

2015-06-16

# Deep Dive Workshop on Energy Efficiency

ESCO Project in Korea

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## I ESCO OVERVIEW

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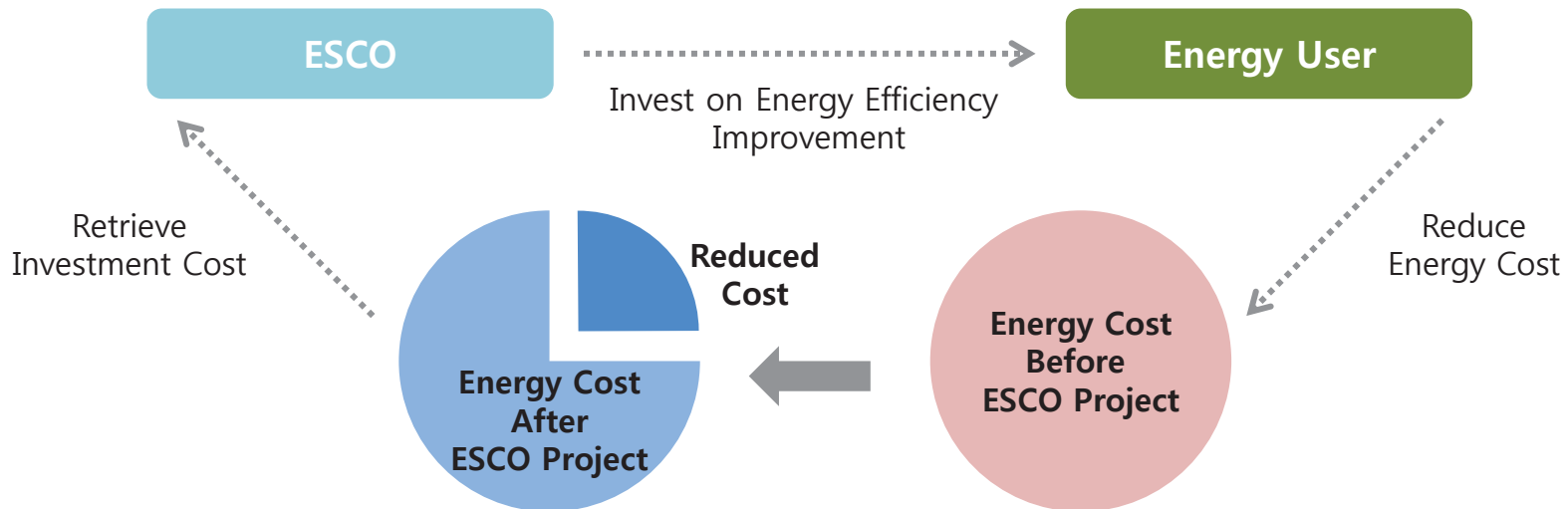
# 01 | General Overview

## ESCO Energy Service Company

A company that provides comprehensive energy saving service (including energy audit, facility replacement, maintenance) and retrieves investment cost through energy reduction cost

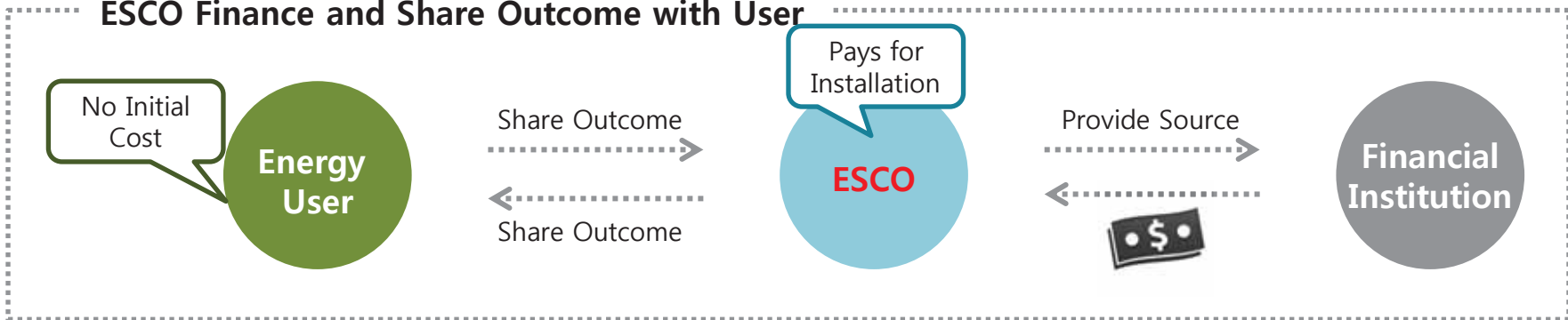
## ESCO Project

Project for replacing low energy efficiency equipments/facilities to higher energy efficiency equipment/facilities where an ESCO finances (or guarantees) for the replacement and retrieves the cost from reducing energy cost

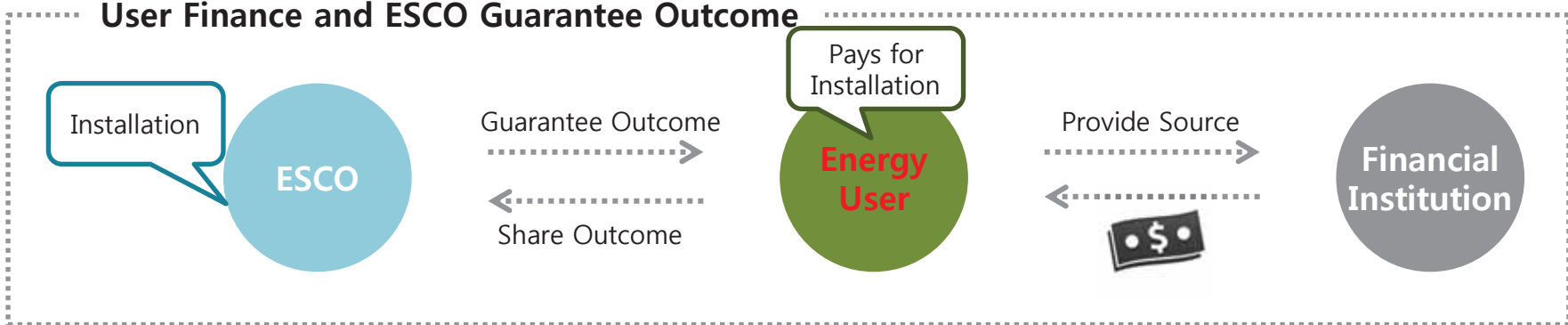


# 02 | Financing Model

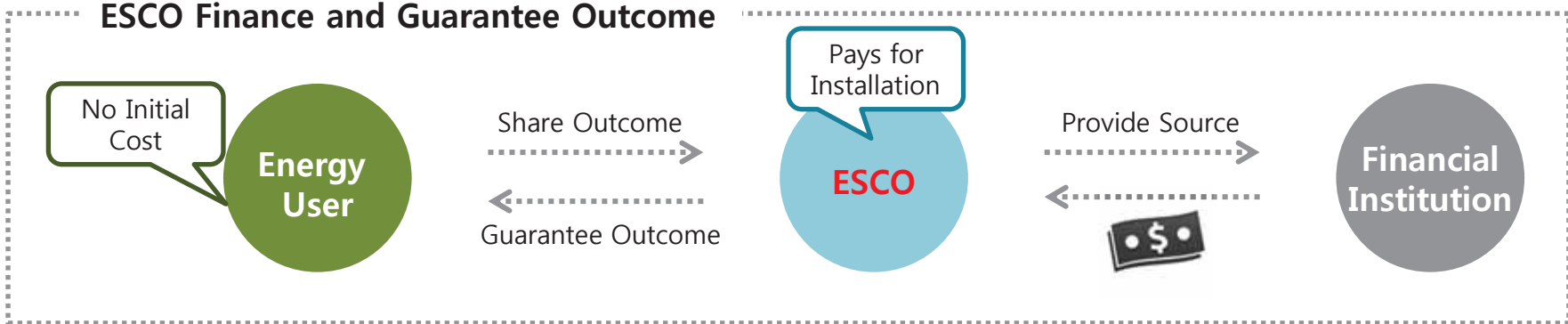
## ESCO Finance and Share Outcome with User



## User Finance and ESCO Guarantee Outcome



## ESCO Finance and Guarantee Outcome



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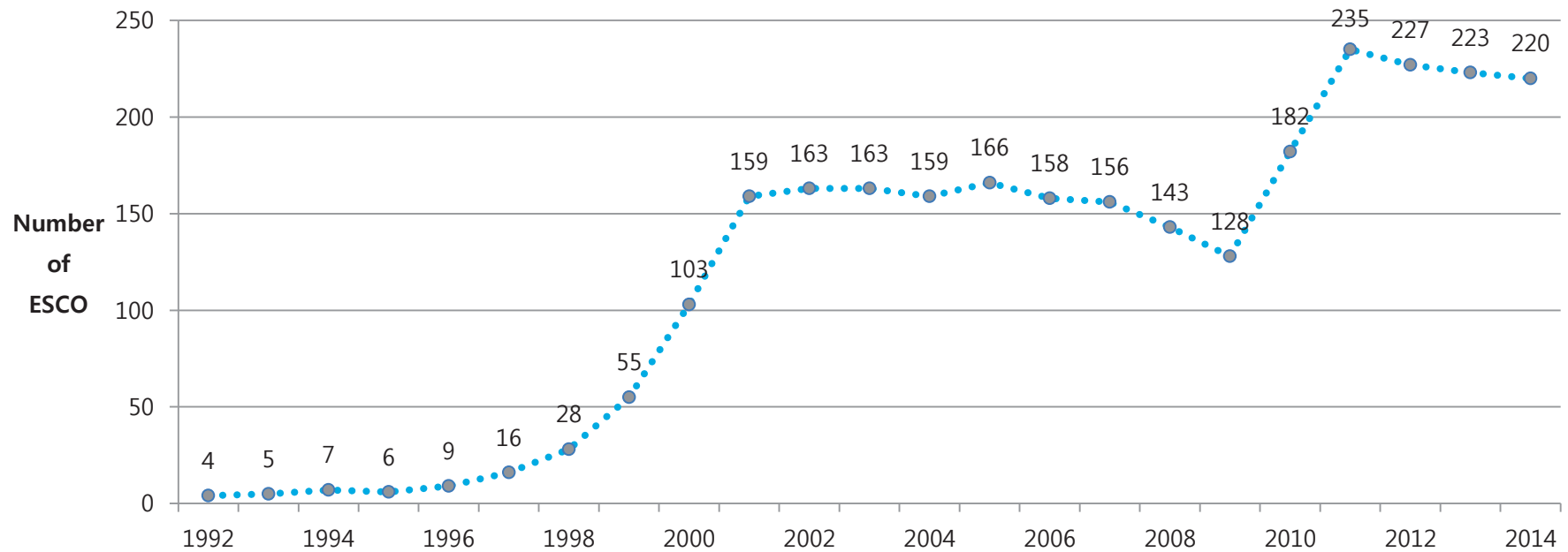
## II

## ESCO IN KOREA

- 01 Recent ESCO Trend in Korea
- 02 ESCO Fund in Korea
- 03 Incentives for ESCO Project in Korea

# 01 | Recent ESCO Trend in Korea (1/2)

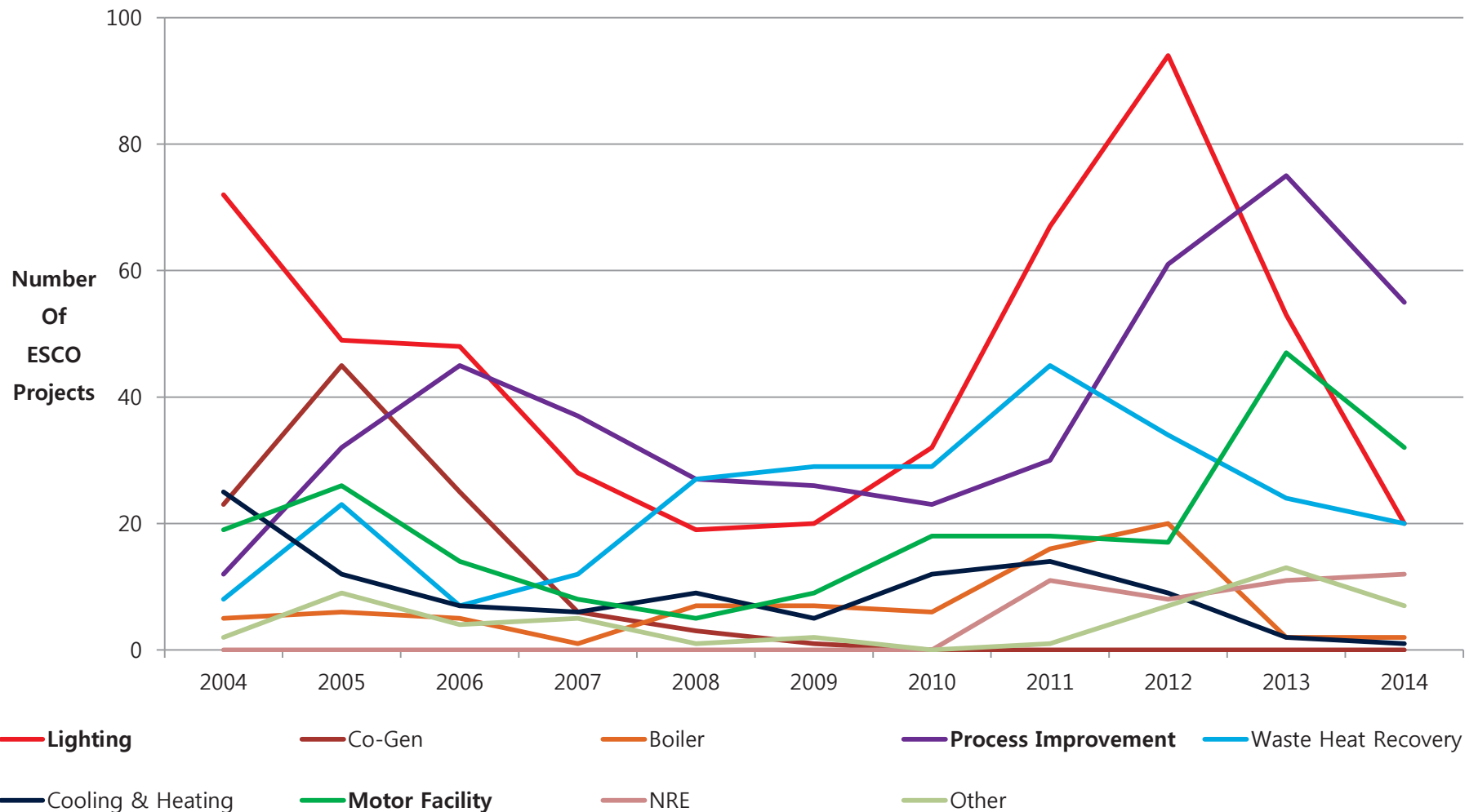
- Number of enlisted ESCO has been increasing steadily in Korea, starting from 4 ESCOs in 1992, to 220 ESCO in 2014
- Rapid Increase in ESCO business, reaching 254 billion KRW (229 million USD) of total investments in 2014



	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14
Investment (Million USD)	126	90.3	74.8	164.6	120	122.1	100.4	118.6	117.6	268.1	248.9	278.7	228.6

# 01 | Recent ESCO Trend in Korea (2/2)

- Lighting replacement for buildings was most dominant in early stages, but the type of project is being diversified
- Increase of specialized ESCO and more diversification of project types is expected





## 02 | ESCO Fund in Korea

- Policy Fund for ESCO is supported by the Korean Government, providing whole or partial amount of project budget with low interest rate

### ESCO Project Funds

No.	Funding Source	Total Amount	Limit per Company (Limit for single workplace)	Loan Term	Interest
1	Policy Fund	190 Million USD Conglomerate : 60 Million USD SME : 130 Million USD	27 Million USD (13 Million USD)	Payable in 7 years with a 3-year grace period	Annual 2.75% (Fixed rate)
2	Private Loan	60 ~ 90 Million USD	18 Million USD (9 Million USD)		To be calculated

- ✓ Policy fund applies different support rate according to energy user
  - SME : 100% of total project cost
  - Conglomerate : 60%; Remaining 40% can be applied to private loan
- ✓ Interest of private loan is not a fixed rate and is subject to calculation
  - Private procurement interest rate + financial institution commission(1.5%) – pinch (approx. 2%)
- ✓ Fund for foreign project can be provided from private loan

## 03 | Incentives for ESCO Project in Korea

- Korean Government has arranged regulation in regards to energy saving projects or ESCO projects to support companies' energy efficiency

### Tax Benefits

#### The Special Tax Treatment Control Law Article No. 25-2

*"Company that invests in specific energy saving facility are subject to excluding 10% of total investment cost from income tax or corporate tax."*

Industry  
/Building  
Energy Saving  
Facility

Power Demand  
Management  
Facility

High-Efficiency  
Certified  
Equipments

Stand-by  
Power  
Reduction  
Products

New and  
Renewable  
Energy Facility

#### The Special Tax Treatment Control Law Article No. 7

*"Small and medium sized ESCO that implements energy saving business stated in Article No. 25 is subject to excluding tax equivalent to income tax or corporate tax multiplied by exemption ratio"*

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## ESCO PROJECT CASE

- 01 Project Overview
- 02 Energy Audit Result
- 03 Project Implementation

# 01 | Project Overview

## Title

Furnace Replacement for Forge Company

## Project Period

2015. 03 ~ 2021. 09 (6 ½ Years)

## Energy User Profile (2014)

GENERAL			
<b>Location</b>	Ulsan City, Korea	<b>Products</b>	Forge Welding Product, Flange
<b>Operation Days</b>	300 Day / Year	<b>Operation Hours</b>	5,400 Hours / Year
ENERGY CONSUMPTION			
<b>Fuel</b>	<b>Consumption (TOE)</b>	<b>Cost (USD/Year)</b>	<b>Unit Cost (Excluding VAT)</b>
LNG	928.5	731,815	0.82 USD/Nm <sup>3</sup>
Electricity	1,630.4	895,795	0.13 USD/kWh

## 02 | Energy Audit Result(1/2)

- Through energy audit to the company, high energy loss was identified within the process

### Current Energy Issues

- ✓ Productivity of Heating Furnaces in 6 ton Forge Line (2014)

Item	No. of Units	Fuel Consumption (Nm <sup>3</sup> /year)	Product (ton/year)	Operation Hours (h/year)	Basic Unit (Nm <sup>3</sup> /ton)
Continuous Type Heating Furnace (Main Furnace)	1	364,012	3,187.6	1,736.8	114.2
Batch Type Heating Furnace	3	139,745	469.2	330.2	297.8
Total	-	503,757	3,656.8	2,067	137.8

- ✓ Issue in Batch Type Heating Furnace
  - High fuel consumption due to discontinuous product heating
  - High heat loss in flue gas (higher than 380°C)
- ✓ Issue in Continuous Type Heating Furnace
  - Not able to produce diverse products due to limits in product size and weight

# 02 | Energy Audit Result(2/2)

- Reduction of energy consumption is expected through replacement of facility

## Improvement Item

- ✓ Replacement of Batch Type Heating Furnace to Rotary Hearth Type Heating Furnace



Investment
1.1 Billion KRW = <b>982,000 USD</b>

Energy Saving
201.3 TOE/year  176.25 Million KRW/year = <b>157,000 USD/year</b>



PAY BACK  
6.2 YEARS

# 03 | Project Implementation

- Energy user decided to implement the improvements through ESCO project to reduce technical and financial risk



Energy User



ESCO

## User Finance and ESCO Guarantee Outcome Contract

### Project Period

➢ 2015. 03 ~ 2021. 09

### Installation Period

➢ 2015. 03 ~ 2015. 06 (3 Months)

### Performance Guarantee Period

➢ 2015. 07 ~ 2021. 09 (6 years and 2 Months)

### Targeted Energy Reduction

➢ 201.3 TOE / Year, 157,000 USD / Year

### Guaranteed Energy Reduction

➢ 181.2 TOE / Year, 141,000 USD / Year (90%)

### Sharing of Excess Reduction Cost

➢ Energy User : 100%, ESCO 0%

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## IV ENERGY AUDIT RESULT IN ASEAN

- 01 Energy Audit in Philippines
- 02 Energy Audit in Indonesia



# 01 | Energy Audit in Philippines

- In 2013, energy audit was conducted to a steel manufacturing company in Philippines.
- Still in process of managerial level confirmation for direct investment

 **Internal Discussion on Implementing Energy Efficiency Project**

**Energy Audit for Energy Efficiency Project**



Installation of  
**Waste Heat Boiler**

Installation of  
**Raw Material Pre-Heating Zone**

Replacement of  
**Fuel Atomizing System (Air->Steam)**

**Investment**  
720,500 USD

**Energy Reduction**  
600,400 USD / Year



**PAY BACK**  
**1.2 YEARS**

# 02 | Energy Audit in Indonesia

- In 2014, energy audit was conducted to a glass product manufacturing company in Indonesia.
- Energy user plans to install the improvement items within 2015 with their internal investment

 Install improvement items within 2015

## Energy Audit for Energy Efficiency Project



- LNG Using Facility**
  - Improve Heat Loss Prevention
  - Control Air/Fuel Ratio
- Electricity Using Facility**
  - VSD in Air Cooling Facility
  - VSD in Cooling Water Pump
  - Cool Inhaled Air
  - Replace Lighting Bulbs

**Investment**  
2.7 Million USD

**Energy Reduction**  
2.5 Million USD / Year



**PAY BACK**  
**1.1 YEARS**

# THANK YOU

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