licensing Modernization Project
 - Developing systematic LBE classification framework
 - Cements M&S role in determining reactor safety
- BlueCRAB Code Suite
 - Utilizes multiphysics modeling capabilities
 - Non-geometry-specific
 - Confirmatory analysis of applicant designs/codes



Analysis

- NRC has taken necessary policy steps to ensure adequacy of M&S tools
- Leveraged partnerships with DOE and academia effectively
- Endorsed LMP NEI 18-04 as NRC RG 1.233
- Continuing to deploy adequate personnel to develop tools
- Some “data gaps” have been identified with CRAB that are cause for concern

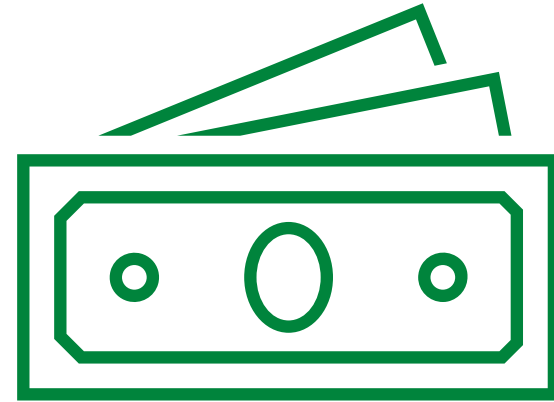


United States Nuclear Regulatory Commission

^[4] *Protecting People and the Environment*

Stay the Course

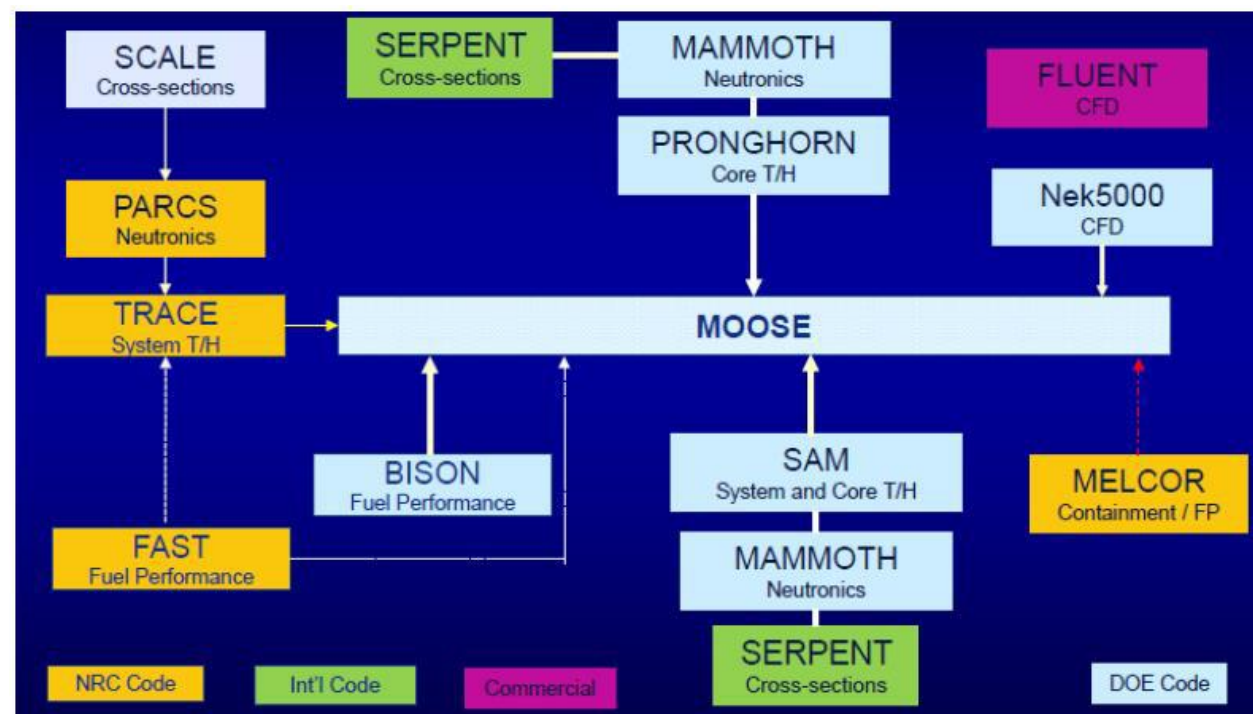
- NRC needs to ensure proper funding allocated to M&S development
- Continue to V&V models and increase their accuracy
- Must avoid complacency



Data Gaps

- Lack of experimental data for advanced reactors
- No set attack plan
- Extensive validation required for many codes in BlueCRAB
- This area must be addressed to ensure accurate reactor evaluation

BlueCRAB Code Suite



How to Fill Data Gaps



[6]

U.S. Department of Energy

- DOE Nuclear Energy University Program (NEUP)
 - Give preference to applications aimed at addressing data gaps
 - Utilize academia's keen ability to conduct research
- DOE Nuclear Energy Enabling Technologies (NEET) Program
 - Goal of NEET is to develop “crosscutting” technologies
 - Utilize NEET to fund projects focused on filling data gaps



[7]

Questions?

- Robby Renfrow
- Email – robby.renfrow@gmail.com
- Phone - 9016870585

References

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