Approaches and Models for Financing Energy Efficiency: An Overview

Prepared by:
Peter du Pont, PhD
Vice-President, Nexant, Inc.

Prepared for:
ADB Energy Efficiency Training Seminar
Central and West Asia Region

Kuala Lumpur, Malaysia
29 May 2014

Topics Covered

- Introductions
- “Climate” Financing
- Policy Approaches to Support EE Finance
- Types of Financing
- Financing with Assistance from Energy Services Companies (ESCOs)

Introductions

Innovative Energy-Efficiency Strategies

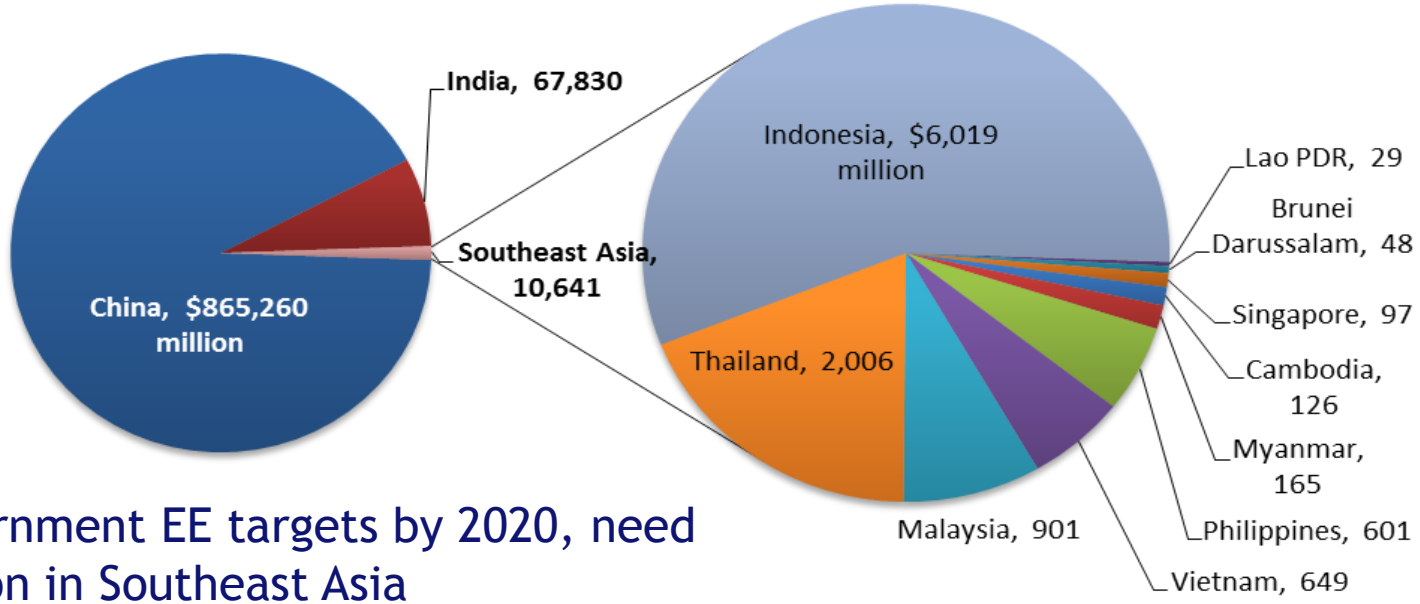
"I'm really into energy saving."

Energy Efficiency Projects Have High Returns

- Why is that $20 bill still lying there?

Developing Asia Will Require More Than $900 billion by 2020

Investment Required by 2020 to Reach EE Targets ($m)



- To meet government EE targets by 2020, need
  - ~$11 billion in Southeast Asia
  - ~$944 billion in China, India, and Southeast Asia combined
- To meet government EE targets by 2030, need an additional $15 billion in Southeast Asia

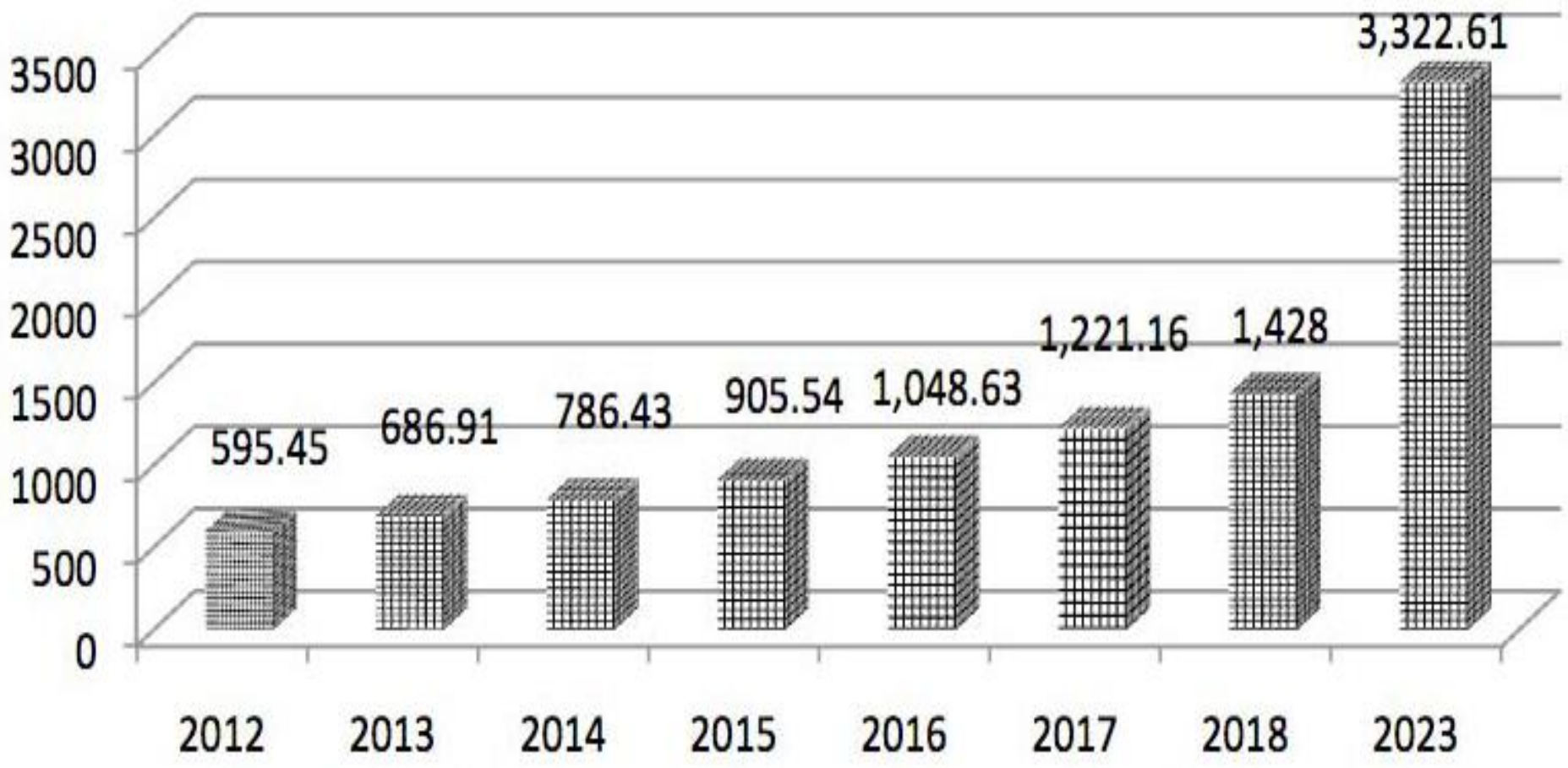
- **92% of investment in China, 7% in India, 1% in Southeast Asia**
- **Largest investment in Southeast Asia countries required by**
  - **Indonesia (57%)**
  - **Thailand (19%)**
  - **Malaysia (8%)**

Source: Nexant report to ADB, The Asia Energy Efficiency Accelerator (2012)

Most Countries in the Region Have Set Energy Savings Targets

Country	Energy Efficiency Strategy/Action Plan	Required Investment ($m)
Brunei Darussalam	Attain 25% reduction of energy intensity from 2005 level by 2030	48
Cambodia	Reduce final energy consumption by 10% in all sectors	126
Indonesia	Decrease energy intensity by 1% annually and decrease energy-GDP elasticity to below 1% by 2025	6,019
Lao PDR	Reduce final energy consumption by 10% in all sectors	29
Malaysia	Reduce final energy consumption in industrial, commercial, and residential sectors by 10% from 2011 to 2030, and reduce final energy consumption of the transportation sector by 1.39 ktoe in 2030	901
Myanmar	Reduce primary energy consumption by 5% in 2020 and 8% by 2030 compared to BAU, and improve EE in all end-use by 16% by 2030	165
Philippines	Reduce final energy consumption by 10% in all sectors from 2007 to 2014	601
Singapore	Reduce energy intensity by 20% by 2020 and by 35% by 2030 from 2005 level, and cap CO_2 emissions from fuel combustion at 63 Mt-CO_2 in 2020	97
Thailand	Reduce the energy intensity of GDP 25% by 2030 relative to BAU	2,006
Vietnam	Reduce energy consumption by 3%-5% by 2010 and 5%-8% by 2010-2015	649

Global Forecast for EE Products and Services



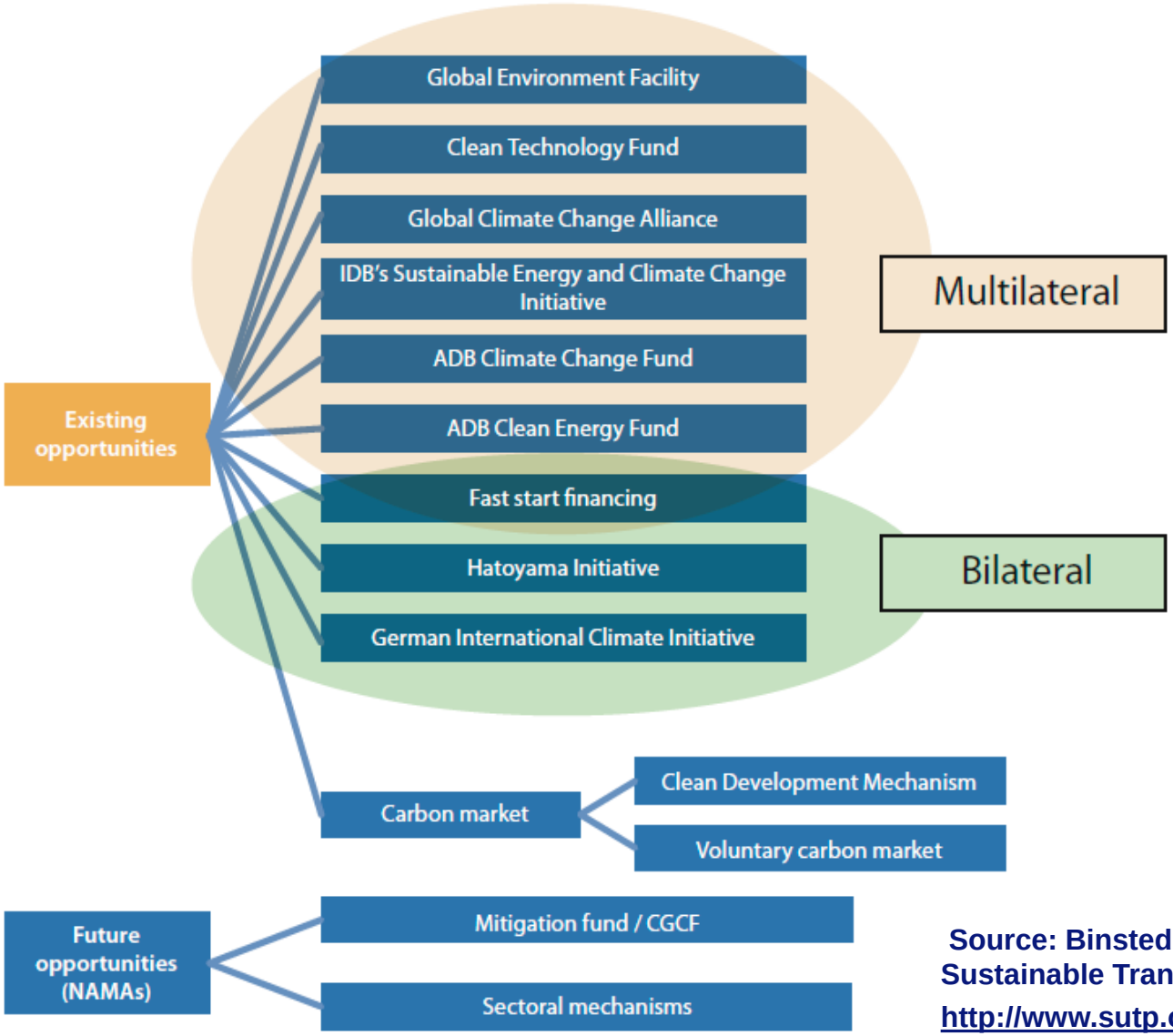
Source: SBI Energy – Energy Efficiency Global Products and Services Markets 2012

The Challenge

- Developing a supportive policy framework
- Ensuring tariffs reflect full costs of production
- Developing a programmatic approach:
  - Codes and Standards
  - Utility and govt incentive programs (i.e. DSM)
- Supporting development of EE businesses
  - ESCOs and service providers
  - Equipment providers
- Building capacity in govt and financial community

Climate Financing

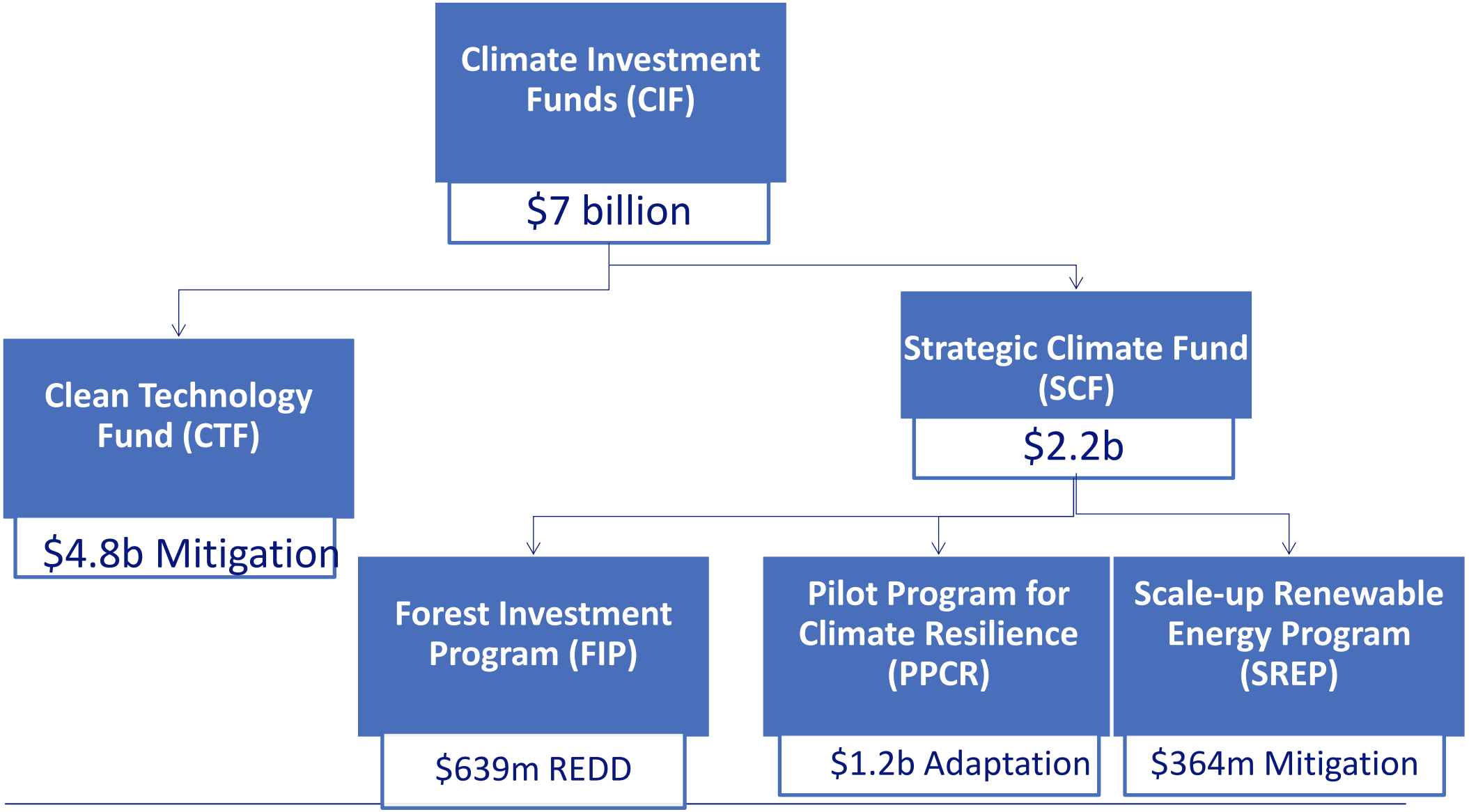
Climate Financing Overview



Source: Binsted et al, 2010 Assessing Climate Finance for Sustainable Transport, GTZ

http://www.sutp.org

Climate Investment Funds: Overview



Climate Investment Funds Comparison

	Clean Technology	Pilot Program for Climate Resilience (PPCR)	Forest Investment Program (FIP)	Scale-up Renewable Energy Program (SREP)
Objective	Scale-up deployment clean technologies to "transform" markets towards low carbon growth	Climate Adaptation: integration of climate risk and resilience into development policies and planning	Forestry projects: reduce emissions from deforestation and forest degradation (REDD)	Small scale RE in low income countries
Total Funds*	$4.5 BN	$1.1 BN	$947 M	$392 M
Donors	Australia, France, Japan, Germany, Sweden, Spain, US, UK	Australia, Canada, Denmark, Germany, Japan, Norway, US, UK	Australia, Denmark, Japan, Norway, US, UK	Japan, Netherlands, Norway, Switzerland, US, UK
Target Countries	South Africa, Nigeria, Mexico, Turkey, Morocco, Ukraine, **Kazakhstan**, Philippines, Colombia, Vietnam, Thailand, Indonesia, Egypt, Chile, India Regional : MENA CSP	Niger, Mozambique, Zambia, Bangladesh, Bolivia, Cambodia, **Tajikistan**, Yemen, Nepal Regional programs: Caribbean, South Pacific	Burkina Faso, DRC, Ghana, Indonesia, Laos, Peru, Mexico, Brazil	Ethiopia, Kenya, Mali, Honduras, Maldives, Nepal, Tanzania, Armenia, Liberia, Mongolia, Yemen, Pacific Region

Global Environment Facility

Funding:

- Total US$ 8.8 billion (1991-2009)
- GEF 5: Total 4.5 billion (2010 – 2014)

Three categories:

- Full size projects (FSPs) (> US2Million)
- Medium size projects (<US2Million), (MSPs),
- Enabling Activities (< 150000 US)

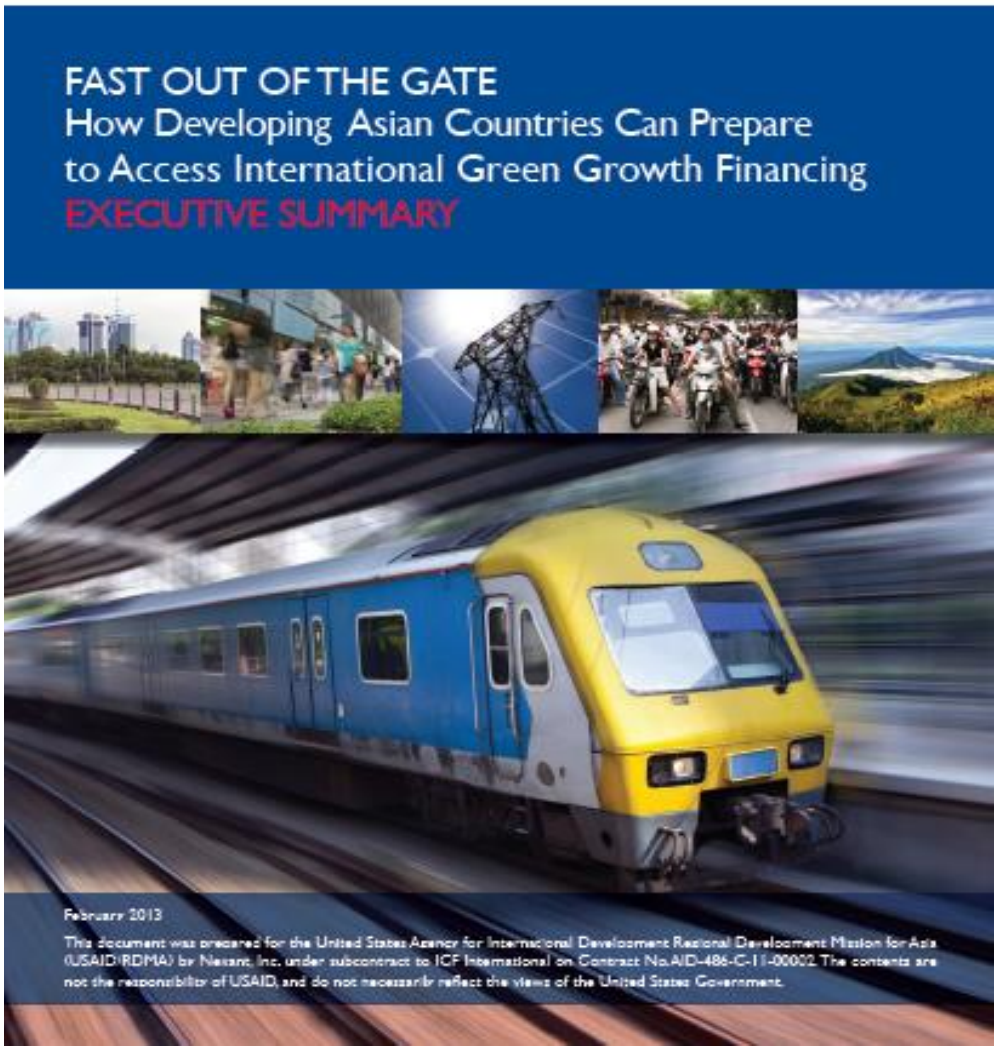
GEF Agencies:

- MDBs, UNEP, UNDP, IFAD, FAO, UNIDO.

Criteria:

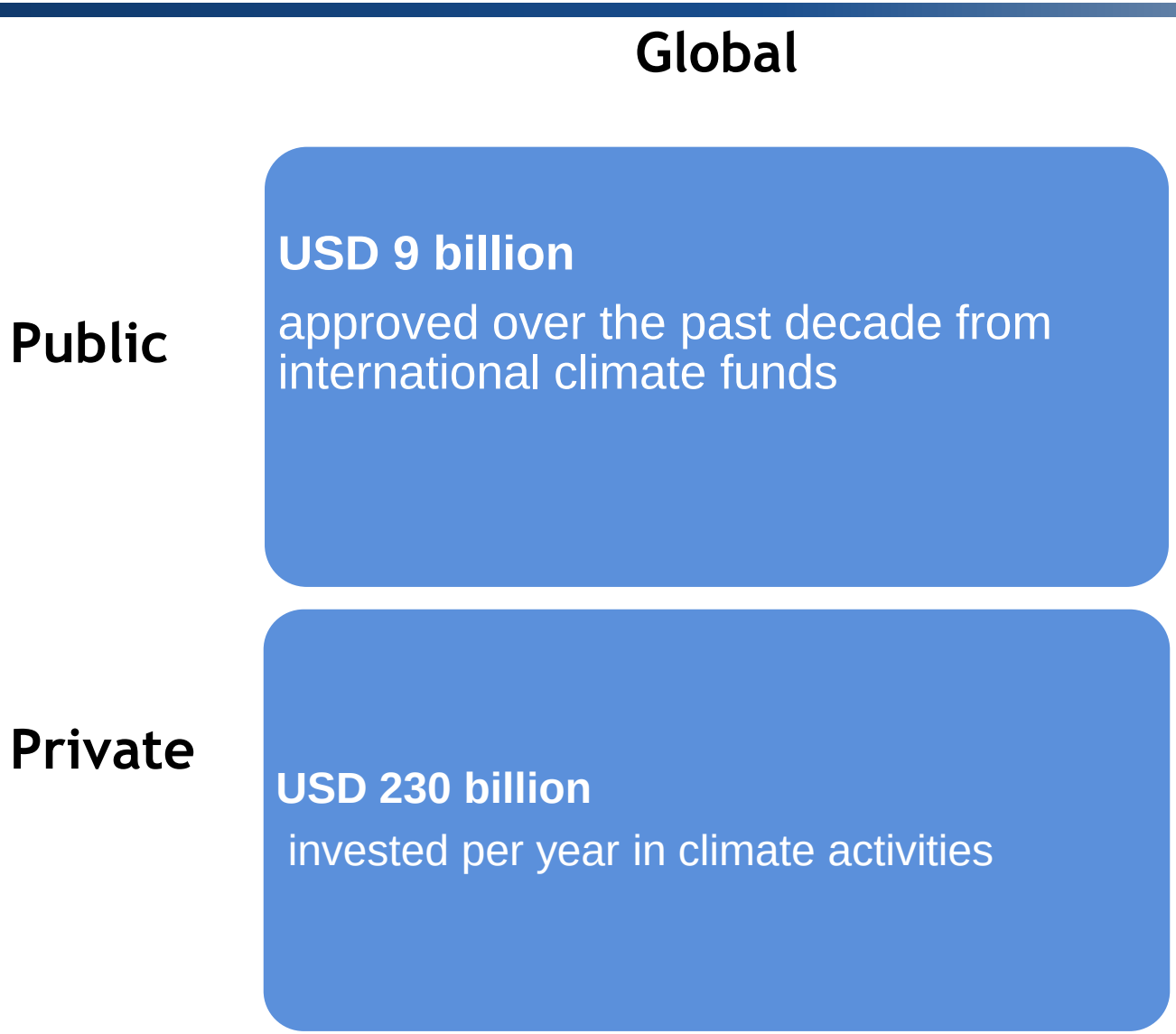
- Consistent with national priorities & with GEF operational strategy, covers incremental costs, requires public involvement, endorsement by host country, eligible country.

Fast Out of the Gate Report



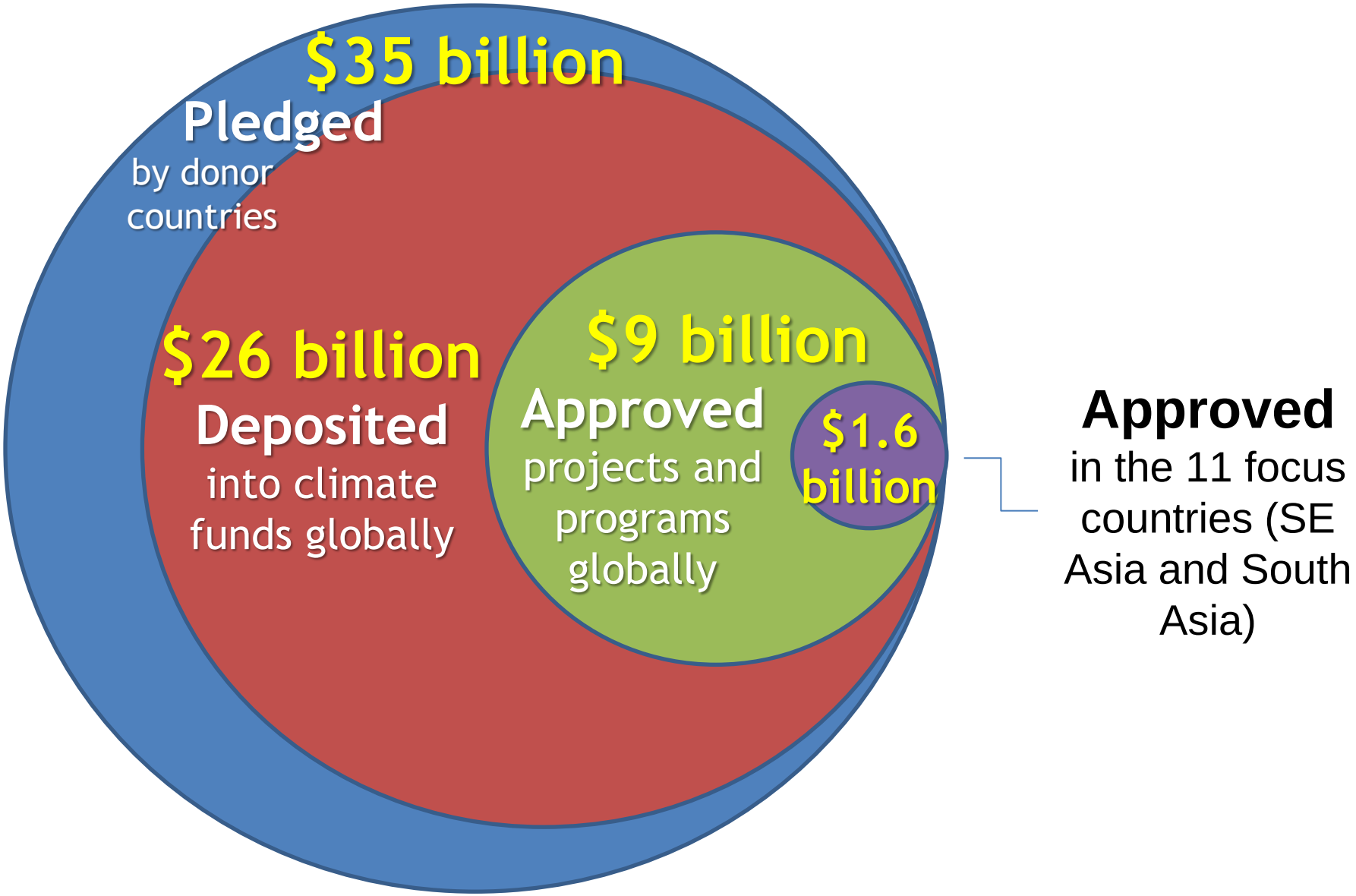
- The Report Targets the 11 LEAD Focus Countries
  - Bangladesh, Cambodia, India, Indonesia, Laos, Malaysia, Nepal, Papua New Guinea, Philippines, Thailand, and Vietnam
- LEAD is a regional program funded by the United States Agency for International Development regional Development Mission for Asia (USAID/RDMA)
- The Executive Summary can be downloaded at http://lowemissionsasia.org/resources

Private Finance Dominates Compared to Public Finance



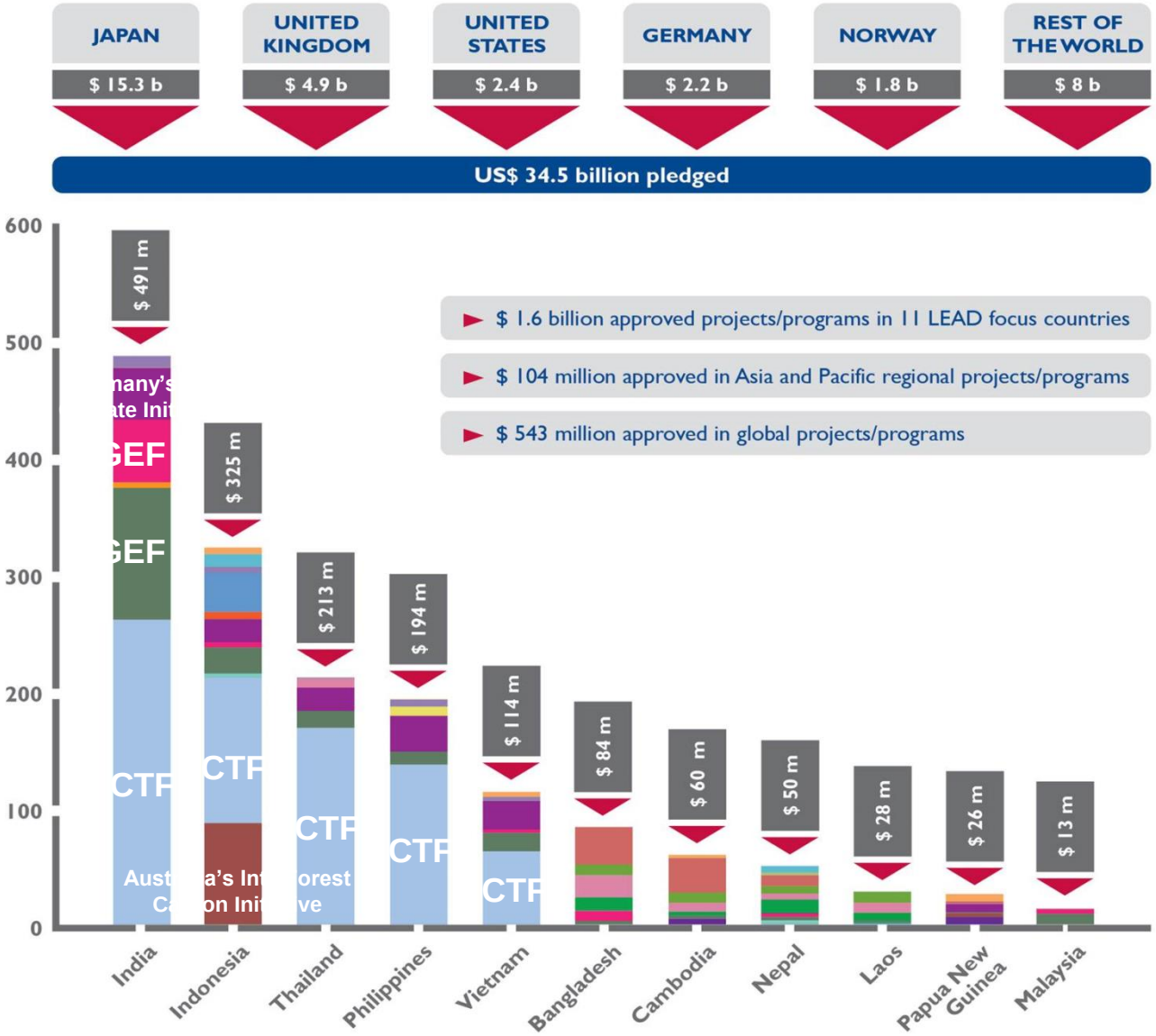
Source: *Climate Funds Update* ; *The Landscape of Climate Finance,* 2012; *Bloomberg New Energy Finance*, 2013; Nexant Research

International (Public) Climate Fund Availability



Source: *Climate Funds Update*, and Nexant research. Numbers include 25 international climate funds

International Climate Fund Flows



Source: *Climate Funds Update*, and Nexant research. Numbers include 25 international climate funds

Report Findings (1 of 2)

- Private sector dominates
  - Private sector flows dominate climate finance globally.
- Private sector needs to be educated
  - Pro-active engagement on climate finance needed with private sector investors.
- Carbon markets lessening, and climate bonds increasing, in importance
  - Decreasing role of carbon markets in leveraging investment.
  - Climate bonds are expected to make an increasing contribution.

Report Findings (2 of 2)

- Unique opportunity in alternative assets
  - Alternative asset investments present a new opportunity.
- Specialized climate banking emerging
  - Commercial banks are establishing specialized climate finance facilities.

- MRV systems crucial
  - Monitoring, reporting, and verification frameworks and capacity is critical to access public finance.
  - Donor financing of climate initiatives lacks a common MRV system
  - MDBs are developing an initiative to track GHG emissions and climate finance flows.

Recommendations (1 of 2)

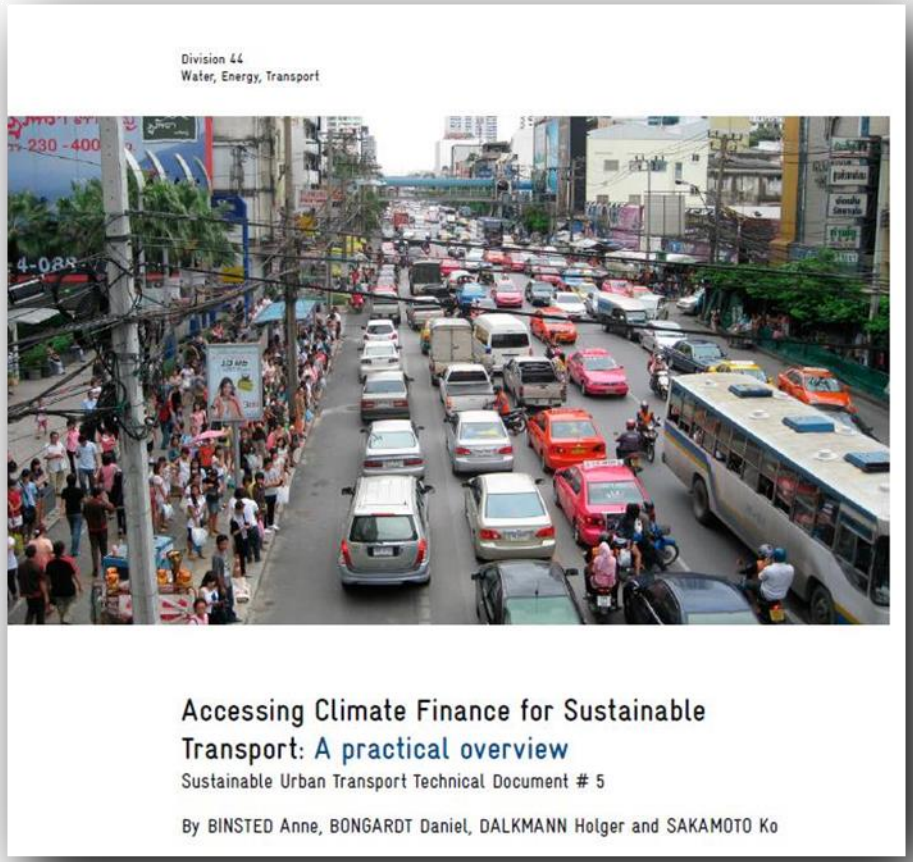
- Develop regulatory frameworks and MRV
  - Establish regulatory frameworks and MRV systems that support climate financing.
- Build capacity to bridge the finance gap
  - Build the capacity to bridge gap between project proposals and available financing.
- Track and monitor public finance
  - Develop processes to understanding linkages between public budgets and climate finance.
- Bring together local and national governments
  - Focus on national and sub-national coordination on finance.

Recommendations (2 of 2)

- Build private sector bank and investor awareness
  - Build awareness of, and capacity for, climate financing among private sector banks and investors.
- Blend public and private finance
  - Blend concessional financing with private sector financing.

- Build government capacity
  - Develop a learning network for effective policy, regulatory, and market mechanisms.
- Develop mechanisms for small projects
  - Establish financing mechanisms for smaller-scale infrastructure.

Climate Finance Guidance



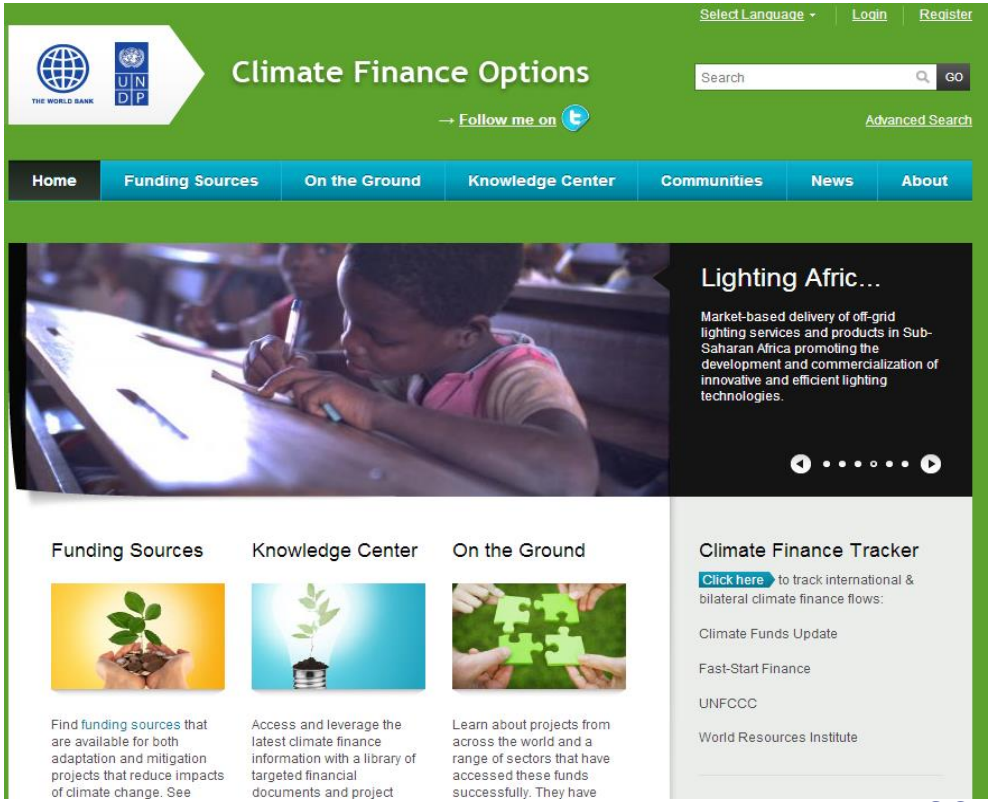
- GTZ Sourcebooks and Technical Papers for Policy Makers worldwide

  http://www.sutp.org

http://www.transport2012.org/bridging/ressources/files/1/1122,SUT-TD-5.pdf

Databases of Financing Sources

- Highlights funds and financing mechanisms to Asia
- Highlights eligibility, access, and MRV requirements
- Financing sources: public and private
- Intended audience: public and private sectors
- Builds on existing databases such as:
  - Climate Funds Update, Henrich Böll Stiftung and ODI: www.climatefundsupdate.org
  - Climate Finance Options, The World Bank and UNDP: www.climatefinanceoptions.org
- Ultimate goal: global database?



Policy Approaches to Support Energy Efficiency Finance

Policy Approaches to EE Finance

	Mandatory Measures	Financial Support				Labeling Program
		Direct Subsidy	Soft Loan	Tax Incentive	ESCO+ ESCO Fund	
1. Industries						
1.1 Large Energy Users	✓	✓	✓	✓	✓	-
1.2 SMES	-	-			✓	-
2. Buildings						
2.1 Gov. Buildings	✓	✓	✓		✓	
2.2 Private Buildings	✓	✓	✓	✓	✓	✓
3. Residential	-	-			-	
			✓			
			✓	✓		✓
4. Transportation	-				-	
		✓		✓		✓ (cars)

Types of Financing

Low Carbon Financing Mechanisms (1 of 3)

- **Carbon finance**: The general term is applied to investments in GHG emission reduction projects and the creation (origination) of financial instruments tradable on the carbon market. These include certified emission reductions (CERs), voluntary emission reductions (VERs), renewable energy certificates (RECs), etc.
- **Co-financing**: Type of financing in which the different lenders agree to fund under the same documentation and security packages, but may have different interest rates, repayment profiles, and terms.
- **Equity**: Risk capital provided by sponsors and investors in the form of funds subscribed for shares and subordinated loans or other credit facilities.

Low Carbon Financing Mechanisms (2 of 3)

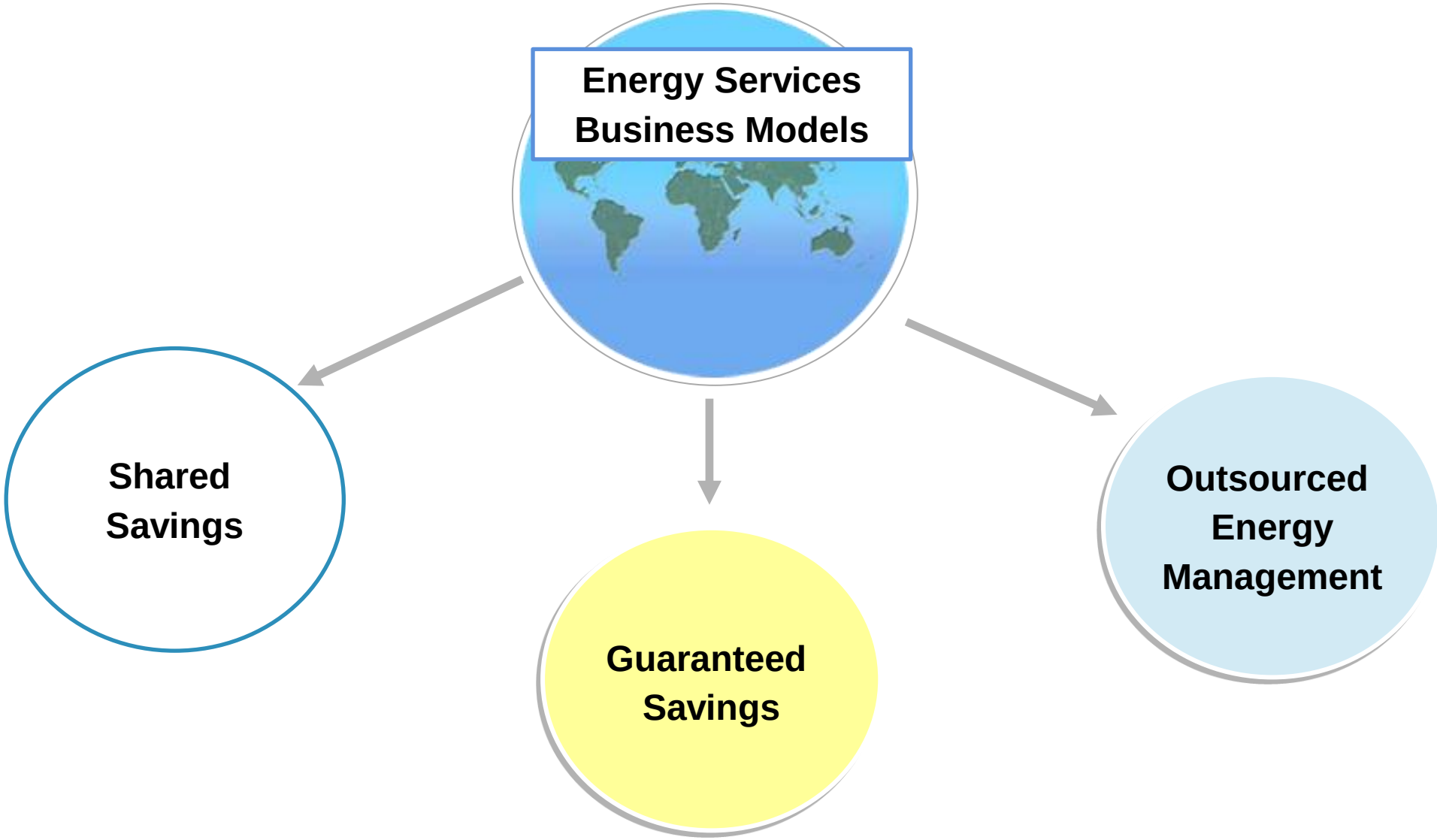
- **Grant**: Fund disbursed by one party, such as a multilateral or bilateral institution, to a recipient for the purpose of project-related funding.
- **Concessional loan**: Fund/facility acts as a lender, extending money to borrowers while being subsidized in terms of interest rate or tenor.
- **Official development assistance (ODA)**: Loans, grants, and technical assistance that governments provide to developing countries.
- **Payment for ecosystem services (PES)**: A financing instrument that internalizes externalities in the environmental sector on a local basis. The underlying principle is that those who provide environmental services get paid for doing so ("provider gets") and those who benefit from environmental services pay for their provision ("user pays").

Low Carbon Financing Mechanisms (3 of 3)

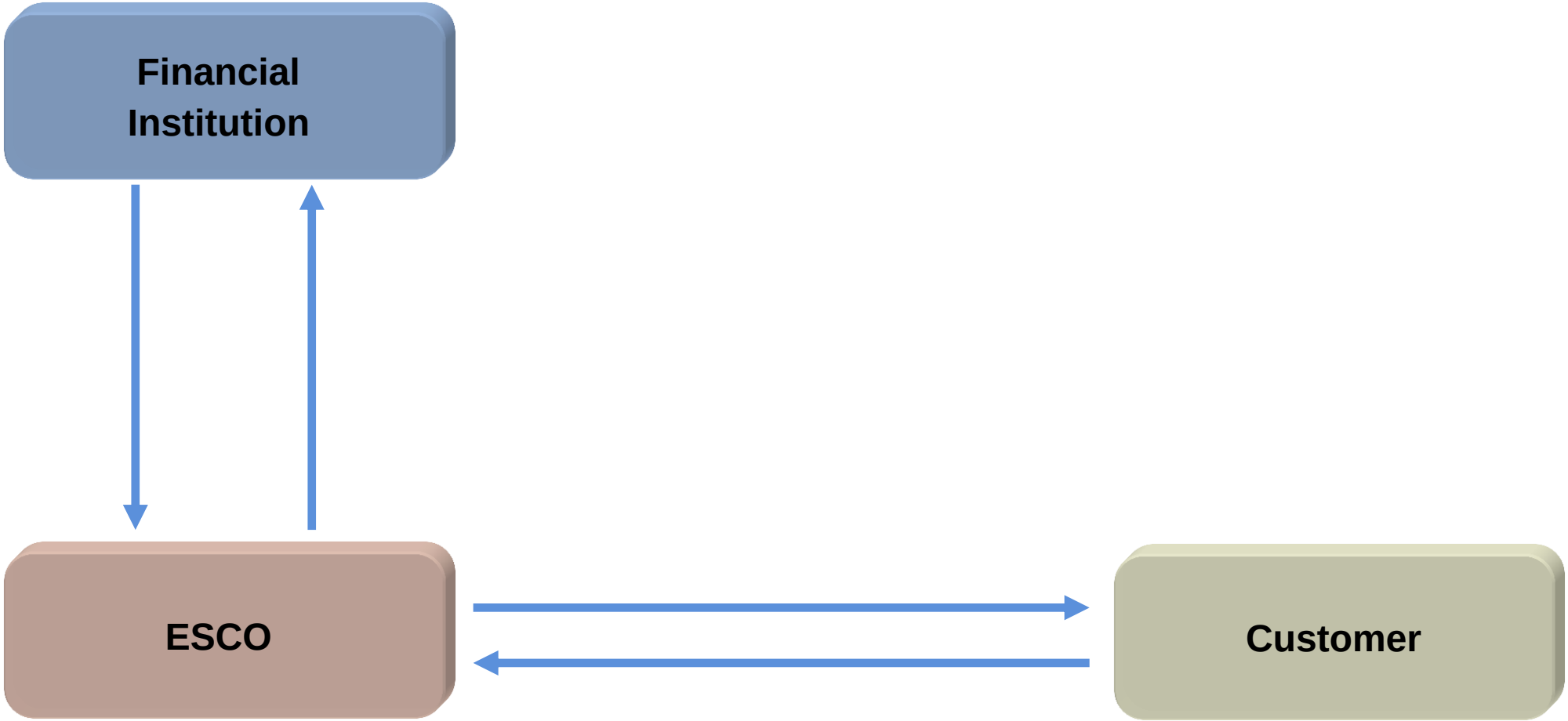
- **Risk management**: The identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events
- **Structured financing**: A sector of finance created to help provide increased liquidity or funding sources to markets such as housing or to transfer risk.
- **Technical assistance**: Assist entities with activities such as identifying, developing, and preparing projects to achieve financial closure.
- **Commercial debt**: Fund/facility acts as a lender, extending money to borrowers at market interest rates.

Financing with Assistance from Energy Services Companies (ESCOs)

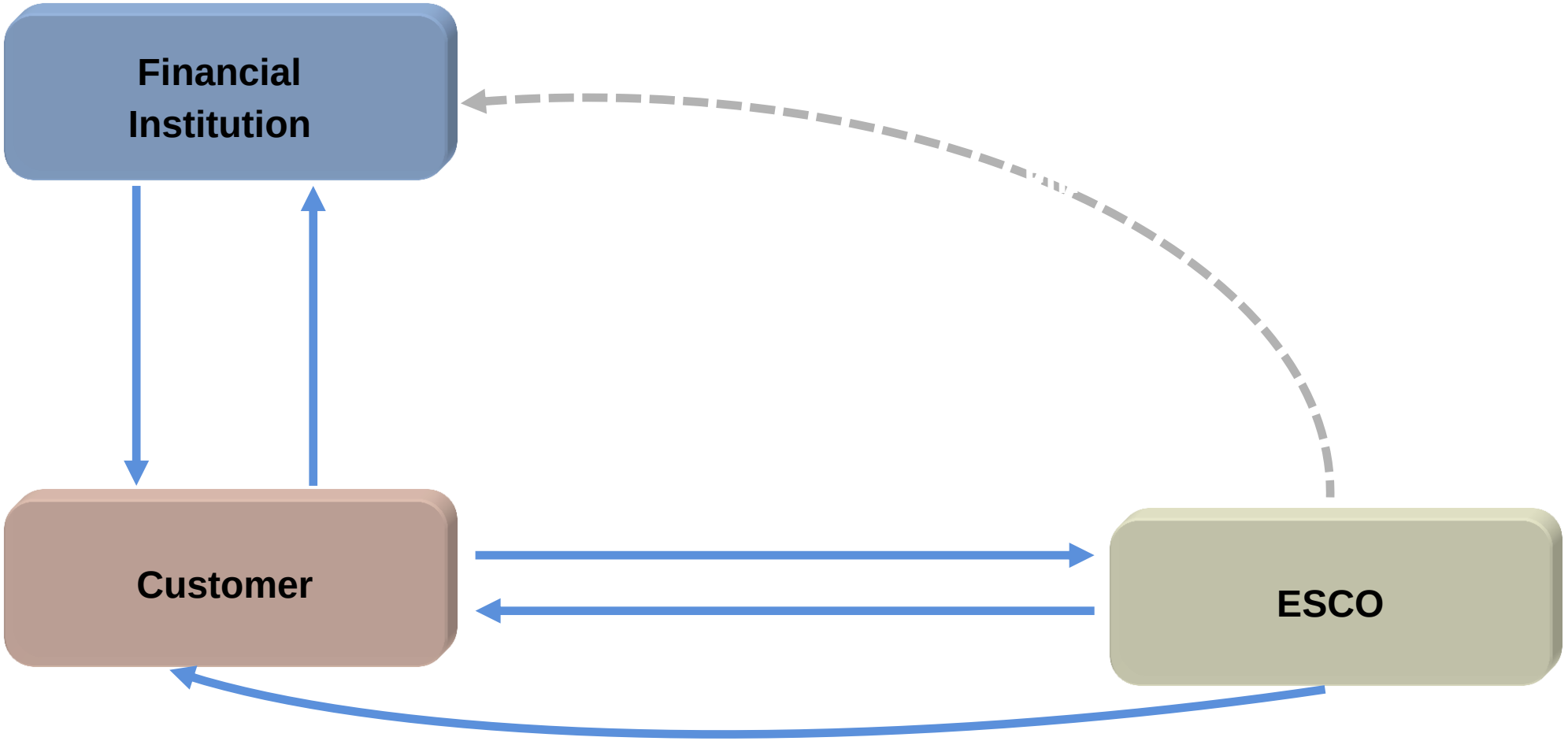
Energy Services Business Models



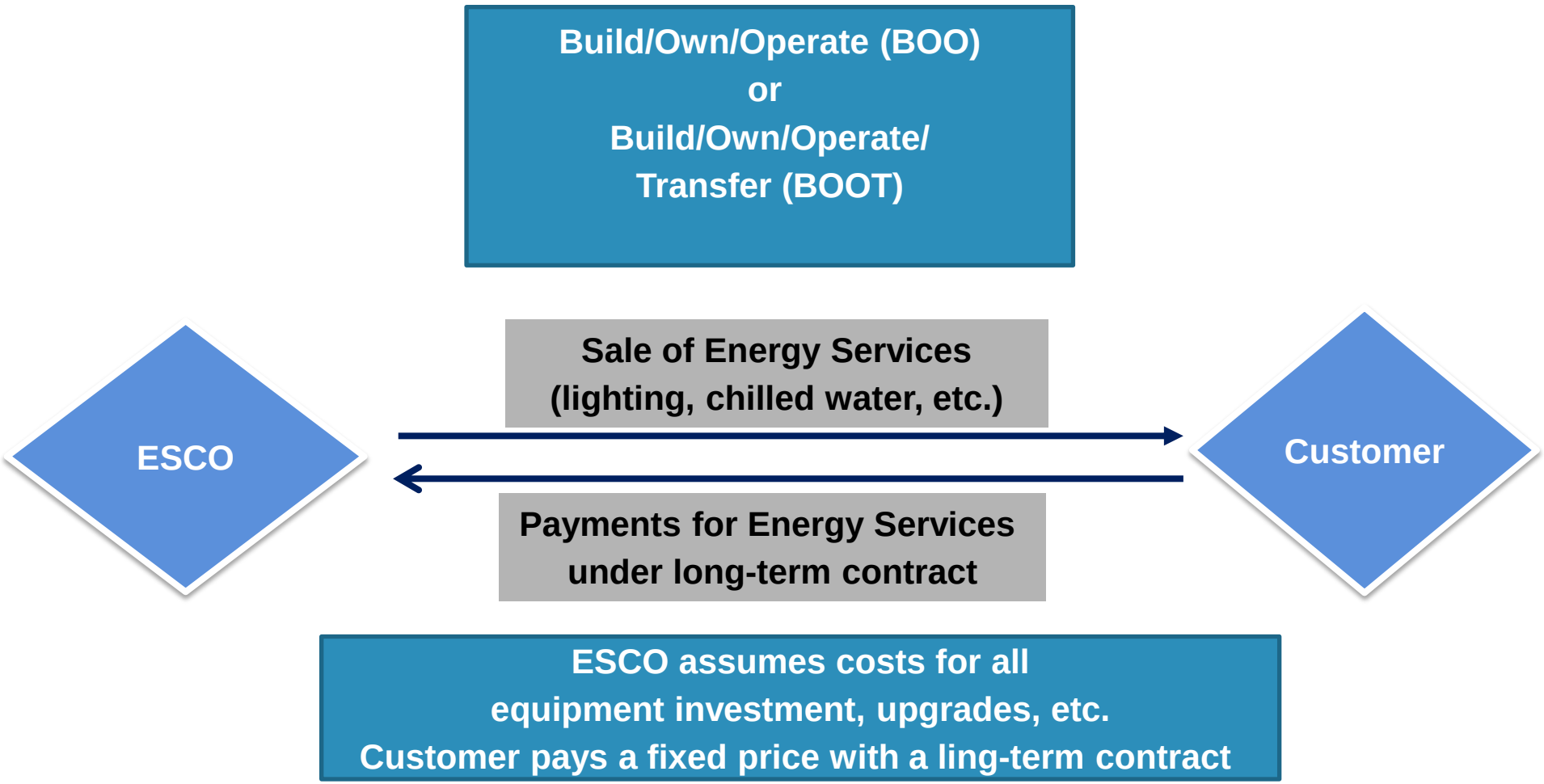
Shared Savings Model



Guaranteed Savings Model



Outsourced Energy Management

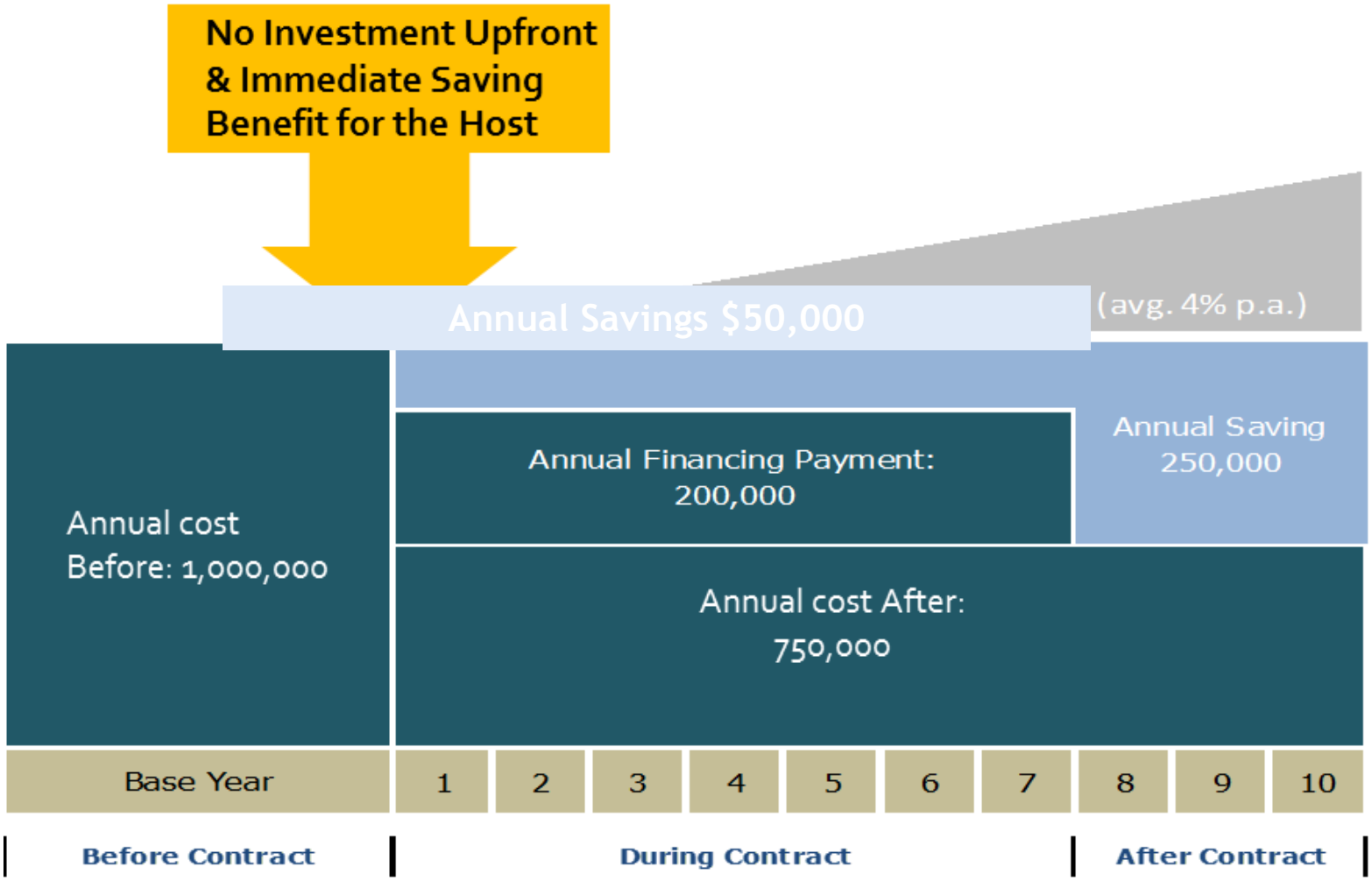


Why and When to use ESCOs for Outsourcing?

- Need for cost reduction
- Guarantee of performance
- Transfer of risks
- Economic decision ; managing your costs more effectively
- Equipment is at end of useful life; needs replacement
- Need to increase infrastructure capacity or optimize assets
- Focus more on core business

Customer Savings from Outsourcing: an example

$1 M Investment by ESCO
No investment by Host



Energy Services Markets in Asian Countries

COUNTRY	Initiation	No. of ESCOs	Characteristics
China	1998	> 500	- World Bank support - Mostly Guaranteed Savings - Focus on industry
Japan	1997	> 30	- 5 types of ESCOs - Focus mostly on buildings - All 3 business models used
India	1995	> 120	- Strong accreditation scheme - High growth in recent years - Focus mostly on buildings
South Korea	1992	> 200	- Financing from KEMCO - Focus on both industry and buildings - Guaranteed and Shared savings
Thailand	1999	45	- Government funding support - Focus on both industry and buildings - Guaranteed and Shared Savings

SAMPLE HOTEL PROJECT

Energy Conservation Measures	Cost (US$)	Savings (US$)	Payback (Years)
Upgrade Chiller Plant	$125,714	$20,247	6.2
Variable Primary Flow	$7,143	$2,069	3.5
Lighting Retrofit with LEDs	$91,996	$45,841	2.0
Hot water heat pump	$88,571	$18,546	4.8
Conversion of Electric heater boiler to LPG Gas Boiler	$150,000	$64,724	2.3
Cooling Tower Optimization	$22,923	$1,145	20.0
Upgrade 2nd Chiller Plant	$129,943	$19,199	6.8
Convert Secondary pump to Variable Flow	$29,086	$7,747	3.8
Convert split A/C to Chilled Water coil in kitchen	$9,137	$1,284	7.1
Total	**US$654,514**	**180,801**	**3.6**
Savings from baseline consumption	**14.5%**		
Total Greenhouse Gas Reduction	**824**	**mtCO2e per year**	

EE Projects Have Attractive Returns:

ADB's Southeast Asia Energy Efficiency Initiative

Name	Location	Business Model	Investment	Savings	Payback IRR	Energy Conservation Measures
Bank of the Philippine Islands HQ	Philippines	Guaranteed savings	$1.63 million	$154,695 guaranteed, $170,238 actual	9.6 years 6.2%	Replace chillers, pumps, cooling tower, install variable speed drives, building energy management system
Dusit Thani Group	Thailand	Guaranteed savings	$51,800	$13,800 guaranteed, $25,300 actual	2.1 years 48%	Replace diesel boilers with heat pumps
Central Patana	Thailand	Guaranteed performance	$1.2 million	$165,962 actual	7.2 years 11%	Install chillers, variable speed drives on pumps
First Sumiden Circuit Inc.	Philippines	Guaranteed savings	$430,000	$86,463 guaranteed, $96,274 actual	4.5 years 18.2%	Replace chiller
Charoen Pokphand Foods	Thailand	Guaranteed savings	$6 million	$1 million guaranteed, $1.2 million actual	5 years 24.7%	Install gas turbine cogeneration, computerized motor optimization
Pataya Food Industries	Thailand	Guaranteed savings	$2.23 million	$480,000 guaranteed, $740,000 actual	5.2 years 32.7%	Install coal and biomass steam boiler
Cyberjaya	Malaysia	Concession model – build-own-operate	$3.041 million	$370,000 actual	8.2 years 11.7%	Install ice storage, install chilled water storage
Grand China Princess Hotel	Thailand	Shared savings	$220,000	$50,000 guaranteed, $70,000 actual	3.1 years 29.2%	Replace chiller, install heat pump

Thank you!

Dr. Peter du Pont
Vice-President
International Development Consulting
Nexant Asia Ltd., Bangkok
pdupont@nexant.com
Asia Tel: +66 2 793 4642

Nexant, Inc.

San Francisco
New York
Houston
Washington
London
Frankfurt
Bahrain
Bangkok
Shanghai
Singapore
Kuala Lumpur

www.nexant.com

e-mail:info@nexant.com

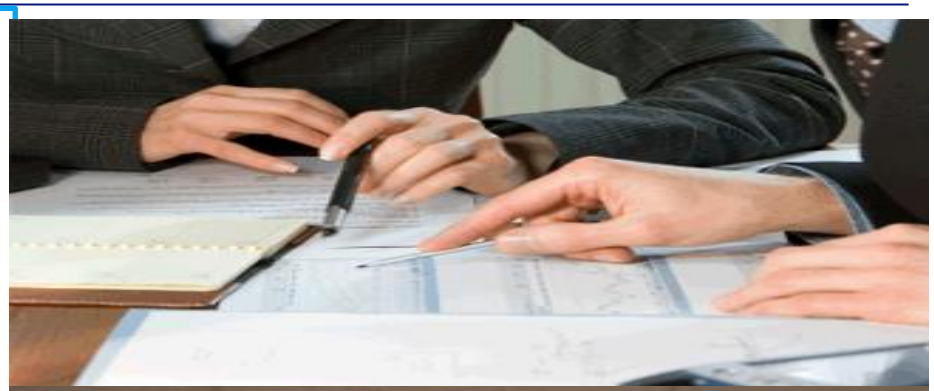
The following slides have been removed from presentation

Typical Concerns of Top Management

- Need to reduce operating costs
- Focus on core business
- Limited availability of funds
- Competing demands for internal capital
- Perception of risk of new technologies
- Staff knowledge and capabilities
- Quality of work
- Trust and confidence in service providers
- Payback/Returns on investment

Why Energy Services?

- Reduced cost and improved efficiency
- Little or no capital investment required from host
- Guaranteed equipment performance and energy savings
- Access to new energy efficient technologies
- Modern capital equipment
- Systemwide approach to implementation
- Flexibility in implementation options
- High quality installation, operation and maintenance
- Reduced maintenance costs
- Staff training



What is an Energy Services Company ESCO

An energy services business:

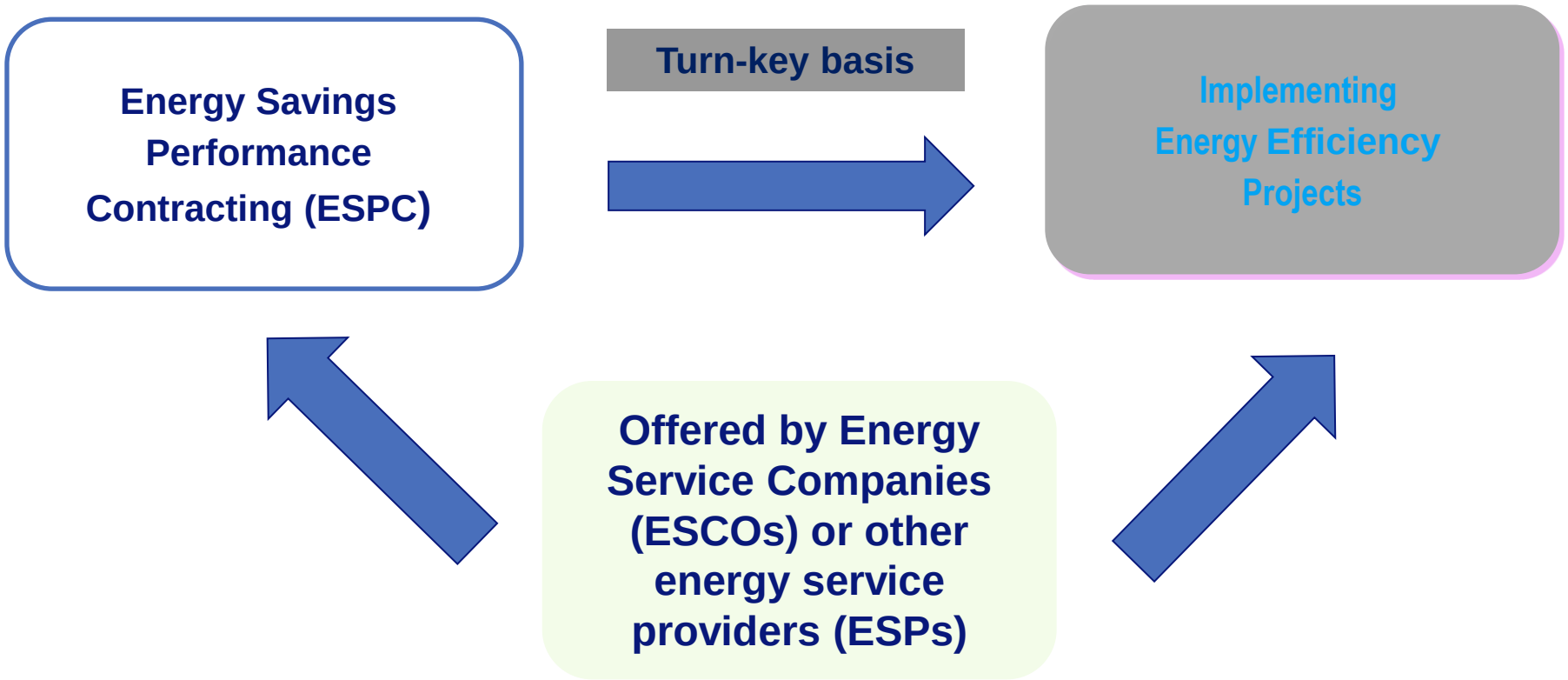
Provides a wide range of services for design and implementation of energy efficiency projects and related services to energy users

Provides these services using a performance contracting approach with guarantees

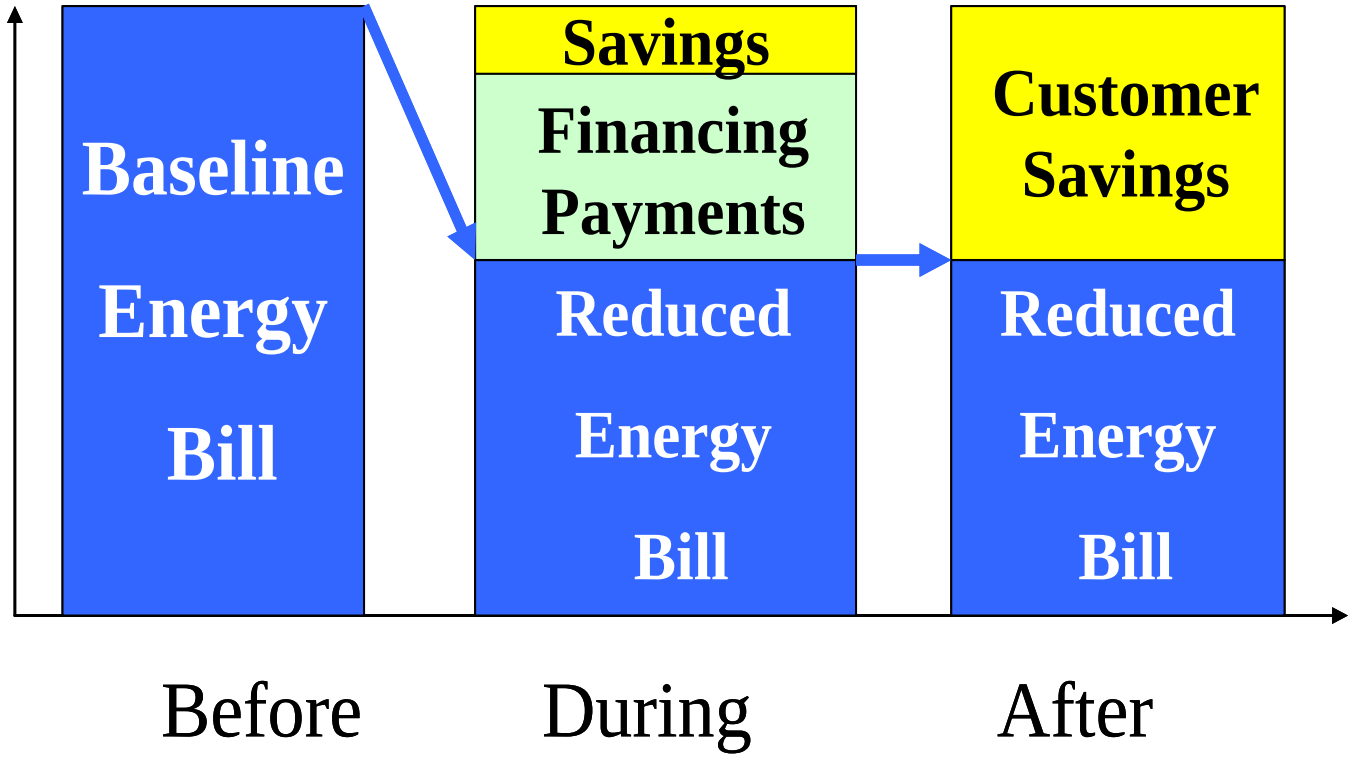
Wide range of organizations may operate as energy service businesses (Energy Service Providers)

Commonly referred to as an Energy Service Company or ESCO

Basic Model - Energy Saving Performance Contracting



Energy Savings from Energy Efficiency Projects



Range of ESCO Services

Additional ESCO Services

Operations and Maintenance

Providing or Arranging Financing

Additional ESCO Services

Training

Key Attributes of ESCO Services

Nexant

Energy Service Companies:

Provide or arrange a complete package of services, including energy analysis, design, installation, financing, and maintenance of the energy management (and other) technologies

Offer business and financing models under which customers effectively pay for the energy services from a portion of actual energy savings achieved

Payments to the ESCO are based on demonstrable results (that satisfy the performance guarantees provided by the ESCO)

Most of the project risks are assumed by the ESCO.