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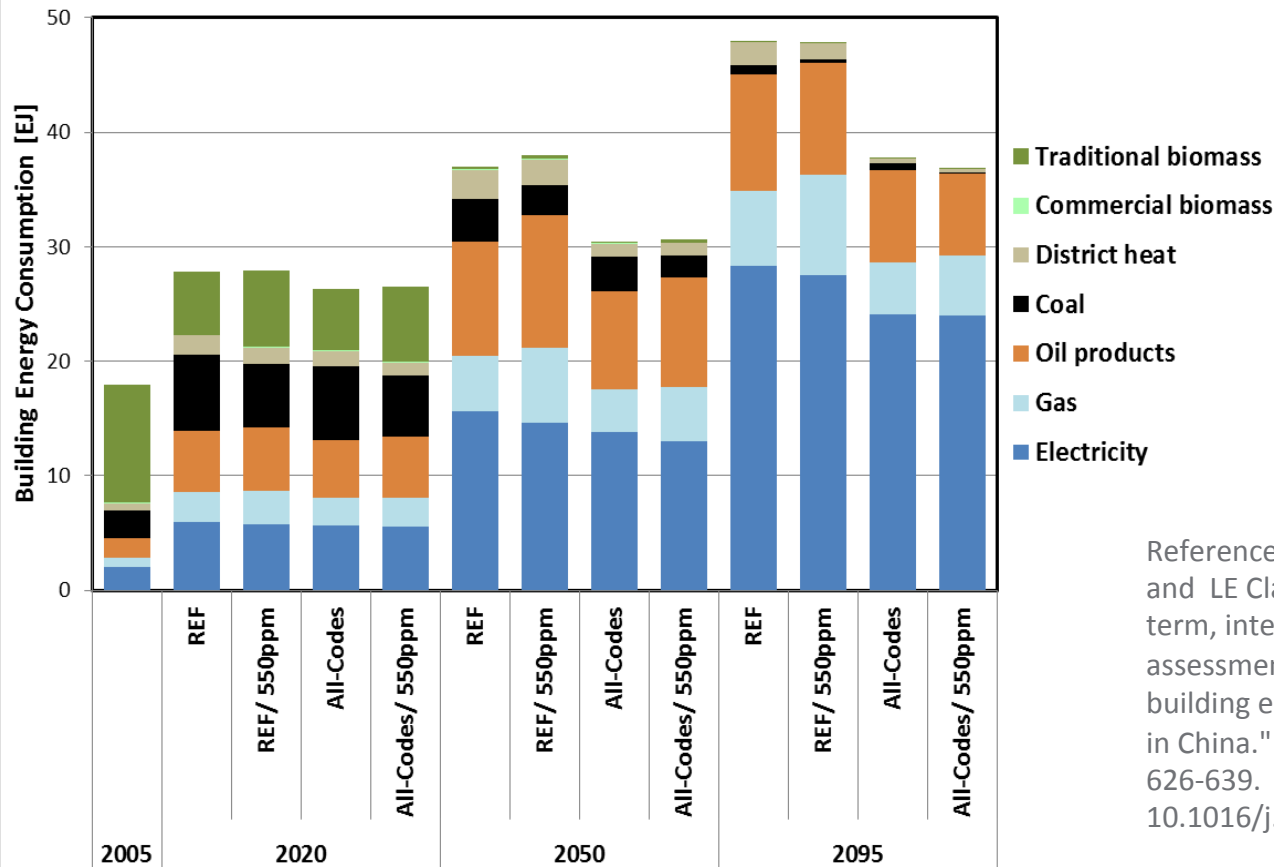
Accelerating International Technology Deployment

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JGCRI 2016 Integrated Assessment Workshop

- ▶ Importance of understanding deployment
- ▶ Deployment mechanisms and observations
 - Policy
 - Institutions and capacity
 - Financing
 - Need to understand the context to adapt best practices
- ▶ Research approaches

Importance of understanding deployment: Impacts of building codes and climate policy in China

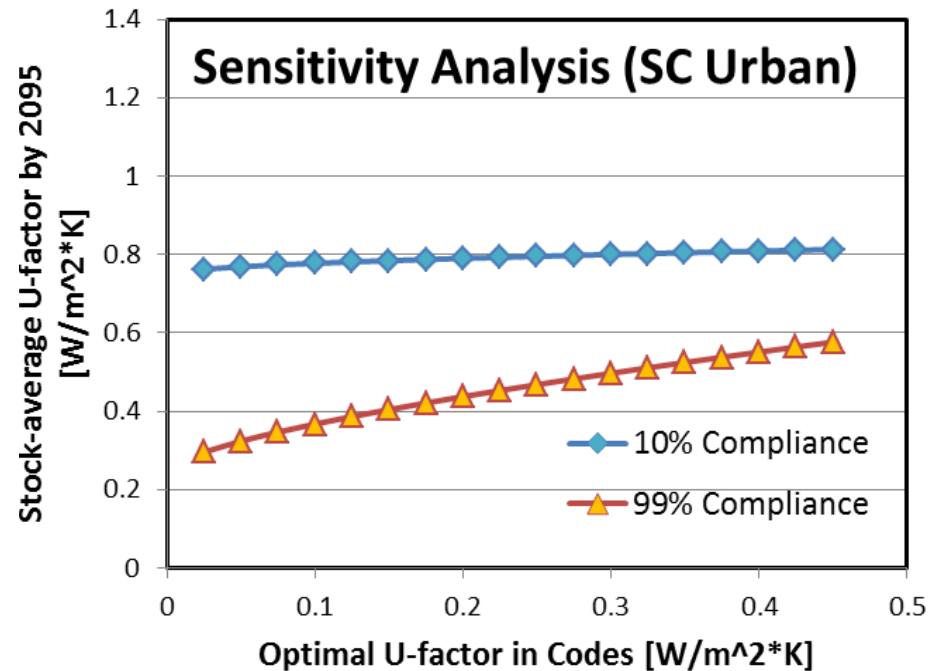
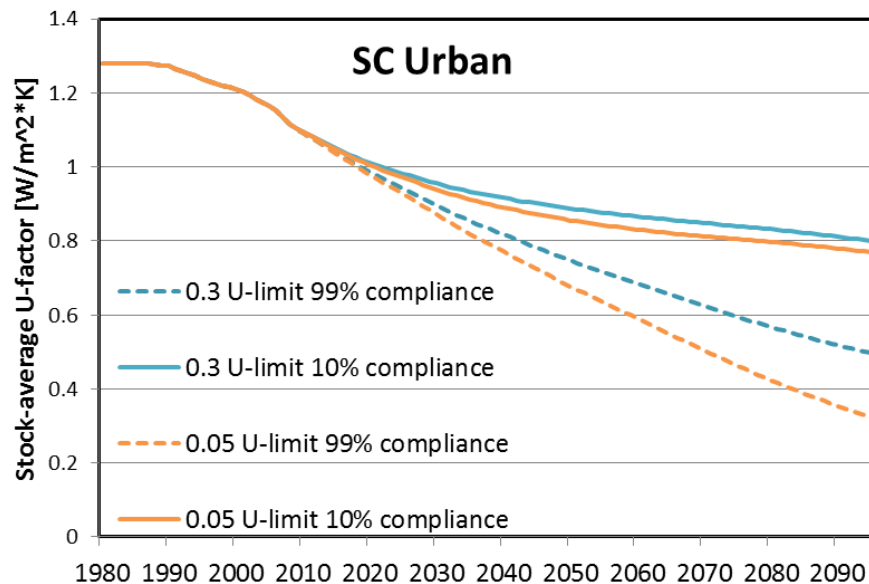


Reference: Yu S, J Eom, M Evans, and LE Clarke. 2014. "A long-term, integrated impact assessment of alternative building energy code scenarios in China." *Energy Policy* 67, pp. 626-639. DOI information: 10.1016/j.enpol.2013.11.009.

- ▶ Energy codes could significantly reduce building energy use; alternative building energy code scenarios may help reduce the sector's energy consumption and its CO₂ emissions by 14-21% by the century-end. The reduction comes from the major decrease in the demand for carbon-intensive heating fuels (e.g., coal, district heat, and gas) and the modest decrease than the demand for A/C electricity.
- ▶ Compared to building energy codes, economy-wide carbon policy may have limited effect on energy use and direct CO₂ emissions from the building sector.

Importance of Understanding Deployment: Impact of Compliance Rate

- ▶ Strong compliance is essential for major efficiency improvement.
- ▶ Compliance grows in importance with code stringency.



Deployment Mechanisms (not an exhaustive list)

- ▶ Policy
- ▶ Institutions and capacity building
 - Ensure that institutions are aligned with low-carbon goals
 - Building understanding to support policy, financing or other aspects of implementation
- ▶ Financing (and other ways of leveraging private sector)
- ▶ Voluntary mechanisms (e.g. corporate sustainability commitments, green building labels, etc.)



Policy examples

- ▶ Electric power reform and renewable portfolio standards
- ▶ Cap and trade systems
- ▶ Vehicle emission and fuel economy standards
- ▶ Building energy codes and appliance standards
- ▶ Energy efficiency requirements in public buildings
- ▶ Policies to reduce short-lived forcers (taxes, offset programs, incentives, etc.)

Policy Example: Enabling Conditions and Policies to Reduce Coal Mine Methane (CMM) Emissions

- ▶ Less supportive conditions require more policy support for CMM projects to make them feasible

MORE POLICY SUPPORT NEEDED

CMM-specific policies



VS.



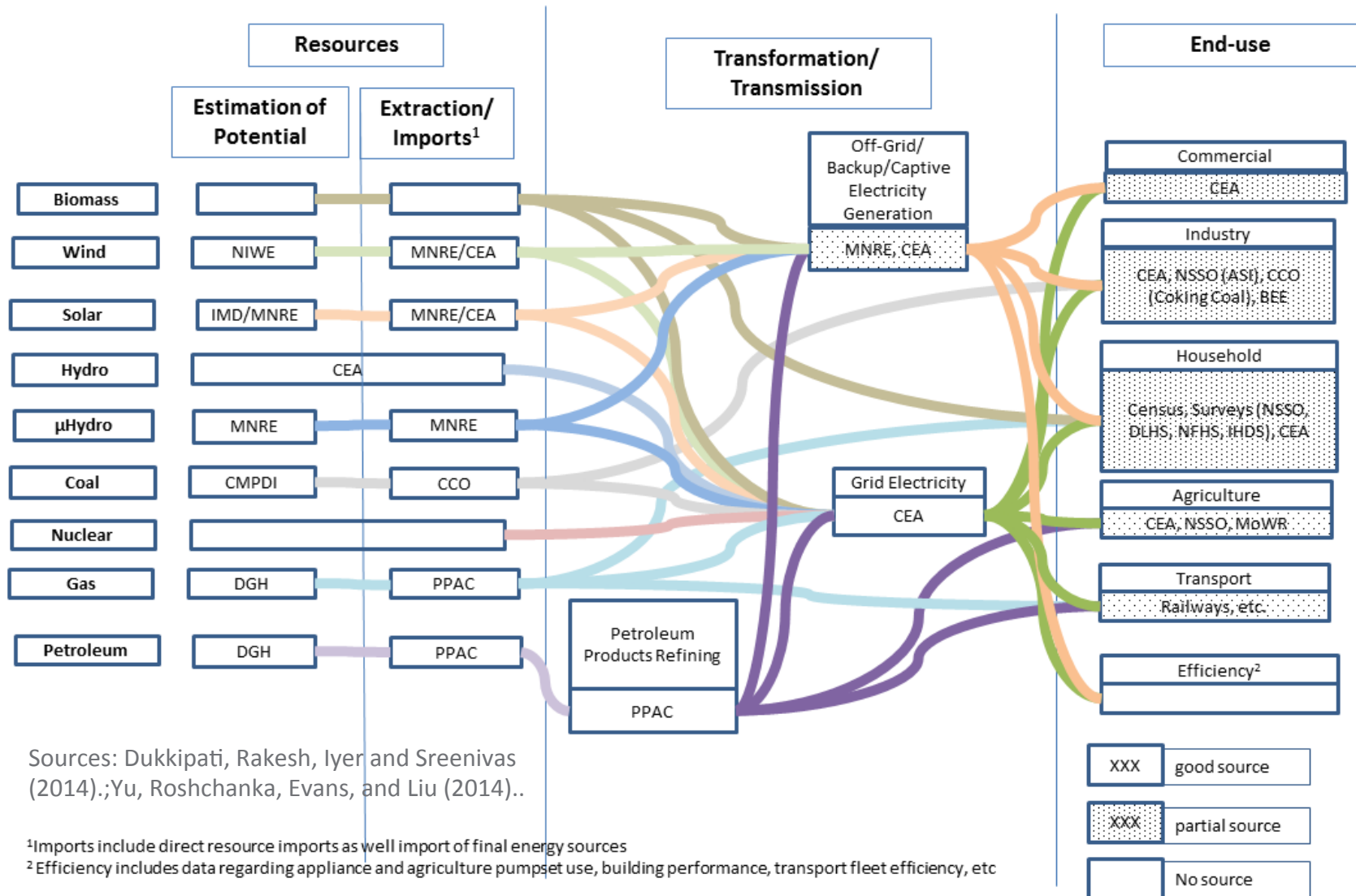
China has experienced challenges in implementing safety requirements. Government decided to encourage CMM projects as a way to improve mine safety. **Carrots tend to work better than sticks!**

Subsidies
Feed-in tariffs and obligations
Tax incentives
Strong institutional support
Environmental taxes

Source: Roshchanka V, and M Evans. 2015. Coal Mine Methane Policy in Kazakhstan: Existing Coal Mine Methane (CMM) Policies in Kazakhstan. Pacific Northwest National Laboratory, Richland, WA.

Strict safety requirements and implementation ✓
Access to energy markets ✓
Cost-reflective prices for natural gas and electricity ✓
Clearly defined property rights ✓
Composition of gas flows ✓
Mine gassiness ✓

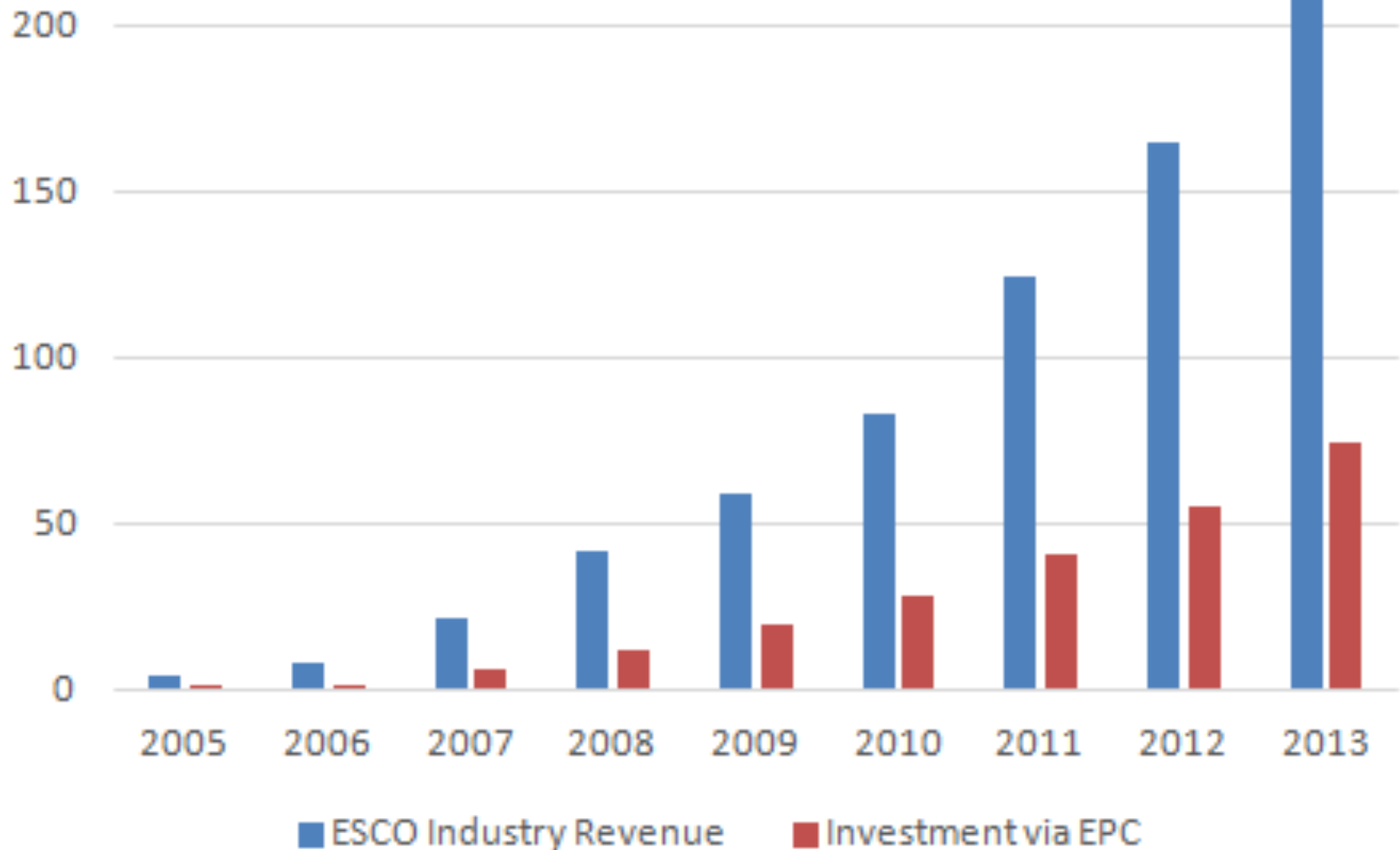
Energy Data Institutions in India: Need for Nodal Agency



China Energy Performance Contracting (Retrofits) Market Overview

Sources: Evans et al 2014, EMCA & IFC, 2012; GBPN, 2013; CESI, 2014

Billion CNY



Black Carbon Demonstration Project: MAT Bus Company

- ▶ Largest private transport company in the Murmansk Region
- ▶ Most old buses: Inefficient, Euro 0 and Euro I emission standards



- ▶ MAT leased new Euro V buses and retired old Euro 0 buses
- ▶ New buses arrived in December 2013



Kholod et al, 2015. <https://oaarchive.arctic-council.org/handle/11374/389>

Understanding Context Leads to Stronger Mechanisms

- ▶ Understanding how different countries approach a similar policy can highlight options, what works well when
 - E.g. Appliance labels work well where energy prices are high, appliance standards work well in countries with low or medium level prices
- ▶ In adapting international best practice, consider using local approach in a new way (for example, expanding testing from safety to environmental or energy performance)
- ▶ Working with local stakeholders: always essential
- ▶ Designing for existing capacity (don't make things too complicated, or allow for multiple approaches)
- ▶ Timing
 - New renewable energy and energy efficiency policies in Ukraine
 - Efforts in China to improve building code compliance after earthquake (acceptance code)



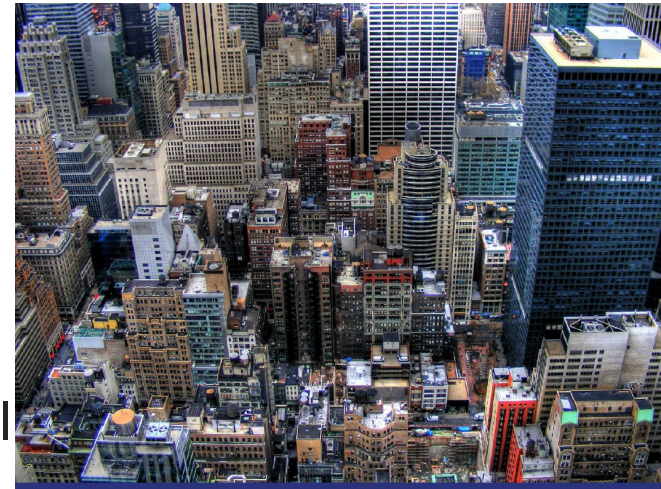
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Research Approaches

- ▶ Analysis and field work to test mitigation options: Understanding how and whether policies and measures can work

Pilot building at MNIT,
Jaipur, India



Delivering Energy Savings in Buildings

International Collaboration
on Building Energy Code Implementation

- ▶ Global and cross-country analysis:
Understanding best practices, speed international innovation on deployment
- ▶ Deeper sectoral and regional understanding through integrated assessment: Putting policies in the context of their national and global impact