

## IEA Building Activities

Marc LaFrance

International Energy Agency

21/22 May 2014

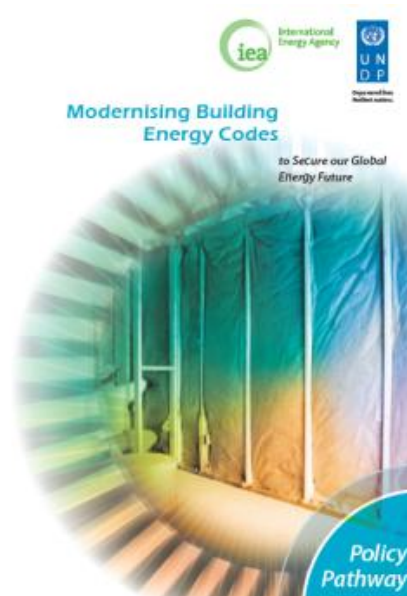
Paris



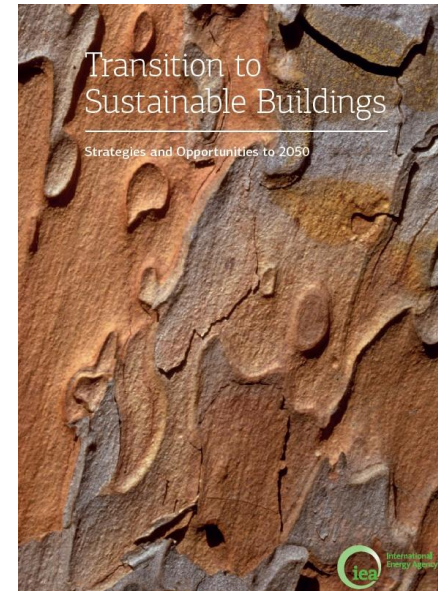
Technology Roadmap  
Energy efficient building envelopes



Dec 2013



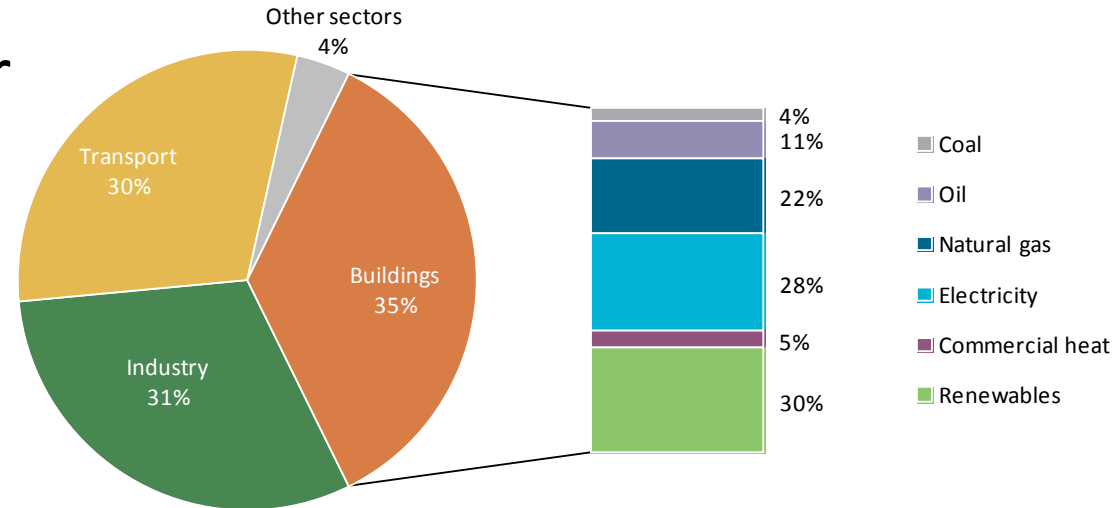
Aug 2013



Jun 2013

- Buildings background - IEA Buildings Publications
- Key policy and technology recommendations
- Building partnership framework -core work plan, possible areas for new activities
- Energy Technology Perspectives (ETP) 2014 and Clean Energy Ministerial (CEM) tracking report, published 12 May 2014
- Next steps
- Stakeholder feedback

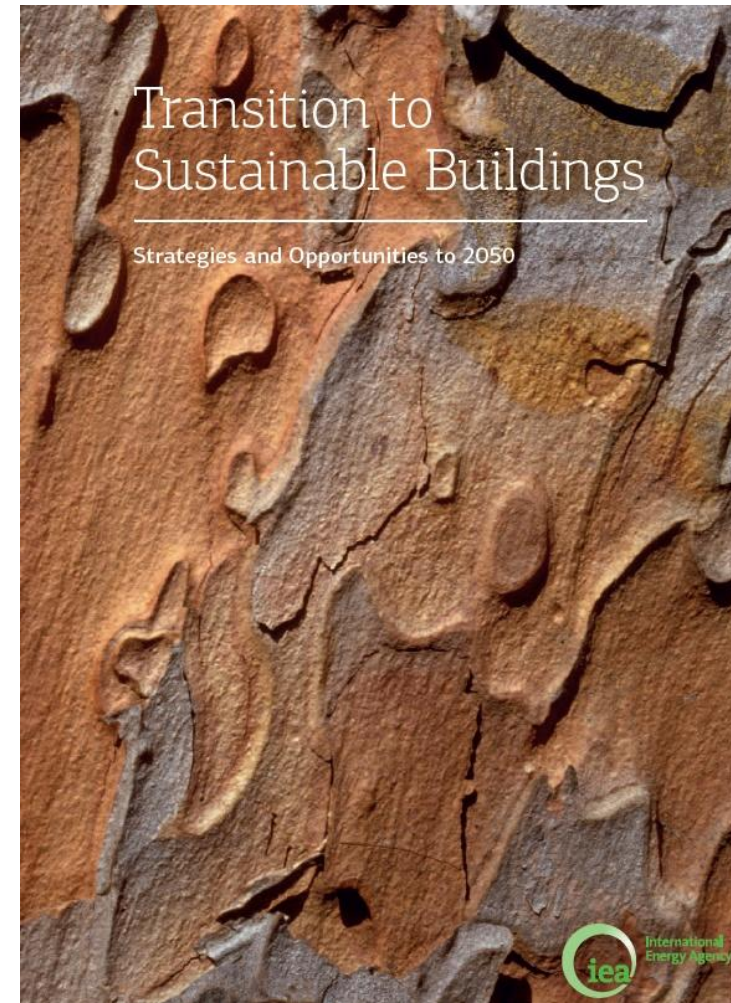
- Largest end-use sector
- 1/3 carbon emissions
- 50% of electricity
- Major portion of GDP
- Stock opportunities:



- 75% - 90% of OECD building stock still in service by 2050
- Large population growth in developing world will drive new floor area that needs to be efficient (2.5 billion more by 2050)

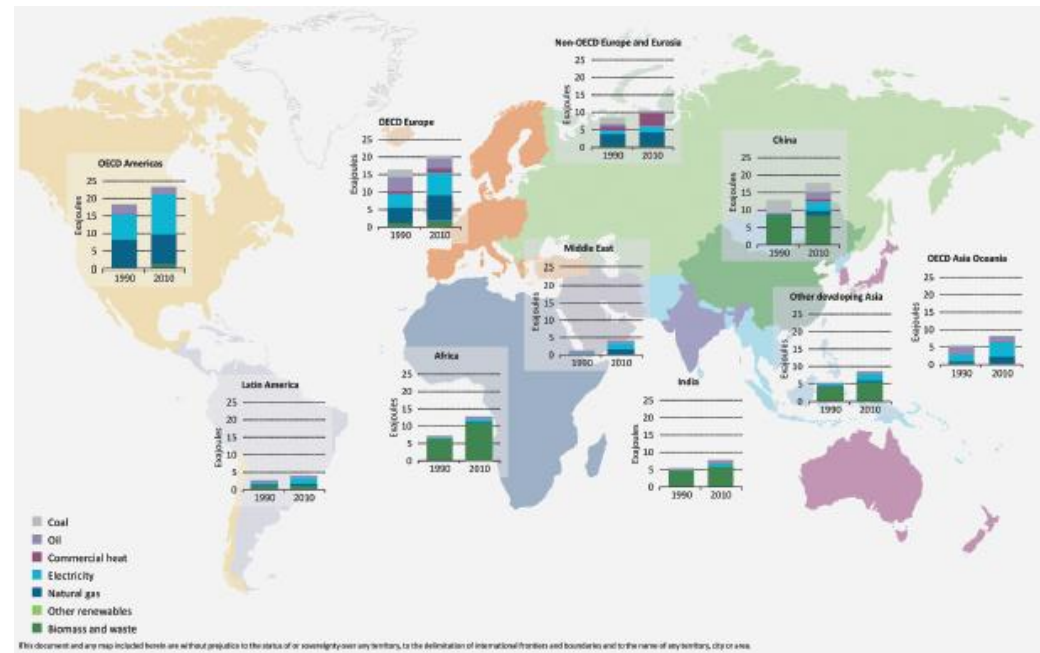
# ***Transition to Sustainable Buildings: Strategies and Opportunities to 2050***

- The overall ETP strategy for buildings
- Global and regional analysis, energy savings and emissions reduction forecasts
- Technical opportunities and recommendations: envelope; heating and cooling; appliances, lighting and cooking
- Policies to transform buildings



Includes:

- Recent trends, end-use consumption, energy intensities, fuel shares and forecasts
- Energy saving and emissions reduction potential with detailed recommendations



**Regions: ASEAN (Association of Southeast Asian Nations), Brazil, China, European Union (EU-27), India, Mexico, Russia, South Africa and United States**

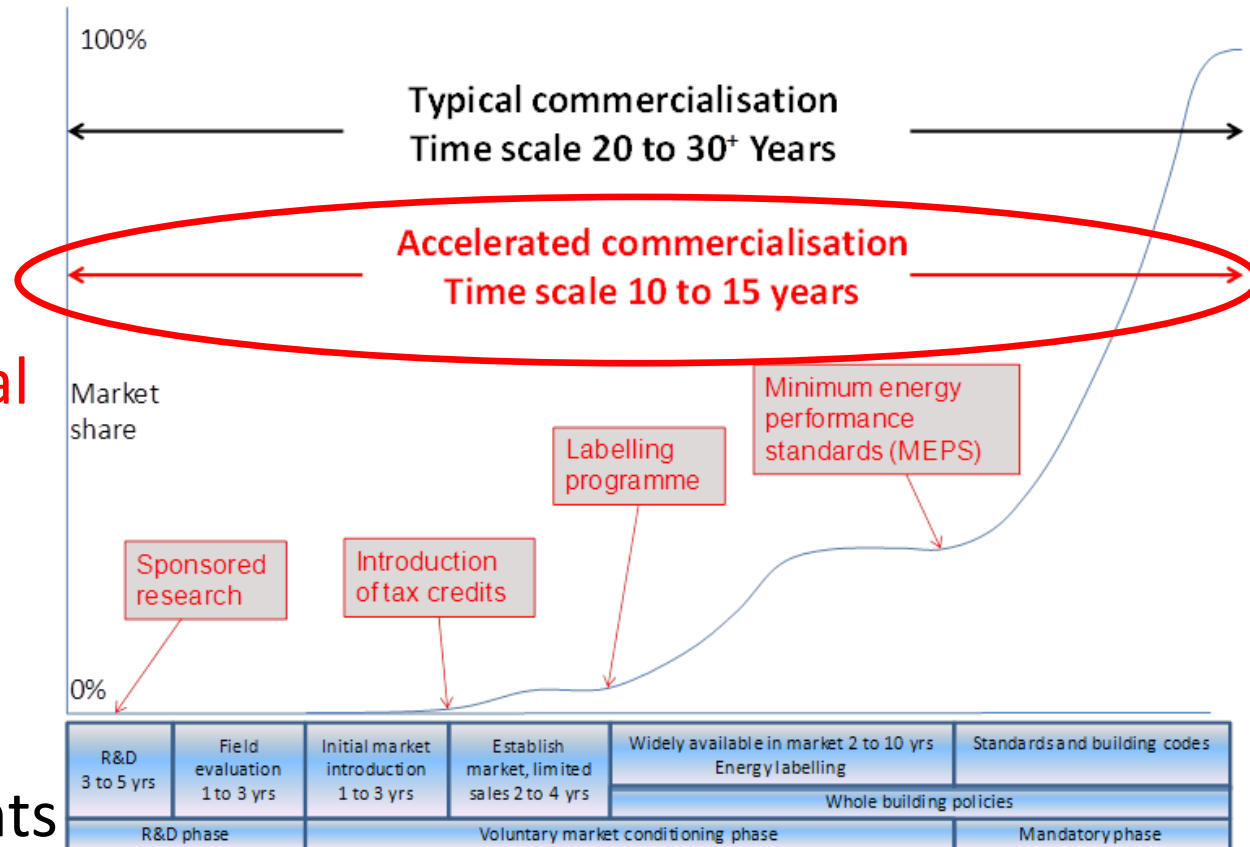
# Priority Recommendations

	ASEAN	Brazil	China	European Union	India	Mexico	Russia	South Africa	United States
<b>Technology</b>									
Advanced envelope – cold climate			Red	Gold			Red		Red
Reduced cooling loads – hot climates	Gold	Gold				Gold			
Heat pumps			Gold	Red			Gold		Gold
Solar thermal		Red			Gold	Red		Red	
More efficient use of biomass	Red				Red			Gold	
<b>Policy</b>									
Building codes with supporting infrastructure	Gold	Gold	Gold		Red	Gold	Gold	Gold	
Appliance and equipment standard	Red	Red	Red		Gold	Red		Red	
Deep renovation of existing buildings				Red			Red		Red
Zero-energy new buildings				Gold					Gold

Note: Recommendations limited to top two for technology and policy, all items could be relevant for most countries. Red indicates immediate priority, while gold indicates medium-term priority

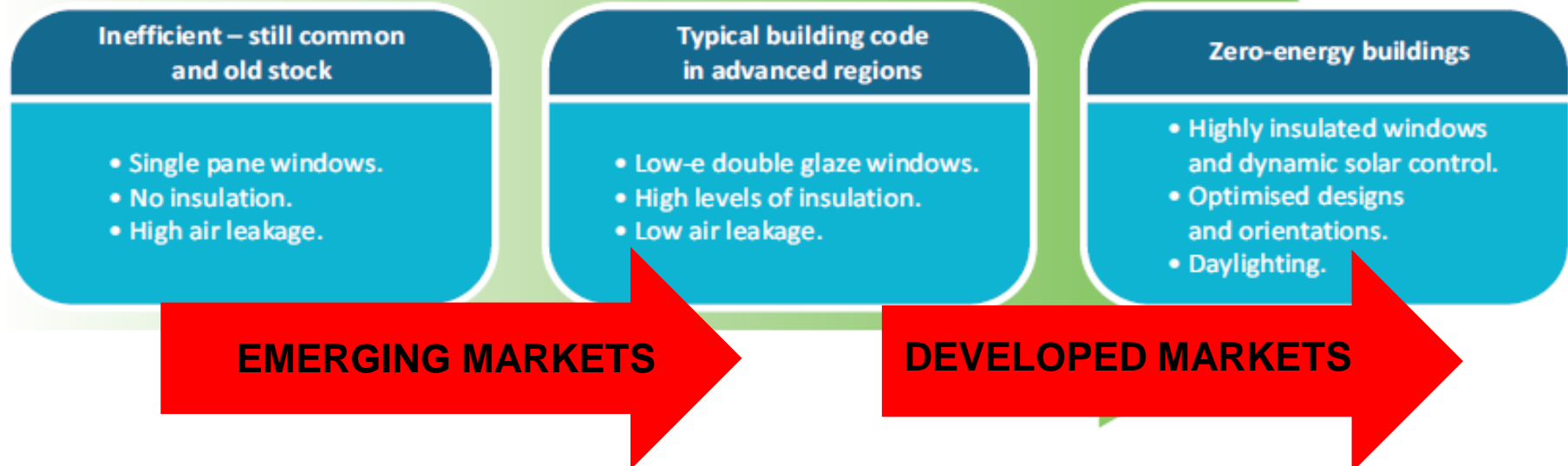
# Integrated Policies – Systems and Components

- Promote integrated policy packages
- Deep renovation critical in mature markets
- **Building codes critical in emerging markets**
- Systems level performance supported by advanced components



# Transformation to Low-Energy Buildings

## Transforming construction to low energy buildings



**KEY POINT:** *the world needs to shift from very old buildings to modern buildings, and then to low-energy or zero-energy buildings.*

**First Step – reduce the need for heating and cooling, passive strategies when possible!!!**



# Technology Roadmap Energy Efficient Building Envelopes

- Construction transformation strategy
- Provides technical, economic and strategic framework
- Assessment of high priority areas for 12 regions of the world
- Policy criteria and evaluation

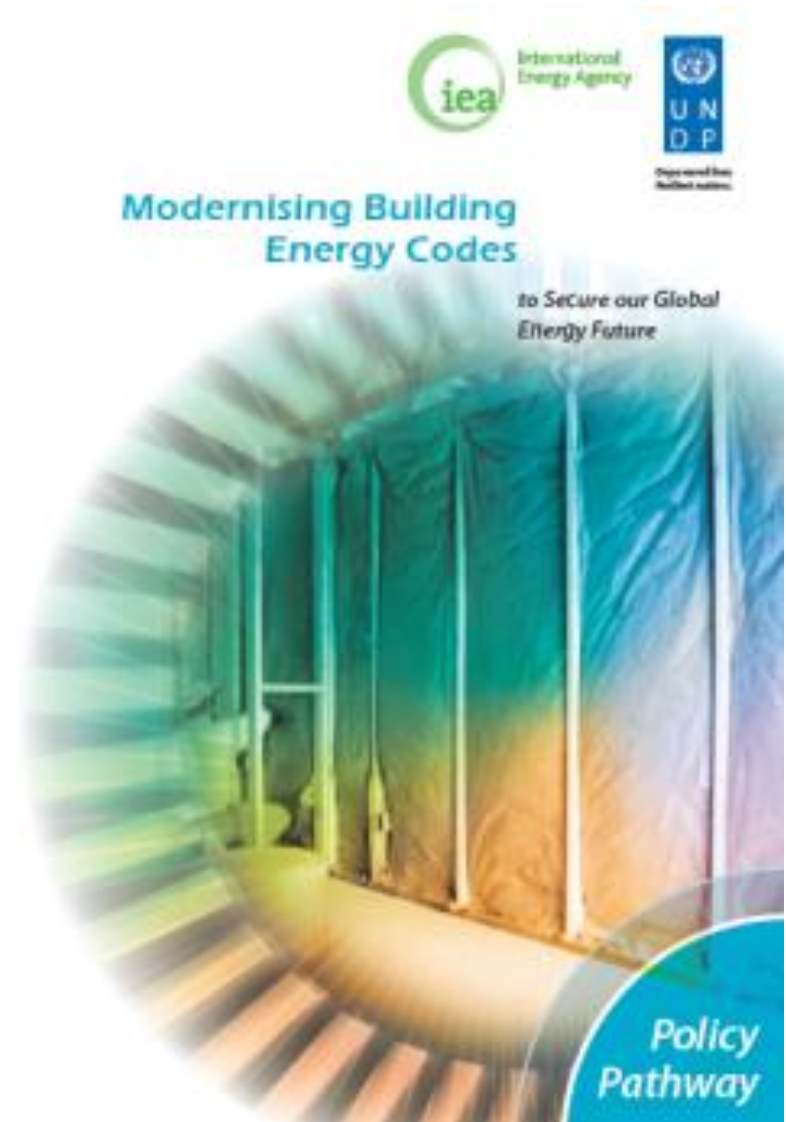


## Technology Roadmap

Energy efficient building envelopes

# Building Codes are Most Effective Policy to Impact Construction

- Vision for very low energy building through building codes
- Self sufficiency (how cool do buildings need to be if we use passive strategies and dress appropriately)
- Utilize renewable energy as much as possible



# Framework for Partnership – IEA Working to Improve Collaboration



- IEA Building's model has 31 country and regions to cover the entire world
- Hybrid econometric model with stock and flow elements for building stock and equipment
- IEA extensive energy balances database and recent energy efficiency indicators data from most developed IEA member countries
- IEA working with multiple organisations on data collaboration but would like to expand this activity
- Modelling results for variety of projects
- This area to be explored in detail in Webinar 4

- Building modelling enhancements
  - More robust driver development/sensitivity
  - Review and updating of inputs and assumptions
  - Enhanced thermal model for more detailed deep renovation scenarios and integration with other sectors
- Joint research paper with Tsinghua University on building demand and solutions for China
- Expanding collaboration and interface with major buildings programs globally

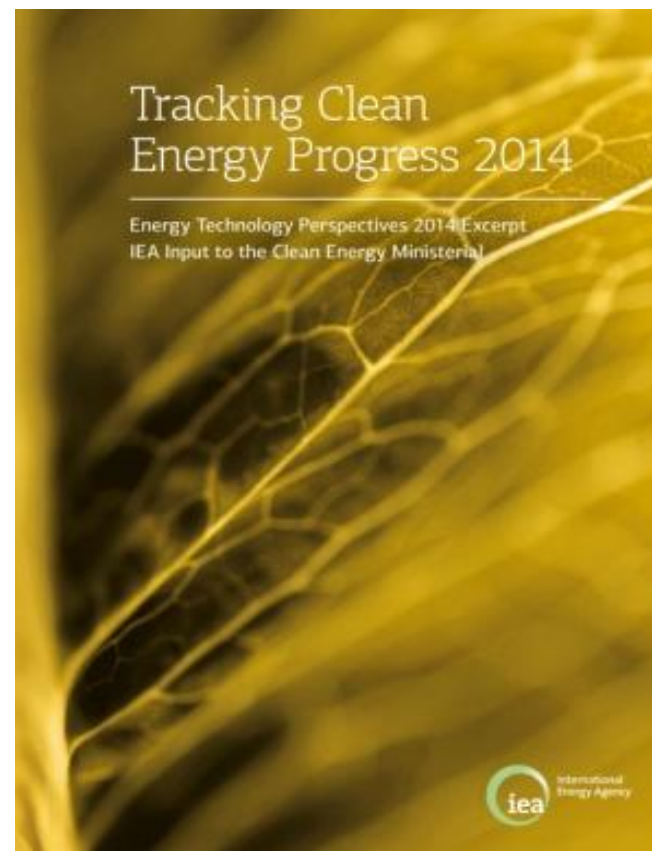
# Possible Building Related New Projects (Not in Priority Order)

- Development of envelope roadmap Implementation Plans in cooperation with leading organisations for countries or regions, e.g. China, India, etc
- Facilitation of policy recommendations and analysis basis for EU EPBD update for 2017
- Development of multiple benefits specific to building sector with job creation as lead metric
- Beyond conventional modelling results for COP 21 (ETP 2015 Innovation theme – limited time to achieve)
- Emerging markets capacity building – policy, technology, analysis, etc
- This area to be explored in detail in Webinar 3

- ETP 2014 – core buildings related analysis to support 2DS advanced scenario (450 ppm)
- High Electrification – greater heat pumps for EU and China
- Significant gas demand reduction for EU and reduced growth for China beyond 2DS
- For reference, see 11<sup>th</sup> Heat Pump Conference 2014 presentation, Montreal May 2014



- Three sections for progress on technology and policy
- Buildings Energy Efficiency – **“Not on Track”**
- Building Envelope – **“Not on Track”**
- Appliance and Equipment – **“Improvement Needed”**



<http://www.iea.org/publications/freepublications/publication/name,51000,en.html>



- Webinar 3 - IEA Building Activities - Proposed Plans and Priorities  
June 10<sup>th</sup>, 1:30pm CET (Paris)
  - IEA presentation of project proposals, summary and feedback from webinars 1 and 2
  - Response and comments from various organisations such as IPEEC, EUWP, Industry, etc
- Webinar 4 – IEA Modelling Peer Review  
Expected late June 2014
  - IEA modelling details including review of inputs and assumptions
  - Presentations from a variety of organisations that the IEA works with

## **International Energy Agency**

9, rue de la Federation  
757 Paris Cedex 15, France

### **Marc LaFrance**

Energy Analyst Buildings Sector, Sustainable Energy Policy and Technology Directorate

[marc.lafrance@iea.org](mailto:marc.lafrance@iea.org), +33 (0)1 40 57 67 38

### **Download Envelope Roadmap - free**

<http://www.iea.org/publications/freepublications/publication/name,45205,en.html>

### **Download Building Code Policy Pathway – free**

[http://www.iea.org/publications/freepublications/publication/PP7\\_Building\\_Codes\\_2013\\_WEB.pdf](http://www.iea.org/publications/freepublications/publication/PP7_Building_Codes_2013_WEB.pdf)

**IEA Bookstore – Buildings Book – discounts to non-profits, partners, and bulk orders**

<http://www.iea.org/W/bookshop/add.aspx?id=457>

## ■ Technology Roadmaps



Technology Roadmap  
Energy-efficient Buildings: Heating and Cooling Equipment

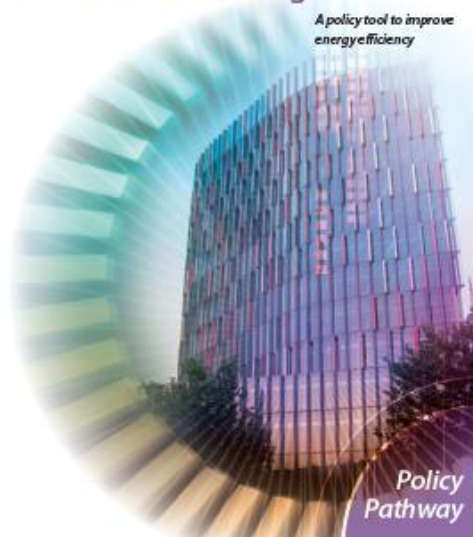


Technology Roadmap  
Solar Heating and Cooling

### Energy Performance Certification of Buildings



A policy tool to improve energy efficiency



Policy Pathway

### Monitoring, Verification and Enforcement



Improving compliance within equipment energy efficiency programmes



Policy Pathway

## ■ Policy Pathways