

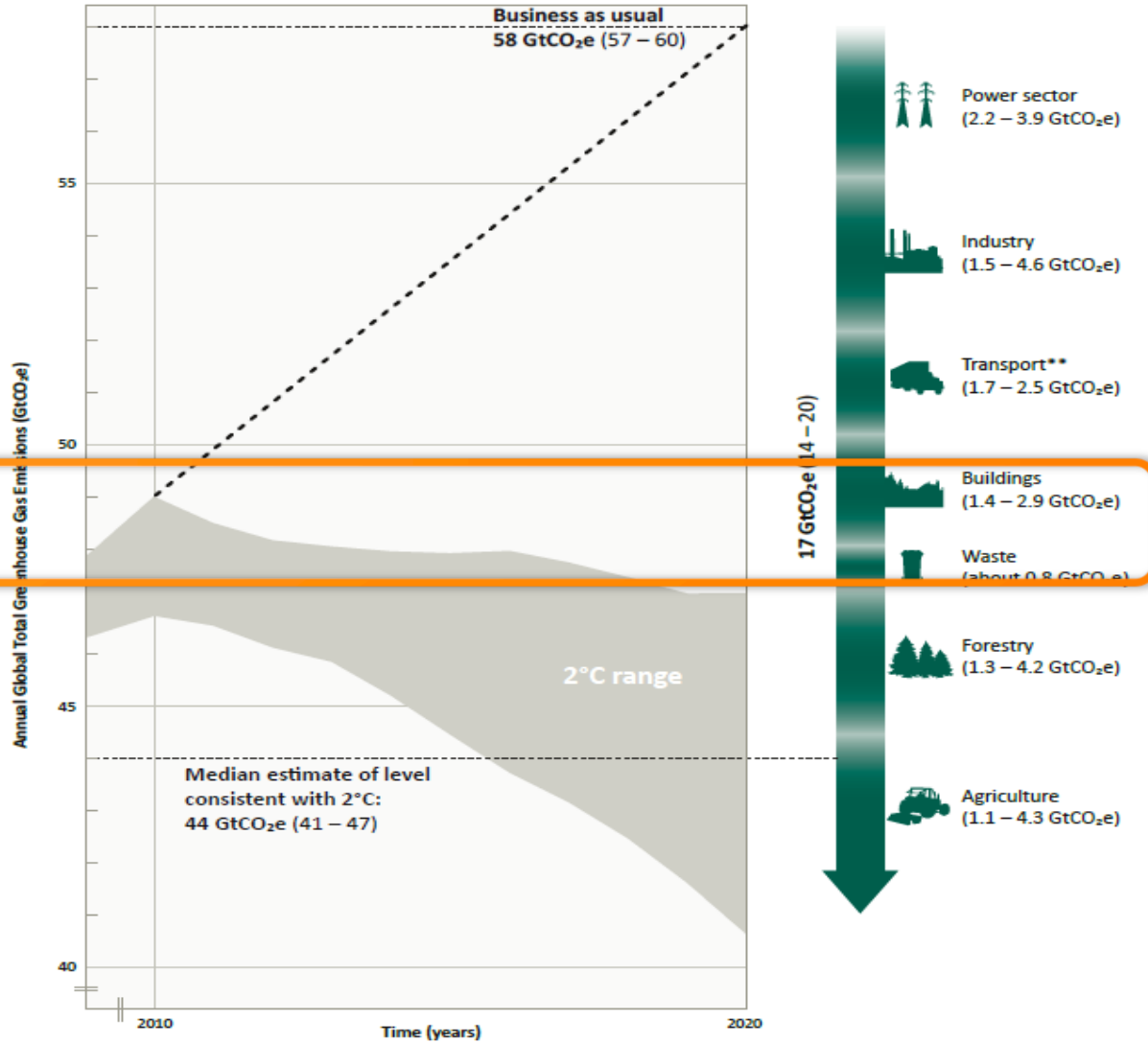
# Does Encouraging Markets in BIPV Pay-Off?

*Monetary benefits of Ambitious Building Energy  
Policies*

*Dr. Peter Graham, Executive Director  
Global Buildings Performance Network*

[Peter.graham@gbpn.org](mailto:Peter.graham@gbpn.org)

## How to bridge the gap: results from sectoral policy analysis\*



\*based on results from Bridging the Emissions Gap Report 2011  
\*\*including shipping and aviation

# Requires

**25% reduction** in current thermal energy demand by 2020 & 50% by 2030

**Doubling** the annual rate of reduction in energy intensity each year between now and 2030 (-2.6%/yr)

Sources: UNEP, 2012; GBPN, 2013; IEA 2014

# Key Issues

## **Net Zero to Positive buildings as minimum required performance:**

New Policies and better Compliance

## **More and Deeper Renovation:**

Markets for Efficiency are improving but need development;

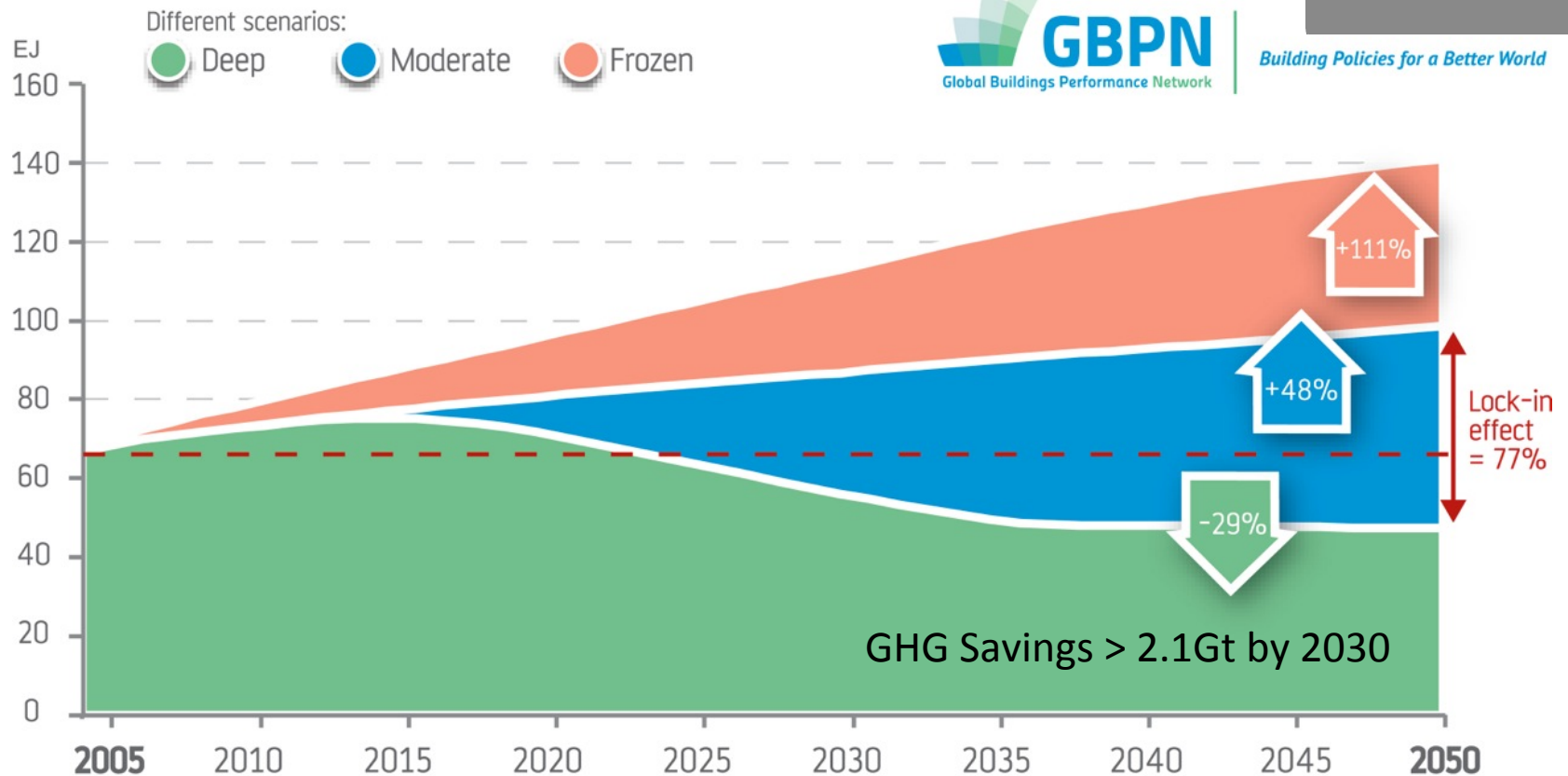
## **Investors and developers are ready to 'go deep':**

But need better information on costs & benefits and clear public policy

## **This is Urgent:**

The cost of delaying action is increasing daily as inefficiency is 'locked-in'

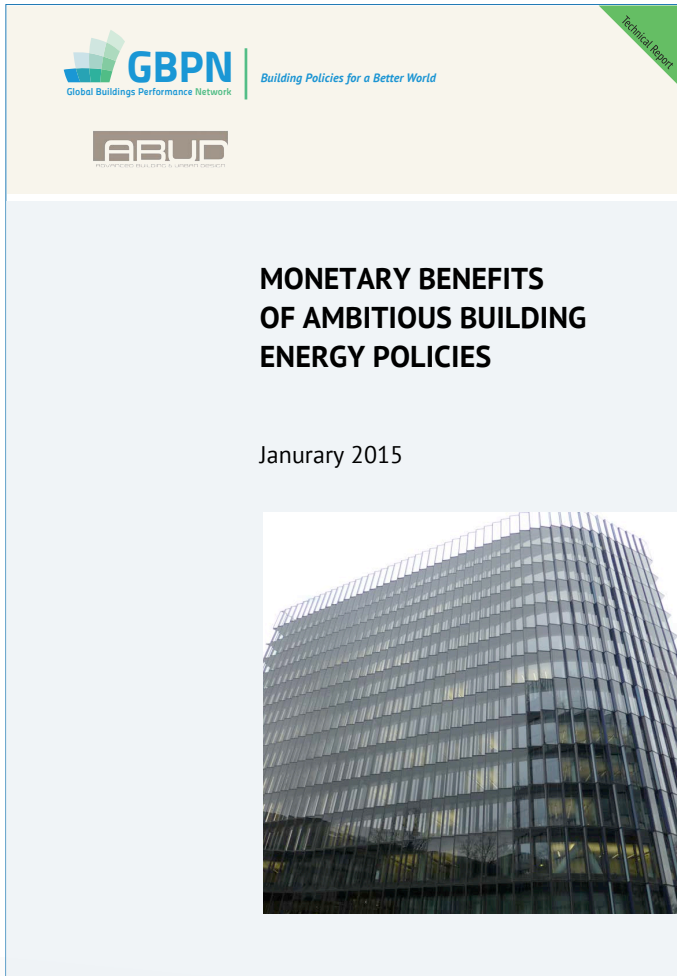
# The Deep Path



Building Policies for a Better World

Scenarios for **Thermal Energy** Demand based on analysis of 14 regions (GBPN, 2012)

# Will Net-Zero Ambition Pay Off?



Quantifies the global and regional cost implications of ambitious scenarios for implementing large-scale energy efficiency improvements in buildings.

- 11 regions & 17 climate zones
- 3 building types in 6 sub-categories
- 5 building vintages
- BAU, Moderate & High-Performance Scenarios
- Builds on the 3CEP-HEP & GBPN Building Efficiency Scenario Models ([www.gbpn.org](http://www.gbpn.org))
- Cost-effective best-practices of building energy performance, which can be replicated for similar climatic conditions and building types

## Principle Investigators:

Diana Ürge-Vorsatz, PhD., (3CSEP):

András Reith, PhD. (ABUD):

# Key Findings

- **Shallow energy efficiency improvements do not pay-off in the long run.**
- **Policy-Makers need to take a long-term view**
- **Energy prices and capacity building are key enablers of the deep efficiency scenario**
- **More data and more research are needed**

# Shallow energy efficiency improvements do not pay-off in the long run.

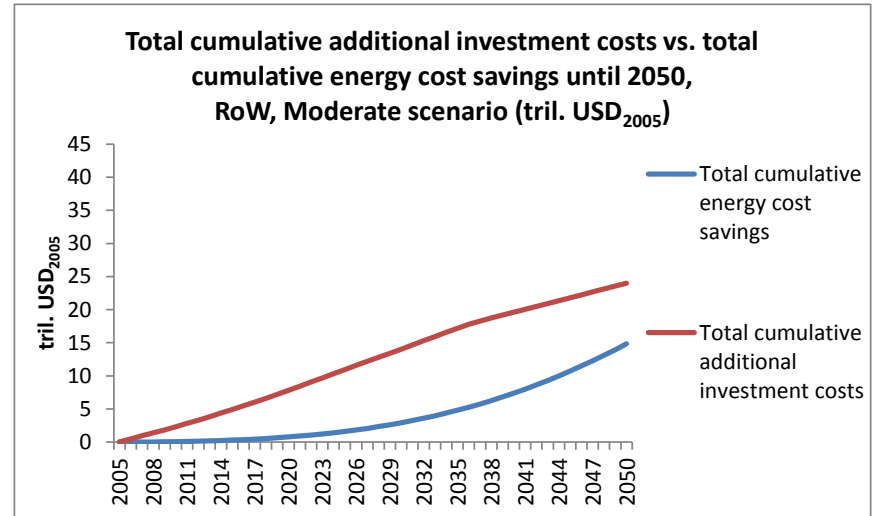
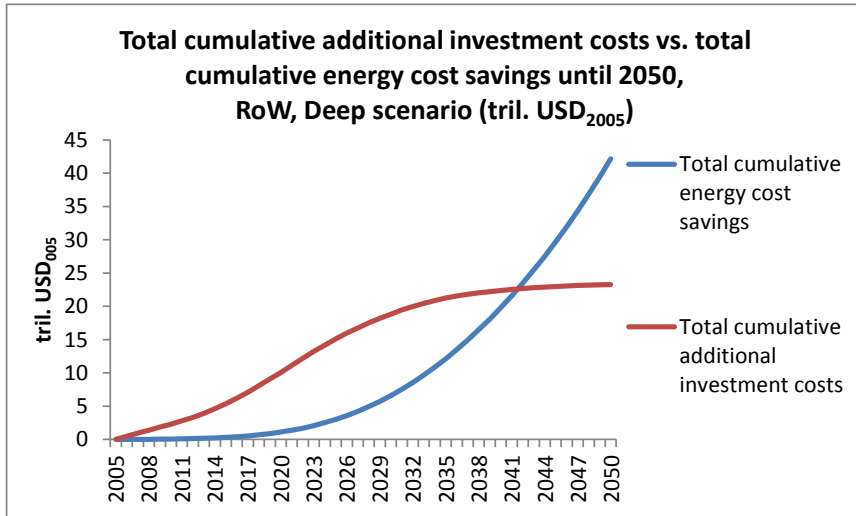
Region	Deep efficiency scenario		Moderate efficiency scenario	
	Total cumulative additional investment costs	Total cumulative energy cost savings	Total cumulative additional investment costs	Total cumulative energy cost savings
	tril. USD <sub>2005</sub>	tril. USD <sub>2005</sub>	tril. USD <sub>2005</sub>	tril. USD <sub>2005</sub>
EU-27	5.1	9.8	5.0	7.5
USA	4.3	8.3	5.6	2.8
China	6.8	11.9	6.5	6.2
India	5.0	11.8	3.6	3.7
RoW <sup>1</sup>	23.3	42.2	24.00	14.8
World <sup>2</sup>	44.3	99.2	44.6	42.0

Notes: 1 - RoW - Rest of the World; 2 - Note, that the region World is not a simple sum of the four major regions and RoW region, but rather a sum of the 11 world regions. Therefore there are differences in World and sum of the four major regions.

**The “Deep efficiency scenario” for buildings is the only possible path to achieve R.O.I globally by 2050.**

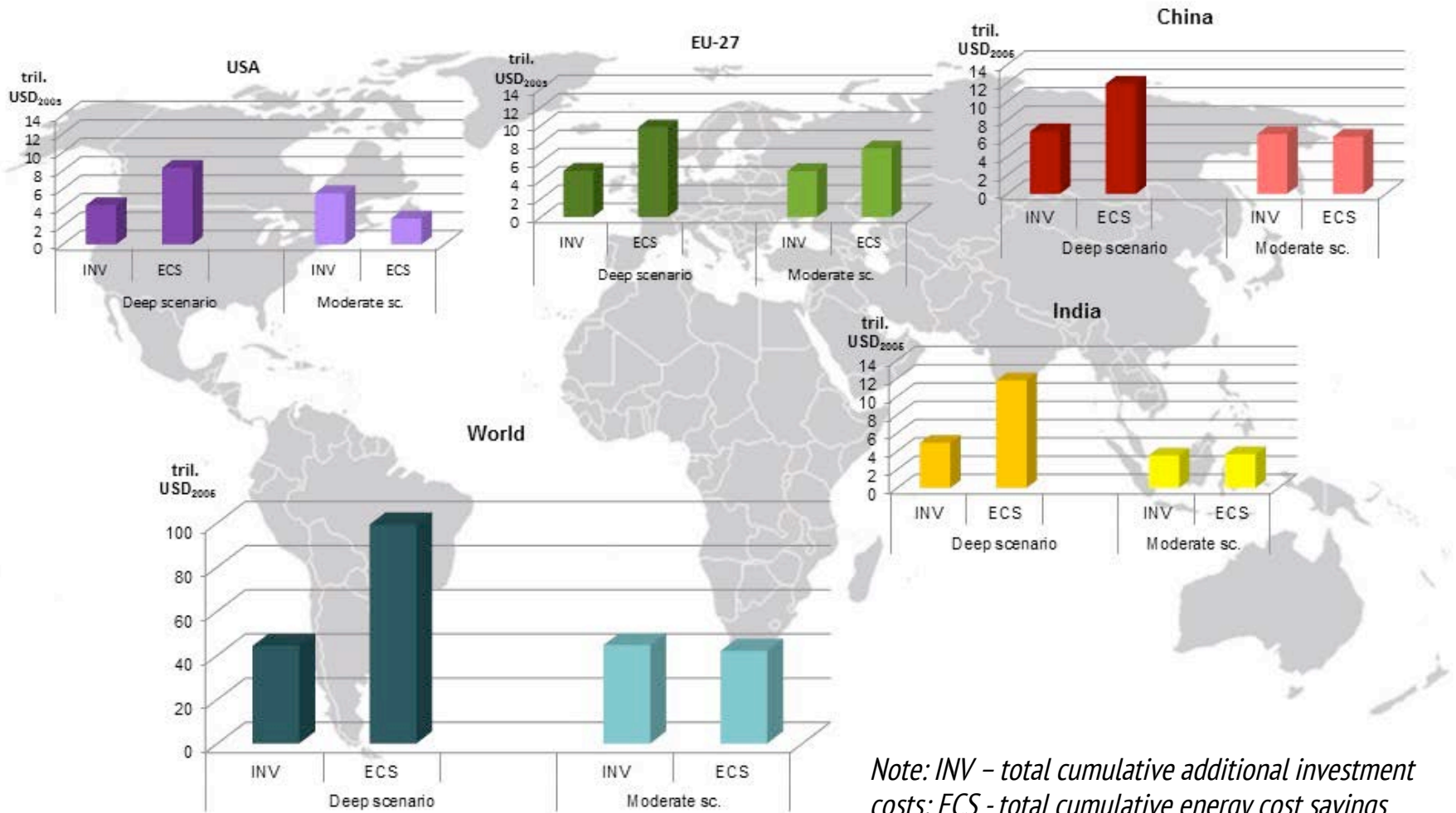
**Mainstreaming high-performance buildings could deliver a 124% return on investment globally through building-related energy cost savings by 2050**

# Shallow energy efficiency improvements do not pay-off in the long run.



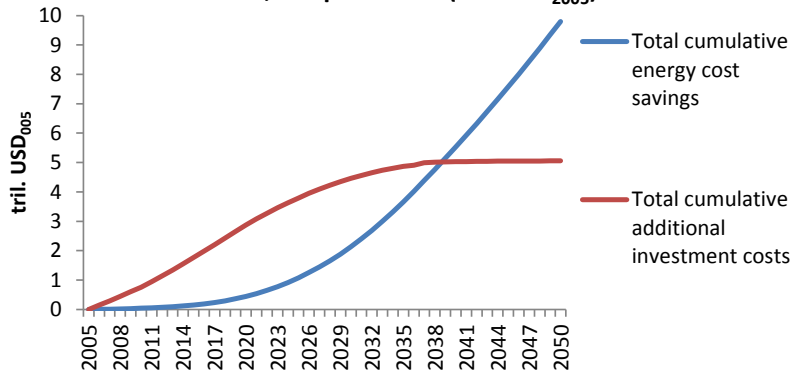


# The “Deep efficiency scenario” for buildings is the only possible path to achieve R.O.I globally by 2050

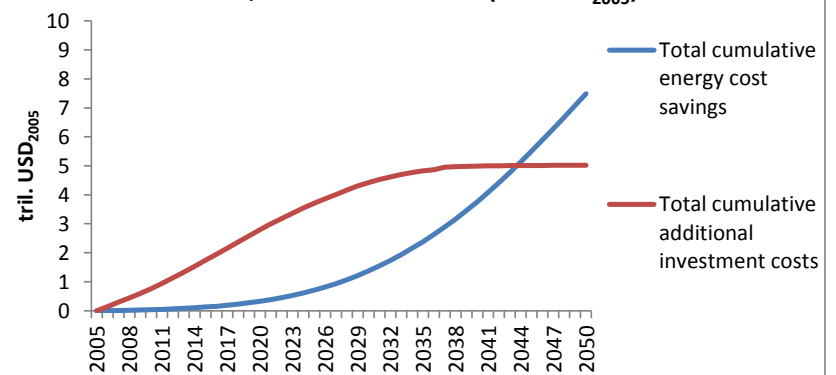


# Policy-Makers need to take a long-term view

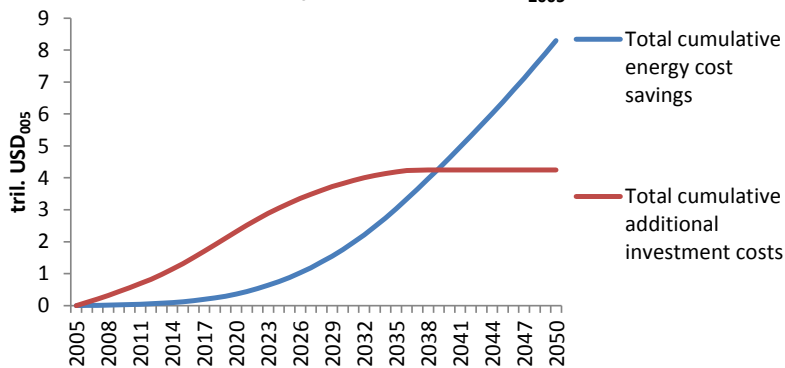
**Total cumulative additional investment costs vs. total cumulative energy cost savings until 2050, EU-27, Deep scenario (tril. USD<sub>2005</sub>)**



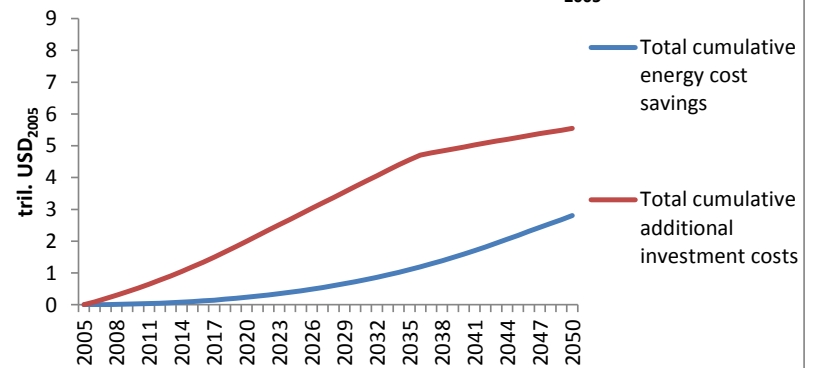
**Total cumulative additional investment costs vs. total cumulative energy cost savings until 2050, EU-27, Moderate scenario (tril. USD<sub>2005</sub>)**



**Total cumulative additional investment costs vs. total cumulative energy cost savings until 2050, USA, Deep scenario (tril. USD<sub>2005</sub>)**

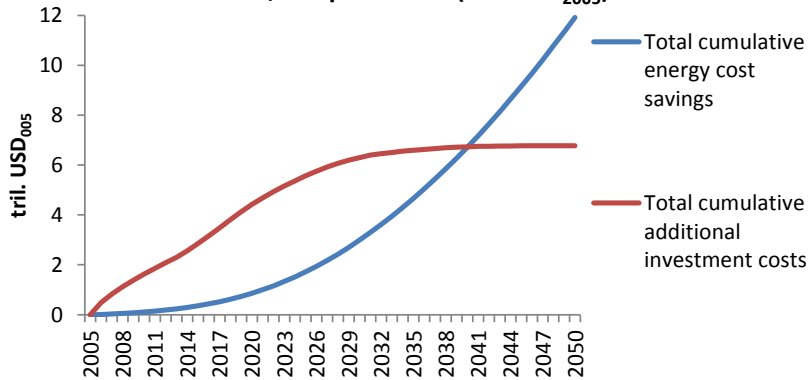


**Total cumulative additional investment costs vs. total cumulative energy cost savings until 2050, USA, Moderate scenario (tril. USD<sub>2005</sub>)**

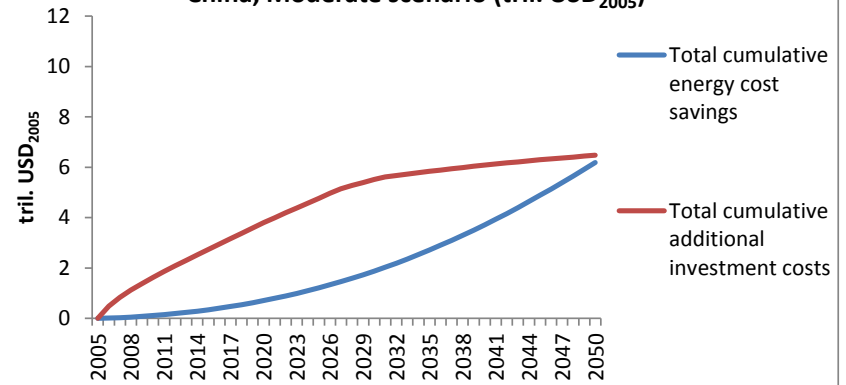


# Policy-Makers need to take a long-term view

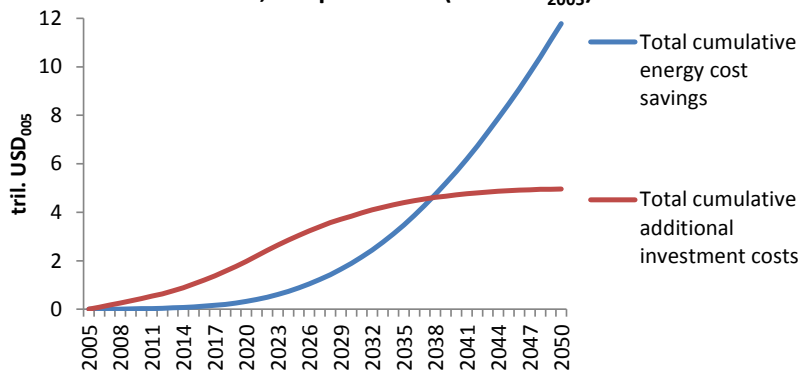
**Total cumulative additional investment costs vs. total cumulative energy cost savings until 2050, China, Deep scenario (tril. USD<sub>2005</sub>)**



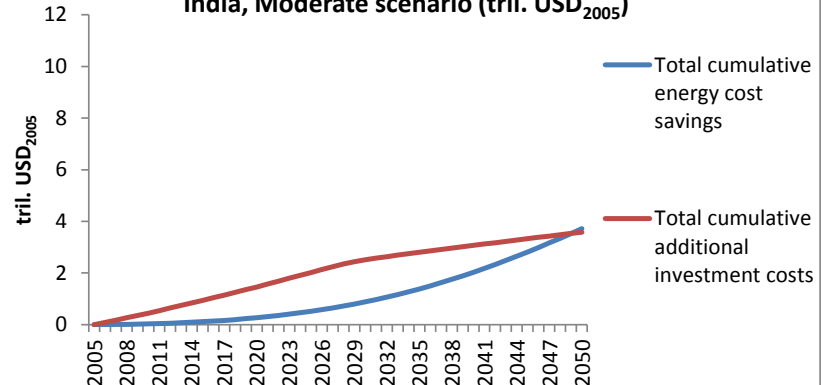
**Total cumulative additional investment costs vs. total cumulative energy cost savings until 2050, China, Moderate scenario (tril. USD<sub>2005</sub>)**



**Total cumulative additional investment costs vs. total cumulative energy cost savings until 2050, India, Deep scenario (tril. USD<sub>2005</sub>)**



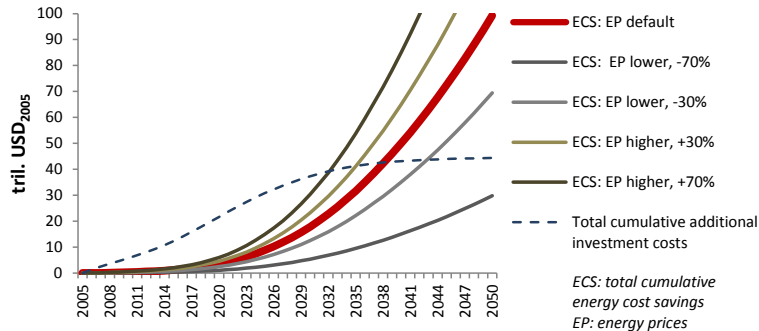
**Total cumulative additional investment costs vs. total cumulative energy cost savings until 2050, India, Moderate scenario (tril. USD<sub>2005</sub>)**



# Energy prices and capacity building are key enablers of the deep efficiency scenario

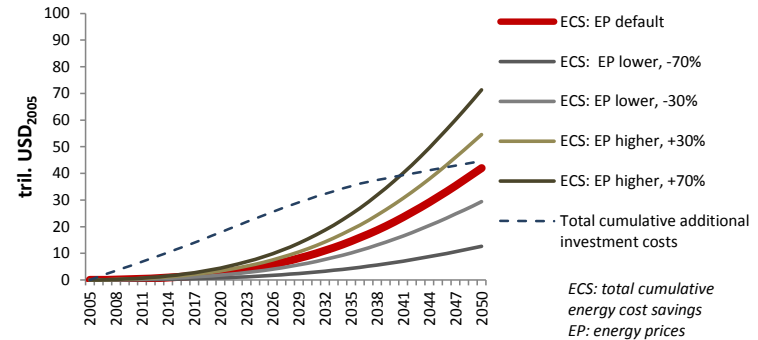
**Total cumulative energy cost savings until 2050, World, Deep efficiency scenario**

Sensitivity analysis for varying energy prices



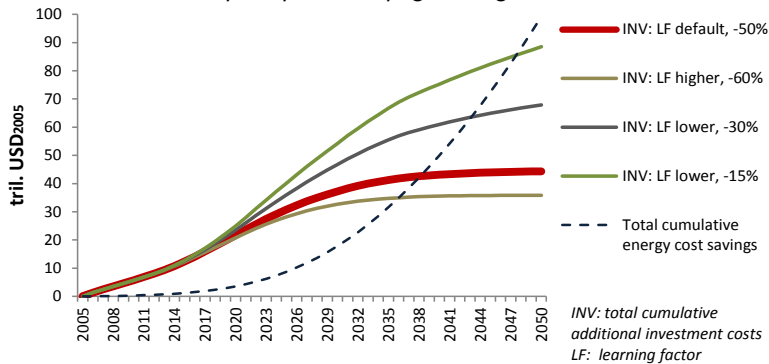
**Total cumulative energy cost savings until 2050, World, Moderate efficiency scenario**

Sensitivity analysis for varying energy prices



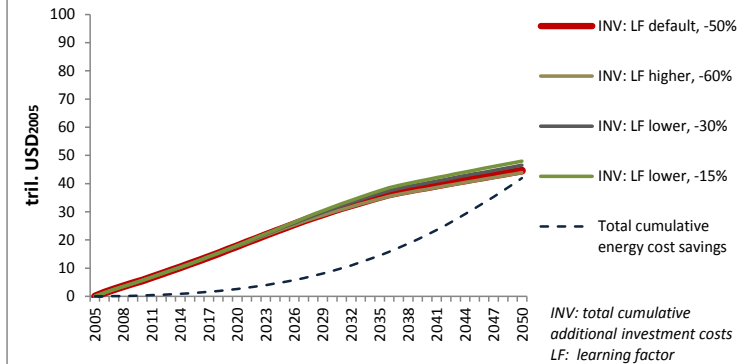
**Total cumulative additional investment costs until 2050, World, Deep efficiency scenario**

Sensitivity analysis for varying learning factor



**Total cumulative additional investment costs until 2050, World, Moderate efficiency scenario**

Sensitivity analysis for varying learning factor



# More Data & Research Needed

- Experience with high-performance buildings and supporting policies is still too low especially in emerging markets such as China and India
- There is a general lack of good data on costs for integrated solutions.
- Most experience is in adding elements to existing buildings and this approach doesn't work for holistic design or effective bioclimatic design.
- There is a need for large-scale demonstration and comparative studies.

# Recommendations

- **Develop ambitious building codes** for new buildings in developing and emerging regions
  - Including provision for BIPV;
- Then **introduce building codes for retrofit** buildings
- **Enforce energy performance** requirements of codes
- **Education & Training** in advanced buildings for all construction professionals (e.g. architects, planners, engineers, equipment installers, craftsmen, building inspectors, energy auditors, and site managers)

# Conclusions

- Net Zero and Deep Retrofitting pay-off financially
- Provide significant long-term return on investment
- Help avoid building energy demand and GHG emissions at the rate necessary to tackle climate change.
- Only going for low-hanging fruit does not pay-off in the long run.

# Thank you!

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