
Analysis of Financing Model for Energy Efficiency Investments in Korea

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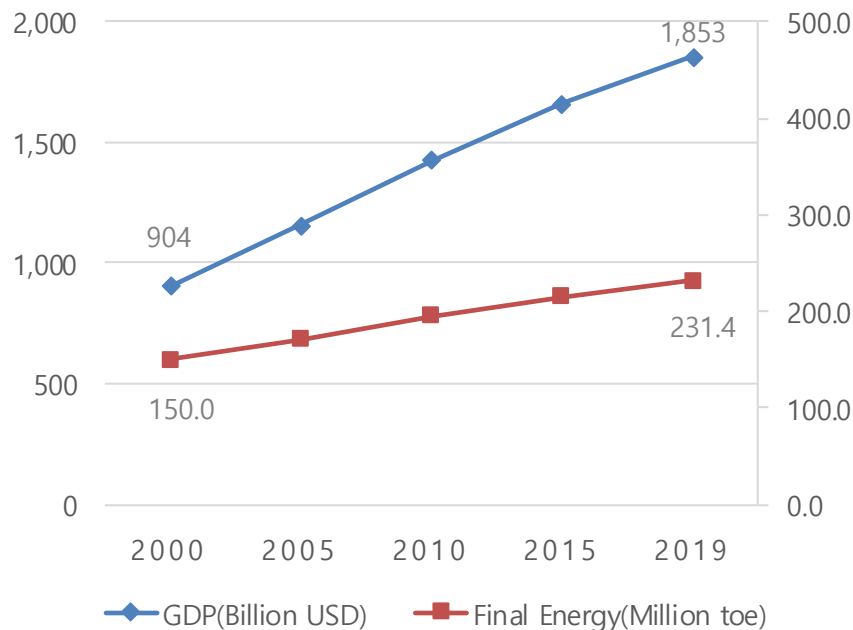
1. Current Status of Energy Consumption in Korea



Final demand and GDP in Korea

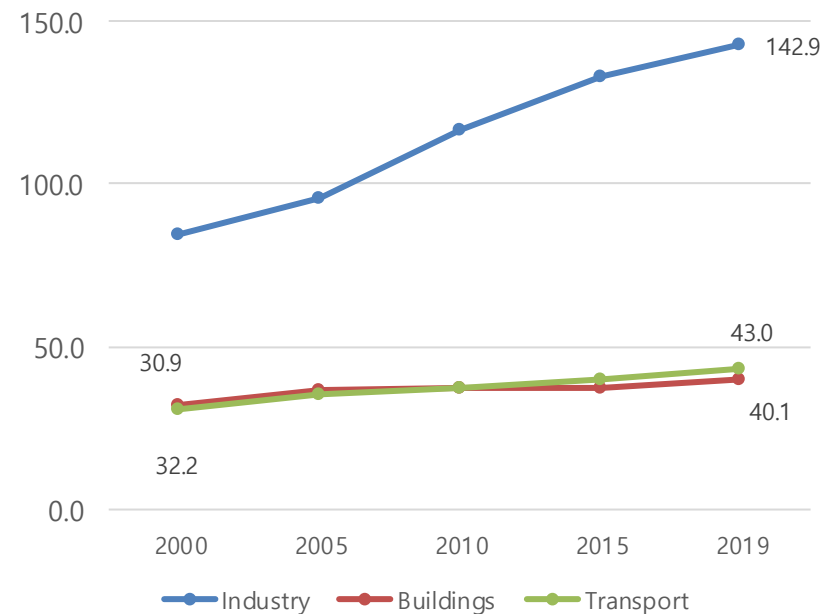
- Final energy consumption has increased at an average annual rate of 2.3% since 2000, which was 231 million toe in 2019, and decreased slightly in 2019 after peaking in 2018.

<Final energy consumption and GDP>



- Industrial sector led to the increase in consumption, which was the largest share of energy consumption, 61.8% in 2019.
- Buildings and Transport increased as well.

< Final Energy Consumption, by sector >



1. Current Status of Energy Consumption in Korea



Energy intensity

- Korean energy intensity was higher than major developed countries although Korea's rate of energy intensity improvement decreased to 1.6% from 2010 to 2019.
- Energy intensity(energy/GDP) : an important indicator of how much energy is used by economy. Lower energy intensity means a lower cost of converting energy into GDP.

< Energy intensity improvement in Korea and major countries, 2000-2019 >

	2000	2005	2010	2015	2019	Average Annual Rate	
						00 → 10	10 → 19
KOREA	0.179	0.156	0.15	0.141	0.130	△1.8%	△1.6%
JAPAN	0.102	0.10	0.092	0.079	0.071	△1.0%	△2.8%
GERMANY	0.111	0.106	0.101	0.083	0.077	△0.9%	△3.0%
USA	0.165	0.149	0.136	0.120	0.111	△1.9%	△2.2%

Note : TEPS/GDP (TOE per thousand 2015 USD PPP)

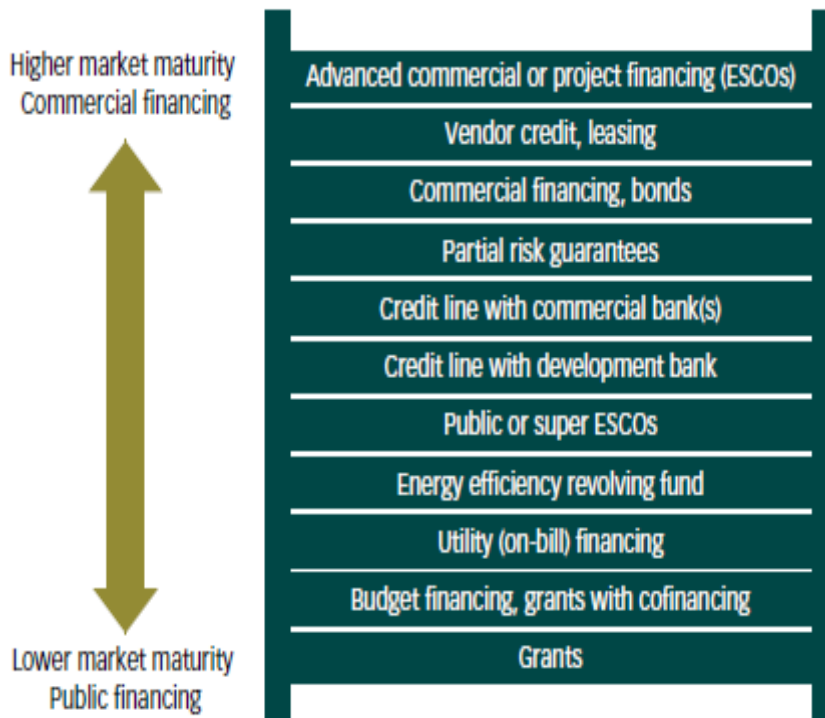
Source: Energy Indicators, OECD Library



2. Financing Energy Efficiency

Financing mechanisms to support EE investments

< Ladder of financing options for EE investments >



Source : World Bank(2018), Financing Energy Efficiency, Part 1: Revolving Funds

- The spectrum of financing options :
 - Advance from financing options that rely more on public resources to those that rely more on commercial capital.
 - i.e. grants and public funds → leasing and project financing
- Financing mechanisms should be selected based on stage of market development and financing gaps.
- Over time, financing programs should seek to climb the ladder to more sustainable and commercial models.

3. Financing Methods for EE Investments in Korea



■ End user's financing for EE projects

- Energy users who are in need of energy efficiency improvements but have limited financial means or technical capacities to implement such projects on their own can (1) hire an ESCO and (2) use Utility Rebate Programs.
 - ESCOs provide technical skills, assuming performance risks, facilitating access to finance from commercial **lenders**, and enabling **energy users to repay initial costs through future savings**.
 - Utility Rebate Programs can reduce users' initial investment costs.

3. Financing Methods for EE Investments in Korea



■ What is an Energy Service Company (ESCO)?

- Generally, the ESCO is a business that provides comprehensive energy solutions including designs and implementation of energy efficiency projects.
- In Korea, the ESCO is defined as to a company equipped with required facilities, capital, and technology and registered to the Ministry of Trade, Industry and Energy(MTIE).

3. Financing Methods for EE Investments in Korea



What is an Energy Performance Contracting (EPC)?

- EPC is an innovative financing scheme offered by ESCOs to customers and an provision of energy savings with a guaranteed outcome.
 - The key principle of EPC is that **the investment costs are financed from the resulting savings.**
 - The ESCO plans and conducts the project and receives only service fees from achieved savings.
 - Clients will eventually benefit from both energy and cost savings after the end of the contract .
 - Most EPC projects focus on the implementation of energy efficiency measures including lighting, HVAC, energy management and control, and envelope insulation.

3. Financing Methods for EE Investments in Korea



EPC models in Korea

- In Korea, ESCOs have three Energy Performance Contract Models for energy users ; **(1) New Shared Savings, (2) Guaranteed Savings by ESCO financing, and (3) Guaranteed Savings by Energy users' financing.**
 - The EPC commits the ESCO to installing the necessary equipment, provides a performance guarantee and establishes the terms of any upfront or ongoing payments, which are intended to be less than the financial savings realised by the project.

⇒ **ESCO's service fees (upfront payments) < achieved savings from the EE project**

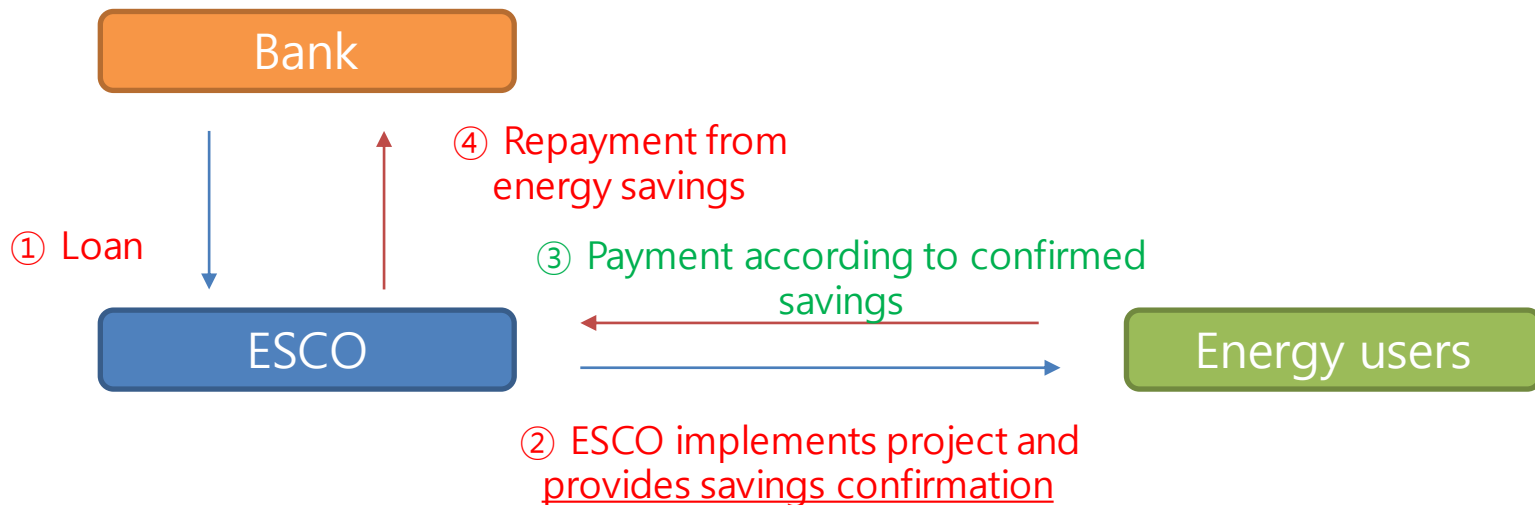
3. Financing Methods for EE Investments in Korea



End users' Financing Options in Korean EPC Models

(1) New Shared Savings Model

- Combining the advantages of the shared savings with those of Guaranteed savings.
- ESCOs take on both financial and technical risk.
- Prior to implement projects, energy users confirms the payback plan to ESCOs according to estimated savings calculated by energy audit.
- ESCOs do not guarantee the energy savings and banks are not responsible for the savings.



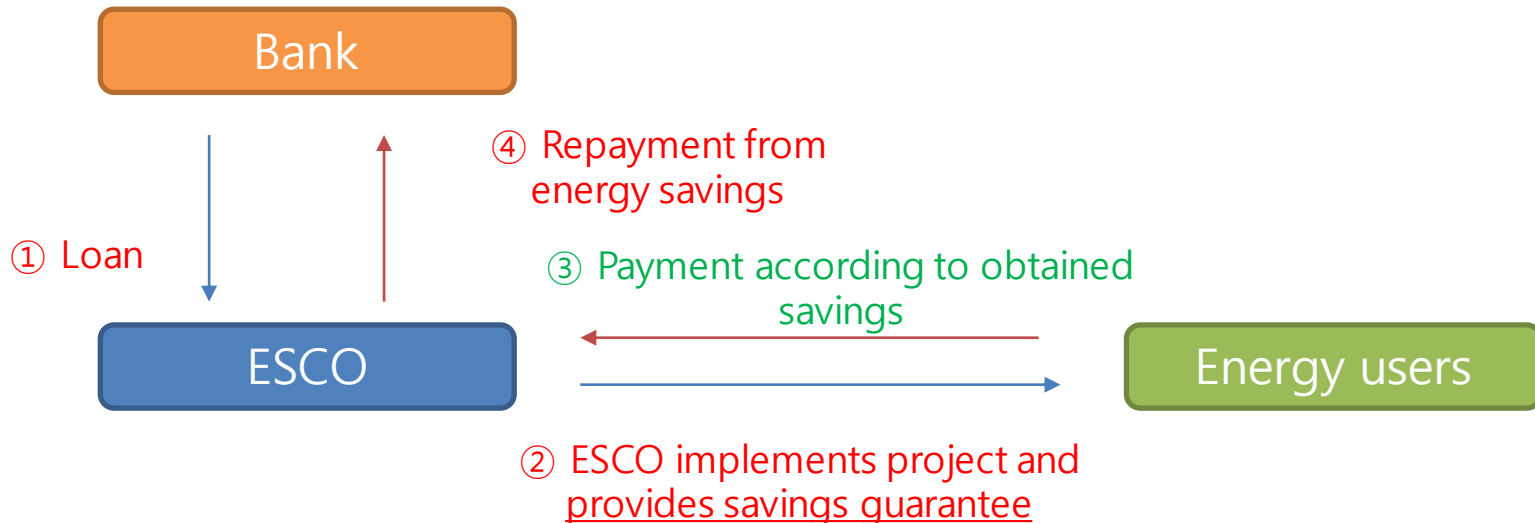
3. Financing Methods for EE Investments in Korea



End users' Financing Options in Korean EPC Models

(2) Guaranteed Savings by ESCO financing

- ESCOs provide financing needed to implement projects and guarantee the energy savings.
- ESCOs take both financial and technical risk.



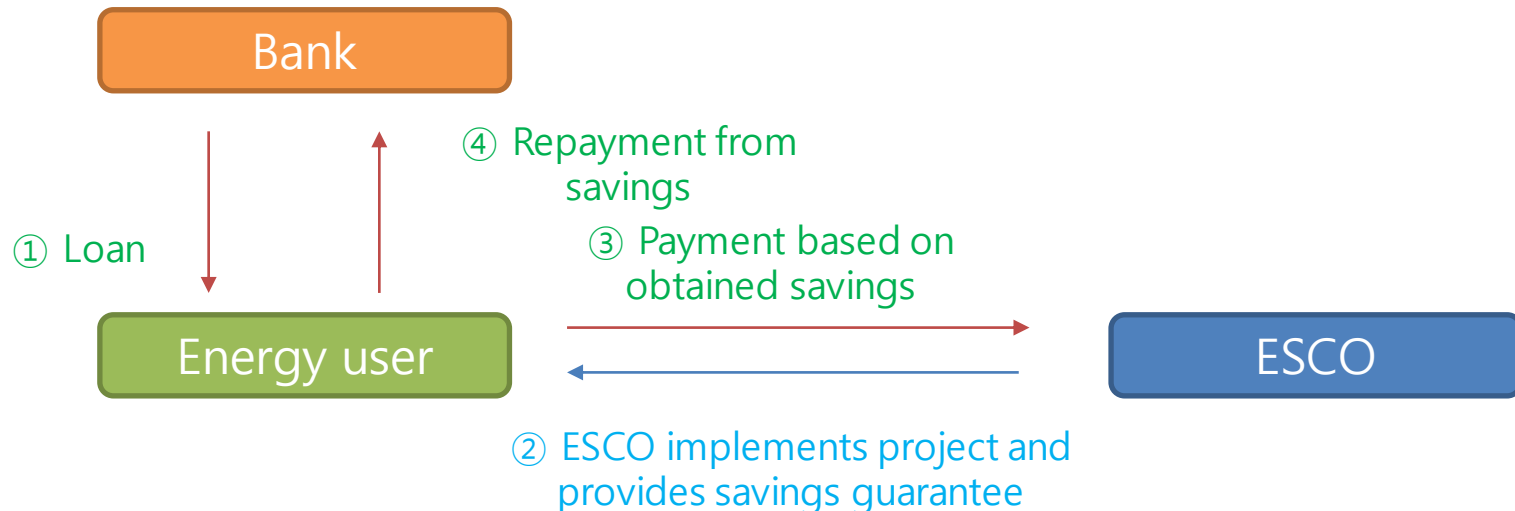
3. Financing Methods for EE Investments in Korea



End users' Financing Options in Korean EPC Models

(3) Guaranteed Savings by Energy users' financing

- Same as the original Guaranteed Savings model.
- Energy users assume on financing for initial costs. (bank or their own equity)
 - ESCOs can help arrange users' project financing.
- ESCOs take only technical risk.

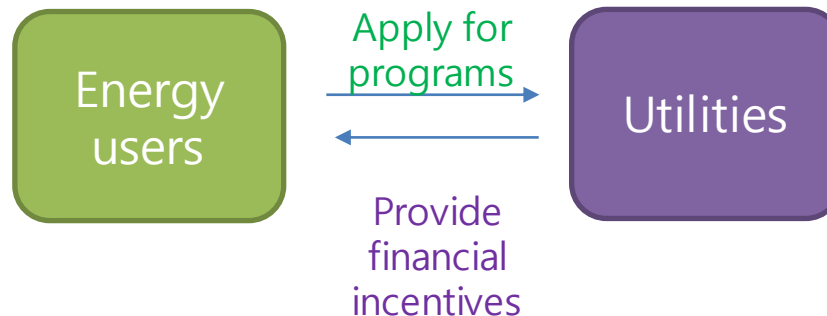


3. Financing Methods for EE Investments in Korea



End user's Financing by using utility rebate program

- Energy users can use utility rebate programs for their energy efficiency investments.
 - EERS programs offer financial incentives to upgrade energy efficiency products.
 - Energy users can reduce their upfront capital costs of projects through rebate programs.
 - Rebate program is not direct financing methods but it can reduce initial costs and energy bills after upgrading.



<Utility Rebate Program>

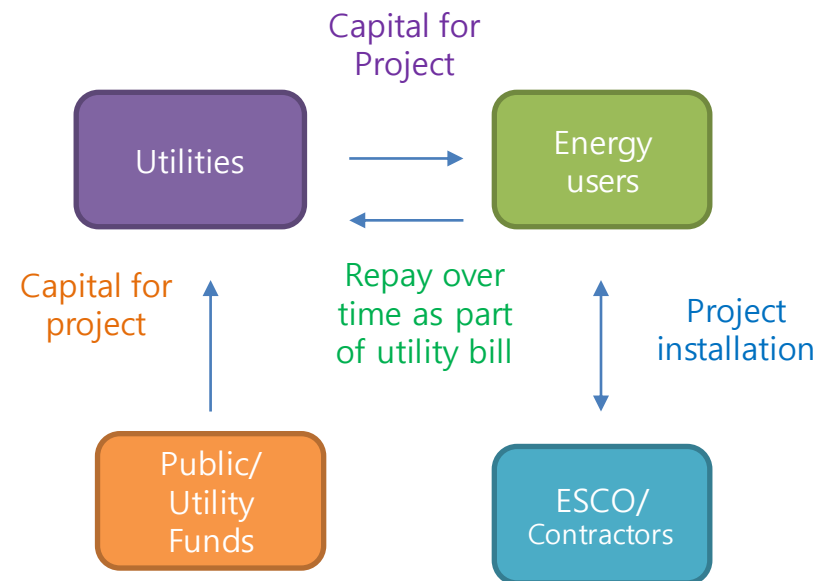
3. Financing Methods for EE Investments in Korea



What is On-Bill Financing (OBF)?

- **On-bill financing** (OBF) : refers to a loan made to a utility customer. The capital to implement the project is provided to the customer by the utility

- **The loan funds** are provided directly by the utility
- **Regular monthly loan payments** are collected by the utility bill until the loan is repaid.
- **Savings** from the funded improvements are expected to **equal or exceed the new on-bill loan payments.**
⇒ "Bill neutrality"



- Korea public utilities do not provide this on-bill financing in their EERS programs so far. But it is a very useful financing for both users and ESCOs to invest EE projects.

3. Financing Methods for EE Investments in Korea



■ Financing Options for ESCO Business

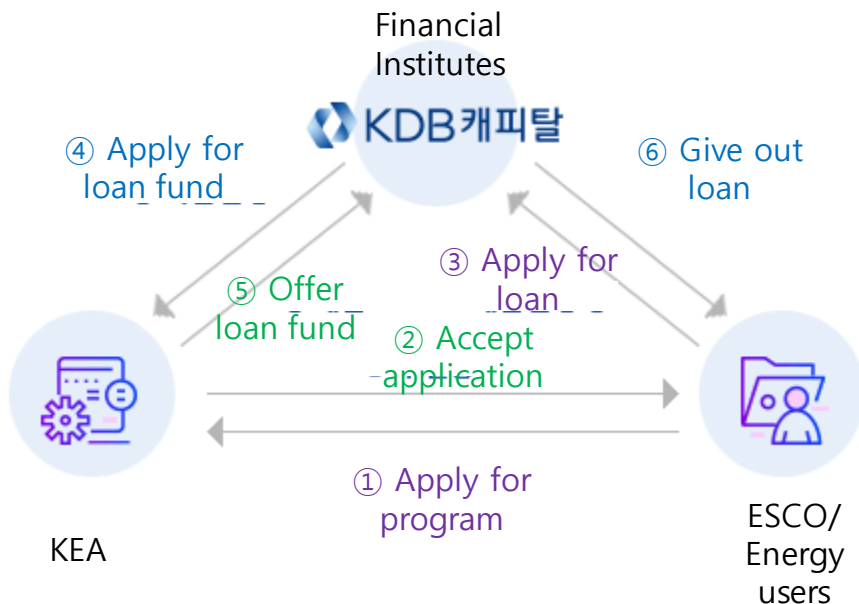
- ESCOs can use policy loan fund and factoring to finance their business.
 - Policy loan Fund
 - Government provides loans with low interest rate to ESCO business according to Energy Use Rationalization Act.
 - Factoring of ESCO's receivables
 - Financial institution buys the receivables from the ESCO, thereby refinancing its portfolio and allowing the ESCO to finance more projects.
 - Financial institution then continues to accept payments from the ESCO clients for the duration of the contracts.

3. Financing Methods for EE Investments in Korea



Policy Loan Fund : Soft Loan for Energy Saving Facilities

- **Soft Loan program** offers long-term and low-interest rate loans to cover part of the investments in energy saving facilities in order to conserve energy and reduce GHG emission.



- **ESCOs** that have a new shared savings contract with energy consumers
- **Energy users** that have a guaranteed savings contract by users' financing

3. Financing Methods for EE Investments in Korea



ESCO investment projects in Policy Loan Fund

- The ESCO investment projects(ESCO loan program) launched in 1993 has supported energy efficiency projects worth 1.7 trillion won and achieved 1.2 million toe of savings from 2010 to 2020.
- In 2015, large ESCOs were excluded from policy loan fund and after then fund size for ESCO projects decreased rapidly.

< Savings and financial support of ESCO investment projects >

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	total
ESCO investment projects	Savings (k TOE)	95	211	233	175	166	157	96	32	55	8	67	1,295
	Financial support (KRW billion)	131	298	277	310	254	163	124	52	54	16	41	1,719

Source : KEA(2021), Energy Report 2021

3. Financing Methods for EE Investments in Korea



■ ESCO Factoring

- Factoring was introduced to help financial institutions purchase ESCOs' receivables and lend money in order to alleviate ESCOs' financial difficulties and debt ratio burden in 1999.
- ESCOs take on financing in the case of most EPC projects. When ESCOs take out loans for EPC investments, their credit capacity caps the total number of projects they can maintain in their portfolio.
- This is the reason why ESCOs face to financial difficulties in their business.

3. Financing Methods for EE Investments in Korea



■ Legal disputes on ESCO Factoring

- Legal disputes arose over energy savings in energy users, ESCOs, and financial institutes under the guaranteed savings contract.
- In April 2014, the Supreme Court ruled that the responsibility for energy savings guarantee of the EPC projects could not be attributed to the user but the financial institution that took over the receivables was responsible for some portion of savings.
- Subsequently, ESCO factoring was stopped in the market.
- From July 2015, the Ministry of Trade, Industry and Energy(MTIE) introduced a new shared saving contract. Under the new contract, the obligation of energy savings guarantee according to factoring is not transferred to the financial institutions.
- Finally, factoring was resumed in the market in March 2016.



4. Conclusions

- Because Korea's energy intensity is higher than other major countries, it is necessary to improve energy efficiency.
- In particular, energy efficiency investments are needed in the private sector.
- To promote private energy efficiency investments, Korea government was introduced to ESCO in 1993.
- ESCO can help Energy users who are lack of technology and financing for energy efficiency projects.



4. Conclusions

- There are three Energy Performance Contract Models to aid energy user' financing in Korea : (1) New Shared Savings, (2) Guaranteed Savings by ESCO financing, and (3) Guaranteed Savings by Energy users' financing.
- There are two financing models for ESCO business: policy loan fund and ESCO factoring in Korea although the U.S.A and China have many ESCO financing models : bonds, leasing, energy services agreements (ESAs), local government and private funds, and private equity financing, etc.
- To promote Korea's ESCO industry, it is required to develop more various financing models.

Thank You

Annex 1. General Concept of the ESCO (1/2)



Definition of ESCO

- **Energy service companies** offer services for implementing and financing energy efficiency projects.
- **ESCO's services** include energy auditing, design and engineering, equipment procurement, construction, installation, commissioning, measurement and verification (M&V) of energy and cost savings, operations and maintenance (O&M), facility management, and energy services.

Energy Performance Contract Mechanism

- The energy user, or host facility, pays for the ESCO's services from the resulting cost savings.
- ESCOs typically use performance-based contracting models, under which payments are contingent on customer satisfaction.
- ESCO assumes most of the technical, financial, and performance risks.

Annex 1. General Concept of the ESCO(2/2)



Energy Performance Contract Model

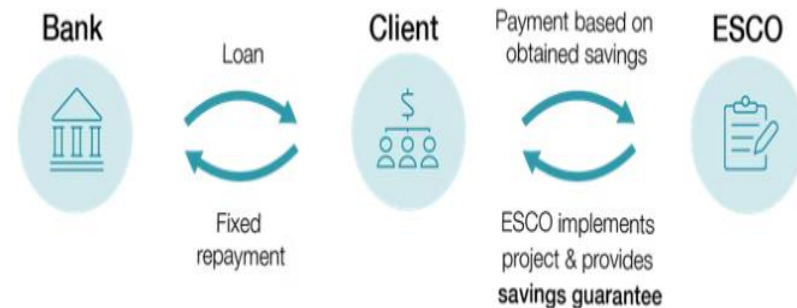
● Shared savings model



Source : IEA webpage, Report extract ESCO contracts

- The ESCO provides for most or all of the financing needed to implement an energy efficiency project
- The agreement between the ESCO and host facility specifies how cost savings are shared, measured, and verified.
- The host facility does not invest in the project but receives a share of the energy cost savings during the contract period and 100 percent of the savings after it, allowing for a positive cash flow for the duration of the project

● Guaranteed savings model



Source : IEA webpage, Report extract ESCO contracts

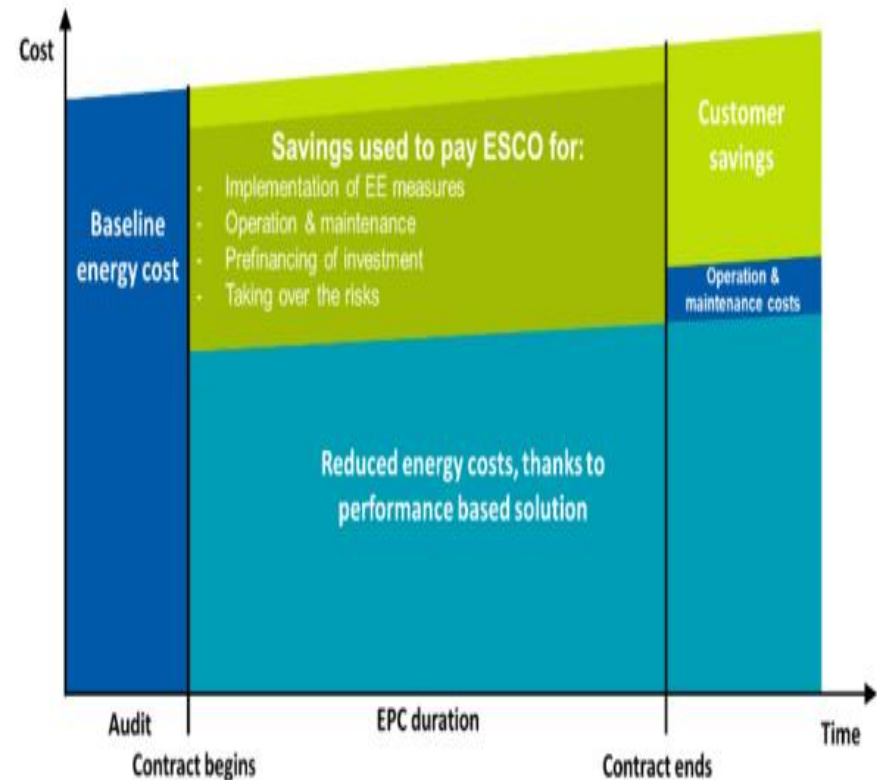
- The host facility borrows the funds needed to finance the project and puts the project loan on its balance sheet
- The ESCO guarantees performance standards and specifies M&V methods
- Payments are made by the host facility to the ESCO once performance guarantees are satisfied.
- The loan is repaid by the host facility out of the energy cost savings

Annex 2. Energy Performance Contracting (1/2)



Financing Structure of EPC

- The ESCO **guarantees energy cost savings** in comparison to a historical energy cost baseline.
- For its services and the savings guarantee, the ESCO receives performance-based remuneration (service fees) in relation to the savings it achieves.
- Generally, savings achieved can only be measured indirectly as **difference between consumption before and after implementation** of the energy efficiency measures.
- Relative measurement: savings = baseline – ex post-consumption



Source : Elorie(2019.10.2) Energy Performance Contracting (EPC), STUNNING webstie



Benefits of EPC

- One partner, one contract for different types of deliveries and services
- EPC helps the client arranging the financing of the project
 - Energy efficiency investments are financed directly from cost savings
- ESCO takes on the performance risks of works and technology
- Guaranteed energy savings and greenhouse gas emissions
- Energy management by ESCO



■ End user's Financing by using EERS

- Energy Efficiency Resource Standard (EERS) is a policy requiring electricity, natural gas, or heat utilities to achieve specified levels of customer energy savings.
 - Public utilities including KEPCO, KOGAS, and KDHC have joined the EERS pilot project since 2018.
- To achieve EERS objectives, utilities should conduct energy efficiency programs to their customers.
 - In Korea, most EERS programs are rebate programs for upgrading energy efficiency equipment.