

# IEA Energy Efficiency in Emerging Economies

India Training Week Programme



**10 – 13 December 2018**

*India International Centre and India Habitat Centre*

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# The Opportunity for Energy Efficiency

MORNING SESSION: AUDITORIUM STEIN - INDIA HABITAT CENTRE (ENTER VIA GATE 3 ON VARDHAM MARG, NEW DELHI)

08:00 - 09:00 Participant Registration - Welcome Coffee & Tea

## WELCOMING ADDRESS

09:00 - 09:30

- Arijit Sengupta, Director, Bureau of Energy Efficiency
- Melanie Slade, International Energy Agency
- Abhay Bakre, Director General, Bureau of Energy Efficiency
- Mr. Rajpal, Economic Advisor & JS(EC), Ministry of Power, Government of India (TBC)
- A. K Bhalla, Secretary, Ministry of Power, Government of India (TBC)
- Pankaj Kumar, Secretary, Bureau of Energy Efficiency

09:30 - 09:45

Group Photo - Coffee & Tea Break

## LESSONS LEARNED: INTERNATIONAL ENERGY EFFICIENCY EXPERIENCES

Moderator: Melanie Slade, IEA

09:45 - 10:45

- Daniel Bradley, Team Leader for Low Carbon Growth, British High Commission
- Henriette Faergemann Bredsten, First Counsellor, Delegation of European Union to India
- Anand Shukla, Senior Thematic Advisor, Swiss Agency for Development and Cooperation
- Arvind Kumar Asthana, Senior Technical Specialist, Indo-German Energy Program
- Arijit Sengupta, Director, Bureau of Energy Efficiency

10:45 - 11:15

Coffee & Tea Break

11:15 - 11:35

## MEASURING ENERGY EFFICIENCY

Brian Dean, IEA

11:35 - 12:00

## FOSSIL FUEL SUBSIDY IMPACTS ON ENERGY EFFICIENCY

Vibhuti Garg, Senior Energy Specialist, International Institute for Sustainable Development

12:00 - 12:20

## ENERGY-EFFICIENT COOLING

John Dulac, IEA

12:20 - 12:40

## MULTIPLE BENEFITS OF ENERGY EFFICIENCY

Ailin Huang, IEA

12:40 - 12:45

## THE WEEK AHEAD: THE TRAINING SESSIONS

Melanie Slade, IEA

12:45 - 14:00

Lunch

*NB: After lunch we will be moving to the India International Centre - 40 Max Mueller Marg, New Delhi (10 min walk from IHC)*

## Buildings

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: BRIAN DEAN, INTERNATIONAL ENERGY AGENCY

14:00 - 14:30

INTRODUCTORY ROUNDTABLE

14:30 - 15:30

1. WHERE TO START: ENERGY USE IN BUILDINGS

*Brian Dean-IEA*

Scenario: An influential NGO is urging for all new construction to be zero emission or net zero energy buildings.

Discussion question: *What factors are key to achieving zero emission or net zero energy buildings?*

15:30 - 16:00

Coffee & Tea Break

16:00 - 17:00

2. WHERE TO START: ENERGY EFFICIENCY POTENTIAL IN BUILDINGS

*Brian Dean-IEA*

Scenario: You have been asked to create new policies for energy efficient buildings.

Discussion question: *How do you determine where to start?*

17:00 - 20:00

Social Activity & Networking Cocktail

## Buildings

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: BRIAN DEAN, INTERNATIONAL ENERGY AGENCY

09:00 - 09:30 REVIEW: WHAT WE LEARNED YESTERDAY AND QUESTIONS

09:30 - 11:00

3. TOOLKIT: ENERGY EFFICIENT BUILDING DESIGN  
*Brian Dean-IEA and Pierre Jaboyedoff-BEEP India*

Scenario: Builders are saying that construction timelines are short and it is not possible to design more efficient buildings because it is too complicated.

Discussion question: *What changes in building design can enable more energy efficiency in buildings?*

11:00 - 11:30 Coffee & Tea Break

11:30 - 13:00

4. TOOLKIT: ENERGY EFFICIENT BUILDING TECHNOLOGIES  
*Brian Dean-IEA and Pierre Jaboyedoff-BEEP India*

Scenario: Stakeholders are saying that new policies are not possible because the technology is not available that enables increased energy efficiency.

Discussion question: *What technologies could change your market for energy efficiency?*

13:00 - 14:00 Lunch

14:00 - 14:30

SPECIAL SESSION: IEA'S TECHNOLOGY COLLABORATION PROGRAMMES  
*Brian Dean-IEA*

14:30 - 15:30

5. TOOLKIT: ENERGY EFFICIENCY POLICIES AND TARGET SETTING  
*Brian Dean-IEA and Sumedha Malaviya-WRI*

Scenario: There has been a change of government and the incoming government wants a range of options for interventions to rapidly increase energy efficiency.

Discussion question: *How do you identify, prioritise and quantify these policy options?*

15:30 - 16:00 Coffee & Tea Break

16:00 - 17:00

6. WHAT ARE THE STEPS? ENABLING INVESTMENT WITH ENERGY EFFICIENCY POLICIES  
*Brian Dean-IEA and Shruti Narayan-IFC*

Scenario: You continue to hear from stakeholders that all they need is money and then they will consider doing energy efficiency in buildings.

Discussion question: *What policy approaches can enable energy efficiency investment?*

## Buildings

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: BRIAN DEAN, INTERNATIONAL ENERGY AGENCY

09:00 - 09:30 REVIEW: WHAT WE LEARNED YESTERDAY AND QUESTIONS

09:30 - 11:00

### 7. WHAT ARE THE STEPS? IMPLEMENTING CODES AND STANDARDS

*Brian Dean – IEA and Pierre Jaboyedoff – BEEP India*

Scenario: A respected industry association claims that the building energy codes out of date.

Discussion question: *How do you advance building energy codes in your jurisdiction?*

11:00 - 11:30

Coffee & Tea Break

11:30 - 12:30

### 8. WHAT ARE THE STEPS? BUILDING OPERATIONS AND PROCUREMENT

*Brian Dean – IEA and Shruti Narayan – IFC*

Scenario: Citizens are asking why government-operated buildings are not efficient.

Discussion question: *What measures can enable the government to lead by example with efficient buildings?*

12:30 – 13:00

### SPECIAL SESSION. THE MULTIPLE BENEFITS OF ENERGY EFFICIENCY IN BUILDINGS

*Brian Dean – IEA*

13:00 - 14:00

Lunch

14:00 - 15:30

### 9. DID IT WORK? EVALUATION AND ENERGY EFFICIENCY INDICATORS

*Brian Dean – IEA*

Scenario: Leadership wants to know how effective the building energy efficiency policies have been.

Discussion question: *How do you determine the benefits of your policies and programmes?*

15:30 - 16:00

Coffee & Tea Break

16:00 - 16:15

### SPECIAL SESSION. INTERNATIONAL AND REGIONAL INITIATIVES THAT CAN HELP

*Brian Dean – IEA, Sumedha Malaviya-WRI and Pierre Jaboyedoff – BEEP India*

16:15 - 17:00

### 10. ENERGY EFFICIENCY QUIZ

## Appliances and Equipment

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: MELANIE SLADE, INTERNATIONAL ENERGY AGENCY

14:00 - 14:30 INTRODUCTORY ROUNDTABLE

14:30 - 15:30

1. WHERE TO START: PLANNING ENERGY EFFICIENCY PROGRAMMES  
*Melanie Slade – IEA*

Scenario: The government wants a range of options for interventions to rapidly increase residential energy efficiency for appliances, equipment and lighting.

Discussion question: *How do you identify, prioritise and quantify these options?*

15:30 - 16:00 Coffee & Tea Break

16:00 - 17:00

2. WHERE TO START: MINIMUM ENERGY PERFORMANCE STANDARDS  
*Melanie Slade – IEA*

Scenario: You've been asked to suggest a new MEPS level for residential air conditioners.

Discussion question: *What steps would you take to develop your recommendation?*

17:00 - 20:00 Social Activity & Networking Cocktail

## Appliances and Equipment

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: MELANIE SLADE, INTERNATIONAL ENERGY AGENCY

09:00 - 09:30 REVIEW: WHAT WE LEARNED YESTERDAY AND QUESTIONS

09:30 - 11:00

3. TOOLKIT: INSIGHTS INTO ENERGY LABELS  
*Melanie Slade – IEA*

Scenario: A newspaper article has questioned the validity of energy labels on refrigerators, saying that the label does not reflect real usage. Your manager has asked you to outline a response.

Discussion question: *What do you say?*

11:00 - 11:30 Coffee & Tea Break

11:30 - 13:00

4. TOOLKIT: INCENTIVES AND PROCUREMENT POLICY  
*Melanie Slade – IEA*

Scenario: Your government wishes to provide incentives to encourage the uptake of energy efficiency equipment.

Discussion question: *What initiatives would you recommend and what would be involved in implementing these?*

13:00 - 14:00 Lunch

14:00 - 14:30 SPECIAL SESSION: IEA'S TECHNOLOGY COLLABORATION PROGRAMMES

14:30 - 15:30

5. WHAT ARE THE STEPS? INDUSTRY TRANSFORMATION

Scenario: Your government is proposing to introduce MEPS of electric fans. Several local manufacturers are upset, claiming that the MEPS in force in several neighbouring economies would ban most of their current products lines, and threaten their businesses.

Discussion question: *What steps could you take to gain the support of local industry for the introduction of MEPS?*

15:30 - 16:00 Coffee & Tea Break

16:00 - 17:00

6. WHAT ARE THE STEPS? MONITORING, VERIFICATION AND ENFORCEMENT (MV&E) OF STANDARDS AND LABELLING PROGRAMMES  
*Melanie Slade – IEA*

Scenario: You've been asked to take steps to improve compliance with MEPS in your region.

Discussion question: *How do you go about deciding on the most effective ways to achieve this?*

## Appliances and Equipment

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: MELANIE SLADE, INTERNATIONAL ENERGY AGENCY

09:00 - 09:30 REVIEW: WHAT WE LEARNED YESTERDAY AND QUESTIONS

09:30 - 11:00

7. WHAT ARE THE STEPS? COMMUNICATION STRATEGIES  
*Melanie Slade – IEA, Neha Dhingra – CLASP*

Scenario: You are asked to prepare a communications strategy for your MEPS programme.  
Discussion question: *What are the key elements to this strategy?*

11:00 - 11:30 Coffee & Tea Break

11:30 - 12:30

8. TOOLKIT: THE RELATIONSHIP BETWEEN PRODUCT EFFICIENCY AND PRICES  
*Melanie Slade – IEA*

Scenario: You have been asked to prepare an impact statement for your regulations, including the effect on product prices.  
Discussion question: *How would you go about the task of estimating future product costs?*

12:30 – 13:00 SPECIAL SESSION. KEY LEARNINGS: FURTHER INFORMATION, BEST PRACTICE

13:00 - 14:00 Lunch

14:00 - 15:30

9. DID IT WORK? TRACKING PROGRESS AND ASSESSING THE MULTIPLE BENEFITS  
*Melanie Slade – IEA*

Scenario: The Minister wants to know how effective your programme has been.  
Discussion question: *How do you go about answering this?*

15:30 - 16:00 Coffee & Tea Break

16:00 - 16:15 SPECIAL SESSION. INTERNATIONAL AND REGIONAL INITIATIVES THAT CAN HELP  
*Melanie Slade – IEA*

16:15 - 17:00 10. REVIEW AND ENERGY EFFICIENCY QUIZ



## Industry

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: PATRICK CRITTENDEN, SUSTAINABLE BUSINESS

14:00 - 14:30

INTRODUCTORY ROUNDTABLE

14:30 - 15:30

1. WHERE TO START: MAKING THE CASE FOR INDUSTRIAL ENERGY EFFICIENCY POLICY

*Patrick Crittenden – Sustainable Business*

Identify policy-making challenges, analyse data and explore business barriers to establish the need for industrial energy efficiency policies and programmes.

Discussion question: *What are the key justifications for the programmes you are involved in?*

15:30 - 16:00

Coffee & Tea Break

16:00 - 17:00

2. WHERE TO START: MAKING THE CASE FOR INDUSTRIAL ENERGY EFFICIENCY POLICY (CONT.)

*Patrick Crittenden – Sustainable Business*

Set objectives and position energy efficiency programmes in the context of national priorities and other policies and programmes.

Discussion question: *What does success look like?*

17:00 - 20:00

Social Activity & Networking Cocktail

## Industry

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: PATRICK CRITTENDEN, SUSTAINABLE BUSINESS

09:00 - 09:30 REVIEW: WHAT WE LEARNED YESTERDAY AND QUESTIONS

09:30 - 11:00 3. TOOLKIT: UNDERSTANDING AND CONSULTING WITH STAKEHOLDERS  
*Tirtha Biswas - CEEW*  
 Factors influencing the uptake of energy efficiency Initiatives by Indian MSMEs.  
Discussion question: *Who are your key stakeholders and how can you align your interests with theirs?*

11:00 - 11:30 Coffee & Tea Break

11:30 - 13:00 4. TOOLKIT: SELECT ENERGY EFFICIENCY PROGRAMME MEASURES  
*Patrick Crittenden – Sustainable Business, Prosanto Pal - TERI*  
 Overview of energy efficiency measures for industrial energy efficiency  
 Technology demonstration and dissemination measures for industrial SMEs.  
Discussion question: *What are the best approaches that you can use in your region to maximise energy efficiency outcomes?*

13:00 - 14:00 Lunch

14:00 - 14:30 SPECIAL SESSION: IEA'S TECHNOLOGY COLLABORATION PROGRAMMES  
*Patrick Crittenden – Sustainable Business*

14:30 - 15:30 5. TOOLKIT: SELECT ENERGY EFFICIENCY PROGRAMME MEASURES (CONT.)  
*Patrick Crittenden – Sustainable Business*  
 Overview of financing options for industrial energy efficiency and global best practice  
Discussion question: *What are the best options to assist industrial businesses with finance for energy efficiency?*

15:30 - 16:00 Coffee & Tea Break

16:00 - 17:00 6. TOOLKIT: SELECT ENERGY EFFICIENCY PROGRAMME MEASURES (CONT.)  
*Somnath Bhattacharjee – IIP, Patrick Crittenden – Sustainable Business*  
 Adapting energy efficiency measures to focus on SME interests, capability and needs.  
Discussion question: *Roundtable discussion on maximising the impact and reach of regional initiatives for SMEs*

## Industry

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: PATRICK CRITTENDEN, SUSTAINABLE BUSINESS

09:00 - 09:30 REVIEW: WHAT WE LEARNED YESTERDAY AND QUESTIONS

09:30 - 11:00

7. TOOLKIT: IMPLEMENT PROGRAMMES  
*Patrick Crittenden – Sustainable Business*

Design a pilot and develop implementation strategies.

8. TOOLKIT: LOOKING FORWARD – ADAPTING ENERGY EFFICIENCY MEASURES TO LEVERAGE THE CIRCULAR ECONOMY  
*Ritu Bharadwaj – IIP*

Leveraging the circular economy to support energy efficiency policy and programmes.

11:00 - 11:30 Coffee & Tea Break

11:30 - 13:00

9. WHAT ARE THE STEPS? PROGRAMME DESIGN SCENARIO EXERCISE  
*Patrick Crittenden – Sustainable Business*

Scenario: You are working in a programme team to design a new, regional industrial energy efficiency programme.

Discussion questions: What industry sectors and segments will you target and why? Which stakeholders will you consult and involve? What measures will you include in your programme and what barriers will these overcome?

How will you gather data and communicate progress?

13:00 - 14:00 Lunch

14:00 - 15:30

10. DID IT WORK? INDICATORS, EVALUATING AND SCALING UP PROGRAMMES  
*Patrick Crittenden – Sustainable Business*

Design evaluations to track progress, establish programme strengths and to identify limitations and opportunities to scale up.

15:30 - 16:00 Coffee & Tea Break

16:00 - 16:15

SPECIAL SESSION. INTERNATIONAL AND REGIONAL INITIATIVES THAT CAN HELP  
*Patrick Crittenden – Sustainable Business*

16:15 - 17:00 11. REVIEW: ROUNDTABLE DISCUSSION ON APPLICATION CHALLENGES AND THE DEVELOPMENT OF ACTION PLANS

## Municipal and utility services

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: JOHN DULAC, INTERNATIONAL ENERGY AGENCY

14:00 - 14:30

INTRODUCTORY ROUNDTABLE

14:30 - 15:30

1. WHERE TO START: ENERGY USE IN MUNICIPALITIES

*John Dulac – IEA*

Scenario: Your municipal commissioner is under pressure to reduce energy consumption to meet national targets.

Discussion question: How do you help the commissioner understand the drivers of energy consumption in the municipality?

Activity: Drivers influencing energy consumption in municipalities.

15:30 - 16:00

Coffee & Tea Break

16:00 - 17:00

2. WHERE TO START: ENERGY EFFICIENCY POTENTIAL IN MUNICIPALITIES

*John Dulac – IEA*

Scenario: Your municipality has set a target to cut emissions and lower energy spending by 2030.

Discussion question: How can energy efficiency reach these goals?

Activity: Back-of-envelope calculations of energy efficiency potential.

17:00 - 20:00

Social Activity & Networking Cocktail

# Municipal and utility services

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: JOHN DULAC, INTERNATIONAL ENERGY AGENCY

09:00 - 09:30 REVIEW: WHAT WE LEARNED YESTERDAY AND QUESTIONS

09:30 - 11:00

3. TOOLKIT: ENERGY EFFICIENT MUNICIPAL PLANNING  
*John Dulac – IEA, Deepak Krishnan and Kajol - WRI*

Scenario: Your municipality is growing quickly and so is demand for municipal services.

Discussion question: *How can we design a more energy-efficient municipality?*

Activity: *Ideas for energy efficiency initiatives.*

11:00 - 11:30 Coffee & Tea Break

11:30 - 13:00

4. TOOLKIT: ENERGY EFFICIENCY TECHNOLOGIES  
*John Dulac – IEA*

Scenario: The municipal commissioner wants to be known for innovative solutions at low costs.

Discussion question: *What are the technologies or technology strategies that you can put in place in order to boost energy efficiency?*

13:00 - 14:00 Lunch

14:00 - 14:30

SPECIAL SESSION: IEA'S TECHNOLOGY COLLABORATION PROGRAMMES  
*John Dulac – IEA*

14:30 - 15:30

5. WHAT ARE THE STEPS? IMPLEMENTING ENERGY EFFICIENCY PROGRAMMES - TARGET SETTING  
*John Dulac – IEA, Deepak Krishnan and Kajol - WRI*

Scenario: A prominent NGO is challenging your targets as not being aggressive enough.

Discussion question: *How do you identify, quantify, and prioritise energy efficiency programmes and set appropriate targets?*

15:30 - 16:00 Coffee & Tea Break

16:00 - 17:00

6. WHAT ARE THE STEPS? IMPLEMENTING ENERGY EFFICIENCY PROGRAMMES - IMPLEMENTATION  
*John Dulac – IEA, Deepak Krishnan and Kajol - WRI*

Scenario: The local council and operators are doubting that the energy efficiency programmes will actually deliver the benefits.

Discussion question: *What are the best practices in implementing energy efficiency programmes?*

## Municipal and utility services

VENUE: INDIA INTERNATIONAL CENTRE, 40 MAX MUELLER MARG, NEW DELHI

LEAD: JOHN DULAC, INTERNATIONAL ENERGY AGENCY

09:00 - 09:30 REVIEW: WHAT WE LEARNED YESTERDAY AND QUESTIONS

09:30 - 11:00

7. WHAT ARE THE STEPS? ENABLE PUBLIC ENERGY EFFICIENCY INVESTMENT  
*John Dulac – IEA, Deepak Krishnan and Kajol – WRI*

Scenario: There are ambitious targets set, but seemingly little funding available to realise energy efficiency projects.

Discussion question: *How can you mobilise public finance for your energy efficiency programmes and projects?*

11:00 - 11:30 Coffee & Tea Break

11:30 - 12:30

8. WHAT ARE THE STEPS? ENABLE PRIVATE ENERGY EFFICIENCY INVESTMENT  
*John Dulac – IEA, Deepak Krishnan and Kajol – WRI*

Scenario: There are ambitious targets set, but seemingly little funding available to realise energy efficiency projects.

Discussion question: *What are the private financing options that you can take?*

12:30 – 13:00 SPECIAL SESSION. THE MULTIPLE BENEFITS OF ENERGY EFFICIENCY FOR MUNICIPALITIES  
*John Dulac – IEA*

13:00 - 14:00 Lunch

14:00 - 15:30

9. DID IT WORK? EVALUATION AND ENERGY EFFICIENCY INDICATORS  
*John Dulac – IEA*

Scenario: The government wants to know how effective energy efficiency programmes have been and wants to compare different cities.

Discussion question: *How do you develop indicators that properly measures the benefits of your programmes?*

15:30 - 16:00 Coffee & Tea Break

16:00 - 16:15 SPECIAL SESSION. INTERNATIONAL AND REGIONAL INITIATIVES THAT CAN HELP  
*John Dulac – IEA*

16:15 - 17:00 10. ENERGY EFFICIENCY QUIZ

## Making More Energy Efficiency Happen

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09:00 - 09:30	SECTOR STREAMS REPORT BACK ON KEY LESSONS Melanie Slade and Patrick Crittenden
09:30 - 10:00	COMMUNICATION STRATEGIES TO SUPPORT ENERGY EFFICIENCY GOALS: THE PRINCIPLES OF PLANNING AND IMPLEMENTING EFFECTIVE PUBLIC OUTREACH CAMPAIGNS Melanie Slade and Ailin Huang
10:00 - 10:30	Coffee & Tea Break
10:30 - 11:30	COMMUNICATION STRATEGIES TO SUPPORT ENERGY EFFICIENCY GOALS: THE PRINCIPLES OF PLANNING AND IMPLEMENTING EFFECTIVE PUBLIC OUTREACH CAMPAIGNS Melanie Slade and Ailin Huang
11:30 - 12:00	FUEL SUBSIDIES AND ENERGY EFFICIENCY: INTRODUCTION Brian Dean, John Dulac, Ailin Huang and Siddarth Singh
12:00 - 13:00	Lunch
13:00 - 13:30	FUEL SUBSIDIES AND ENERGY EFFICIENCY – GROUP WORK Brian Dean, John Dulac, Ailin Huang and Siddarth Singh
13:30 - 14:30	FUEL SUBSIDIES AND ENERGY EFFICIENCY – REPORT BACK Brian Dean, John Dulac, Ailin Huang and Siddarth Singh
14:30 - 15:00	Coffee & Tea Break
15:00 - 16:00	CLOSING REMARKS AND AWARDING OF CERTIFICATES

## Sector Leaders

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**Brian Dean** has more than 20 years of experience in energy efficiency and leads IEA's work on energy efficiency in buildings to support governments and organizations globally with energy efficiency policy. Brian has been an author for various recent reports, including IEA's Future of Cooling, Energy Efficiency 2018, and the Global ABC Global Status Report for Buildings and Construction. Prior to joining the IEA in 2014, Brian was head of Energy Efficiency Policy and Analytics at ICF International, where he supported the development of the ENERGY STAR program, utility-based energy efficiency programs, building energy codes and energy demonstration projects. Brian has an education in engineering, architecture and political science from Rensselaer Polytechnic Institute and Massachusetts Institute of Technology.



**Mel Slade** Mel Slade has spent nearly thirty years in energy efficiency policy development and implementation in many parts of the world. She started out working in the UK Government on industrial energy efficiency and has worked with many other governments to establish energy efficiency programmes, perhaps most notably, the Government of China in the 1990s. She also spent six years overseeing the regulation of minimum energy performance standards and labels for lighting, equipment and appliances in Australia and New Zealand. Mel moved to the International Energy Agency in February 2014 to manage the Energy Efficiency in Emerging Economies Programme. Mel and her team work with policy makers in Brazil, China, India, Indonesia, Mexico, South Africa and Thailand to develop more effective energy efficiency policy, track its progress and assess its potential.



**Patrick Crittenden** is the Director of Sustainable Business. He is a recognised expert in industrial energy efficiency policy and practice and has provided advisory and consultation services to national and regional governments on an extensive range of policies including the Australian Energy Efficiency Opportunities Act and the Mongolian Energy Efficiency Business Programme. Patrick is an engaging speaker and facilitator and has designed and delivered stakeholder engagement and energy efficiency capacity building events in Australia, the United States, France, India, Russia and Mongolia. He holds a Bachelor of Social Science and Policy degree as well as a PhD in Management. His PhD research examined the interaction between government policies, market forces and organisational culture to provide new insights into how and why energy management practices change in large energy using businesses.





John Dulac is an Energy Analyst in the Directorate of Sustainability, Technology and Outlooks at the International Energy Agency. He leads the energy technology and policy analysis in the buildings sector, contributing to IEA efforts to better understand the implications for a low-carbon economy. He also leads the IEA's Collaborative on Combined Heat and Power and efficient District Heating and Cooling (CHP/DHC) and is also the desk officer for the Technology Collaboration Programmes (TCPs) on Energy Conservation through Energy Storage (ECES), Heat Pump Technologies (HPT), District Heating and Cooling including Combined Heat and Power (DHC) and Energy Efficient End-Use Equipment (4E). John previously worked as a research associate at the Asian Development Bank. He received a BSc in Environmental Engineering and BA in International Relations from Tufts University, and an MSc in Urban Planning and Master of International Affairs at Columbia University.



Astha Gupta is the Lead Analyst and Coordinator for International Energy Agency (IEA) in India based in New Delhi. She has previously worked at The Energy and Resources Institute (TERI) and has more than 5 years of experience in the area of Renewable Energy and Energy Access.



Ailin Huang works for the IEA's Energy Efficiency in Emerging Economies Programme (E4), managing E4's collaborative activities in India and China. She has previously worked at the International Partnership for Energy Efficiency Cooperation and served as an advisor to the European Commission on innovation policy for the Horizon 2020 Programme.



Siddharth Singh is the Lead Analyst and Coordinator for International Energy Agency (IEA) in India based in New Delhi. He has previously been a German Chancellor Fellow (2016-17), a visiting fellow at Wuppertal Institute in Berlin and Nansen Institute in Oslo, and has also worked at The Energy and Resources Institute (TERI).

