

# The Energy Exascale Earth System Modeling Project: Goals for Meeting

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**“They” said it couldn’t be done..  
DOE said “Just Do It!!!!....**



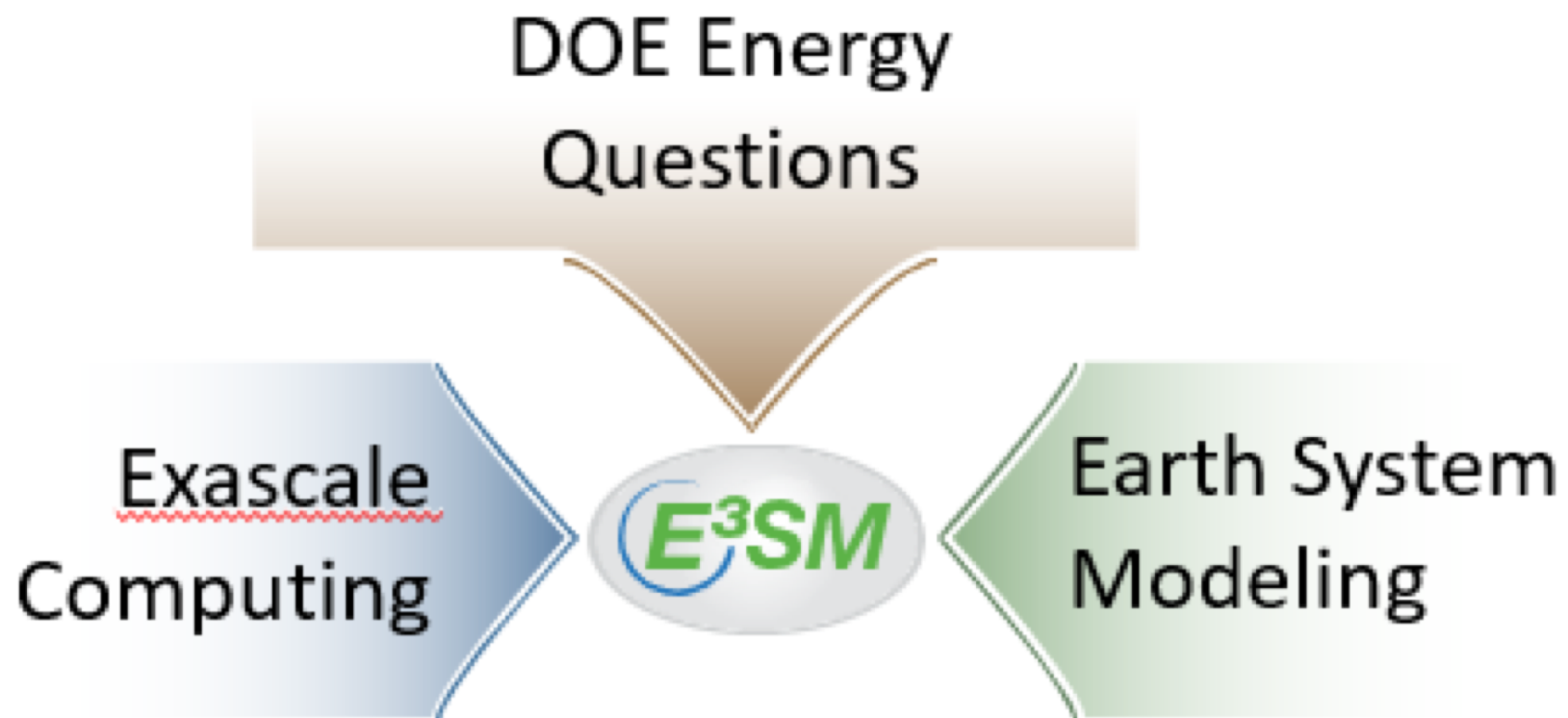
# ***WE did it!!!!***

## **The DOE E3SM coupled model version 1: Overview and evaluation at standard resolution**

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# A Quick Review

# *“A DOE Model for the DOE Mission on DOE Computers”*





# Science and mission drives development and experimentation

- **Resolution** – weather-scale to convective scale-atmosphere and eddy-resolving ocean for simulation of multi-scale phenomena
- Utilize **next-generation disruptive computing** to enable high-throughput, high resolution simulations
- Extensive use of **ensembles** to quantify and bound uncertainty for **actionable predictions**. Even small reductions in uncertainty are useful in risk analysis.
- Coordinated efforts to **reduce biases** and **address mission questions**

# Overlapping Development Cycle

- Two time horizons
  - Near term – v1 and v2 simulation campaigns and analysis
  - Intermediate term – developments for v3 and v4 models that are tested and functioning in the coupled v3 system in 5 years (both scientific and computational)
- Changed (and changing) computing landscape
  - Summit hybrid CPU-GPU design; 100+ PFLOP machine
  - NERSC9 –hybrid
  - Aurora ExaFLOP architecture just announced – hybrid

# Phase 2 project structure

- Core activities
  - Run more like a “traditional” modeling center
  - v1 simulation campaign
  - Finalize v2 development, testing and simulation campaign
  - Performance optimization on current machines (Jones)
  - 5 groups – one for each science question, infrastructure (Jacob) and performance
- Next Generation Development for v3/v4 versions
  - Algorithms and Software
  - Cloud-Permitting Global Atmosphere
  - Atmospheric Physics
  - Land and Energy



# Deliverables, Metrics and Roadmaps

- The project is evaluated
  - from delivering products
  - from documenting objective progress against metrics
- The plan to meet these objectives is in the roadmaps
- Reporting is everyone's responsibility

# Goals for meeting

- Project team cohesion (with or without alcohol)
- Synchronization (reality) check on current status
- Revision of plans and road maps
  - Project-wide and groups/sub-projects
  - Gaps and needs
  - Reallocation of effort