



**Roundtable on Financing Energy
Efficiency in the Manufacturing Sector:
Insights from International Experience
and Implications on Singapore**

Monday, 25 March 2019

Grand Copthorne Waterfront, Singapore

OVERVIEW

Roundtable on Financing Energy Efficiency in the Manufacturing Sector – Insights from International Experience and Implications on Singapore:

The event seeks to bring together international experts to assess energy efficiency financing programmes and the market barriers that persist to impede access to energy efficiency finance in Singapore’s manufacturing sector, recommend improvements to existing programme designs, and identify next steps toward the design and implementation of new government and private sector interventions.

Financial and market-based instruments are important as they deliver a price signal, which provides an incentive for firms to invest in innovation or implement more energy-efficient technologies and deliver energy savings whilst minimising costs. These instruments can have significant advantages for governments, supporting the fiscal sustainability of governments’ energy efficiency efforts, requiring less enforcement than regulation and according the market the flexibility to select the most cost-efficient technologies.

It is imperative now to investigate what new financial products, services, vehicles or market-based instruments can be introduced for Singapore to enable broader end-user and market player access to energy efficiency finance.

The recommendations drawn from this event will then inform specifically the “Promoting Energy Efficiency for the Manufacturing Sector in Singapore – Outlook for Economic Instruments and Energy Services Market” study being undertaken by ESI.

Date:

Monday, 25 March
2019

Time:

9:00 am – 6:00 pm

Venue:

Paradiso Room
Level 3
Grand Copthorne
Waterfront, 392
Havelock Rd,
Singapore 169663

Admission:

By Invitation only.

Enquiries

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AGENDA

08:30 – 09:00	Registration
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09:00 – 09:15	Opening Address <i>Professor Ang Beng Wah, Executive Director, Energy Studies Institute, National University of Singapore</i> <i>Mr Lim Wey-Len, Director, Resource Development, Economic Development Board of Singapore</i>
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09:15 – 10:45	Session 1: Energy Efficiency Barriers in Singapore’s industry sector – What is putting the market demand off energy efficiency financing schemes? <i>Session Chair: Melissa Low, Research Fellow, Energy Studies Institute, National University of Singapore</i> In this session, Singapore government agencies and the ESI will provide a status update on Singapore’s energy efficiency market, financial and market-based instruments to set the context. <u>Speakers: (20 minutes presentation for each speaker)</u> Energy Efficiency Landscape in Singapore <i>Mr Joash Seng, Lead, Resource Development, Economic Development Board of Singapore</i> <i>Mr Leow Beng Kwang, Senior Manager, Energy Efficiency & Conservation Department, National Environment Agency of Singapore</i> Scaling up Industrial Energy Efficiency Market with Innovative Solutions: Implications on Singapore <i>Dr. Liu Yang, Senior Research Fellow, Energy Studies Institute, National University of Singapore</i> Challenges of Industrial Energy Efficiency Financing: Case of China and India and Way Forward <i>Dr Pradeep Perera, Principal Energy Specialist, Asian Development Bank</i> <u>Discussion (30 minutes):</u> What is putting the different stakeholders off improving energy efficiency, especially in the industry sector? It will be a free flow discussion to consolidate comments and suggestions for the study and provide input for the <u>ESI discussion paper</u> to be distributed in advance.
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10:45 – 12:05	Session 2: Energy Efficiency Financing Options for Singapore – Where to go?
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Session Chair: Leow Foon-Lee, Adjunct Principal Research Fellow, Energy Studies Institute, National University of Singapore

The experts in this session will cover the following topics:

- Overview of the current energy efficiency financing barriers;
- Best practices and success stories toward scaling up energy efficiency financing
- Innovative financial vehicles and products

Speakers: (20 minutes presentation for each speaker)

Shifting Singapore's Energy Efficiency Financing to High Gear – Building on market experience

Mr Alexander Ablaza, Co-chair, Asia-Pacific ESCO Industry Alliance

Experience with Energy Efficiency Financing Mechanisms: Overcoming the Implementation Barriers

Mr Mark Lister, Managing Partner, Asia Clean Energy Partners

Energy Efficiency Finance: Lessons from Japan and Bangladesh

Dr Monzur Hossain, Senior Research Fellow, Bangladesh Institute of Development Studies

Prof Naoyuki Yoshino, Dean, Asian Development Bank Institute (video presentation)

Financing Energy Efficiency in China: Roles of Government and Market

Dr Tian Zhiyu, Deputy Director, Energy Efficiency Centre, Energy Research Institute, National Development and Reform Commission, China

12:05 – 13:15

Lunch Reception

13:15 – 14:25

Session 2: Energy Efficiency Financing Options for Singapore - Where to go? (continued)

Discussion (70 minutes):

How can Singapore bridge the gaps in energy efficiency?

Across jurisdictions, which has been more effective in promoting more EE financing projects: changing how financial institutions lend, or how companies want to borrow? Please elaborate on each success case.

It will be a free flow discussion to consolidate comments and suggestions for the study and provide input for the ESI discussion paper to be distributed in advance.

14:25 – 16:55

Session 3: Implementation of Market-Based Instruments in Singapore – Where to start?

Session Chair: Dr Liu Yang, Senior Research Fellow, Energy Studies Institute, National University of Singapore

The experts in this session will cover the following topics:

- Energy efficiency obligations
- Utilities demand side management programmes
- Fiscal incentives and budget transfer
- Voluntary agreement
- Coordination of policy mix

Speakers: (20 minutes presentation for each speaker)

Recent Results from California's Industrial and Financial Energy Efficiency Programs

Dr Edward Vine, Staff Scientist, Lawrence Berkeley National Laboratory, USA

Energy Efficiency Obligation Schemes in Europe

Dr Zhu Xianli, Senior Economist, Copenhagen Centre for Energy Efficiency

The Role of Fiscal Incentives in Promoting Energy Efficiency Finance in the Industrial Sector

Prof Tapan Sarker, Senior Lecturer and Director of Engagement, Griffith Business School, Griffith University, Australia

Market-based Instruments for Industrial Energy Efficiency in Europe

Prof Paolo Bertoldi, Senior Expert, European Commission (video presentation)

Discussion (70 minutes):

How big is the market that will be enabled by market-based instruments for energy efficiency – Based on the preceding findings, could you propose remedial measures and innovative solutions given your expertise and country experience?

Free flow discussion with participants invited to share their views on the presentation and potential implementation of new market-based instruments in Singapore. The outcome of the discussion will be included in the ESI discussion paper to be distributed in advance. The discussion will be structured as follows:

- Comparing major jurisdictions with Singapore (similarities and differences);
- Potential barriers and challenges of the existing policy landscape in Singapore
- Opportunities for further study

16:55 – 17:10

Recap of Key Messages and Next Steps

17:10 – 18:15

Welcome Dinner by invitation

PEER LEARNING WORKSHOP

Date: 26 March 2019

Time: 09:00 – 13:00

Venue: ESI Conference Room

Purpose:

This by invitation workshop aims to bring the discussion back to the objectives of the ESI study. The participants will review the outcomes and consolidate lessons for the study, and provide inputs for determining a selected list of jurisdictions and instruments and the literature review accordingly.

Output from this working session will include:

- Short list of feasible market based instruments and EE financing options for Singapore
- Potential challenges or barriers to development of the study
- Opportunities for collaboration.

09:00 – 10:15

Deep dive session 1: Major jurisdictions and instruments to be included in the study

10:15 – 11:30

Deep dive session 2: Selected literature review and collaboration opportunities

11:30 – 12:00

Re-cap of Conclusions

12:00 – 13:00

Buffet Lunch at the ESI

SPEAKERS SHORT BIO AND PRESENTATION ABSTRACT

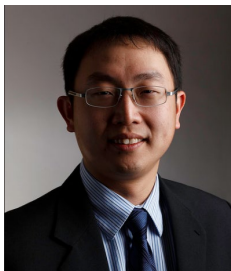
(IN THE ORDER OF PRESENTATION)



Prof. Ang Beng Wah

Executive Director, Energy Studies Institute, National University of Singapore

Professor Ang Beng Wah is the Executive Director of the Energy Studies Institute. He is also Professor of Industrial Systems Engineering and Management at the National University of Singapore. His primary research interests are systems modelling and analysis, and energy economics and policy. He has been very active in energy demand analysis, and has made important contributions to the development of the technique of Index Decomposition Analysis. The decomposition technique he proposed has been widely used by researchers and national and international energy organisations to study factors affecting national energy consumption and carbon emissions, as well as to monitor sectoral and economy-wide energy efficiency trends. Professor Ang is a Co-Editor of Energy Economics, and a member of the editorial boards of several other international energy journals including Energy Policy and Energy.



Mr Lim Wey-Len

Director, Resource Development, Economic Development Board of Singapore

Mr Lim Wey-Len oversees the planning and development of resources such as land, water & utilities required for the growth of industries in Singapore. Prior to this, Wey-Len was the Regional Vice President, Western Americas, where he led EDB's investment promotion team for the Western USA, Western Canada and Central America markets.



Ms. Melissa Low

Research Fellow, Energy Studies Institute, National University of Singapore

Melissa Low joined the Energy Studies Institute in September 2010. She holds a Master of Laws (LLM) in Climate Change Law and Policy (with distinction) from the University of Strathclyde and a Master of Science in Environmental Management from the National University of Singapore. For her NUS Master thesis on past and contemporary proposals on equity and differentiation in shaping the 2015 climate agreement, Melissa was awarded the Shell Best Dissertation Award 2013. She received her Bachelor of Social Sciences in Geography degree (with Honors) and a minor in Urban Studies from the National University of Singapore in 2010.

Melissa has participated in the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP) talks since December 2009 and is the Designated Contact Point for NUS's accreditation to the UNFCCC. Her current research areas are on the implications of the Paris Agreement and countries' progress in meeting their climate pledges.

Melissa recently served as PhD Student Programme Chair for the 40th International Association of Energy Economics (IAEE) Conference held in Singapore from 18-21 June 2017.



Mr Joash Seng
Lead, Resource Development, Economic Development Board of Singapore

Mr Joash Seng covers Energy Efficiency policy, and administers EDB's incentives for Energy Efficiency for companies conducting manufacturing activities.

Mr Leow Beng Kwang
Senior Manager Energy Efficiency & Conservation Department, National Environment Agency of Singapore

Mr Leow Beng Kwang and his team administer capability development programmes and incentive schemes to help industrial companies improve energy efficiency.



Dr. Liu Yang
Senior Research Fellow, Energy Studies Institute, National University of Singapore

Dr. LIU Yang leads research and consultancy projects in the areas of the integration of renewables and energy efficiency, energy market design, and policy evaluation. Some of his recent work includes impact assessment of long-term energy portfolio in Singapore, prospects of the energy services market in ASEAN, and electricity market design for smart grids. Dr. Liu has more than 15 years' experience with the energy industry, government bodies and academia, including as an energy specialist at the International Energy Agency, where he co-authored the 2015 and 2016 IEA Global Energy Efficiency Market Reports, and provided technical assistance regarding the energy market reforms. He earned his Ph.D. in Energy Economics from the Ecole Polytechnique of France.



Dr. Pradeep Perera
Principal Energy Specialist, Asian Development Bank

Dr. Pradeep Perera has been with Asian Development Bank for more than 15 years and he had led ADB's lending operations in energy sector in Vietnam, China and currently in India. This includes structuring lending projects for conventional power sector projects including complex hydro

power projects. During his stint in China, he had been involved in designing innovative financing structures for industrial energy efficiency projects. He also led ADB's support for designing the emission trading system in China. Currently he is leading ADB's energy sector operations in India and is engaged in policy dialogue with Indian government to establish a financing framework for industrial energy efficiency financing. He possesses PhD degree from Power System Economics from Imperial College, London UK and Bachelor of Electrical Engineering from University of Moratuwa Sri Lanka. Prior to joining ADB, he had been with the World Bank Group.

Presentation:

Challenges of Industrial Energy Efficiency Financing: Case of China and India and Way Forward

Although energy efficiency investments have short payback period and high financial returns, due to variety of reasons the required level of investments has not been made. The presentation will analyze these issues and describe how they can be overcome. The policies and initiatives undertaken by China and India in this regard will be presented. The presentation will also describe various financial models that can be utilized to overcome some of the financing barriers to energy efficiency.



Mr Leow Foon-Lee

Adjunct Principal Research Fellow, Energy Studies Institute, National University of Singapore

Leow Foon-Lee joined the Energy Studies Institute since June 2017. He has more than 25 years of experience in the energy sector, having worked for some of the world's global US, European and Asian companies, including GE (for 20 years), Shell etc with global assignments in New York, Singapore, Taiwan, Hong Kong, Beijing and Shanghai. Career portfolio encompassed leading APAC regional operations, large gas power and LNG regasification terminal project development, turbine technology transfers and coal gasification licensing as well as managing start up and operation of equity joint ventures etc. He is also the founder and CEO of Enerpower, an energy investment advisory company focused in renewable energies and projects. In 2015 he was appointed as a technology expert by the Asian Development Bank (ADB) under RETA 8105 for Transfer of Low-Carbon Technologies to Asia and the Pacific. At ESI he is actively supporting all the energy related research works both in Singapore and in the Asia-Pacific region. Foon-Lee holds a Bachelor of Engineering (Mechanical) from the National University of Singapore and an MBA from the Rensselaer Polytechnic Institute in New York. He is bilingual in English and Mandarin.



Mr. Alexander Ablaza
Co-chair, Asia-Pacific ESCO Industry Alliance

Over half of Alex Ablaza's 35-year professional career has been dedicated to accelerating energy efficiency (EE) markets across developing Asia. He led the identification, structuring and due diligence in support of financial close of over \$3 billion in EE investments and EE policy and market interventions in a growing list of countries which includes Bangladesh, China, India, Indonesia, Lao PDR, Malaysia, Nepal, Pakistan, Philippines, Singapore, Thailand and Vietnam.

Wearing his non-profit hats, Alex currently serves as President of the Philippine Energy Efficiency Alliance (PE2) and as Co-Chairman of the Asia-Pacific ESCO Industry Alliance, which represents the energy services sectors of China, India, Japan, Korea, Philippines, Singapore and Taiwan. He is CEO of BlueSkyEnergy, which flows cross-border equity investments toward EE project portfolios.

As EE anchor of multilateral lenders, he previously served as Asia-lead for EE and other clean energy investment operations for the global climate finance team of the IFC/World Bank Group and the Asian Development Bank.

Presentation:
Shifting Singapore's Energy Efficiency Financing to High Gear – Building on market experience

The presentation aims to identify the persistent market gaps in energy efficiency financing and propose viable solutions for both the government and the private sector to consider. Specific to the needs of the Singapore market, and building on the experience of the market gathered through current and existing models and programmes, these recommended solutions may include either or both:

1. A redesign of the existing third-party equity investment programme, with incorporated features and safeguards intended to remove the persistent market barriers and bridge the financing gaps in the energy efficiency end-use sectors.
2. A totally new financial mechanism, involving either an innovative structure, product, vehicle or market-based instrument that could either strengthen the third-party equity investment programme, or complement it with market tools that would enable access of unreachable sectors to energy efficiency project capital.



Mr. Mark Lister

Managing Partner, Asia Clean Energy Partners

After starting out in corporate finance, Mark specialised in energy efficiency almost 20 years ago and has become a leading advocate for expanded energy efficiency deployment. During that time he has been involved with ESCO industry advocacy in Australia, worked on grassroots projects in sub-Saharan Africa, and lectured in postgraduate sustainable energy courses. After a stint with ADB in the Philippines working to facilitate and scale up climate technology and energy efficiency investments in Asia-Pacific, Mark led the Copenhagen Centre on Energy Efficiency, the global energy efficiency hub of Sustainable Energy for All that aims to double the rate of global energy efficiency improvement by 2030. He is now a Managing Partner of the recently formed Asia Clean Energy Partners, an international firm that provides consulting, advisory, and project origination services related to the energy sector, working to support the acceleration of clean energy deployment and achieve greater speed and greater scale with a focus on markets in Asia and the Pacific. Mark has a Master's Degree in Social Science (Environmental Policy) from RMIT University and is also a Director of the Efficiency Valuation Organization (EVO).

Presentation:

Experience with energy efficiency financing mechanisms: overcoming the implementation barriers

This presentation will look at some of the reasons for the current gap between required and actual energy efficiency finance and investment levels, and draw on examples from other countries around the region and around the globe of experience in how this gap can be closed, including through selected financing mechanisms and techniques such as energy efficiency obligation schemes, project aggregation, and monitoring and verification. Implications for policy making and market design to increase energy efficiency investment in Singapore will also be examined.



Dr. Monzur Hossain

Senior Research Fellow, Bangladesh Institute of Development Studies

Dr. Monzur Hossain is a professional economist having specific interests in macroeconomics, international economics, financial sector, ICTs and SMEs. He obtained a Ph.D. in International Economics from the National Graduate Institute for Policy studies (GRIPS), Japan. He has participated and served as team leader in numerous professional research projects. He served as consultant for the UNDP, ADB, UNCTAD, EU, International Growth Center, London School of Economics etc.

Presentation:

Energy Efficiency Finance: Lessons from Japan and Bangladesh

This presentation will review Japanese experiences with hometown investment trust fund and the case of applying the financing scheme in Bangladesh.



Dr. Naoyuki Yoshino,
Dean, Asian Development Bank Institute (ADBI)

Naoyuki Yoshino is Dean of the Asian Development Bank Institute; Professor Emeritus of Keio University, in Tokyo, Japan; and Chief Adviser at the Japan Financial Services Agency's Financial Research Center. He obtained his PhD from Johns Hopkins University in 1979. He was a visiting scholar at the Massachusetts Institute of Technology and has been a visiting professor at various universities including the University of New South Wales (Australia), and Fondation Nationale des Sciences Politiques (France). He was an Assistant Professor at the State University of New York at Buffalo and an Economics Professor at Keio University from 1991 to 2014. He was appointed chair of the Financial Planning Standards Board in 2007, and also served as chairperson of the Japanese Ministry of Finance's Council on Foreign Exchange and its Fiscal System Council. He was also a board member of the Deposit Insurance Corporation of Japan, chairperson of the Meeting of Japanese Government Bond Investors (Ministry of Finance), and was President of the Financial System Council of the Government of Japan. He was conferred honorary doctorates by the University of Gothenburg (Sweden) in 2004, by Martin Luther University of Halle-Wittenberg (Germany) in 2013 and the Fukuzawa Award for his contribution to academic research in 2013.

Presentation:

Energy Efficiency Finance: Lessons from Japan and Bangladesh

This presentation will review Japanese experiences with hometown investment trust fund and the case of applying the financing scheme in Bangladesh.



Dr. Tian Zhiyu
Deputy Director, Energy Efficiency Centre, Energy Research Institute,
National Development and Reform Commission, China

TIAN Zhiyu, Deputy Director, Energy Research Institute of National Development and Reform Commission (NDRC), MS, graduate from Tsinghua University. TIAN Zhiyu focuses on policy research on energy efficiency, energy strategy, climate change, as a key researcher, he participated in compiling China's Energy Development Strategy (2030), Energy Conservation Plan for 12th and 13th FYP, Energy Development Plan for 12th and 13th FYP, etc. His recent research focuses on China's revolution strategy

on energy production and consumption, Reinventing Fire China, reaching an early peak of carbon emission in China. TIAN Zhiyu published over 20 papers and 15 books, and has been awarded by NDRC, NEA and AMR in numerous researches.

Presentation:

Financing Energy Efficiency in China: Roles of Government and Market

This presentation will review energy efficiency financing programs in China with a focus on

- Fiscal instruments: special fund for energy efficiency
- Green financing: ESCO mechanism
- Public-private Partnership: on-lending program



Dr. Edward Vine

Staff Scientist, Lawrence Berkeley National Laboratory, USA

Edward Vine is an Affiliate at the *Lawrence Berkeley National Laboratory (LBNL)*, where he was involved in the evaluation of energy efficiency programs and technology performance measurement for over 36 years.

Dr. Vine contributed to the development of the California Public Utilities Commission's Energy Efficiency Evaluation Protocols, the US Department of Energy's Impact Evaluation Framework for Technology Deployment Programs, and the National Action Plan on Energy Efficiency's Evaluation, Measurement and Verification Guidelines. He was also on the Board and the Planning Committee of the *International Energy Program Evaluation Conference (IEPEC)*, and is on the Planning Committee of the *International Energy Policy and Program Evaluation Conference (IEPPEC)*.

He has received the following awards related to his work on evaluation: The Lifetime Achievement Award from the IEPEC, Outstanding Achievement in Marketing Research and Evaluation Award from the Association of Energy Service Professionals and Certificates of Appreciation from the IEPEC and from the International Performance Measurement and Verification Protocol (IPMVP) organization. In 2007, as a member of the Intergovernmental Panel on Climate Change (IPCC), he received the Nobel Peace Prize.

He has consulted on evaluation projects around the world. For the last three years, he has been working with colleagues in creating a community of evaluators in Asia. He has led several evaluation workshops in Asia, was instrumental in establishing the first conference in Asia on the evaluation of energy efficiency programs and policies, and, working with others, created an organization, Energy Evaluation Asia Pacific (and website energy-evaluation.org) to support the evaluation of energy policy and programs.

Dr. Vine has a BS in Environmental Studies from Middlebury College, and a MS and Ph.D. in Ecology from the University of California at Davis.

Presentation:

Recent Results from California's Energy Efficiency Programs

California spent \$2.6 billion (US dollars) on energy efficiency programs in 2013 to 2015. In order to understand what worked and what did not work, as well as to uncover the energy and fiscal impact of these programs, more than 100 evaluation studies were conducted across more than 400 programs across seven sectors (e.g., residential, commercial and industrial). Financing mechanisms played a critical role in many of these programs. This presentation will present the key findings for the overall portfolio of programs as well as report on selected findings for the industrial and finance programs.



Dr. Zhu Xianli

Senior Economist, Copenhagen Centre on Energy Efficiency, UNEP DTU Partnership

Xianli has a PhD in Economics and has been working in the UNEP DTU Partnership in Denmark for 13 years. Her main working areas are analysing and assessing enabling policies and programmes for energy efficiency improvement and climate change mitigation. Since 2015, her main working area has shifted to the best practices for promoting energy efficiency in the industrial sector and the cooling sector. She has coordinated the preparation and publications on multiple reports and papers on best practices for energy efficiency improvement in different industries and countries, high-impact opportunities for energy efficiency, as well as policies and potential for energy efficiency improvement. She has a long experience working on climate change mitigation, especially market mechanism and technology needs assessment. Xianli has worked as regional, and national coordinator in the implementation of multiple international technical assistance projects on the energy efficiency, low-carbon development, technology needs assessment and the Clean Development Mechanism in numerous Asian and African countries.

Presentation:

Energy Efficiency Obligation Schemes in Europe

This presentation will start with an overview of the EE Obligation Schemes in Europe and the experiences in key countries. It will explain details of the Danish EE Obligation Scheme, which has an industrial focus. It elaborates the interactions of the EE Obligation Schemes with other market mechanisms for energy efficiency in the industrial sector and concludes with some suggestions on countries that are interested in introducing similar schemes.



Dr. Tapan Sarker

Senior Lecturer and Director of Engagement, Griffith Business School, Griffith University, Australia

Dr Tapan Sarker is a Senior Lecturer at the Department of Business Strategy and Innovation at Griffith Business School, Griffith University, Australia. His work as an academic, political economist, sustainability advisor, CSR expert and professional speaker has taken him to 20+ countries in the past 20 years to work with leading MNCs such as BHP Billiton, Rio Tinto, Mahindra & Mahindra Ltd India to the Mongolia Revenue Authority, Ministry of Natural Resources and Environment of Lao PDR, Ministry of Environment and Forestry, Indonesia and the World Bank. Dr Sarker is widely published in the area of strategy and sustainability, CSR and political economy of sustainable development. He has led a number of projects (worth over \$2.5 million) funded by both government and industry. Dr Sarker is a former World Bank Scholar. He is currently a Research Chair at Griffith Centre for Sustainable Enterprise, and a fellow at Griffith Asia Institute based at Griffith University, Australia. Dr Sarker held several prestigious visiting positions including at Indian Institute of Management Kolkata and Keio University in Japan.

Presentation:

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

Fiscal incentives can play an important role in promoting energy efficiency (EE) finance, and have the potential to enhance industrial sector development in Asia. Such incentives often provide via a country's tax system, offer tax subsidies, rebates, and tax-holidays in investments in EE technologies. It also allows deductions and accelerated depreciation of capital expenditure in EE investments that include investments in Research & Development (R&D), and other related activities within the industrial sector. The recent 2018 UN Environment Emissions Gap Report has also highlighted the potential role of fiscal policies as a key instrument in reducing future emissions. To date, a number of Asian countries have used fiscal policies in promoting investment in EE finance aimed at industrial sector development through increased investment in high-energy saving technologies and high-efficiency services. Such policies are predominant both in developed countries such as Japan and South Korea, and in developing and emerging countries such as India and Indonesia. However, given the variation in policies and differences in the overall structure of the economies including their income, socio-cultural and awareness status, the results are mixed. In this research, we explicitly elaborate the types of fiscal incentives provided by the four selected countries, India, Indonesia, South Korea and Japan in energy efficiency (EI) finance with a specific focus on the industrial sector development in each of the countries to explore the patterns, if any, in their energy efficiency outcomes. In particular, this research aims to present comparative case studies of the above four Asian

countries and highlights the current state and nature of fiscal incentives provided by the countries, effectiveness of fiscal incentives and policies, key barriers in implementing such policies, and suggest measures for effective implementation of such policies across the countries. We also present a summary of the findings and highlight the lessons learned for other countries in Asia and elsewhere.



Prof Paolo Bertoldi

Senior Expert, European Commission

Paolo Bertoldi has gained a Doctor Degree in Electrical Engineering in 1985 at the University of Padova (Italy). He has been working with the European Commission since 1986 and in 2015 he has been nominated Senior Expert. From 1986 to 1993 he was working in the EU nuclear fusion project, the Joint Undertaking Torus (JET) in the UK. For 1993 until April 2001, he was Administrator with the European Commission, DG Energy and Transport (DG TREN, Brussels Belgium), in charge of EU regulatory and voluntary programmes for energy efficiency in end-use equipment, buildings and industry. He was also in charge of voluntary agreements with industry and tertiary sectors and the GreenLight programme. Since May 2001, he is at the European Commission Joint Research Centre (Ispra, Italy), in charge of research activities on energy efficiency policy analysis, the efficient use of electricity (in particular ICT) and innovative policy instruments for energy efficiency (e.g. white certificates, financing mechanisms, ESCO, EPC, emission trading) and the Covenant of Mayors. He also manages the Covenant of Mayors research activities at the JRC.

He has published over 100 articles on energy efficiency in scientific journals and conference proceedings, as well as over 100 reports.

He has been a Contributing Author for IPCC Assessment Report 4, Lead Author for IPCC Assessment Report 5 and the Special Report on 1.5 C and recently he has been nominated Lead Author for IPCC Assessment Report 6. He is the Editor-in-Chief of the peer reviewed journal Energy Efficiency.

Presentation:

Market-based instruments for industrial energy efficiency in Europe

The presentation will give a short summary of the EU and its Member States policies for the industrial sector. It covers the Energy Efficiency Directive, which introduces the obligation for Energy Companies Obligations in the EU and other policies for the industrial sector. The presentation will focus on market based instruments and in particular on White Certificates in Italy, a very successful scheme to promote energy efficiency in the industrial sector. In the Italian WhC a key role is played by ESCOs.