U.S. DEPARTMENT OF ENERGY | Nuclear Energy

Advanced Methods for Manufacturing

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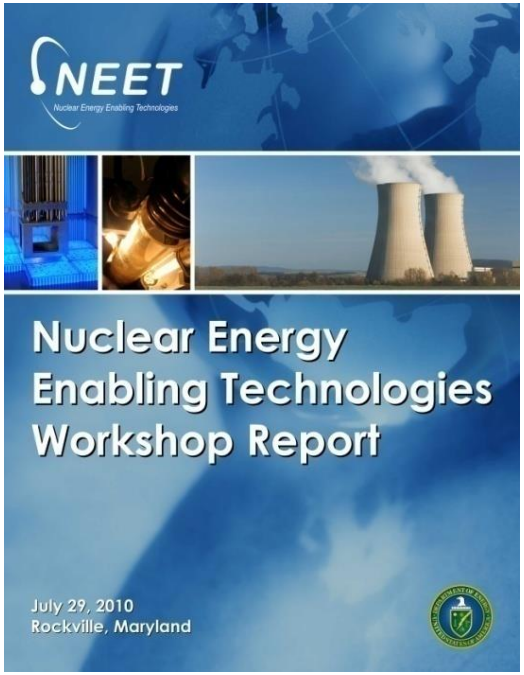
AMM Vision and Goals

Vision

- To improve the methods by which nuclear equipment, components, and plants are manufactured, fabricated, and assembled by utilizing practices found in industries such as oil, aircraft, and shipbuilding

Goal

- To reduce cost and schedule for new nuclear plant construction
- To make fabrication of nuclear power plant (NPP) components faster, cheaper and more reliable



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NEET-1 FOA Technical Focus Areas

- **Factory and Field Fabrication Techniques**
- **Assembly and Material Innovation to Enhance Modular Building Techniques**
- **Advances in Manufacturing Processes**
- **Improved Concrete Inspection, Acceptance and Construction Methods**

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Field and Factory Fabrication Techniques

- **Practical Shop Floor Applications**
  - Electron beam welding for fabricating heavy sections
  - Surface modification
  - Metal spraying techniques
- **Heavy lift and load leveling equipment**
  - Use input from the design engineering packages
  - Create optimum movement in a shop or field environment
- **Strength assistance tooling for factory and field workers**
  - Flexibility of the human body but increased strength and mobility

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Assembly and Material Innovation to Enhance Modular Building Techniques

- **Advances in high strength concrete and rebar**
  - High strength concrete and rebar, and new types of reinforcement systems to improve quality and reduce construction time
- **Pre-assembled rebar systems**
  - Field equipment and processes for heading, swaging and splicing rebar to improve quality and speed of reinforced concrete placement
- **Innovations in concrete**
  - Design of structures that can reduce total volume of concrete poured
  - Reduce overall thickness of concrete sections

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Advances in Modular Construction

- **Advances in manufacturing processes**
  - Reactor internals, fuel cladding and fuel support assemblies
- **Manufacturing methods for individual components or fabrications of assemblies**
- **Cladding or surface modification methods**
  - Corrosion and wear resistant applications

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Improved Concrete Inspection, Acceptance and Construction Methods

- **Improved concrete pour inspection and acceptance techniques**
  - Rebar placement
  - Dimensional checks of pieces and parts
  - Quality controls

- **Alternate methods for measuring the curing of concrete**

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Previously Awarded Projects

- **FY2011**
  - Laser-Arc Hybrid Welding of Thick Section Ni-base Alloys: Penn State University
  - Development of Seismic Isolation Systems using Periodic Materials: University of Houston
- **FY2012**
  - Monitoring and Control of the Hybrid Laser-GMAW Process: Idaho National Lab
  - Innovative Manufacturing Process for Nuclear Power Plant Components via Powder Metallurgy and Hot Isostatic Processing Methods: Electric Power Research Institute (EPRI)
  - Laser Direct Manufacturing of Nuclear Power Components Using Radiation Tolerant Alloys: Lockheed Martin
  - Modular Connection Technologies for SC Walls of SMRs: Purdue University

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Previously Awarded Projects

FY2013

- Ultra-High-Performance Concrete and Advanced Manufacturing Methods for Modular Construction: University of Houston
- Self-Consolidating Concrete Construction for Modular Units: Georgia Institute of Technology
- Improvements in SMR Modular Construction through Supply Chain Optimization and Lessons Learned: Georgia Institute of Technology

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Summary of Expectations

- The technologies developed will **increase the reliability** of nuclear power plants while **decreasing the cost** of fabrication and construction
- The development of products and components will be able to **gain acceptance** by the appropriate regulatory or standard-setting bodies
- Specific products should be **licensed** for commercial nuclear plant deployment

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