Timely Delivery of Laser Inertial Fusion Energy

Presentation prepared for

Town Hall meeting: "Accelerating the Delivery of Fusion Power"

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Lawrence Livermore National Laboratory • Laser Inertial Fusion Energy

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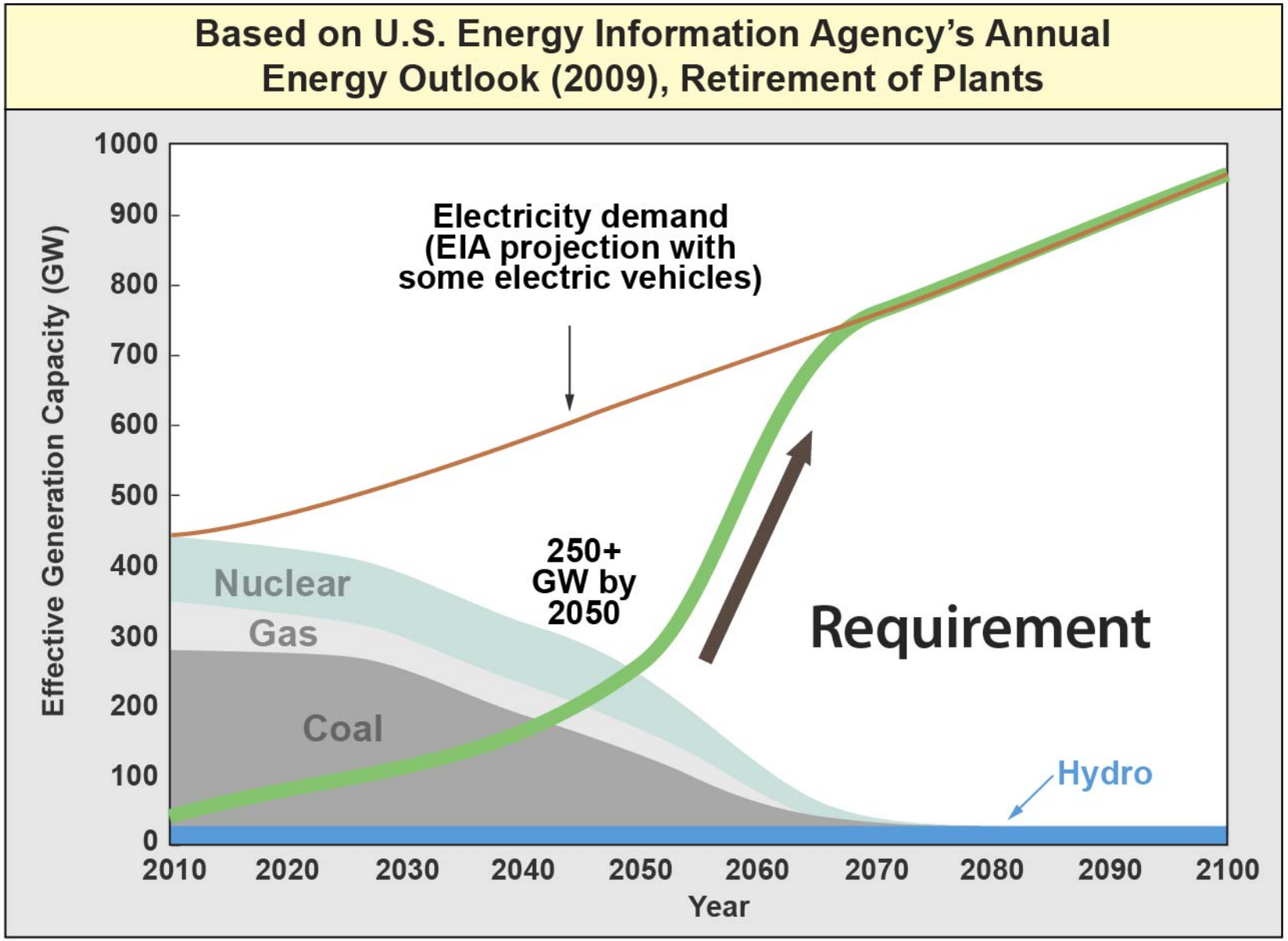
Commercialization timescale is motivated by the recapitalization profile of the US electric power sector



Any credible delivery plan must directly address the end-user requirement for commercial power

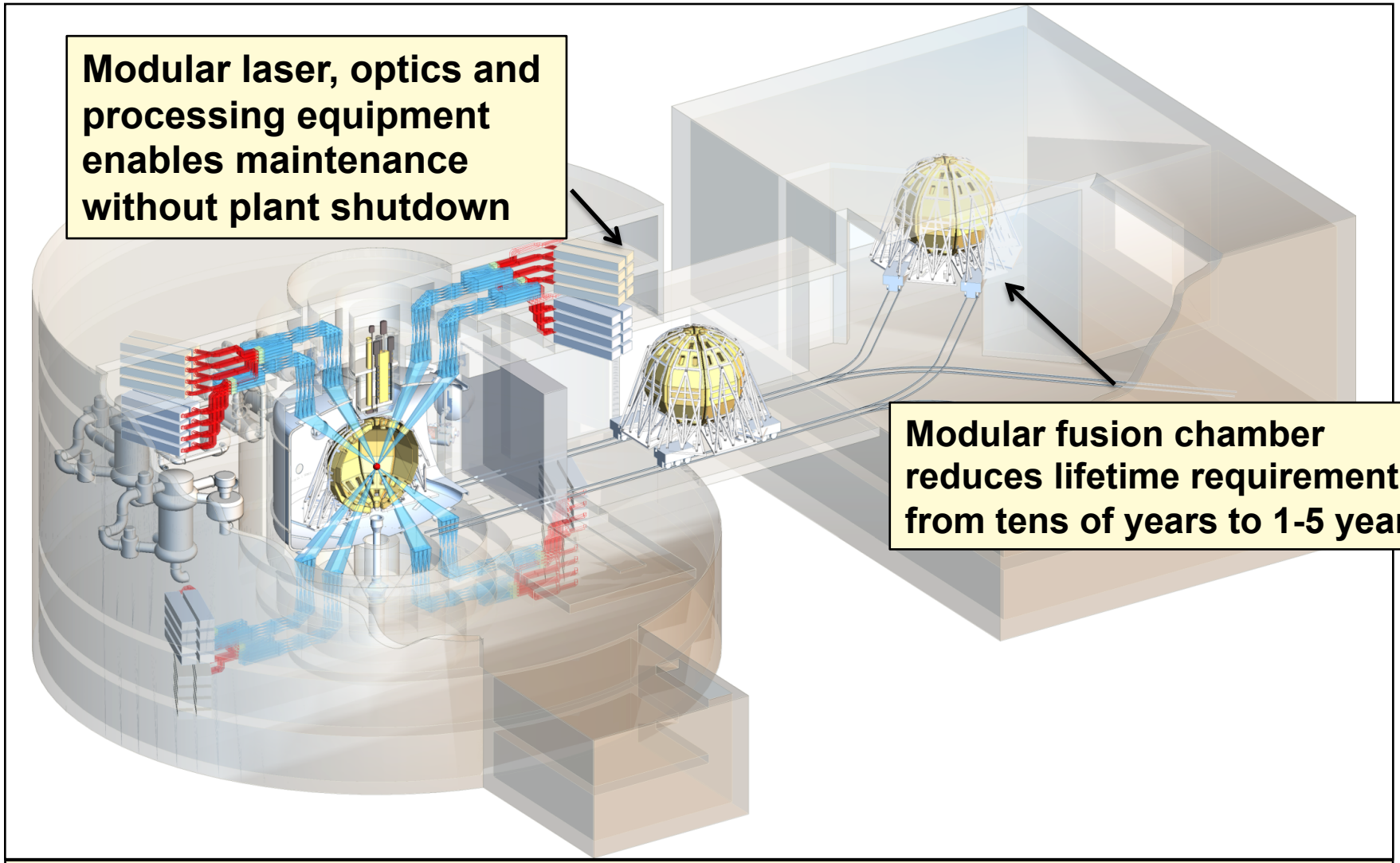
Electric Power Utility needs
• Pinnacle West Capital Corp • PG&E Corporation • MidAmerican Energy Company • Wisconsin Energy • Nuclear Management Company • Constellation Energy • Dominion Generation • Exelon Generation Company • Southern California Edison
Vendor readiness
Licensing requirement
Return-on-Investment

Plant Primary Criteria (partial list)
Cost of electricity
Rate and cost of build
Licensing simplicity
Reliability, Availability, Maintainability, Inspectability (RAMI)
High capacity credit & load factor
Predictable shutdown and quick restart
Protection of capital investment
Meet urban environmental and safety standards (minimize grid impact)
Public acceptability
Timely delivery

Founding Principles for the power plant design

- Delivery soon enough to make a difference to global energy imperatives.
- Design based on direct evidence of fusion performance (NIF).
- Use of available technology and materials that can be proven at full scale, as part of a risk-managed, investor-focused delivery plan.
- Design for high availability operations and ease of maintenance.
- Use of factory-built, modular technology.
- Manufacturability and costs based on commitments of vendors, standard costing methodologies, and experience from the NIF and similar projects.
- Involvement of a wide range of expert participants, taking advantage of the separability of the technology.
- Adoption of project management practices, technical rigor and openness consistent with best industry practices and NIF experience.
- Protection of Intellectual Property for commercially robust deployment.

LIFE's modular architecture is what enables commercialization in a relevant timeframe



Pilot plant fusion chamber can use conventional FM steel rather than wait for new radiation-resistant alloys to be developed

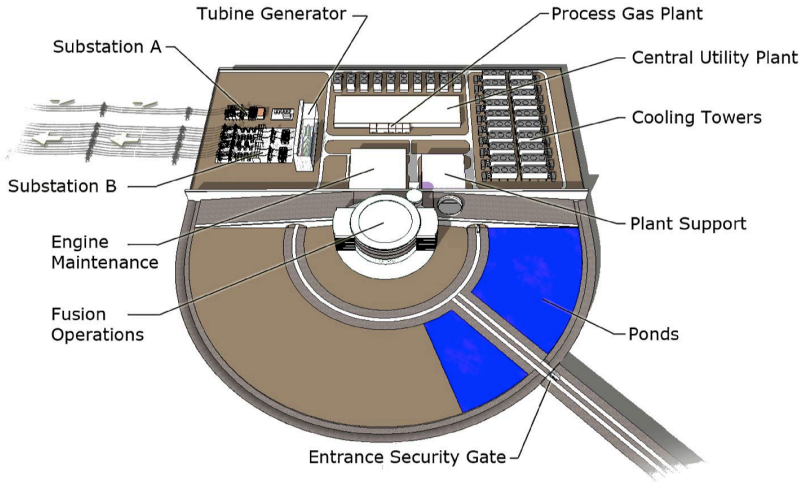
Detailed delivery plan provides the investment route from ignition on NIF to first commercial operations

First-of-a-Kind commercial plant

- Staged development & commissioning program, leading to full-scale commercial operations
- Range of options for plant scale and required site infrastructure

Delivery plan integrates:

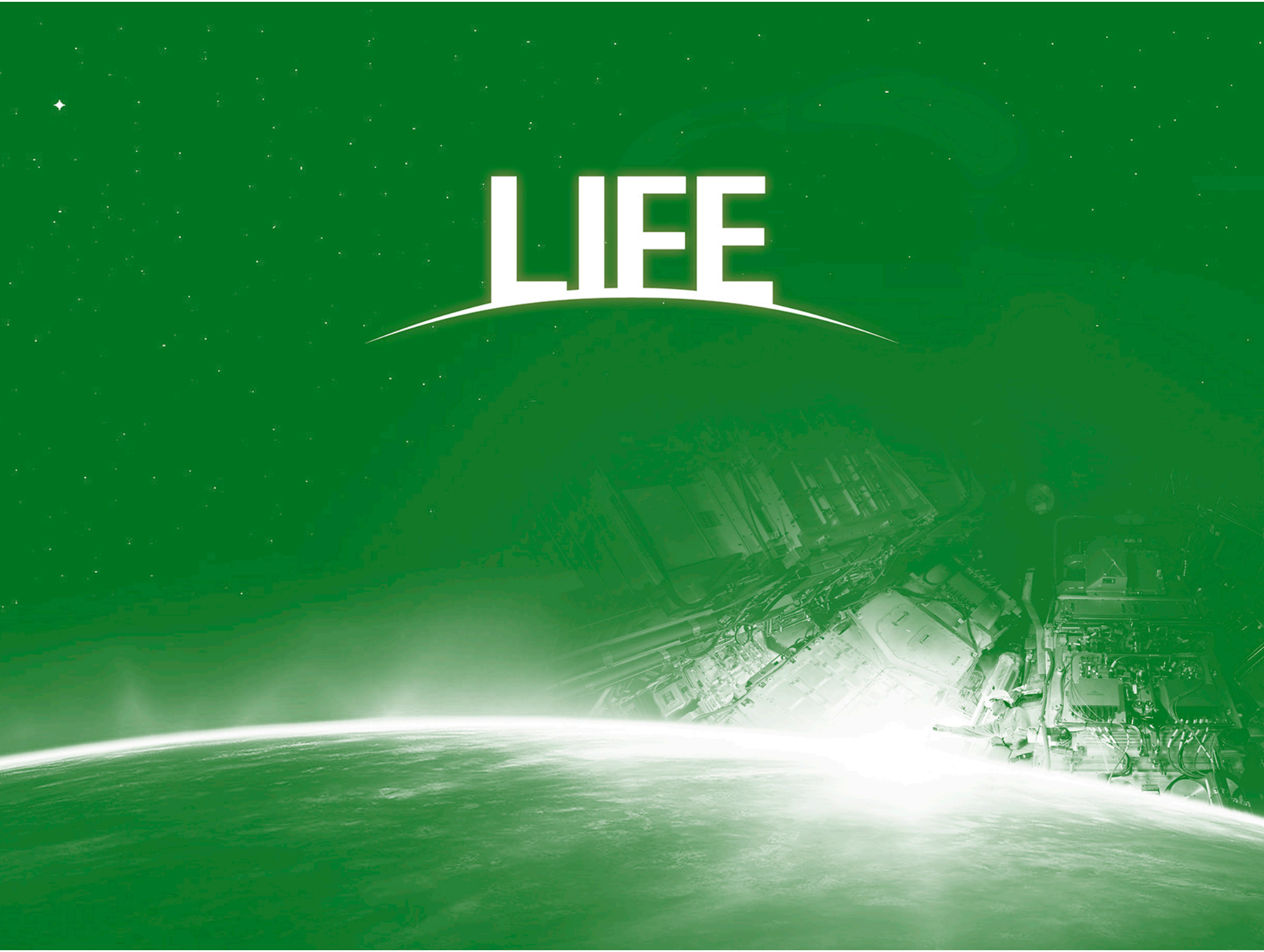
- Technology demonstration program
- Vendor facilitization (capability & capacity)
- Licensing and permitting
- Plant construction & commissioning



Structured to allow risk-informed investment decisions

Final Thoughts

- NIF Ignition should motivate a focused IFE delivery program
- A pragmatic approach to power plant design can take advantage of the inherent separability and modularity of IFE
  - Tackles the long-standing problems of plasma performance, material survival and plant operations / maintenance
- Alignment of technologies from other sectors can be used to reduce development timescales and meet cost requirements
  - Driver, targetry, thermal plant, tritium processing, …
- Our job is to ensure that delivery timescales are determined by funding availability (political and commercial will) – and minimize the timescales due to scientific or technological uncertainty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