

Sustainable Energy Security

Need for a Comprehensive Synergistically Integrated Approach

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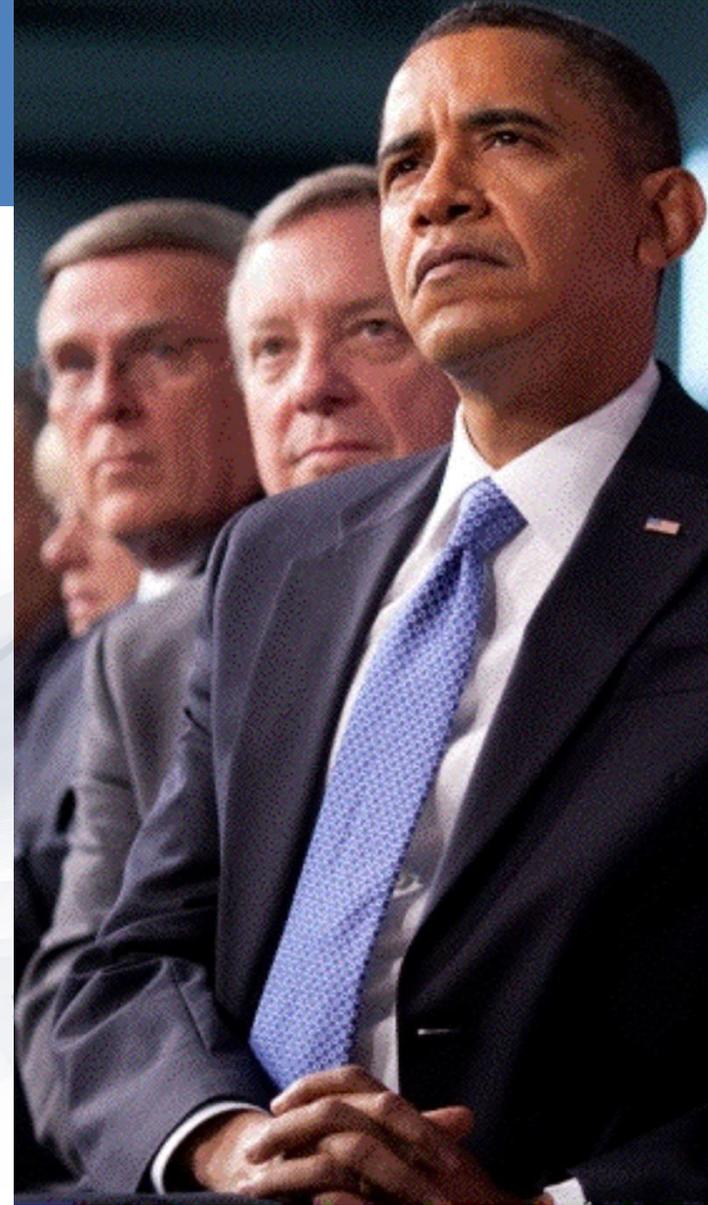
A Challenge

“I am convinced that whoever builds a clean energy economy, whoever is at the forefront of that, is going to own the 21st Century economy.

I’m convinced America can win the race.

Let’s get it done.”

*President Barack Obama
February 3, 2010*



Energy Conversion Systems

Several options are available to meet energy needs



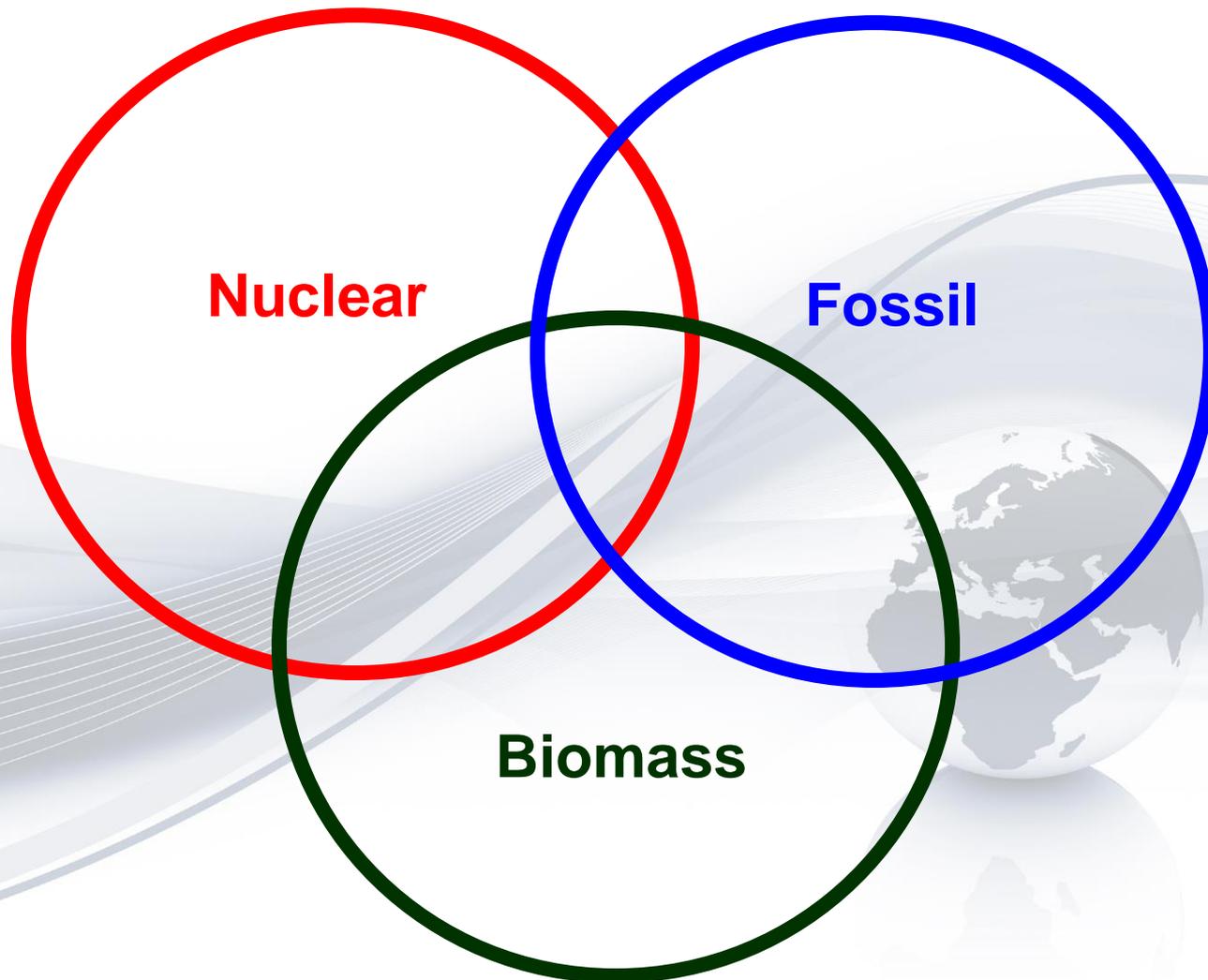
Test Question?

Which energy source will provide energy security?

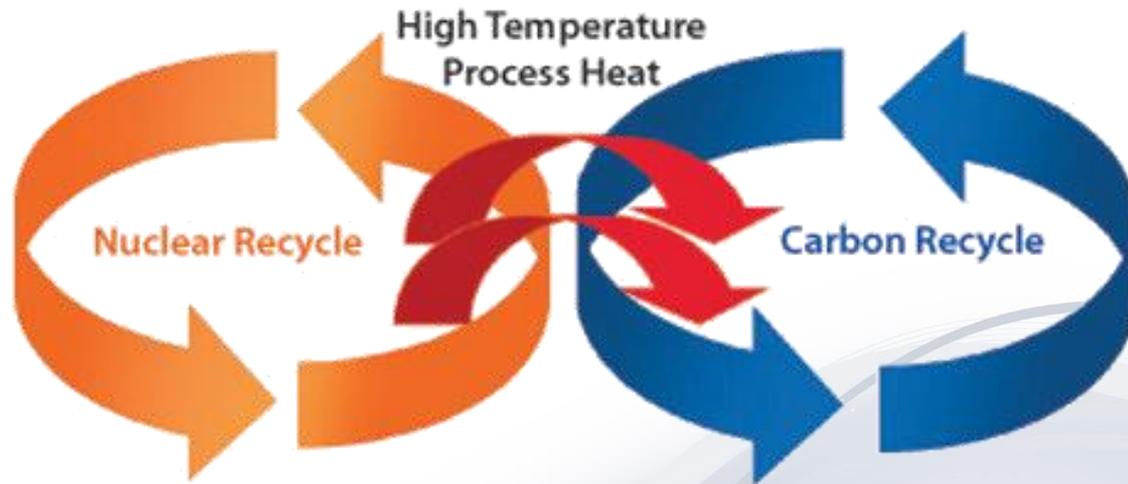
- a) Renewables (Solar, wind, biomass, geothermal, hydro, etc)**
- b) Fossil (Coal, natural gas, oil, shale oil, tar sands, etc.)**
- c) Nuclear (fission and fusion)**
- d) All the above**

**The answer is d), DIVERSITY
“Energy mix is the fix”**

Combined Energy Systems



A Potential Technological Approach



- **A hybrid (combined) clean energy system**
 - Begin closing the nuclear and carbon fuel cycles with high temperature process heat and hydrogen
- Produce electricity, hydrogen, hydrocarbons, and specialty chemicals
- Carbon Capture and Recycle (CCR)

Key Enabling Technologies

- **Energy conversion**
 - **Nuclear**
 - **High temperature reactors with long core life**
 - **Hydrogen (H₂O splitting and purification)**
 - **Hydrocarbon: chemical processing, CO₂ capture and recycle, etc**
- **Materials**
 - **High temperature**
 - **Carbon based materials**
- **Recycling (Lifecycle Designing)**
 - **Separations**
 - **Capture/collection**
 - **Transport and storage**



An Energy Development Concept

Energy Integration Cluster (EIC)



Regional stakeholders synergistically integrating assets and resources to meet regional, national and global energy needs.

How Can We Obtain Energy Security?

- **Gain energy security** by synergistically integrating existing technologies and aggressive purpose-driven energy RDD&D programs
- **Have a roadmap utilizing a comprehensive synergistic integrated approach**
- Work **together for energy independence**
 - Reach-out and make relationships with other professions
 - Scientists, engineers, politicians, journalist, lawyers, environmentalist, etc.
 - Seek and value other's opinion
 - Educate and be teachable
- **Bold deliberate action** with a sense of urgency

Quote

“You cannot escape the responsibility of tomorrow by evading it today.”

Abraham Lincoln

**Vision, Determination,
Leadership**

