



National Defense University

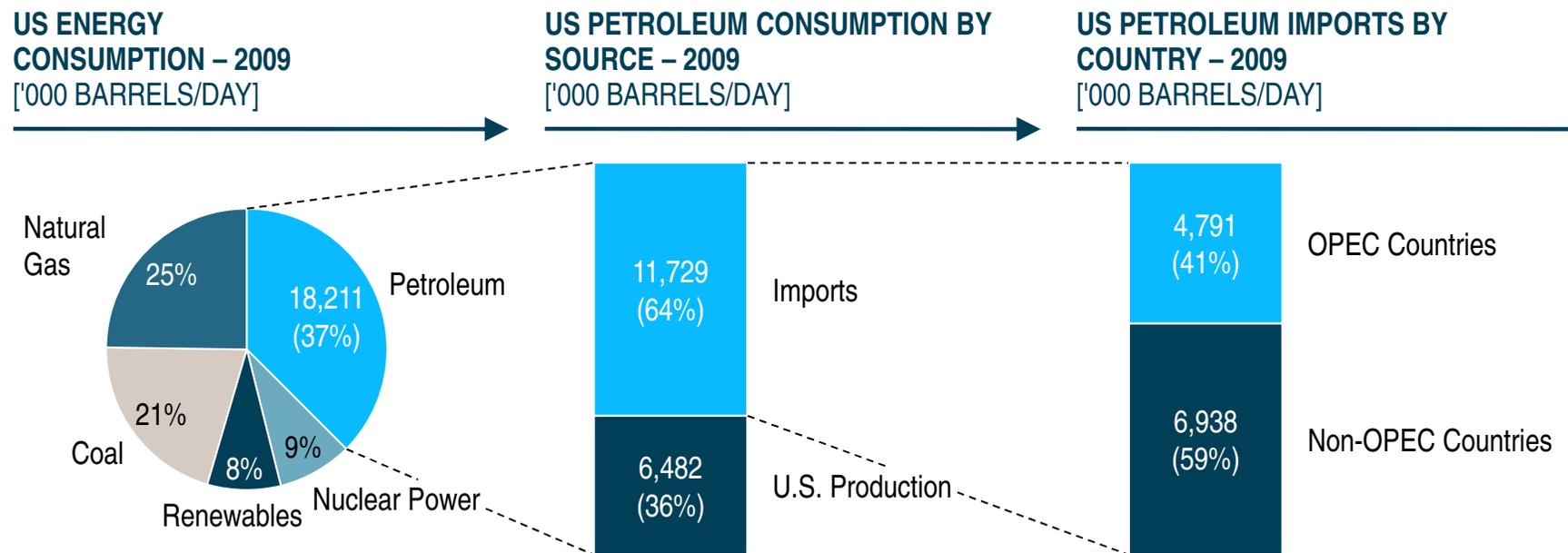
Energy Security is National Security

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Of all the oil used in the US, 64 percent is imported, and 41 percent of these imports come from OPEC Countries



"...our dependence on oil means that we will continue to send billions of dollars of our hard-earned wealth to other countries every month -- including countries in **DANGEROUS AND UNSTABLE REGIONS**. In other words, our continued **DEPENDENCE ON FOSSIL FUELS** will **JEOPARDIZE OUR NATIONAL SECURITY**"

– President Barack Obama

It is not all about imported oil – technology leadership, value chain capabilities, and geo-political implication are critical, too

HIGH DEPENDENCE ON IMPORTED OIL

- > Representing about half of the US trade deficit
- > Main sources are in unstable regions: significant revenues are sent to these countries

DEPENDENCE NOT ONLY A FUNCTION OF IMPORTS

- > Level of domestic know-how and R&D spend
- > Depth of national value chain

NATIONAL SECURITY DRIVEN BY GLOBAL SECURITY LEVEL

- > Influence on and by destabilized regions (Middle East)
- > Global race for access to natural resources
- > Impact of global warming on security

US ENERGY MIX AND CONSUMPTION CRITICAL

- > Energy mix AND consumption drive dependence
- > Indirect impact on national security via environmental and economic issues

There are four primary areas that need to be pursued to ensure a leadership position in energy security

1 Increase energy efficiency by implementing best practice technology

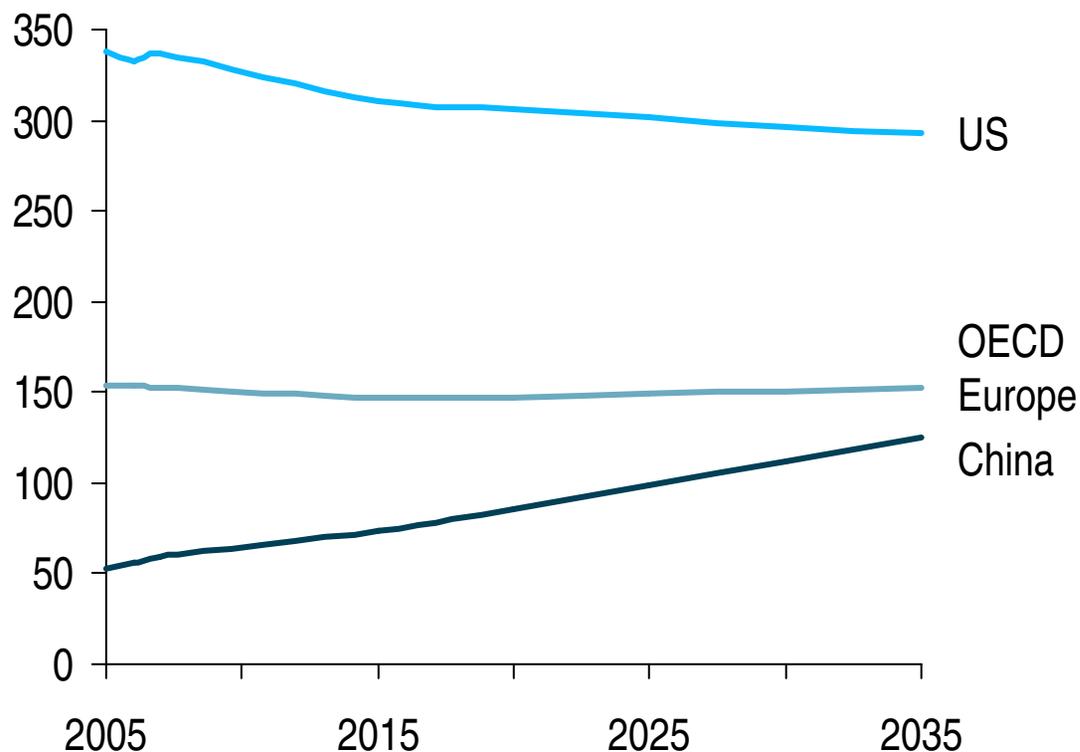
2 Achieve leading position in R&D for clean energy

3 Strengthen domestic renewable technology IP and manufacturing capability

4 Implement integrated policy to optimize domestic energy mix and anticipate global implications

Energy Efficiency presents significant opportunities for the US – to reduce dependence and gain technology leadership

PER CAPITA ENERGY CONSUMPTION FORECASTS – 2005-2035 [M BTUs PER PERSON]



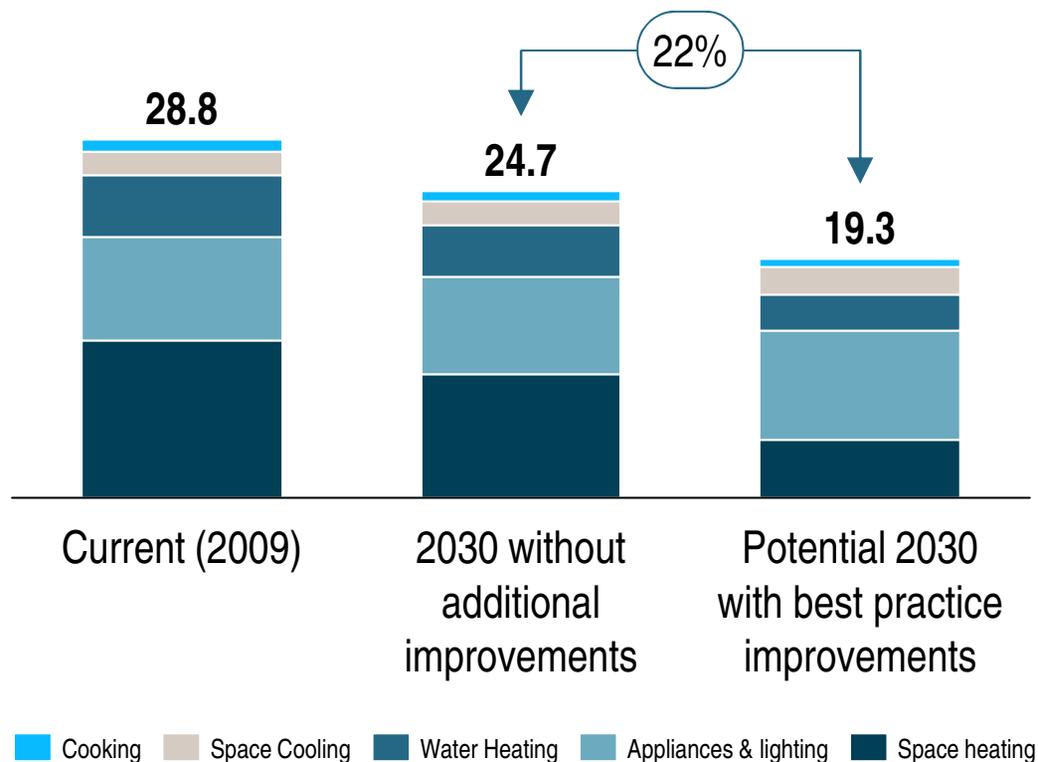
COMMENTS

- > Short-term: Incentives to upgrade technology (residential/commercial housing, industry, transportation) will help drive efficiency
- > Long-term: Need to ensure utilization of the best available technology to reduce energy footprint

The United States could save significant amounts of energy by implementing proven best practices from abroad

EXAMPLE: RESIDENTIAL HOUSING IN THE US

ENERGY CONSUMPTION PER HOUSEHOLD [MWh]

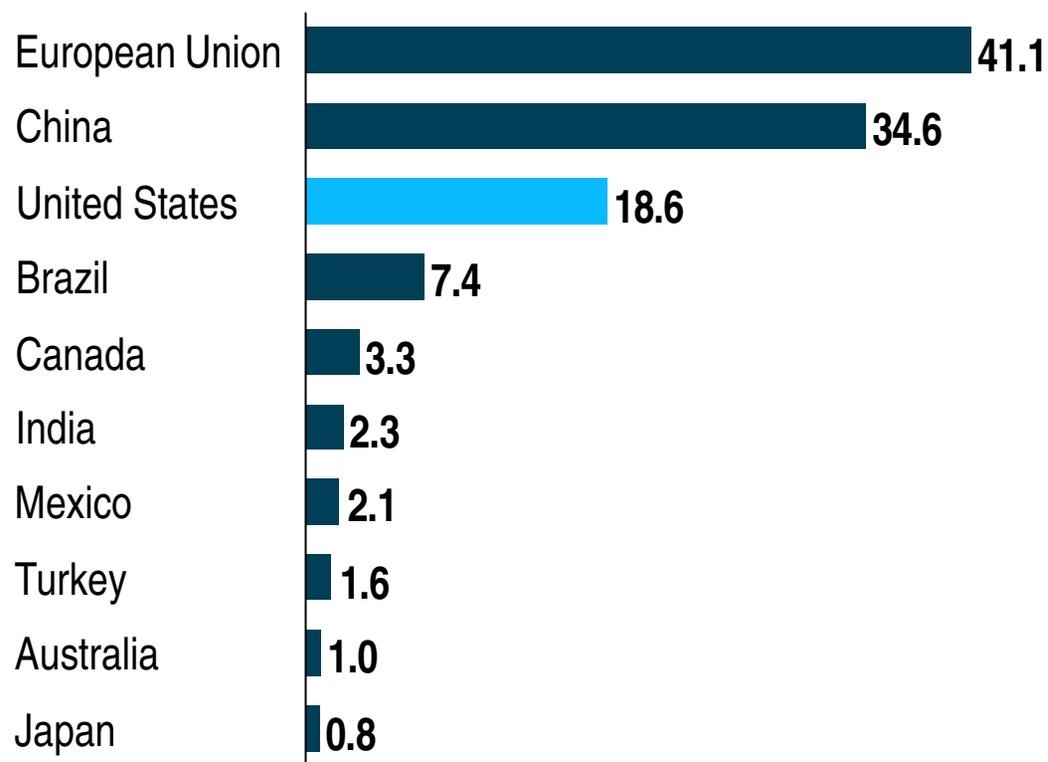


COMMENTS

- > Improvements in residential/commercial housing also generates strong local economic impact
- > Energy efficiency in the industrial sector will strengthen global competitiveness
- > Fuel efficiency technologies and electrification provide significant opportunities for the transportation sector

In 2009, the US fell behind China in total investment in clean energy for the first time in five years

TOP 10 IN CLEAN ENERGY INVESTMENT [USD BN]



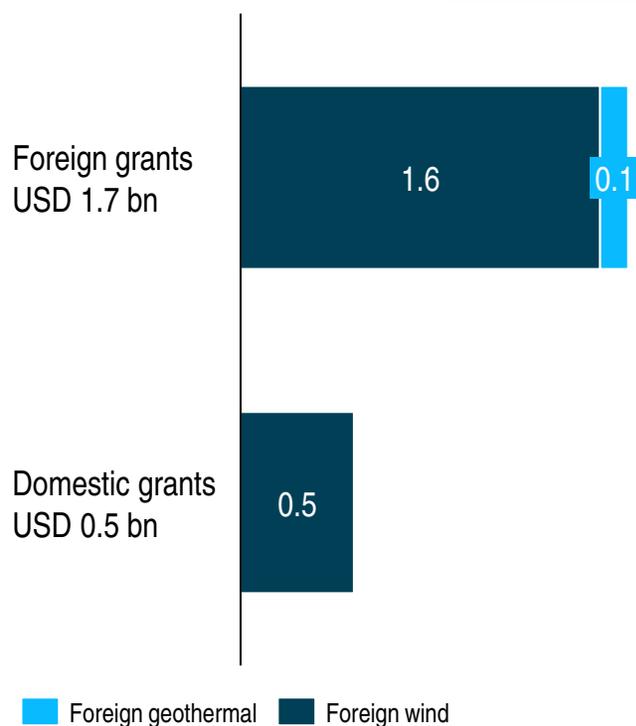
COMMENTS

- > The American Energy Innovation Council recommended that the US government increase annual investment in clean energy R&D
- > Need to allocate a larger portion of R&D budget to support academic research
- > Need to incentivize the private sector to continue to develop new ideas and break-through technologies

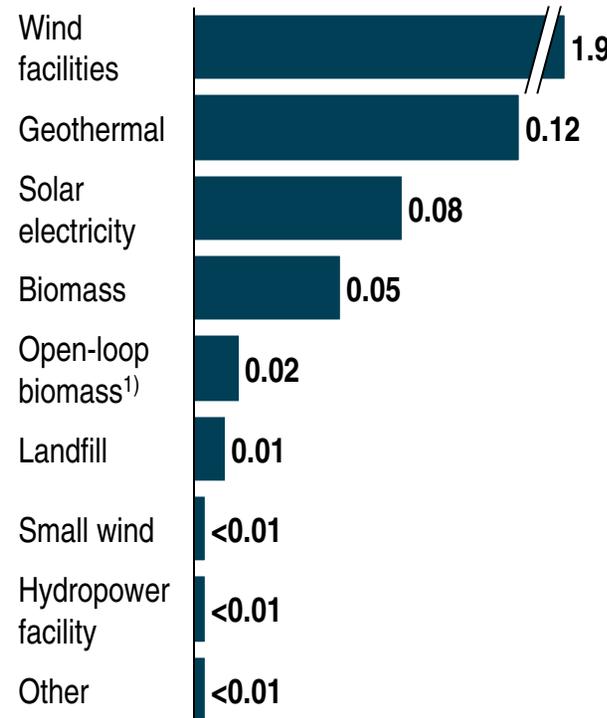
Domestic capabilities and a balanced energy portfolio are important elements of energy security

GRANT AWARD BREAK DOWN

FOREIGN COMPANIES COLLECT BULK OF GRANTS



MOST ENERGY GRANTS GO TO WIND POWER [USD BN]



COMMENTS

- > Need to develop a more balanced portfolio of investment in the renewable energy sector
- > Balancing short-term job creation requirements and long-term industry development will be critical
- > Increasing R&D spend in public and private sector will drive US IP development

1) Open-loop biomass burn other organic material that was not specifically created for the purpose of using as a fuel – like waste wood material or animal manure

An integrated energy policy needs to balance domestic issues and global implications

Key factors for an integrated approach

THINK GLOBALLY

- > Global implications should drive the domestic agenda: regional stabilization, environmental impact, technology leadership

ESTABLISH STRATEGIC VISION

- > There is no "silver bullet" for energy security: an integrated approach should optimize national resources and sets clear objectives to reduce dependence on foreign energy sources

VALUE CHAIN DEVELOPMENT

- > Establishing a sustainable value chain will be a critical success factor for energy security and global leadership

LONG TERM COMMITMENT

- > Continuity and predictability of public/private funding is necessary for developing technology advancements and mobilizing investments throughout the value chain

CLEAR PERFORMANCE MEASURES

- > Clear national performance measures and goals will help maintain momentum and focus on strategic targets



It's character that creates
impact!

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