

# The Future of Industrial Energy Efficiency Finance in China

*Webinar Series for Industrial Excellence*

*Patrick D'Addario, Thomas K. Dreessen, Dilip Limaye, Bob Taylor*  
July 30, 2013

# Agenda

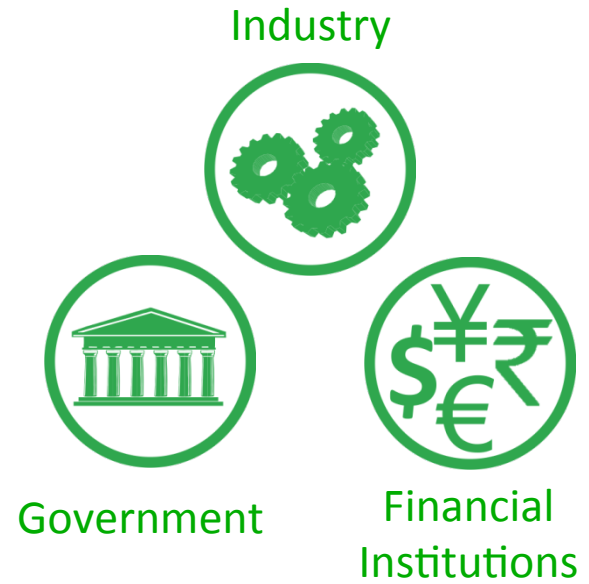
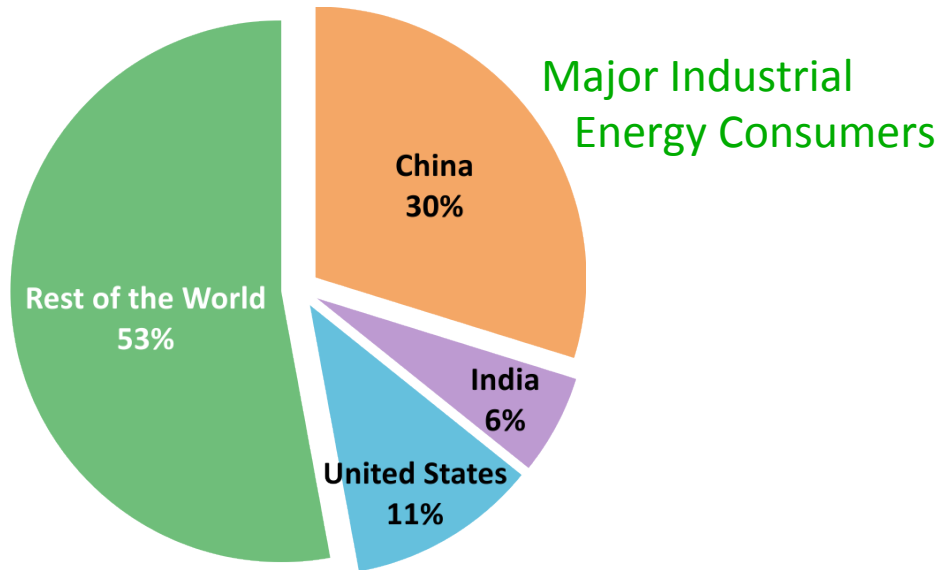
1. Patrick D'Addario: Setting the scene
2. Thomas K. Dreessen: China's energy efficiency finance landscape
3. Panel discussion: Dilip Limaye and Bob Taylor (discussants)
4. Q&A
5. Patrick D'Addario: Resources on industrial energy efficiency finance

# Setting the Scene

Patrick D'Addario  
**Senior Advisor for Financial Products**  
**The Institute for Industrial Productivity (IIP)**



# IIP's Focus



*Energy-intensive industries, such as...*



Cement



Chemicals



Iron & Steel

# The Chinese government's industrial EE incentives\*

## Energy Savings Awards in 11<sup>th</sup> and 12<sup>th</sup> FYP plans for large and medium enterprises, and ESCOs

Description	11 <sup>th</sup> FYP – CNY (US\$)	12 <sup>th</sup> FYP CNY (US\$)	New policy for ESCOs (2010) CNY (US\$)
Reward CNY/tce (USD/tce)	200-250 (32.4 -40.5)	240-300 (38.9-40.6)	240 (38.9) from central govt. >60 (9.7) from local govt.
Targeted energy savings (tce)	>10,000	>10,000	500-10,000
Minimum energy consumption (tce)	Not applicable	20,000	Not applicable

### Other support

- Ten key energy projects
- Eliminating outdated capacity
- Energy savings projects
- ESCOs
  - 0 income tax for years 1-3; 50% income tax rate for years 4-6, on income from qualifying projects
  - VAT reduction

“Addressing the effectiveness of industrial energy efficiency incentives in overcoming investment barriers in China.” J.Romankiewicz, et al., ECEEE, 2012.

## The Chinese government's industrial EE incentives,\* continued

	2006	2010	2011
ESCO companies	89	782	1,472
ESCO project investment – CNY (USD) billion	1.3 (0.21)	28.8 (4.7)	41.2 (6.7)
ESCO project energy savings per year (Mtce)	0.9	10.6	16.5
Total number of employees in energy efficiency service industry	16,000	175,000	378,000
Total value of energy efficiency service industry – CNY (USD) billion	4.7 (0.8)	83.6 (13.5)	125.0 (20.2)

The Ministry of Finance's special fund for energy conservation and emissions reduction reportedly paid out CNY133 billion (US\$21.5 billion) in incentive payments in the 11th FYP. The Climate Policy Initiative (CPI) at Tsinghua University reported additional funding from central and local governments for energy efficiency of CNY126 billion (US\$20.4 billion).\*

According to ACEEE's Chittum and Nowak, in 2010, a total of US\$879 million was spent on industrial energy efficiency by utilities (US\$737 million), state agencies and public universities (US\$74 million), nonprofit organizations (US\$39 million), and the Federal Government (US\$29 million).

"Addressing the effectiveness of industrial energy efficiency incentives in overcoming investment barriers in China." J.Romankiewicz, et al., ECEEE, 2012.

# China's energy efficiency finance landscape

Thomas K. Dreessen  
Chairman and CEO  
Energy Efficiency Project, Investment Company Limited  
(EEPIC)

# The China Energy Efficiency Financing Landscape Report

- Published by IIP in October 2012
- Authored by Thomas K. Dreessen, James Wang and EMCA
- Includes a literature review of China's EE finance market, bank sector background, EE policy development, demand for financing, lending practices, debt financing and leasing for EEPs, credit enhancement programs equity sources and EE financing products.
- See it at: [www.iipnetwork.org/IIP-ChinaFinancingLandscape](http://www.iipnetwork.org/IIP-ChinaFinancingLandscape)



# Bank sector background

## Local commercial banks (3 Tiers)

- Tier 1 (“Big 4”): SOEs & assets ~ US\$ 300B
- Tier 2: Shareholders & assets ~ US\$ 30B
- Tier 3: Provincial/city banks controlled by SOEs most active in EE and SME financing

## Regulatory framework:

- PBOC: performs Central Bank functions
- CBRC: regulates/supervises banks, leasing & Gty. Cos.
- NDRC: FYPs and all national energy & EE policies
- MII: SME development and guarantee policies

## EE policy development

- Mandatory targets in 12th FYP (2011-2015)
  - 16% decrease in energy consumption per unit GDP
- Restricts bank lending to industrial facilities in high-energy consumption sectors
- Encourages lending to EEPs
- Project financing business guidelines
- Energy-saving incentives for EEPs
- Demand-side management policy
- Special ESCO treatment and tax benefits

## Demand for EE financing

- US\$140 billion EE investments made in 11th FYP (2006-2010)
- US\$200 billion EE investments est. for 12th FYP (2011-2015)
- 11th FYP EE investments mostly made by SOEs; ESCOs < 10%, but expected to grow to 25% in 12th FYP
- EEPs estimated to need US\$40 billion of funding each year from bank loans or other sources
- 12th FYP national 16% targets broken down by province (see report) with consequences to leaders if not met
- Top 10,000 Enterprise Program in Dec 2011 targeting 17,000 companies with over 5,000 tce per year and over 60% of China's total energy consumption

# Bank lending practices

- EE lending is small part of bank loans
  - Less than 1%; a niche business to Tier 2 banks
- Ceiling on interest rates for commercial banks
  - Not higher than 90% of prime lending rate
- Standard credit evaluation procedures used
- 30% equity investment required
- 80% of loans require full collateral or approved 3rd party guarantees

## Debt financing for EEPs – an overview

- Loans mostly made directly to large corporate entities (SOEs) that own/operate facilities with EEPs (Hosts)
- Loans booked on Host's balance sheet
- Repayment of EEP loans not related to savings performance and thus not project-based
- 30-50% equity for most EEPs and SMEs
- Project loans generally not viable for EEPs

# Debt financing for EEPs – by “LFIs”

## Domestic bank loans:

- Working capital
- Fixed asset investments
- Trade finance
- Projects
- Mortgage
- Accounts receivable
- SME (new joint surety pilot by ICBC and Bank of Beijing)

## Debt financing for EEPs – by “IFIs”

- World Bank (“WB”) CEEF Program
  - China Eximbank, Huaxia, China Minsheng Bank
- French Development Agency (“AFD”)
  - Shanghai Pudong Development Bank (“SPD”), Huaxia, China Merchants Bank
- Asian Development Bank (“ADB”)
  - Guangdong Province (2009), Shangdong Province (2011), Hebei Province (2012 projected closing)
- KfW Bank EE/RE Loan to China Eximbank

## Leasing for EEPs

- Leases mostly sale leasebacks directly to large private companies and SOEs
- Most leasing companies require the same security as banks and thus are not a major ESCO financing option
- In 2011, World Bank US\$133 million loan to 1 ESCO and 2 lease companies in Shandong Province for leases:
  - to ESCOs, industrial EEPs & equipment vendors
  - offered on EPC model with equipment as collateral
  - US\$5 million max funding per project, 15%, 3-5 years
- Financial leasing not fully developed in China: only 0.83% of GDP in 2009 vs. 30% in US



## Credit enhancement programs

- **IFC new SME risk sharing facility** in 2011 with 2 participating banks (SPDB & BRCB):
  - Targeted customers/EEPs: EE loan applicants of participating banks for all types of EEPs
  - Typical term: until end of IFC guarantee in 2018
  - Collateral: project assets
- **Insurance companies** established in 2003 mainly to underwrite credit risk on trade receivables for seller's bankruptcy, insolvency or default (N/A to host EEPs due to no receivables)

# Credit enhancement programs, continued

- **Guarantee companies**
  - accept slightly wider range of collateral than banks
  - can provide loan guarantees to select SMEs & ESCOs
  - some starting to explore the future receivables pledge model, constituting a significant technical risk
- **Huazun Investment & Credit Guarantee Company:**
  - introduced a financial service product solution in 2010 for ESCOs with future receivables pledged as collateral for loan guarantee.
- **National SME Guarantee Program**
  - Exempts operation tax for SME guarantee institutions
  - Stringent requirement on size and compensation
  - SME typically must provide counter guarantees

## Equity sources of EE financing

- **CECEP:** only national SOE in 2010 to fund large EEPs
- **General Environment Industry Fund:**
  - Established by national SOE in 2009 with US\$8 million capital to raise US\$400 million for EEPs as 1 of 4 areas
  - Launched in 2011 a dedicated investment fund for EPC
- **Shiyin EC and Environmental Protection Fund:**
  - Announced intention in 2011 intention to raise US\$8 million
- **Good Hope Capital Co:** raising US\$16 million for ESCOs
- **China CDM Fund:** no GHG project investments made as if mid 2011
- **PE & other equity funds:** little info available on EEP investments by PE funds

## Other types of EE financing sources

- **Energy performance contracting project trading:**
  - China Beijing Environment Exchange (CBEEEX) and EMCA launched China's first EPC investment and financing trading platform in 2010
  - Platform designed to provide project financing based on ESCOs EEP future savings receivables trades
- **ESCO Association industry funding programs:**
  - EMCA formed strategic cooperation partnerships with several banks and guarantee organizations; and arranged financing support for dozens of ESCOs

## Summary of China EEP financing

- Like in most developing countries, China banks typically offer only asset-based lending, limited to 70% of capital cost requiring:
  - 30% equity investment in EEPs
  - 100% collateral or guarantees required on loan amount
- Like in most countries, LFI not comfortable lending to EEPs without full guarantees or collateral AND no collateral value attributed to their savings
- Except for ~6 commercial banks that participated in IFI programs, few LFIs interested in EEPs or have internal capacity to evaluate their cash flow benefit
- Current partial credit risk guarantee and direct lending programs from IFIs rarely result in LFIs deviating from business-as-usual lending terms

## Summary of China EEP financing – continued

- Debt terms from LFIs for EEPs are generally not attractive to ‘*non-SOE*’ Hosts and cannot be met by most ESCOs and SMEs because of the resulting reduction in their core business credit capacity
- Most ESCOs and SMEs have little ability to access loans for EEPs due to their limited financial capacity
- Primary barrier to accessing EEP loans from LFIs is guaranty and/or collateral requirements
- **New risk-mitigating products needed to motivate LFIs to develop new lending products with commercially-attractive terms**

## Contact details



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# Panel discussion

Dilip Limaye

**President and CEO, SRC Global Inc. and Senior Advisor to the World Bank**

Bob Taylor

**Principal at Energy Pathways, LLC and former World Bank Energy Sector Leader of the East Asia and Pacific Region**



# Energy efficiency financing in China:

## Recent innovations and future outlook

Dilip Limaye  
**President and CEO, SRC Global Inc.**  
**Senior Advisor to the World Bank**

# China's leading role in EE finance

- Strong government mandate for EE
- Successes in:
  - Developing a large ESCO industry
  - Engaging major banks in loan financing
  - Use of IFI credit lines and risk sharing programs
  - Introduction of leasing models
- Limitations
  - Banking sector regulations
  - Role of regional banks
  - Access to financing for small ESCOs
  - Financing EE in buildings and municipalities

# Potential future innovations

## Some wishful thinking?

- Reforming banking regulations to facilitate EE financing
- Using project cash flow as collateral
- Energy Saving Insurance – guaranteeing technical performance of EE equipment
- Capacity building of banks – loan officers and risk managers
- “Mainstreaming” EE finance as a business area
- Building capacity of small ESCOs in preparing “bankable proposals”
- Creating financing mechanisms for specialized sector-specific ESCOs
- Engaging utilities in financing and implementation of EE projects (EE obligations and DSM programs)

# Energy efficiency financing in China:

A dynamic sector on the move

Bob Taylor  
President, Energy Pathways, LLC

## Converging events

- China is continuing its aggressive promotion of energy efficiency in industry, buildings and other sectors, with perhaps the most comprehensive set of government programs in the world
- Financial sector reform is on the agenda, with new reform breakthroughs possible during the next several years
- Accordingly, many domestic banks and other financial institutions are aiming to expand energy efficiency financing initiatives, building on pilot programs undertaken by about a half dozen banks over the last five years

## New developments and trends

- Expanding loan financing for China's large domestic ESCO industry, using new products and approaches, including use of previously executed energy performance contract project accounts receivable for new loan collateral
- Emergence of domestic financial leasing models for energy efficiency financing
- Increasing interest in development of energy efficiency project add-ons to large industrial loans

**IIP should develop and disseminate case studies of emerging best practices of energy efficiency financing in China for both Chinese and international audiences.**

# IIP's resources on industrial energy efficiency finance

Patrick D'Addario

# IIP's Industrial Efficiency Databases

The screenshot shows the homepage of the Industrial Efficiency Financing Database (IEFD). The header includes the IIP logo and the text 'Industrial Efficiency Financing Database' and 'A PROJECT OF Institute for Industrial Productivity'. A navigation menu on the left lists 'ABOUT', 'USING THE DATABASE', and 'INSIGHTS'. The main content area features a welcome message: 'Welcome to the Industrial Efficiency Financing Database (IEFD). This database identifies vehicles and programs that have successfully delivered industrial energy efficiency financing.' Below this is a search bar with the text 'Search and/or filter the database:' and a 'SEARCH' button. There are four filter categories: 'Status' (Completed, Future, In operation), 'Sponsoring Entity' (ADB Energy Efficiency Improvement Program, Austrian Government, British High Commission (BHC), Bulgarian Government, Bureau of Energy Efficiency), 'Program Type' (Asset-based lending, Clean energy, technology or innovation fund, Cluster loan, Concessional loan, Credit line, Equity), and 'Geographic coverage' (China, Europe, Bulgaria, Central and Eastern Europe, India, Kerala, Maharashtra).

Industrial Efficiency Finance Database  
[www.iipnetwork.org/databases/finance](http://www.iipnetwork.org/databases/finance)

The screenshot shows the homepage of the Industrial Efficiency Programs Database (IEPrD). The header includes the IIP logo and the text 'Industrial Efficiency Programs Database' and 'A PROJECT OF Institute for Industrial Productivity'. A navigation menu on the left lists 'ABOUT', 'USING THE DATABASE', and 'INSIGHTS'. The main content area features a welcome message: 'Welcome to the Industrial Efficiency Programs Database (IEPrD). This database contains information about energy management and utility obligation programs, and includes program descriptions, evaluations and assessments.' Below this is a search bar with the text 'Search and/or filter the database:' and a 'SEARCH' button. There are three filter categories: 'Supervising Entity' (Australian Department of Resources, Energy and Tourism (DRET), British Columbia Utilities), 'Program Type' (Energy Management, Resource Acquisition), and 'Geographic coverage' (Australia, Canada, British Columbia, Ontario).

Industrial Efficiency Programs Database  
<http://www.iipnetwork.org/databases/programs>

The screenshot shows the homepage of the Industrial Efficiency Policy Database (IEPD). The header includes the IIP logo and the text 'Industrial Efficiency Policy Database' and 'A PROJECT OF Institute for Industrial Productivity'. A navigation menu on the left lists 'POLICY PYRAMID', 'USING THE DATABASE', and 'INSIGHTS'. The main content area features a welcome message: 'Welcome to the Institute for Industrial Productivity's database of industrial energy efficiency and greenhouse gas (GHG) mitigation policies! The database illustrates a country's policy package as a "Policy Pyramid"...' Below this is a search bar with the text 'Quick Policy Search...'. There are three filter categories: 'Countries' (displaying flags of various countries), 'Policy Pyramid' (Effort Defining, Supporting Measures, Implementation Toolbox), and 'Industry Characteristics' (Gross Domestic Product, Final Energy Consumption, Primary Energy Consumption, CO<sub>2</sub> Emissions from Fuel).

Industrial Efficiency Policy Database  
[www.iepd.iipnetwork.org](http://www.iepd.iipnetwork.org)

The screenshot shows the homepage of the Industrial Efficiency Technology Database (IETD). The header includes the IIP logo and the text 'Industrial Efficiency Technology Database' and 'A PROJECT OF Institute for Industrial Productivity'. A navigation menu on the left lists 'ABOUT IETD', 'USING THE DATABASE', and 'INSIGHTS'. The main content area features a welcome message: 'Welcome to the Industrial Efficiency Technology Database (IETD). The IETD aims to catalyse the widespread adoption of technologies and practices in industry that improve productivity and profitability while reducing energy...'. Below this is a search bar with the text 'Quick Technology Search...'. There are three filter categories: 'Sectors' (Cement, Iron and Steel, Motor Systems), 'Cross Sectoral Systems', and 'Featured Content' (Alternative Fuels in Cement - IIP Catalyses Increased Use in India (2018), The State-of-the-Art Clean Technologies (SOACT) for Steelmaking Handbook (2016), Emerging Energy-Efficiency and Greenhouse Gas Mitigation).

Industrial Efficiency Technology Database  
[www.ietd.iipnetwork.org](http://www.ietd.iipnetwork.org)

The screenshot shows the homepage of the Supply Chain Initiatives Database. The header includes the IIP logo and the text 'Supply Chain Initiatives Database' and 'A PROJECT OF Institute for Industrial Productivity'. A navigation menu on the left lists 'USING THE DATABASE' and 'INSIGHTS'. The main content area features a welcome message: 'The Supply Chain Initiatives Database is an interactive and user-friendly database of case studies that describe supply chain initiatives for energy savings and GHG mitigation in industry.' Below this is a search bar with the text 'Case Study Search'. There are four filter categories: 'Activity types?' (AI, Auditing, Audits), 'Company/Organization' (AI, BASF, Birkh.Gyppum), 'Target Sector' (AI, Aluminium, Cement), and 'Program/Partnership?' (AI, Applied Sustainability Center, Automotive Industry Action Go).

Supply Chain Initiatives Database  
[www.iipnetwork.org/databases/supply-chain](http://www.iipnetwork.org/databases/supply-chain)



## IEE resources

- China Energy Efficiency Financing Landscape Report:  
[www.iipnetwork.org/IIP-ChinaFinancingLandscape](http://www.iipnetwork.org/IIP-ChinaFinancingLandscape)
- Next Steps in Financing Energy Efficiency in China:  
[www.iipnetwork.org/next-steps-financing-energy-efficiency-china](http://www.iipnetwork.org/next-steps-financing-energy-efficiency-china)
- China Energy Efficiency Program (CHEEF) – case study:  
[www.iipnetwork.org/IIP-FinanceFactsheet-1-CHEEF](http://www.iipnetwork.org/IIP-FinanceFactsheet-1-CHEEF)
- China Utility-Based Energy Efficiency Finance Program (CHUEE) – case study:  
[www.iipnetwork.org/IIP-FinanceCaseStudy-A-CHUEE](http://www.iipnetwork.org/IIP-FinanceCaseStudy-A-CHUEE)
- Delivery Mechanisms for Financing of Industrial Energy Efficiency: A Collection of Best Practices: [www.iipnetwork.org/IIP-11.%20FinancialVehiclesBestPractices](http://www.iipnetwork.org/IIP-11.%20FinancialVehiclesBestPractices)
- China's IEE policy package: [www.iepd.iipnetwork.org/country/china](http://www.iepd.iipnetwork.org/country/china)
- EnMS under China's Top-10,000 Program: [www.iipnetwork.org/China\\_EnMS\\_Top10000](http://www.iipnetwork.org/China_EnMS_Top10000)
- Financing Industrial Energy Efficiency In India:  
[www.iipnetwork.org/IIP-IndiaFinancing%20Landscape](http://www.iipnetwork.org/IIP-IndiaFinancing%20Landscape)
- Energy Efficiency Resource Acquisition Programs (summary for China):  
[www.iipnetwork.org/IIP\\_EEResourceAcquisitionSummary\\_China](http://www.iipnetwork.org/IIP_EEResourceAcquisitionSummary_China)

## Q&A and Contacts

- Participants will be answering questions submitted with registrations and during the course of the Webinar
- If you have questions or suggestions, don't hesitate to get in touch: [info@iipnetwork.org](mailto:info@iipnetwork.org)
- Or go to our website for more information on EE technologies, policies, programs and initiatives: [www.iipnetwork.org](http://www.iipnetwork.org)