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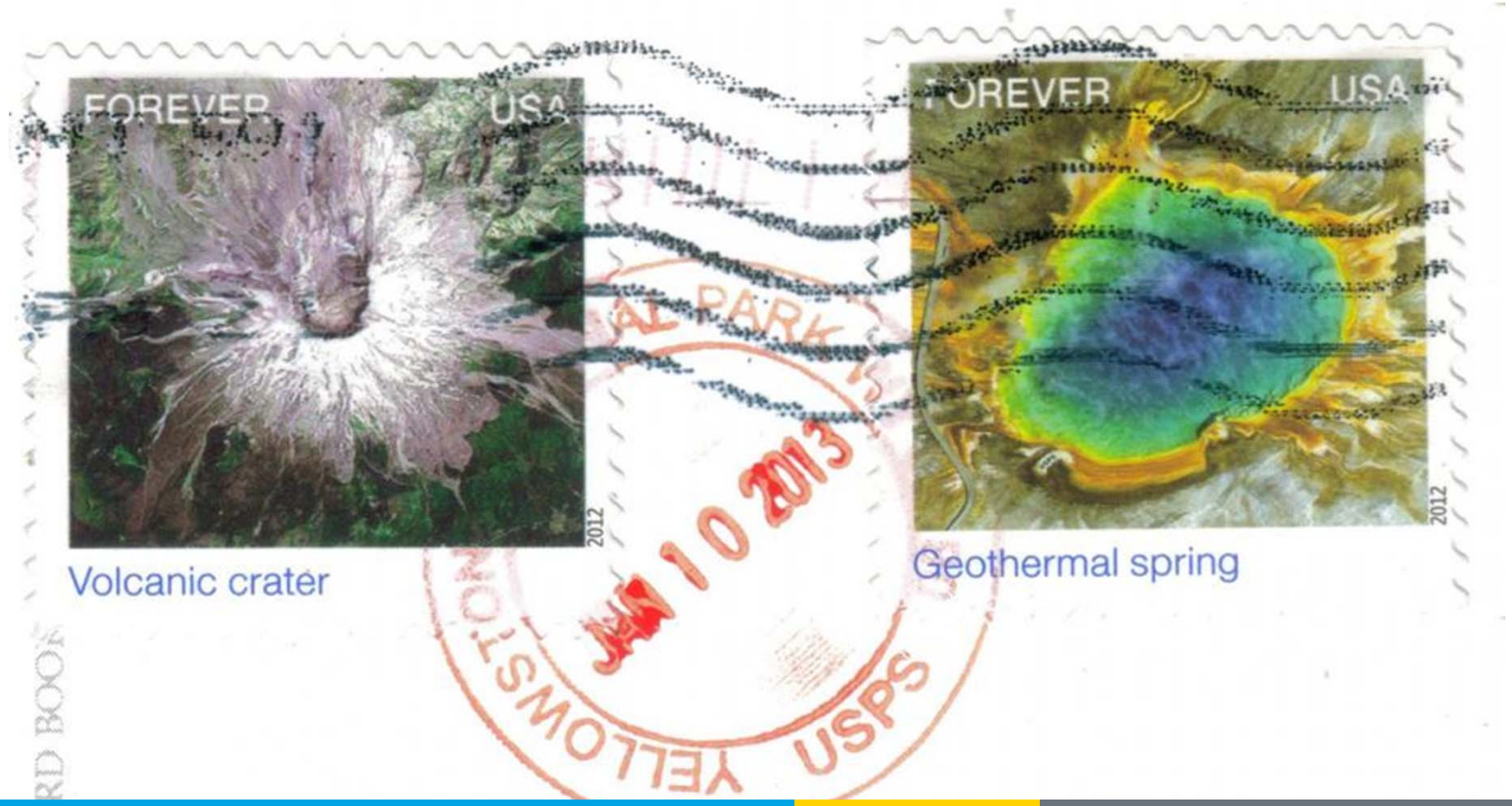

Geothermal – Domestic Energy for a Cleaner, Safer America

GTO Vision Study 2015-16

Doug Hollett, Director

10/28/2014

Geothermal - Potential

- The mean electric power generation potential from **Identified Geothermal Systems** alone is **9,057 MWe** (USGS National Geothermal Resources—Fact Sheet FS 2008-3082), distributed over 13 states.
- The mean estimated power production potential from **Undiscovered Geothermal Resources** is **30,033 MWe** (USGS National Geothermal Resources—Fact Sheet FS 2008-3082).
- Another estimated **100,000+ MWe** (http://energy.gov/eere/geothermal/downloads/enhanced-geothermal-system-egs-fact-sheet-1) could be generated through the implementation of **Enhanced Geothermal Systems (EGS)** technology for creating geothermal reservoirs in regions characterized by high temperature, but lower permeability rock formations.
- The preliminary analysis presented at 2013 DOE Peer Review on April, 24, 2013 shows the beneficial heat from Low Temperature Systems is ~**44,300 MWt** (http://energy.gov/sites/prod/files/2014/02/f7/gs_resource_assessment_peer2013.pdf).
- High Temperature Sedimentary resource potential evaluation analysis is underway.

Key questions

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Current: DOE Geothermal Vision 2016
Redefine and Enhance Geothermal Vision

- What is the state of geothermal (power and heat) in the US today?
- Will it be competitive in the near-(2020), mid-(2030), and long-term (2050)?
- Where is it likely to be most competitive? Why?
- What are the costs, benefits, and impacts within the context of the broader sector trend?
- What technical and economic factors will be needed to sustain and enhance the growth of geothermal through 2020, 2030, and 2050?
- What are the high value pathways and priorities that will help us achieve our vision?
- How will geothermal be a key part of the national energy and climate change priorities?

Geothermal Vision

By 2016, DOE seeks to develop credible analysis jointly with the GEA/GRC community that:

I. Articulates clear *GTO investment strategies* across different sectors and has a cohesive plan to attain the goals;

II. Discusses *geothermal growth scenarios* for 2020, 2030 and 2050 backed by robust data, modeling and analysis;

III. Addresses *all market segments*: existing and potential hydrothermal, electrical and non-electrical usages, new EGS sector, and other value streams; and is

IV. Supported by *objective and peer-reviewed* industry data and *available to decision-makers*

V. Is *aspirational* and *inspirational*

Geothermal Vision Approach

- Models and tools first
  - Establish current state of available models + data
  - Develop new/modified models as required
- Phased Parallel Approach
  - Assess what we have, what we need
  - Identify gaps (data, tools, models etc.)
- Wind office has recently done a vision study and the Water the water program is commencing one
- We will use their process as a critical starting point , but the content, structure and the analysis included in the study needs to be different as follows:
  - Use existing technology roadmaps
  - New roadmaps would be update or modified as appropriate
  - As a baseload renewable, unlike other renewables, will require modified analytical decision models e.g., Regional Energy Deployment System (ReEDS)
- Be Mindful of Sector Dynamics
  - Smaller industry dictates longer completion time
  - Industry, academia, and the national lab support
- Proposed completion by ~2016

External Participation & Internal Concurrence

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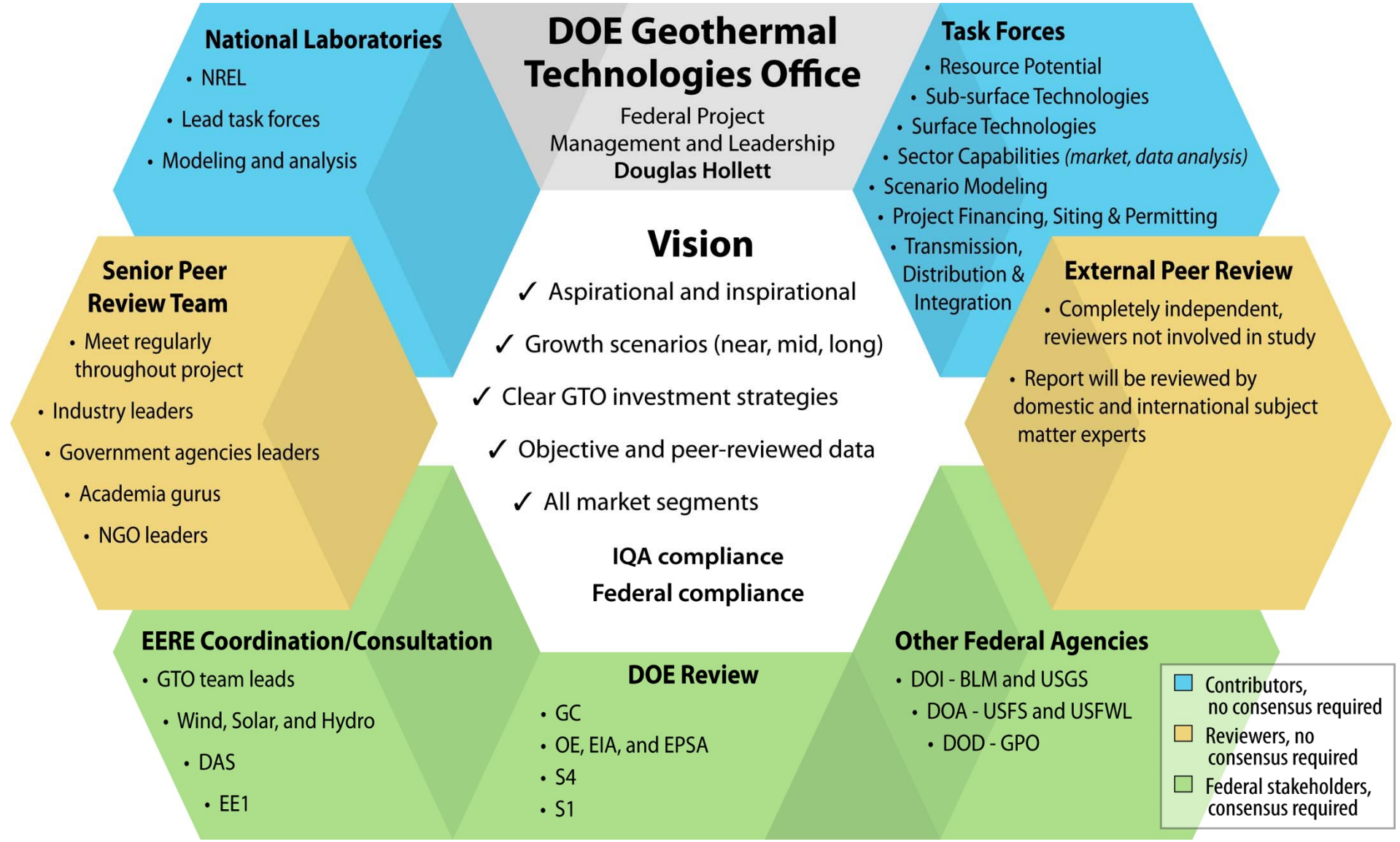
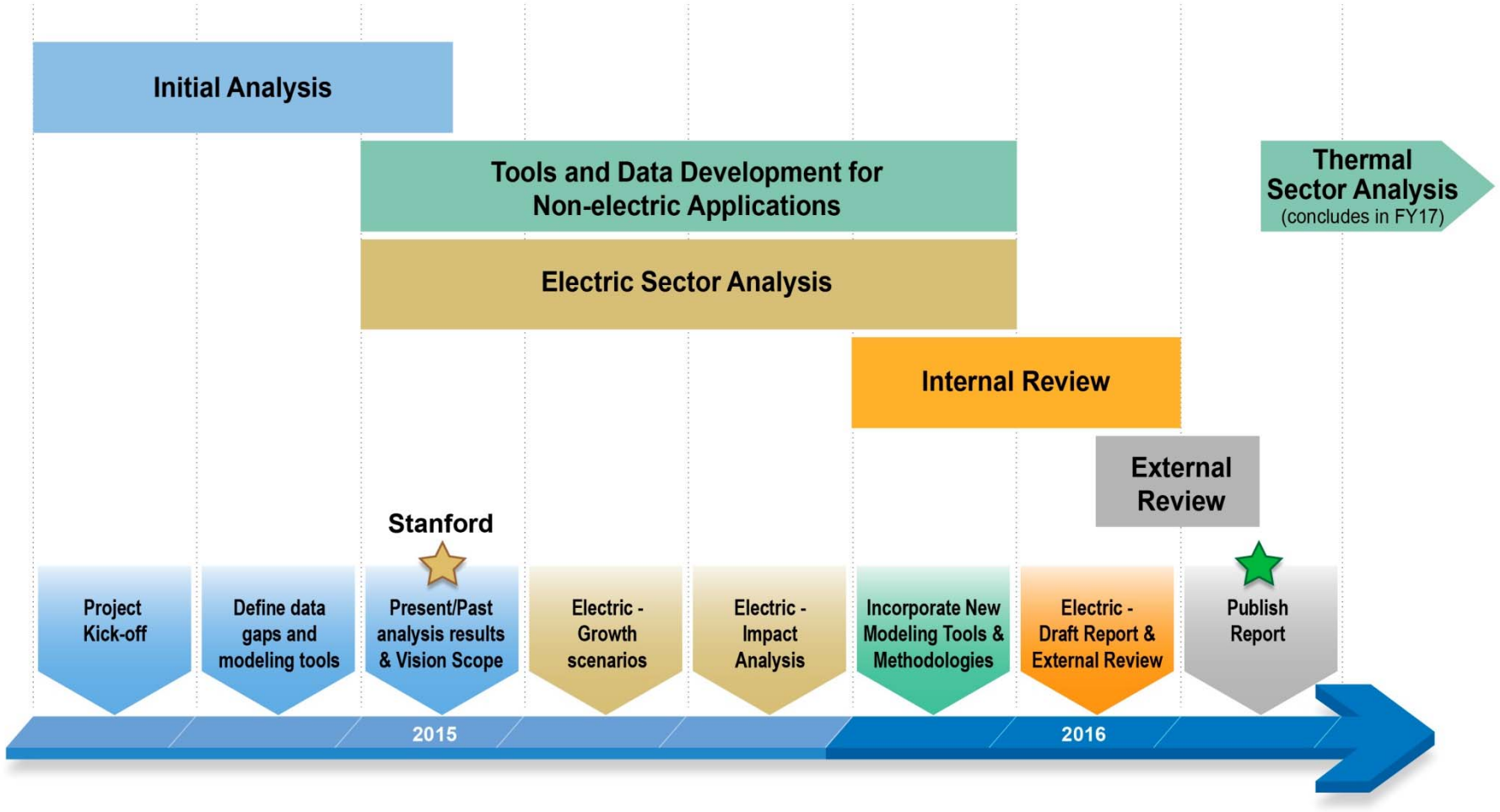
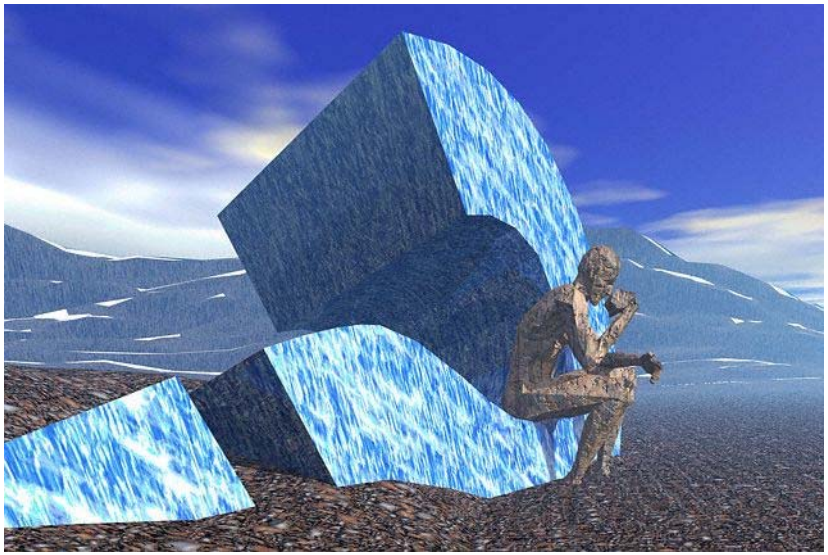


Geothermal Vision Study (draft)



Questions



IQA Compliance Language

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The Office of Management and Budget's "Final Information Quality Bulletin" provides guidelines for properly managing peer review at Federal agencies in compliance with Pub. L. No. 106-554, § 515(a), the Information Quality Act. Consistent with those guidelines, meeting minutes will be recorded at the meeting and may be made publicly available subsequently. The purpose of today's meeting is to ask for your input regarding the DOE Geothermal Vision project. To that end, it would be most helpful to us that you provide us, based on your personal experience, your individual advice, information, or facts regarding this topic. It is not the object of this session to obtain any group position or consensus. Rather, the Department is seeking as many recommendations as possible from all individuals at this meeting. To most effectively use our limited time, please refrain from passing judgment on another participant's recommendations or advice instead concentrating on your individual experiences.