Renewable Energy Deployment in the United States and China:
Regulatory models and motivations

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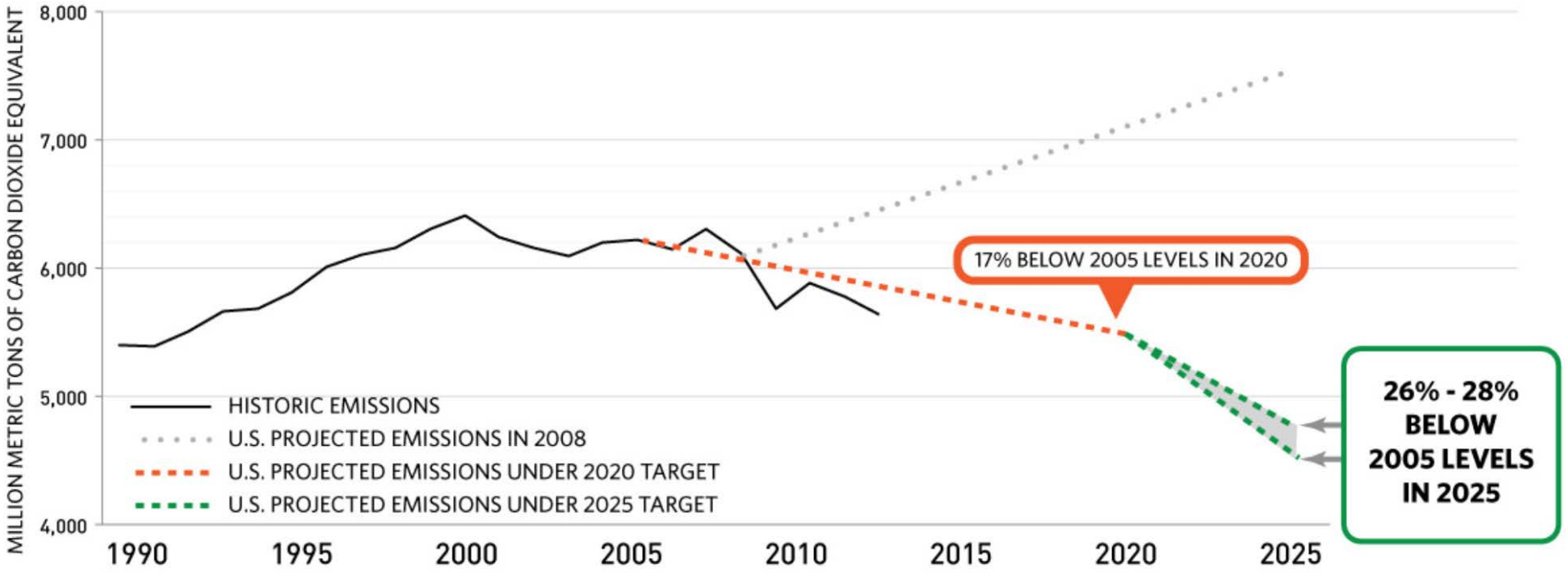
New U.S.-China climate deal is a game changer

Deal on Carbon Emissions by Obama and Xi Jinping Raises Hopes for Upcoming Paris Climate Talks

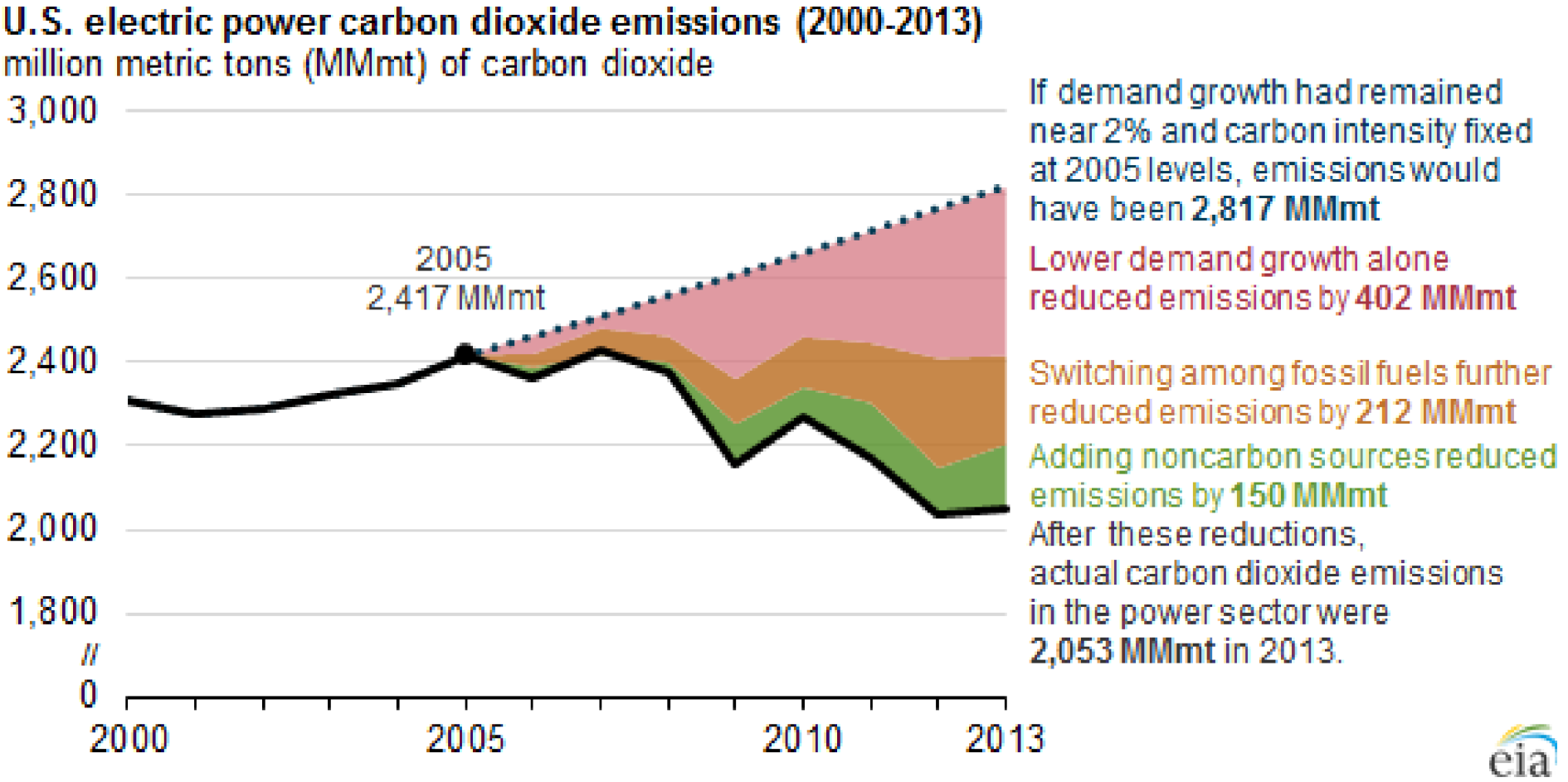
US Submission to the UNFCCC



- Clean Power Plan
- Standards for Heavy-Duty Engines and Vehicles
- Energy Efficiency Standards
- Economy-Wide Measures to Reduce other Greenhouse Gases (methane, HFCs)

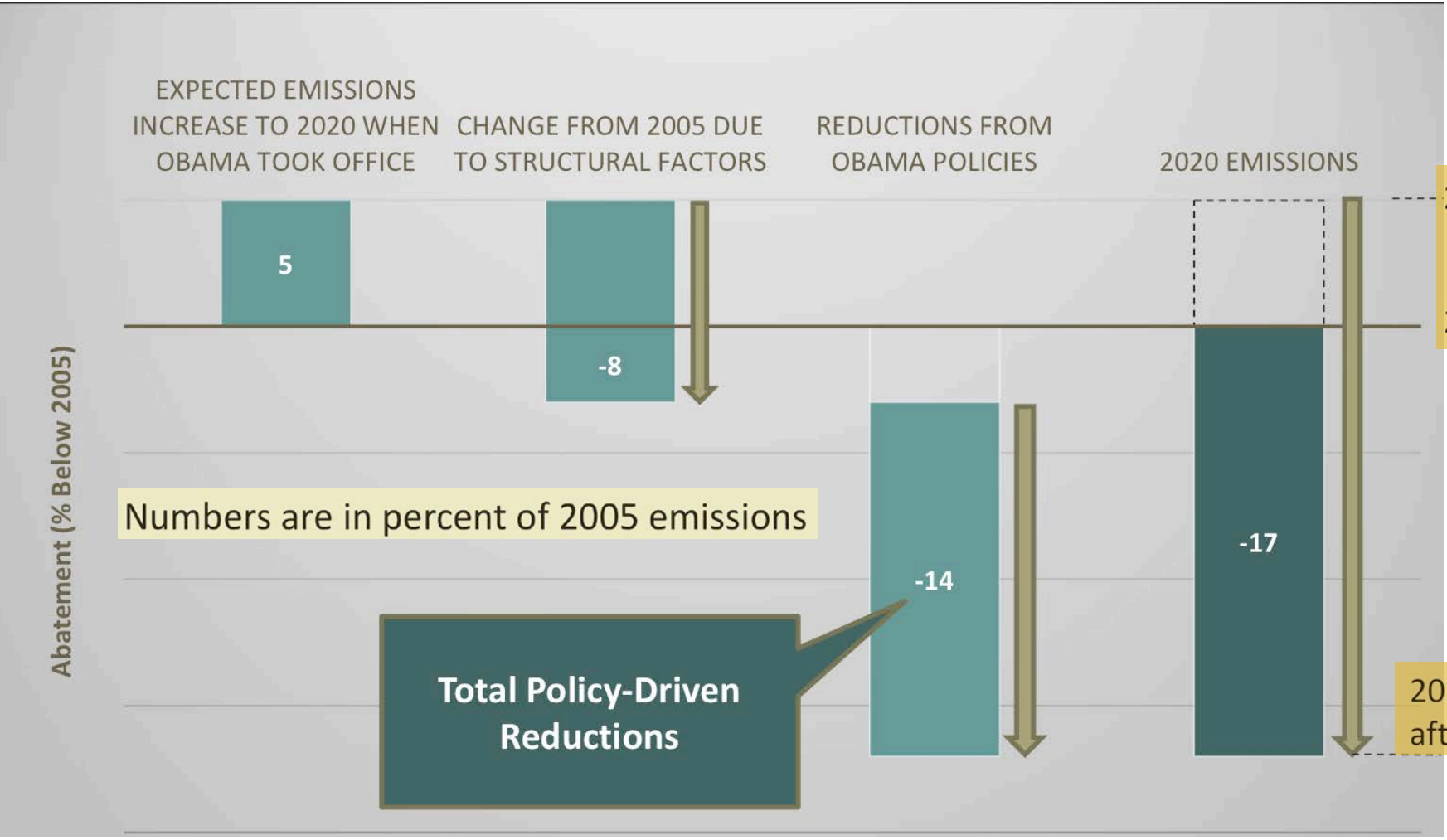
Source: US UNFCCC INDC Submission, 2015;
White House Fact Sheet on 2025 Target, 2015

Renewable energy key to US decarbonization



Source: US Climate Action Report 2014.

Renewable policy support key to US climate targets



Source: US Climate Action Report 2014.

State action important for RE

- **20 states with carbon emissions targets or limits**
  - 9 states in Regional Greenhouse Gas Initiative (RGGI)
  - California's Global Warming Solutions Act (AB 32)
- **38 states with renewable energy standards or goals**
  - 29 states have binding renewable portfolio standards (RPS)
  - 9 states have non-binding goals
- **27 states with energy efficiency standards or goals**
  - 23 states have binding energy efficiency resource standards
  - 4 states have non-binding/RPS eligible goals
- **Cities are also leading**
  - 16 Climate Action Champions
  - Over 1,055 cities from all 50 states have signed the U.S. Mayors Climate Protection Agreement

Source: US Climate Action Report 2014.

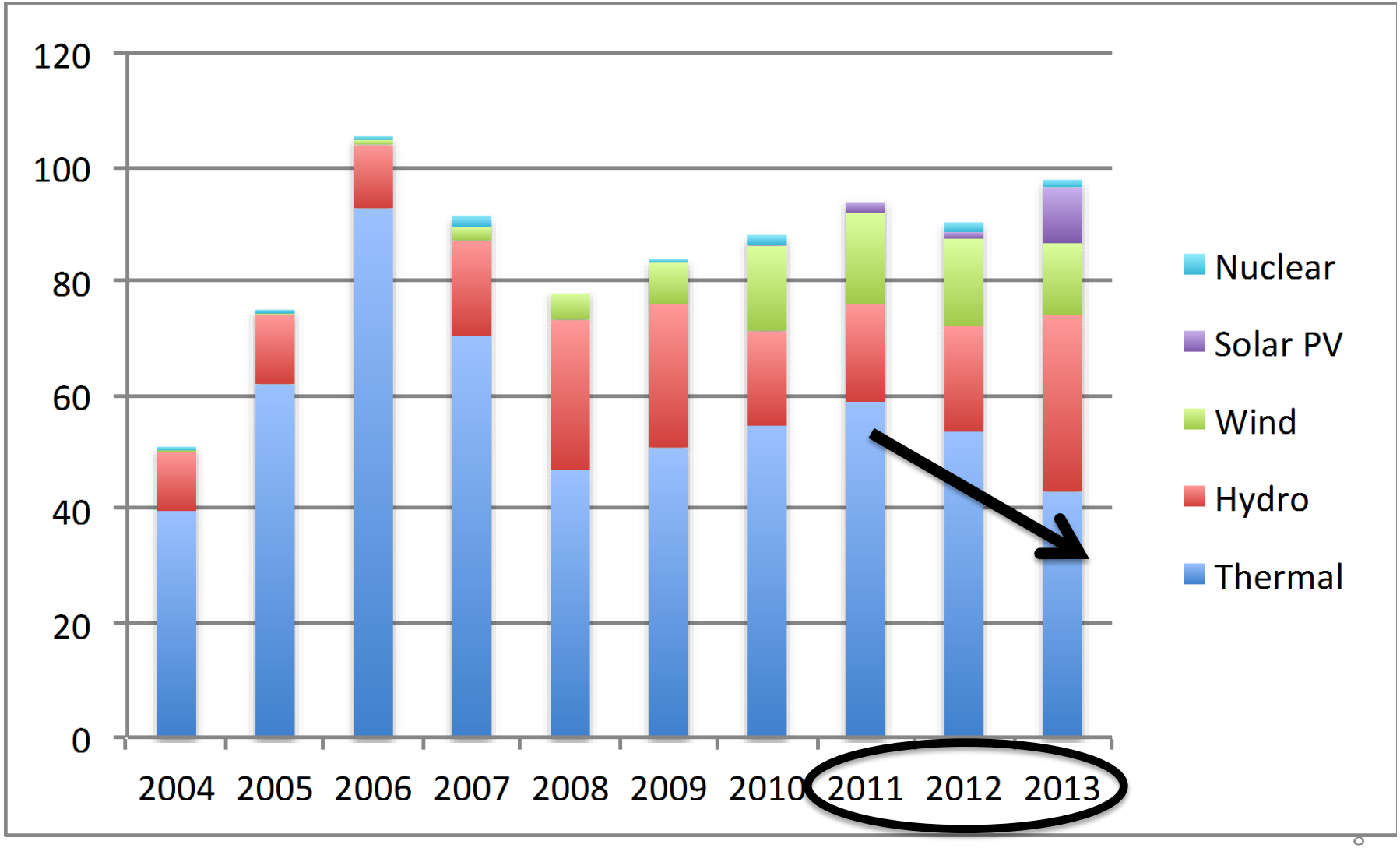
Note: The state count is inclusive of mandatory portfolio and resource standards only.

Domestic drivers for China's clean energy technology development

- The need to address local air pollution, global climate change
- The transition from an energy intensive, heavy industry-dominated economy
- The identification of renewable energy technologies as strategic industries
- The push to develop a more innovative society less reliant on foreign S&T expertise

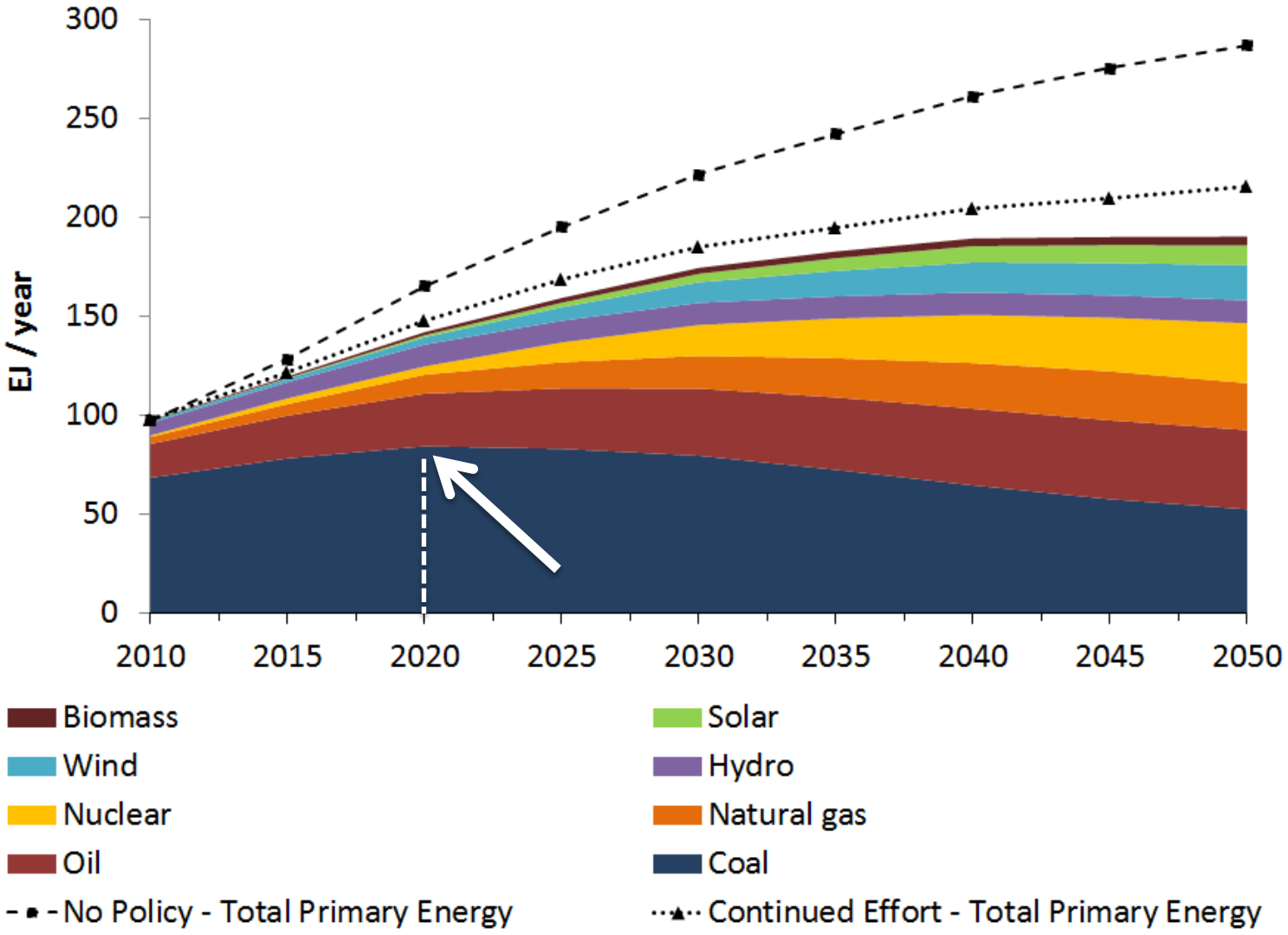
The start of a low-carbon transition?

China electricity capacity additions by generation technology (2004-2013)



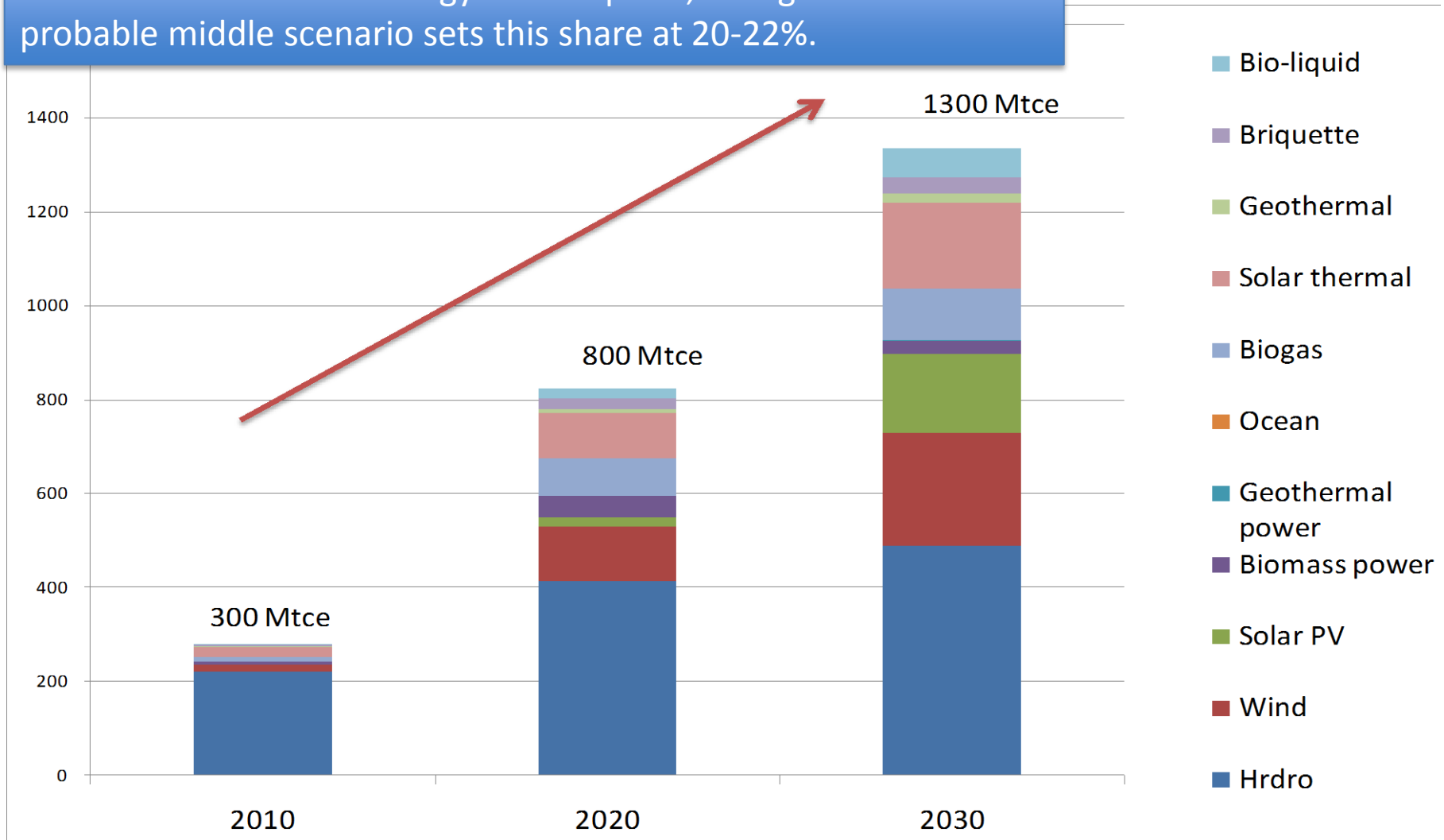
China Energy Group, Lawrence Berkeley National Laboratory 2013; NEA 2013.

Tsinghua/MIT Study: Accelerated Effort Scenario



2011 REEEP study

In the most optimistic of the three scenarios, RE could cover 26.7% of China's 2030 energy consumption, though the more probable middle scenario sets this share at 20-22%.



http://www.reeep.org/news/china%E2%80%99s-2030-re-potential-highlighted-reeep-funded-report

Key regulatory changes on the horizon

United States

- Expiring tax credits
- Climate policy/carbon price uncertainty
- Low oil and gas prices
- Aging T&D infrastructure

China

- FIT reductions
- Climate policy/carbon price uncertainty
- Transmission & integration bottlenecks; new UHV expansion
- Wind curtailment, distributed solar
- **Power sector market reform & restructuring**

Key variable: the future of China power sector reform

- Monopolies established in 2002 control T&D assets; tariffs highly regulated
- NDRC has announced competitive power markets will be established in the generation and retail segments of the supply chain; distributors would have to open their infrastructure to users without discrimination
- Trial tariff reforms underway in some provinces
- Reform is likely to face major resistance from established companies, but is crucial for further development of RE markets, carbon pricing