

# **The role of fiscal incentives in promoting energy efficiency finance in the industrial sector**

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# Outline

1. Introduction
2. Why industrial energy efficiency (IEE) in the manufacturing sector is important?
3. Financing industrial energy efficiency (IEE): Key barriers
4. Measures to overcome IEE financing barriers
5. Fiscal policies to overcome industrial energy efficiency financing barriers
6. Tax Relief for IEE: Examples
7. Comparative case studies
8. Conclusions

# Introduction

## Energy Efficiency:

- Energy efficiency (EE) stands at the cross road today (IEA Energy Efficiency, 2017).
- A vast number of studies discuss energy efficiency (particularly Patterson 1996; Greening et al. 2000; Turner and Hanley 2011; Popescu et al. 2012; Tuominen, Forsstrom, and Honkatukia 2013; Markus, Brunauer, and Bienart 2015; Ihara, Gustavsen, and Preter Jelle 2015; Sorrell 2015; Koesler, Swales, and Turner 2016) as a way to achieve more with less energy usage in an economy.
- **They consider energy efficiency, the act of controlling and minimizing energy use, as a major priority of governments around the world.**

# Introduction

- Based on the IEA's (2014) World Energy Investment Outlook, to unlock the economic and environmental advantages of energy efficiency, a huge increase in finance is necessary, with estimates projecting a need to mobilize over \$550 billion a year by the 2030s.
- To this end, public finance plays a major role. At COP21 (the 21 Conference of the Parties), national governments and multilateral development banks (MDB) announced significant increases in funding for climate mitigation, with some pledging to double the amount that they provide.
- Even more recently, the G20 members officially affirmed their post-Paris commitment to scaling up green financing.

# Introduction

- Generally, public finance has a crucial role to play in the field of energy efficiency (see e.g. Bardhan et al. 2014; Braun and Hazelroth 2015; Gouldson et al. 2015; Hall, Foxon, and Bolton 2016).
- It is a fact that energy efficiency markets face challenges across the supply chain, from financiers to end-users via technology suppliers and consultants.
- Whilst the specific barriers to energy efficiency in any given context are likely to be numerous and varied, there are three broad categories, shown in Table 1, into which they fall.

# Introduction

## Table 1. Overarching Barriers to Energy Efficiency Deployment

| Barrier                           | Explanation                                                                                                                                                                                                                                                                                                          |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Awareness and commitment          | Lack of knowledge and awareness of energy efficiency, skepticism and misunderstanding of benefits, conflicting priorities, and a lack of motivation across businesses stymie the potential demand. Linked to this is the lack of a convincing business case in contexts with cheap energy and absent regulation.     |
| Technical solutions and expertise | Insufficient technical capacity and a lack of commonality on best practice and standardization of procedures and technologies, including difficulties in project assessment, monitoring, and verification, act as obstacles to the delivery of energy efficiency solutions that are trustworthy and minimize hassle. |
| ➡ Financial resources             | Perceived high investment costs, coupled with prohibitive calculations of risk and return, limit the supply of affordable capital and the demand for such investments.                                                                                                                                               |

**Source: Retallack et al. (2019)**

Retallack, S., A. Johnson, J. Brunert, E. Rasoulizhad, and F. Taghizadeh-Hesary. (2019). Energy Efficiency Finance Programs: Best Practices to Leverage Private Green Finance. *Handbook of Green Finance: Energy Security and Sustainable Development*. Eds. J.D. Sachs, W.T. Woo, N. Yoshino. F. Taghizadeh-Hesary. Tokyo: Springer

# Introduction

Industrial energy efficiency (IEE):

- Increasing industrial energy efficiency (IEE) is key for shifting country development paths toward lower carbon economic growth (ESMAP/ The World Bank, 2008).
- IEE brings multiple dividends, including (1) helping governments achieve environmental objectives through reduction in greenhouse gas emissions while simultaneously (2) meeting energy demand, and (3) achieving security of energy supply (Dixon-O'Mara and Ryan, 2018).
- Promoting IEE can significantly reduce total industrial energy consumption in the energy-intensive industry (Kesicki and Yanagisawa, 2015), which will have positive social and environmental benefits (Lunt et al. 2014).

# Introduction

- Among the policy instruments, financial and market based instruments are important as they deliver a price signal, thereby providing an incentive for firms to invest in innovation/ or implement more energy efficient technologies and deliver energy savings whilst minimising costs (The World Bank, 2008; de la Rue du Can et al. 2011).
- Fiscal instruments, subsidies and taxes are seen as important policy initiatives in both developing and transitioning economies (Institute of Industrial Productivity, 2012).

# Introduction

- However, the extent to which fiscal incentives can play an effective role in promoting IEE in the Asian context is yet to be seen.
- Consequently, the current research aims to examine the role and effectiveness of fiscal incentives in promoting industrial energy efficiency (IEE), with a particular focus on selected Asian emerging economies.

# Why industrial energy efficiency (IEE) in the manufacturing sector is important?

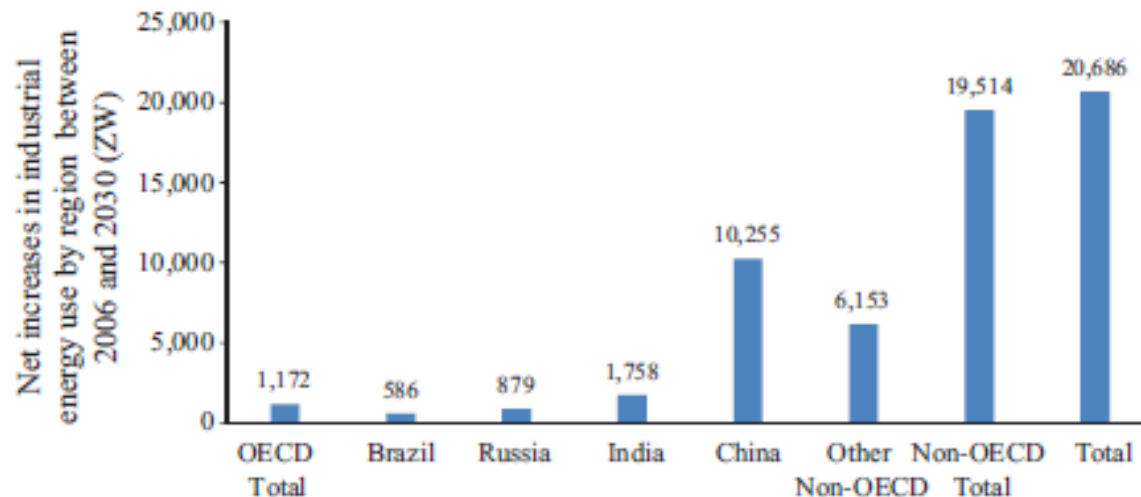
- The industry sector is characterized by a number of energy-intensive industries, including: *iron and steel, chemicals and petrochemicals, cement, pulp and paper, and aluminum*, all of them are important for economy and society (Kesicki and Yanagisawa, 2015).
- However, the industry sector accounts for more than a third (37%) of global final energy consumption (Abdelaziz et al. 2011), and nearly the same share of global energy-related CO<sub>2</sub> emissions (Kesicki and Yanagisawa, 2015).
- Industrial energy efficiency (IEE) improvements therefore can significantly reduce a country's/ region's demand for energy (US Department of Energy, 2015).

# Why industrial energy efficiency (IEE) in the manufacturing sector is important?

- Reducing the energy consumption of manufacturing operations is becoming an attractive improvement opportunity for many organisations (IEA Energy Efficiency, 2017).
- For manufacturers that use energy intensive processes, reducing energy makes a lot of sense since it can form a large percentage of operating costs (e.g. 15-20 per cent for steel manufacturing and 30 per cent for aluminium (Bauman, 2011)).

# Industrial energy consumption by regions

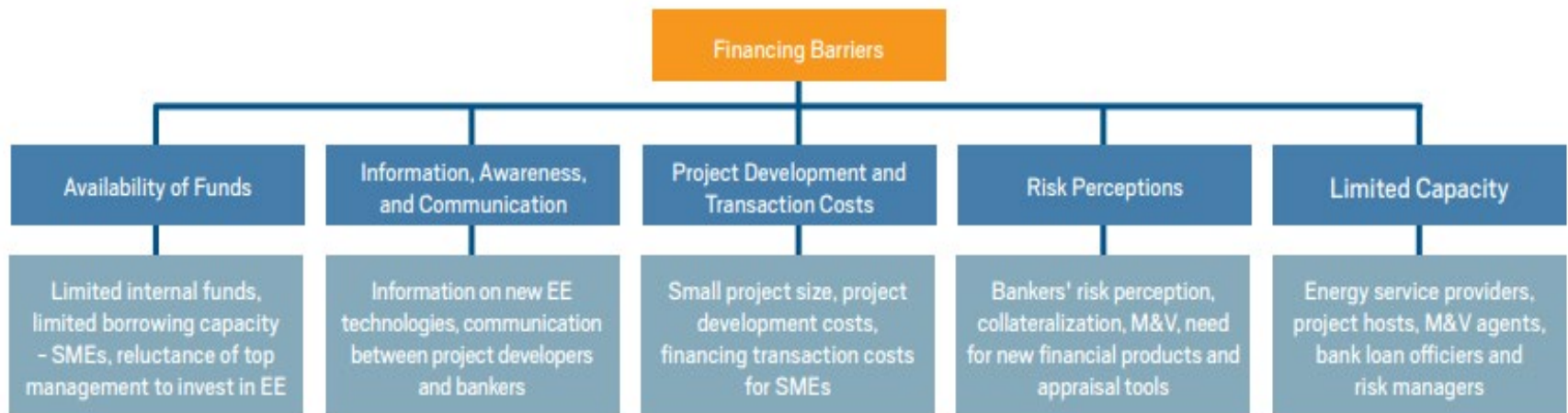
- Growing trend of energy consumption in non-OECD economies



Net increases in industrial energy use by region between 2006 and 2030 (ZW)

Ref: Abdelaziz et al. (2011)

# Financing industrial energy efficiency (IEE): Key barriers



Source: Compiled by authors based on review of IEE studies and programs and interviews with IEE experts.

Source: Limaye et al. 2012. Financing Industrial Energy Efficiency In India: Lessons Learned And Directions For The Future, Prepared for Institute for Industrial Productivity by SRC Global Inc

# Measures to overcome industrial energy efficiency financing barriers

- There are many types of policies and programs that have been used in countries worldwide to improve energy efficiency in the industrial sector.
- Some of these policies and programs as include:
  - Regulations/standards
  - **Fiscal policies**
  - Agreements/targets
  - Reporting/benchmarking.

# Fiscal policies to overcome industrial energy efficiency financing barriers: Rationale

- Fiscal incentives indirectly reduce the cost of investments in energy efficiency measures.
- Economic incentives that directly reduce the costs associated with increasing energy efficiency include subsidies and loans.
- However, the costs of subsidies are to some extent offset by additional tax receipts, savings in unemployment benefits payments, and other revenue streams generated as a result of the activities promoted under the program (Rosenow et al. 2014).
- This effect can even lead to subsidies becoming self-financing – (Brown et al. 2011).

# Fiscal policies to overcome industrial energy efficiency financing barriers: Rationale

- The main contributors to those positive fiscal impacts are:
  - Value added tax paid by households taking up energy efficiency measures,
  - Income tax paid by employees working along the supply chain,
  - Additional corporate tax paid by the companies indirectly benefiting from the subsidies through reduced relative cost of the technologies they supply/ install, and
  - The avoided cost of paying unemployment benefits to workers who were not working previously.
- Hence most of the fiscal benefits are a result of increased employment.

# Fiscal policies in IEE: Budgetary effects

- Programs supporting the installation of energy efficiency measures typically incur a cost in the form of subsidies as well as lost VAT income due to reduced energy consumption.
- Those costs are to some extent offset by the tax receipts and other revenue streams generated as a result of the activities promoted under the program.

# Fiscal policies and IEE

- Taxation policies are a mandatory means for influencing the introduction of industrial energy efficiency.
- Fiscal policies include imposition of taxes, tax rebates, investment tax credits, and establishing investment bank lending criteria for promotion of energy efficiency.
- Taxation policies can also influence industrial energy efficiency through the use of tax rebates or investment tax credits.
- Investment bank lending criteria can be established to give higher priority for funding projects that improve energy efficiency.

# Fiscal policies and IEE

- Tax and fiscal policies encourage investment in IEE equipment and processes in two ways
  - By increasing the costs associated with energy use to stimulate EE (e.g., Carbon taxes, pollution levies, and public benefit charges); or
  - By reducing the costs associated with energy efficiency investments (e.g., Grants and subsidies, subsidized audits, soft loans and innovative funds, guarantee funds).
- Key instruments include,
  - Energy or energy related carbon taxes
  - Direct and indirect subsidies
  - Economic incentives
  - **Fiscal incentives / Tax relief**

# Tax relief for IEE

- Mainly in three forms:
  - Accelerated depreciation
  - Tax deduction
  - Tax exemption
- Provide special tax treatment for purchase of specified technologies or
- Through programs that allow tax rebates to industries that meet specified targets.
- Found in 22 countries
- Programs that provide tax relief for specific energy efficiency technologies typically have a large number of participants.

# Tax relief for IEE

- Programs that provide tax relief for specific energy efficiency technologies typically have a large number of participants.
- For instance, Japan's Energy Conservation and Recycling Assistance Law resulted in accelerated depreciation of approx. 25,000 pieces of equipment each year during the period 1996 through 1998.
- The law's taxation measures led to increased investment in energy efficient products from 300 billion yen in 1990 to 800 billion yen in 1993 (US\$ 4 billion) (WEC, 2001).

# Tax relief for IEE

Evaluation / Pros & Cons

Advantages of Tax Relief

- Tax relief for energy – efficiency technologies may be more effective than taxing energy per se.
- This is because, decisions regarding the purchase of energy efficient technologies are typically based more on the cost of the equipment than on the expected cost of energy used to power the equipment.

# Tax relief for IEE

## Disadvantages of tax relief

- Tax relief doesn't provide incentives to reduce energy use.
- It can result in large expenditure in public funds.
- Subject to a large number of 'free riders' or investors who take advantage of the program even though they would have made the investment without the tax relief (Newell, 2004).
- Accordingly, programs should be designed as such that 'free riders' are not involved considerably, and that authorities avoid providing tax relief for technologies that are already profitable (de Beer et al. 2000).

# Tax relief for IEE: examples

| Tax relief               | Countries | Outcomes / findings                                                                                                                                                                                                   |
|--------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accelerated depreciation | Japan     | Under Energy Conservation and Recycling Assistance Law (1993), an accelerated depreciation allowance equal to 30% of the acquisition cost is available for investment in energy efficient equipment (Anderson, 2002). |
|                          | Singapore | Under Income Tax Act, companies that investment in qualifying energy efficient equipment can write off the capital expenditure in one year instead of three (NEEC, 2005).                                             |

# Tax relief for IEE: examples

| Tax relief    | Countries           | Outcomes / findings                                                                                                                                                                                                        |
|---------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tax Deduction | Korea (Republic of) | A 5% income tax credit is given for energy efficiency investments such as replacement of energy saving equipment, installation of energy saving equipment, and other facilities that reduce energy by 10% (UNESCAP, 2000). |
|               | Japan               | Under Energy Conservation and Recycling Assistance Law, a corporate tax rebate of 7% is given for the purchase of energy efficient equipment for small and medium sized firms (WEC, 2001).                                 |

# Tax relief for IEE: examples

| Tax relief    | Countries | Initiatives                                                                                                                                                           |
|---------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tax Exemption | Germany   | Full exemption from petroleum tax is provided for highly efficient combined heat and power facilities.                                                                |
|               | Romania   | Imported energy efficient technologies are exempt from customs taxes<br>Share of company income directed for energy efficiency investments is exempt from income tax. |

# Case studies

| Country | EE policy/ IEE initiatives                                                                                                                                                                                                     | Fiscal incentives / EE Financing model                                                                                                                                                               | Outcomes / findings                                                                                                                                                                                                                                                                                                                   |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| China   | <p>10<sup>th</sup> five year plan (2001) focused on energy intensive industries.</p> <p>MOF (2006) adopted tax shifts.</p> <p>11<sup>th</sup> five year plan (2006) also focused on improving EE in each Industrial sector</p> | <p>Increased export taxes on energy intensive industries [15 % export tax on copper, nickel and aluminium and other metals.]</p> <p>Import tariffs were cut on 26 energy and resource products .</p> | <p>Will reduce China's greenhouse gas emissions 10% below business as usual (over 1.5 billion tons of CO<sub>2</sub>).</p> <p>Tax shifts discouraged the export of energy – intensive products as a means of conserving domestic energy resources.</p> <p>Light industry has achieved the highest EE, followed by heavy industry.</p> |
| Japan   | Kyoto Protocol Ratified (2002)                                                                                                                                                                                                 | <p>Fiscal incentives and subsidies for EE and EE technology Climate Change Tax (Aug 2003).</p> <p>Tax rate 3400 yen per ton on Carbon emitted from the combustion of the fossil fuel.</p>            | <p>Tax levied is distributed to purchase energy efficient equipment.</p> <p>Not as effective as expected due to shortfall of the tax raised.</p>                                                                                                                                                                                      |

# Case studies

| Country | EE policy/ IEE initiatives                                                                                                                                                                                                                                                                                                                                                       | Fiscal incentives / EE Financing model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Outcomes / findings                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| India   | <p>EE and Investment in IEE are regarded as important issues.</p> <p>Policies adopted include:</p> <ul style="list-style-type: none"> <li>(1) Pricing policy;</li> <li>(2) Institutional development policy;</li> <li>(3) EE technology policy</li> </ul> <p>National Action Plan on Climate Change (2008)</p> <p>Enforcement of Energy Conservation Act and Electricity Act</p> | <p>Tax incentives to promote EE by allowing the accelerated depreciation for EE and pollution control equipment.</p> <p>Carbon Tax (2010)/ Clean Energy Cess Framework for Energy Efficient Economic Development (FEEED), is looking at ‘developing fiscal instruments to promote energy efficiency’.</p> <p>At present, the fiscal incentives EE to SSI units include : (i) complete exemption from—or lower rates of—excise duty payment obligations; and (ii) reduced company tax rates, for instance, in general allowing a deduction of 25 percent of profits in the first 10 years of operation for tax computation purposes.</p> <p>Additional Tax Holiday for SSI units located in designated backward areas for the first five years of operation.</p> | <p>Attracted over \$12 billion of capital investment in EE in the industrial sector.</p> <p>However, there are:</p> <ul style="list-style-type: none"> <li>Inadequate enforcement of EE institutional development policy.</li> <li>EE investments and adoption of new energy efficient technologies were not prioritised enough.</li> <li>SMEs have fallen behind the benchmarks set by the larger industrial firms in terms of efficiency.</li> </ul> |

# Case studies

| Country   | Energy policy / Initiatives                                                                                                                                                                                 | Fiscal incentives                                                                                                                                                                      | Outcomes / findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indonesia | <p>Develop providing reliable information for financial institutions regarding EE technologies ;</p> <p>Providing financial guidelines for more conducive EE finance Green Building Code Implementation</p> | <p>Tax incentives for green building construction in some Indonesia cities (e.g., Bandung)</p> <p>Fiscal transfer to support energy efficiency from centre to sub-national region.</p> | <p>Unclear impacts/ effectiveness of tax incentives. More cities intend to implement tax incentives to implement green standards particularly in the commercial building sector.</p> <p>Providing fiscal transfer on the energy efficiency will be beneficial to the emission reduction, both in national and sub-national level.</p> <p>Fiscal transfer with the energy efficiency purpose will be better in terms of curbing more emission.</p> <p>Fiscal transfer to support energy efficiency gives positive impacts to the economy and carbon emission, as well as to the consumption level of households.</p> |

# Conclusions

- The provided tax incentives for energy efficiency and industrial energy efficiency show a heterogeneous spectrum, and mixed results and are subject to constant change.
- There is no unified orientation regarding the design of the tax incentives to support energy efficiency.
- Some western and few Asian countries have long experience in the field of tax incentives to support energy efficiency, whereas there are limited use on such instruments in many Asian countries.
- However, tax policy have been found to be an effective tool to improve IEE, so further research is needed.

# Conclusions

- Attitudes towards using tax policy for IEE have been found both positive and negative and policy acceptance surrounding using tax policy for IEE is mixed.
- Among the key barriers to finance IEE, available funds for investing EE projects, and lack of information and communication on new technologies are important.
- Creating an Energy Efficiency Financing Platform could help address the barriers.

# Recommendations

- Tax instruments/ budgetary policy should be integrated into industrial energy efficiency policies to encourage emission intensive industries to invest and align with improving energy efficient technology and innovation.
- Tax policy frameworks with the right economic and regulatory drivers needed to incentivize and bring about change to strengthen business cases for using tax instruments for industrial energy efficiency.

# Q&A

Thank you

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