



Energy Technologies Area

Lawrence Berkeley National Laboratory

# Financing: Leveraging Capital Markets to Scale Building Energy Efficiency in China

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# Discussion Topics

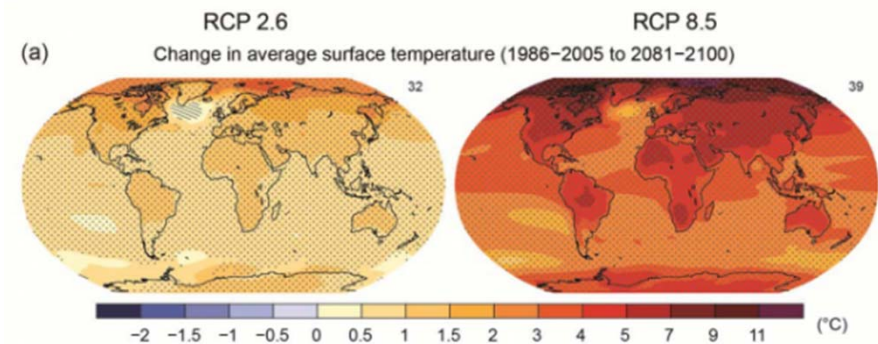
1. Global Context
2. Key Terms and Definitions
3. Barriers
4. Exploratory Solutions
5. Key Components to Scale



# Global Context

- ◆ The 2015 Paris Agreement aims to keep global surface temperature rise **well below 2°Celsius (C)** above pre-industrial levels by the end of the 21<sup>st</sup> Century (UNFCCC 2017).
- ◆ A critical component of achieving mitigation goals is to **reduce energy usage in buildings, which account for over one-third of final global energy consumption** (IEA 2013).
- ◆ The International Energy Agency (IEA) estimates that limiting global temperature rise to 2 °C will require an estimated **77% reduction in total CO<sub>2</sub> emissions in buildings by 2050** compared to a baseline of 2012 (IEA 2013).

Intergovernmental Panel on Climate Change (IPCC)  
Fifth Assessment Report (AR5) (Stocker et al. 2013)



**Buildings Account for One-Third of  
Final Total Global Energy Use**



# What's the Problem?

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- ◆ According to IEA, cumulative global investments in building EE **must reach \$13.4 trillion by 2035** to keep global surface temperature rise below 2° Celsius (C) (Rugova 2016).
- ◆ This scale exceeds the capacity of public funding and **mobilization of private capital is necessary** (IPEEC 2016).
- ◆ However, few structures exist in the market today for institutional investors to deploy capital, **resulting in the absence of EE as an asset class** (EEFIG 2015).
- ◆ In other words, **EE projects are not “developed, delivered, maintained, verified, and measured in a consistent manner”** (Investor Confidence Project 2017).

# What is China's Opportunity?

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- ◆ China requires between **US\$330 and US\$460 billion annually** for investment in EE and other clean energy solutions (IPEEC 2016).
- ◆ Approximately **80% of the required investment** must come from non-government sources (IPEEC 2016).
- ◆ Traditionally, **China has relied heavily on grants and subsidies** to advance its energy goals.
- ◆ **Innovative business models and financing mechanisms** to leverage primary and secondary market capital in China are needed.

# Key Terms and Definitions

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- ◆ **Capital Market:** serves as a conduit for demand and supply of debt and equity capital. It allocates funds between lenders and borrowers through financial instruments (e.g., bonds, notes) (Goldman Sachs 2014).
- ◆ **Primary Market:** The initial financing of a loan between a lender and a borrower
- ◆ **Secondary Market:** The resale of one or more loans to a new (secondary) investor. Often involve highly standardized products and the bundling of numerous loans into tradable instruments. An asset-backed security (ABS), which is a bond backed by assets (i.e., auto loan) that provide a regular income stream, is an example.
- ◆ **Host or Customer:** The property upon which measures are being implemented (may also refer to owner of said property).
- ◆ **Energy Service Company (ESCO):** The company responsible for implementing the measures, that in some case takes performance risk through a guarantee.

# EE: State of the Market

| Indicator  | China   | United States                      |
|--|---|------------------------------------|
| EE investments 2011                                  | \$6.38 billion                                      | \$6.32 billion                     |
| EE investments 2013                                  | \$11.98 billion (delivered by 4,852 ESCOs in China) | \$7.62 billion                     |
| Dominant market segment (% share) in 2013            | Industry (72%) Buildings (21%) Transport (7%)       | Government and institutional (84%) |
| Typical project size                                 | \$100,000-\$1 million (2007-09)                     | \$2 million-\$15 million           |
| Number of measures involved in EE project, typically | Selected and specialized, less integrated           | Multiple and integrated            |
| Typical contract term                                | 4-8 years   | 10-20 years                        |

Despite the rapid growth of China's ESCO industry, access to third-party finance is still constrained. While the dominant form of financing is bank debt financing, in 2011, **only 18% of ESCOs had access to bank loans**. Thus, approximately **82% of ESCOs funded their own EE projects using working capital**.

# Barriers to EE Lending in China

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## 1. Technical Barriers

- ◆ Lack of information/asymmetric information.
- ◆ Lack of standardized protocols and tools for originating EE projects.
- ◆ Lack of technical capacity for EE.

## 2. Credit/Market Barriers

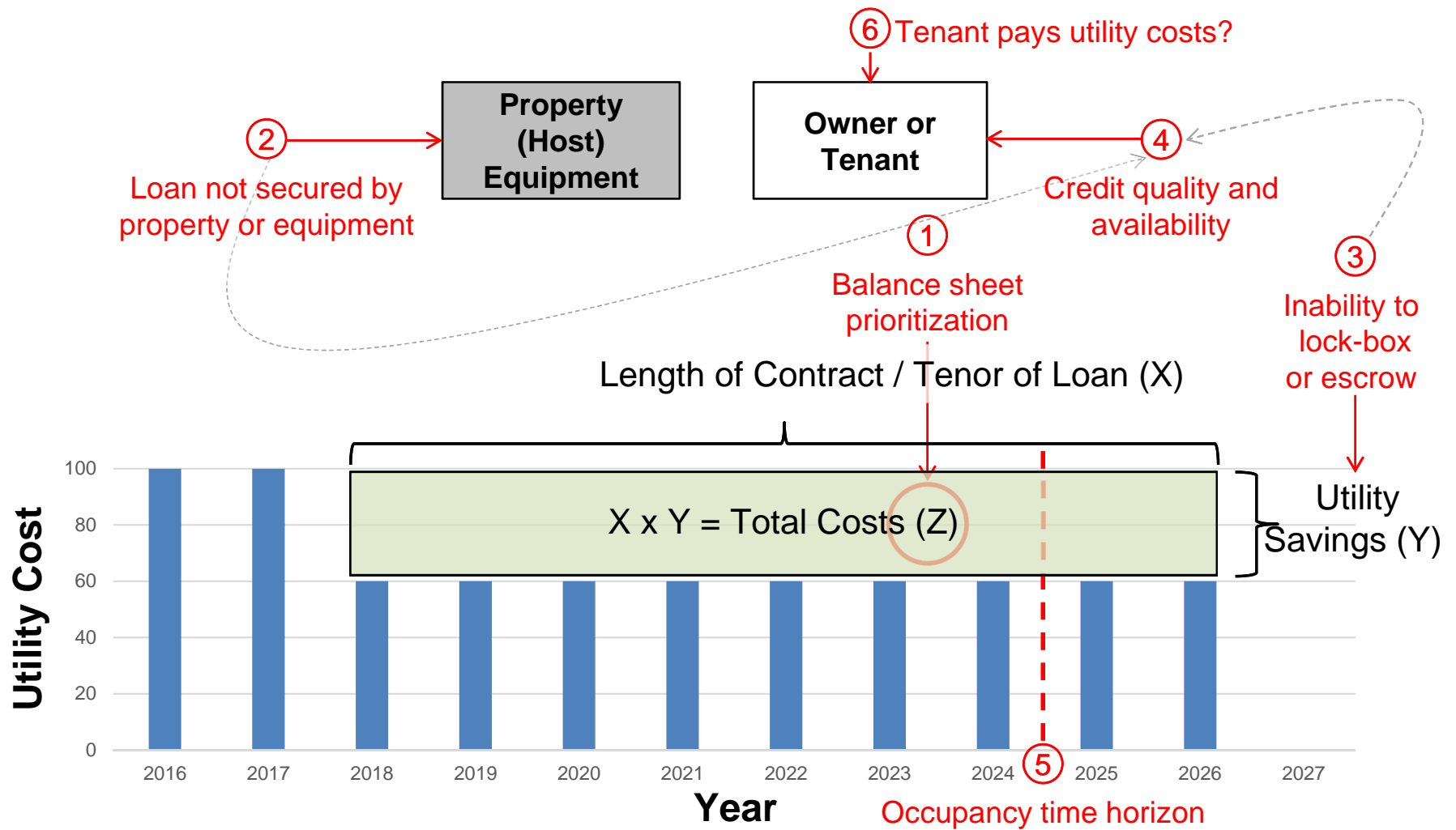
- ◆ Balance sheet prioritization (self-finance thresholds).
- ◆ Loan not secured by property or equipment.
- ◆ Inability to “lock-box” or “escrow” future streams of cost-savings.
- ◆ Quality/availability of host credit information.
- ◆ Disconnect between occupancy time horizon in property and contract tenor.
- ◆ Split incentive (landlord/tenant).

## 3. Impact

- ◆ **Three-quarters** of Chinese EE project hosts have encountered EE financing difficulty (IFC and EMCA, 98).



# Credit/Market Barriers





# Objective



- ◆ Facilitate large-scale financing by non-government financial institutions (i.e., banks, private equity firms, pension funds) in EE projects for buildings/ facilities by addressing the technical and credit/market barriers to EE lending in China.



# Exploratory Solutions to Technical Barriers

- ◆ Advancing **data transparency** to expand the market for EE.
- ◆ Developing open-source **virtual assessment tools** to target cost-effective EE opportunities.
- ◆ Developing **standardized procedures for originating EE projects** which mitigate risk.

