bigEE - bridging the information gap on energy efficiency in buildings

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for Climate, Environment
and Energy

bigEE

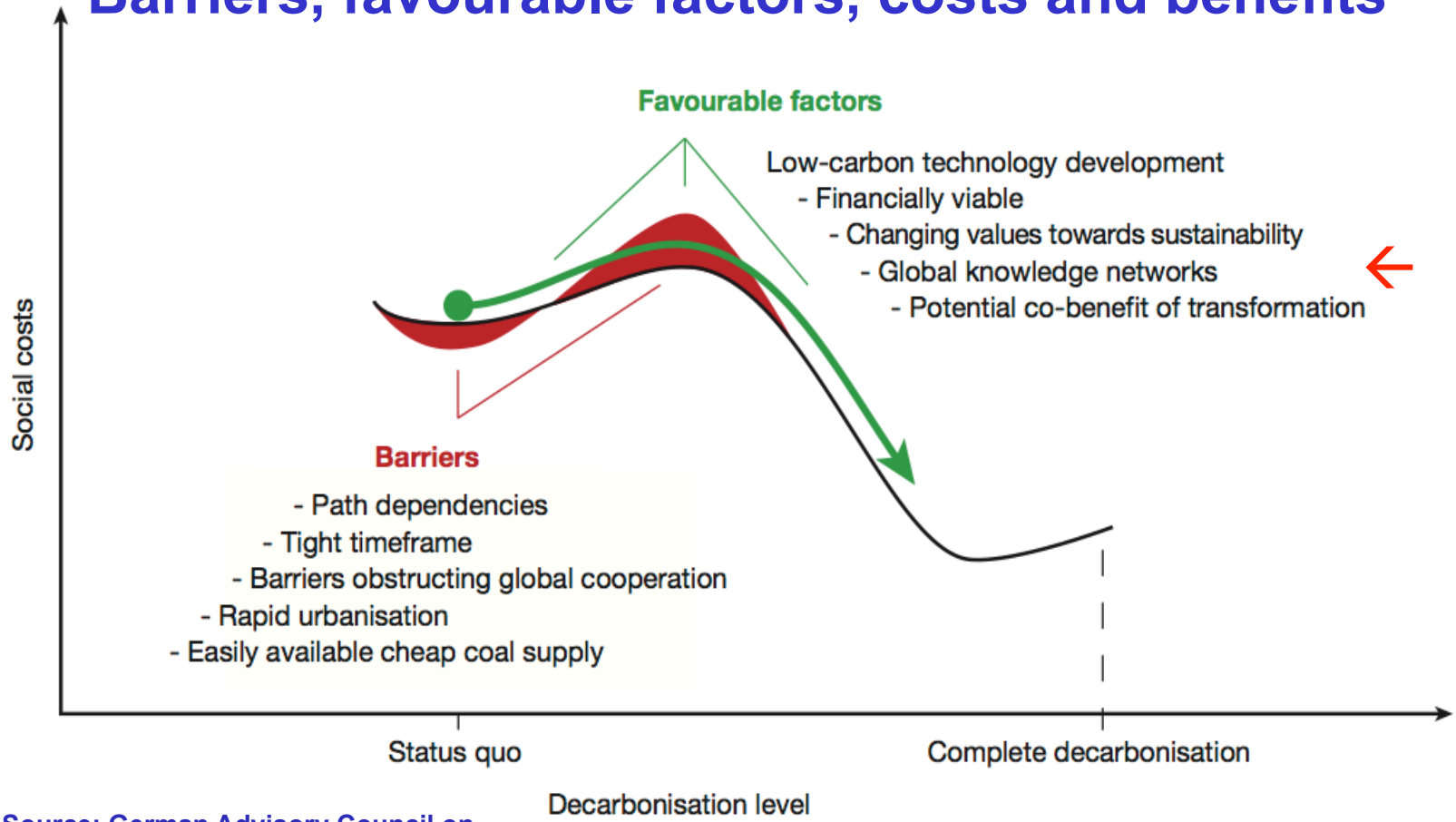
FVEE ForschungsVerbund Erneuerbare Energien
Renewable Energy Research Association

Background and scope of bigEE

- **Global Knowledge Management** can foster know how transfer of green/efficient buildings
- bigEE combines comprehensive **worldwide information** with dissemination **in partner countries**
- bigEE informs about the **potential for cost-effective GHG reduction** and **resource protection**
- bigEE adresses the problem of **lock-in effects** for countries with weak efficiency strategies
- bigEE develops **policy packages** to address market failures and specific frame conditions
- bigEE demonstrates **good practice** for buildings, appliances and policies
- bigEE discusses the **co-benefits** of ressource efficiency as well as **„rebound effects“**

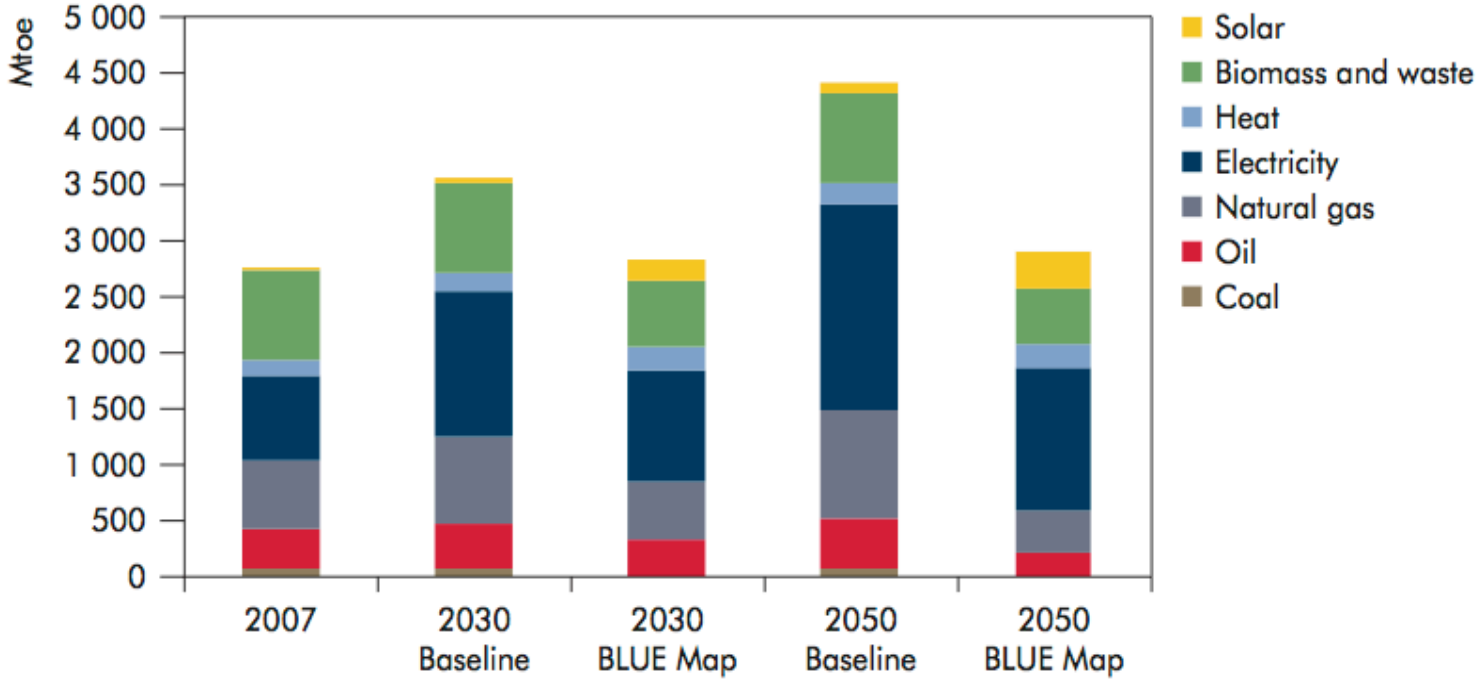
The Great Transition to a Global Low Carbon Society

Barriers, favourable factors, costs and benefits



Source: German Advisory Council on Global Change (WBGU) 2011

Buildings sector energy consumption in the IEA scenarios



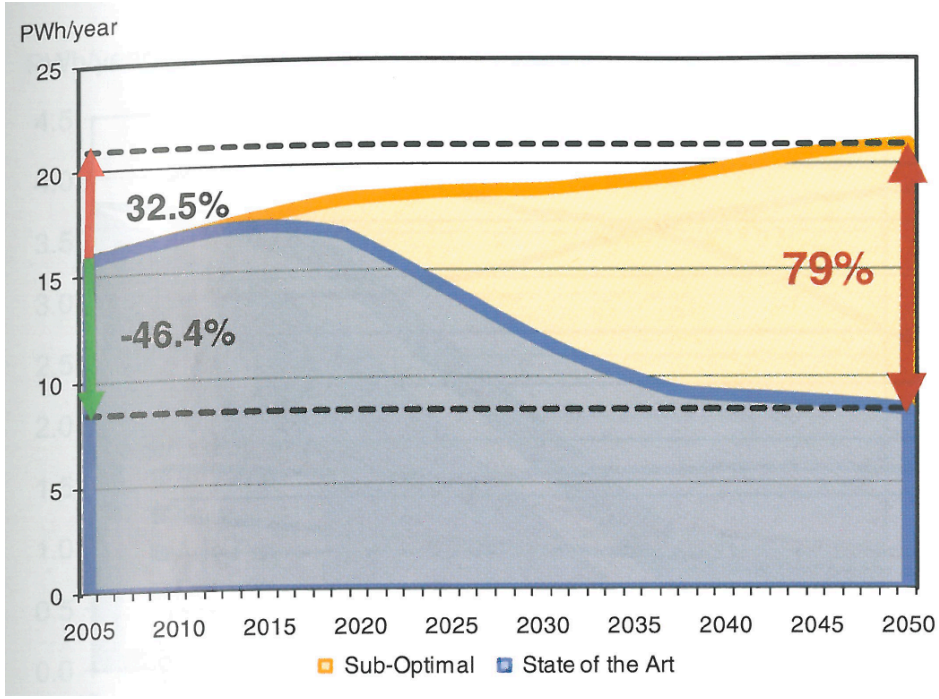
Key point

Energy consumption in the buildings sector is 5% higher in 2050 than in 2007 in the BLUE Map scenario.

Source: IEA, Energy Technology Perspectives 2010

Global energy consumption in 2050 for cooling and heating

state of the art compared to BAU/sub-standard



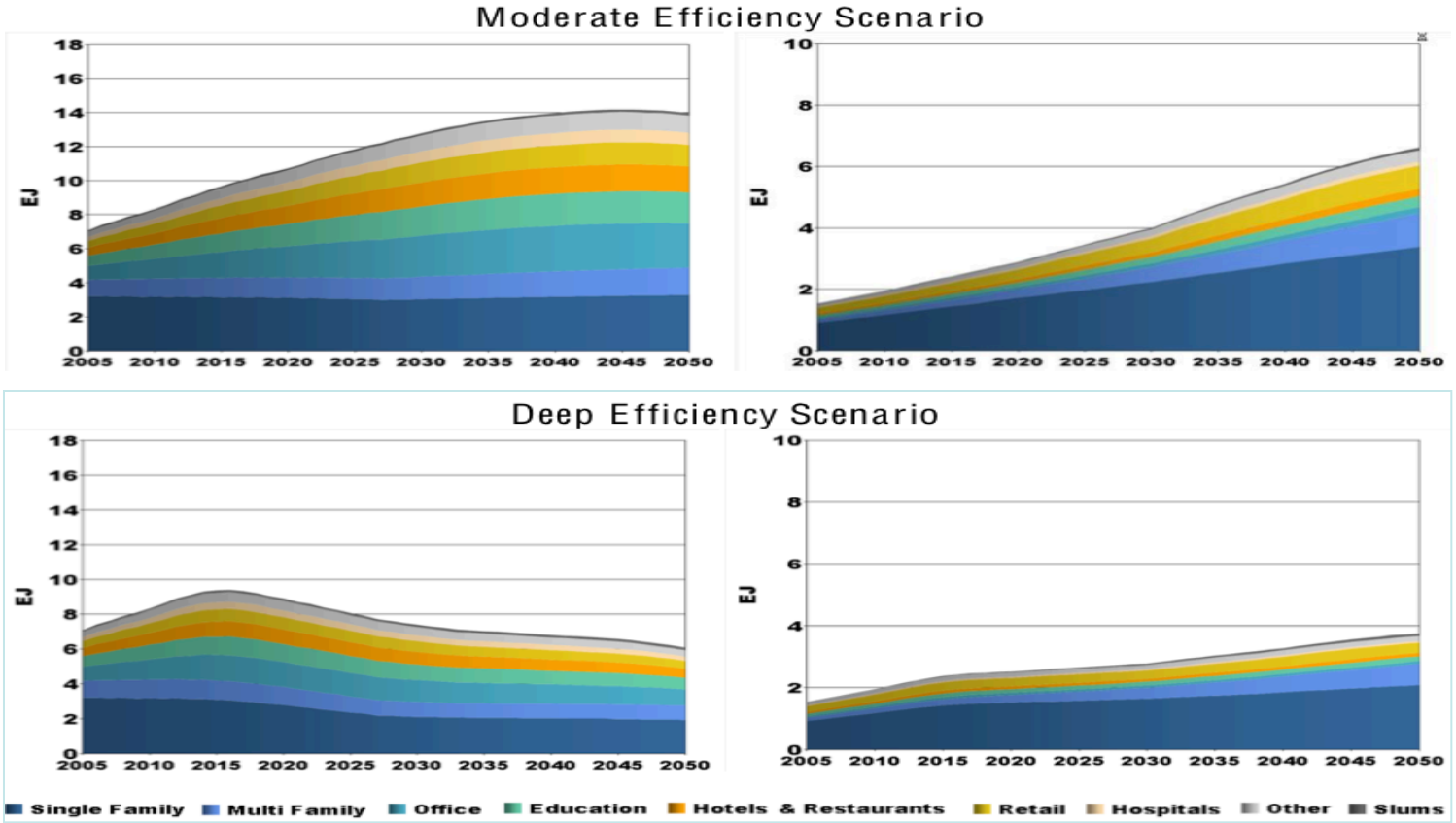
World Final Energy for Thermal Comfort: State of the Art and Sub-Standard Scenarios

Source: Global Energy Assessment 2012

High „lock-in“ effects of moderate efficiency increase

Final energy for cooling and heating in

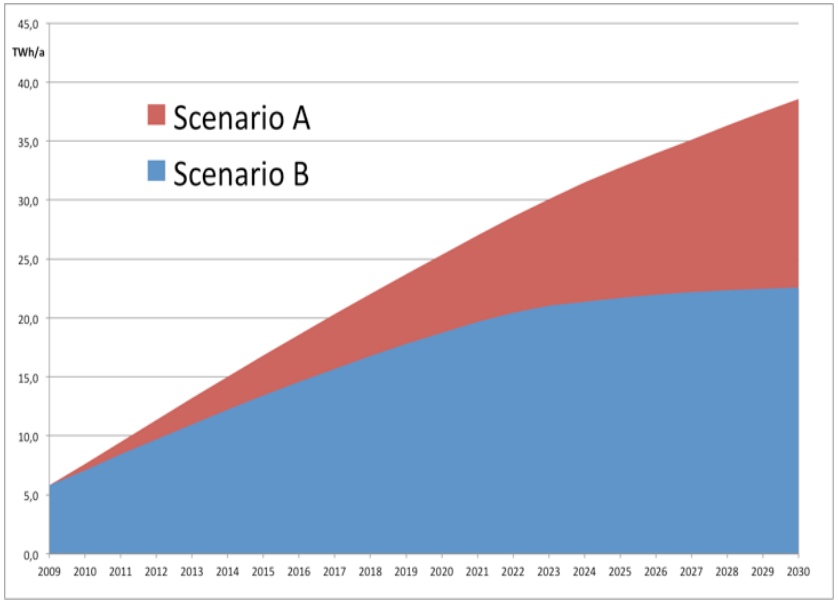
China India

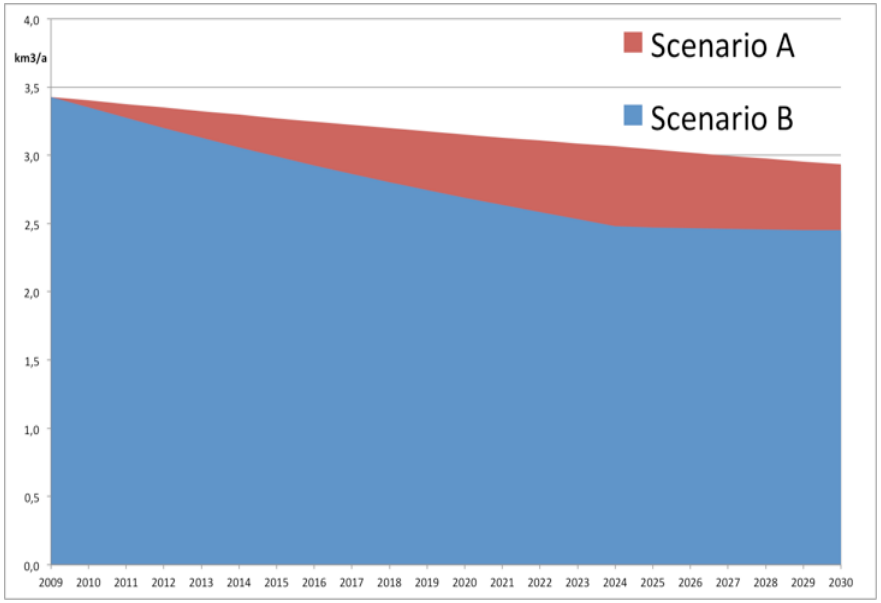


Source: Ürge-Vorsatz et al. 2012

Energy and Water consumption in CPA up to 2030

Washing maschines in „BAU“ (Scenario A) vs. „Max efficiency“ (Scenario B)





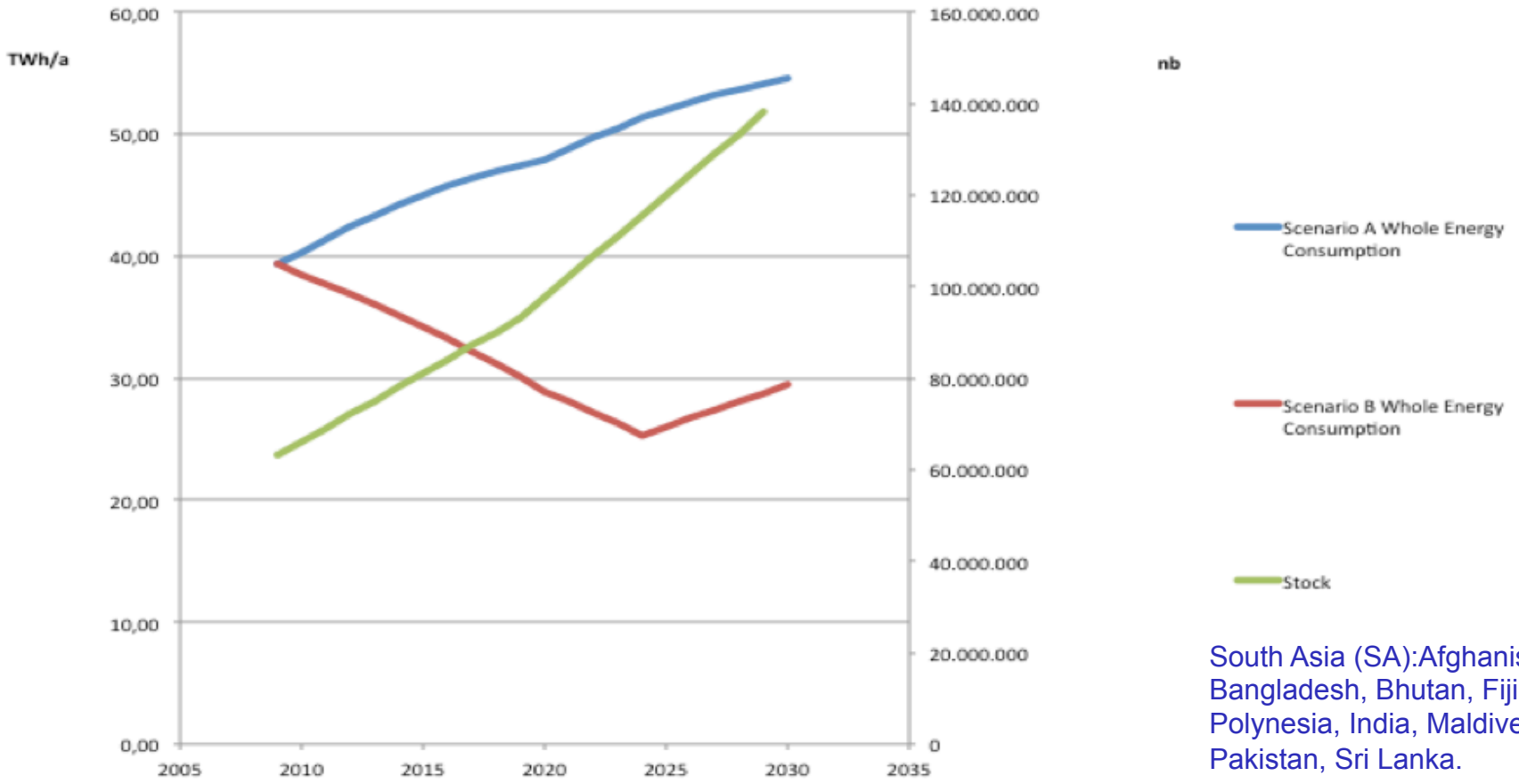
Assumptions:

- Region: CPA – Centrally planned Asia (Cambodia, China, Hong Kong, N.-Korea, Laos, Macau, Mongolia, Vietnam)
- Technology change from vertical Axis technology to Horizontal Axis ("European-style") washing machines combined with an average washing temperature of 30°C
- BAU-Scenario (A) = 20% BAT market share in scenario 'BAU'
- Max-Efficiency-Scenario (B) = 100% BAT market share in scenario 'Energy Efficiency‘

Source: bigEE 2012

Electricity consumption for fridges in South Asia

50% cost-effective reduction (Scenario B) comp. to BAU (Scenario A)

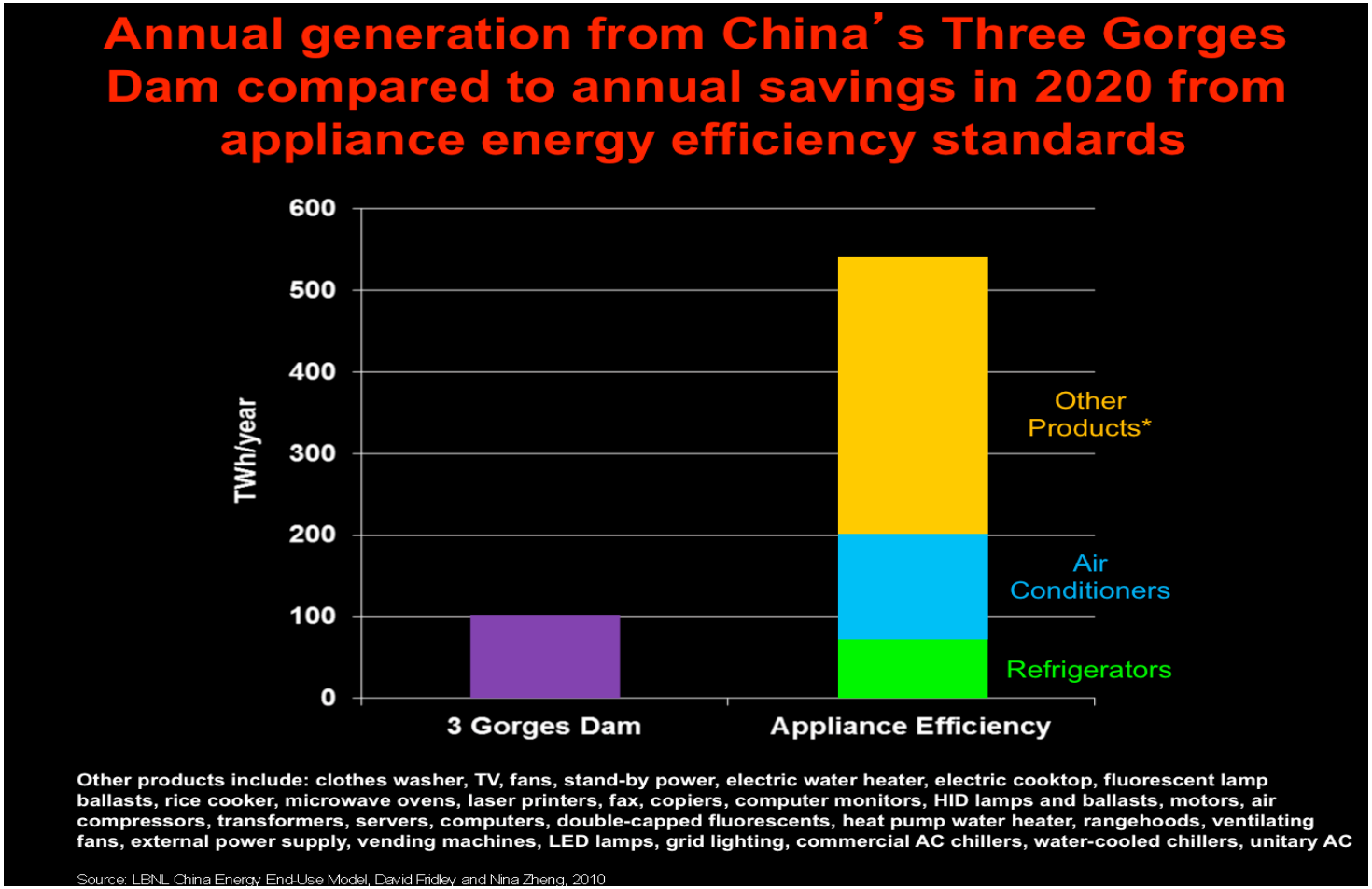


South Asia (SA):Afghanistan, Bangladesh, Bhutan, Fiji, French Polynesia, India, Maldives, Nepal, Pakistan, Sri Lanka.

Source: bigEE 2012

Chinese example: The power of „NEGAWatts“

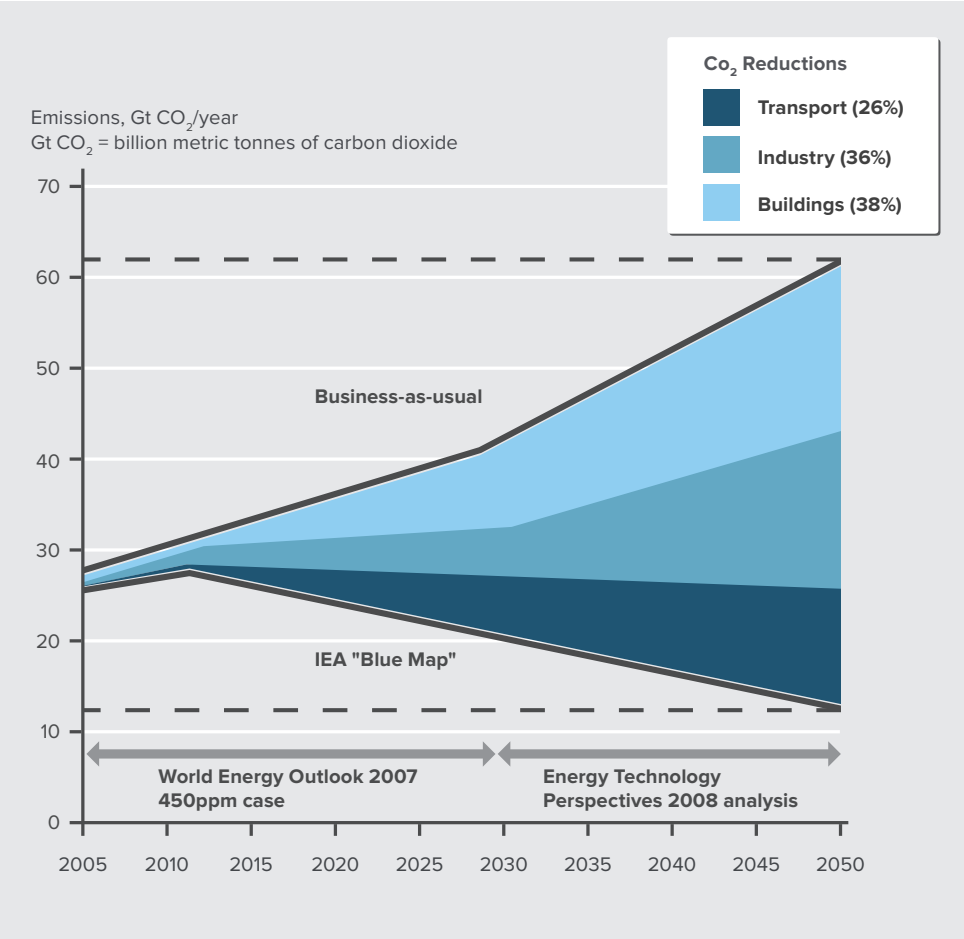
Savings from energy efficiency standards for appliances



Source: Marc. D. Levine, LBNL, 2012

The global knowledge and implementation gap has to be closed

Buildings have to contribute with 38% to CO_2 reduction in 2050



Source: IEA 2008

- This will only happen, if innovative policies and measures are used
  - *Because:* the sector has complex structures and lots of barriers
- Knowledge exists but is not easily available („closing the knowledge gap“)
  - *In particular:* for emerging economies and developing countries

bigEE Objectives

- Raise greater awareness and attention...
  ... for the variety of benefits of increased energy efficiency in new and existing buildings.
- Close the gaps of scattered information and material on energy efficiency ...
  ... by providing latest know-how in a target group oriented, consistent, comprehensive, easily accessible, and transparent way.
- Manage and communicate available knowledge ...
  ... especially for emerging economies

bigEE Target Groups

Decision-makers worldwide:

- **Investors**
- **Policy-Makers**
- **Staff involved in policy implementation**

… in 5 emerging economies, with partners

bigEE Funding, cooperation, milestones

- Financed by the German Ministry of Environment (International Climate Initiative)
- National cooperation with other German Ministries, GIZ, Dena….
- International cooperation with Research Institutes and Partner Countries
- 2009: Pre-feasibility study (China, India, Brazil, Mexico, South Africa; positive response)
- December 2009 - 6/2014: Duration of the bigEE project
- 2011-2012: start of country projects in China, South Africa, India, Mexico (?)
- December 2012: International Launch of bigEE at COP 18/Doha

bigEE Networking

- Close cooperation with:
- SBC (Sustainable Buildings Centre, IEA)
- WBCSD (World Business Council for Sustainable Development)
- UNEP (United Nations Environmental Programme, mainly SBCI – Sustainable Buildings and Climate Initiative)
- GIZ (MED-ENEC; India, South Africa), KfW (India), German Energy Agency dena (China)
- Central European University (Global Energy Assessment, IPCC)
- CLASP (Collaborative Labeling and Appliance Standards Program)
- LBNL (Lawrence Berkeley National Laboratory)

bigEE seeks for close country cooperationss

- **China – cooperation well established, signed Nov. 2010**
  - Project Partner: CSUS-IBR – Beijing China Society for Urban Studies and Institute for Building Research Eco Technology Cooperation

北京市中城深科生态科技有限公司
Beijing CSUS-IBR Eco Technology Co.,Ltd.

- **South Africa – cooperation takes off**
  - Project Partner: SANEDI – South African National Energy Development Institute

sanedi
South African National Energy Development Institute

- **India – last hurdle has to be cleared**
  - Project Partners: BEE: dissemination, contribute to data gathering, in-kind co-funding; TERI: managing data gathering

teri
ENERGY IS LIFE
BEE
CONSERVE IT

Scope and Structure of the Platform

The bigEE web platform will cover

- residential buildings
- commercial / public buildings
- industry sector related building technologies
- appliances

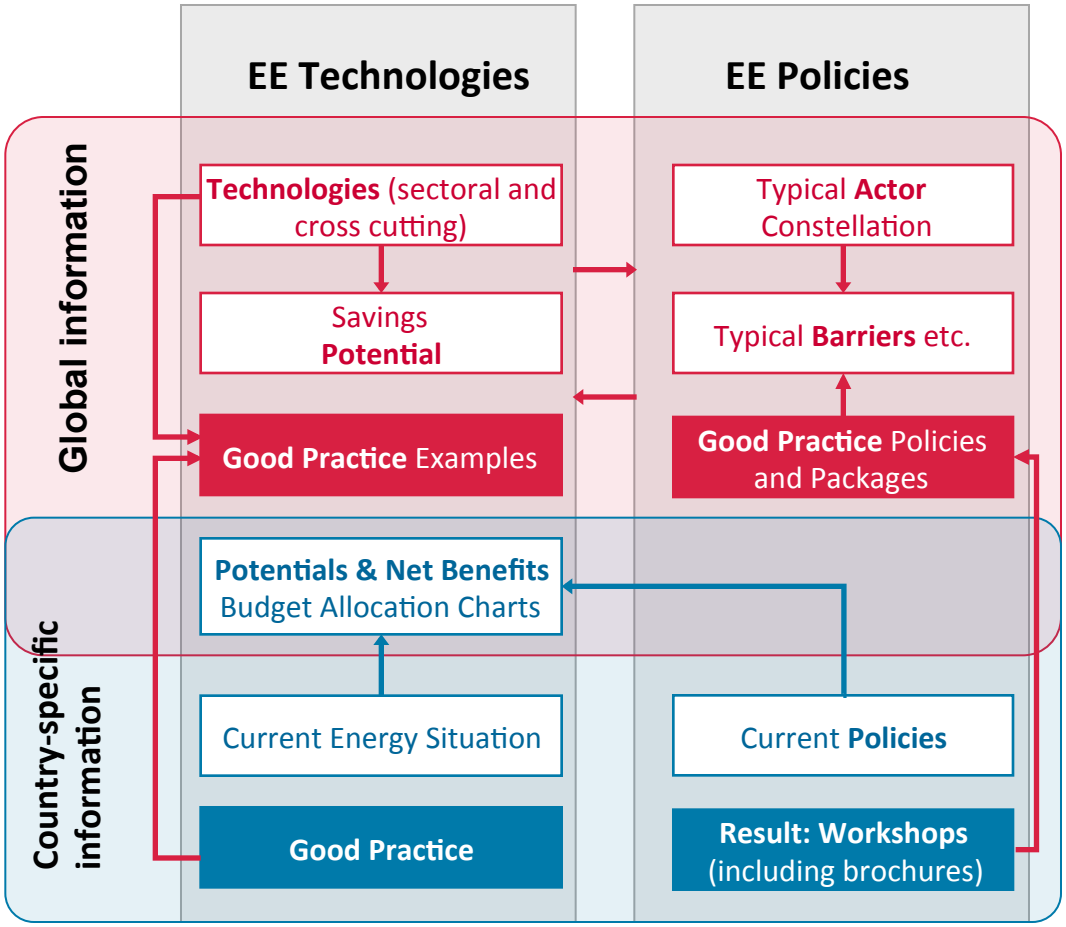
in four main climate zones

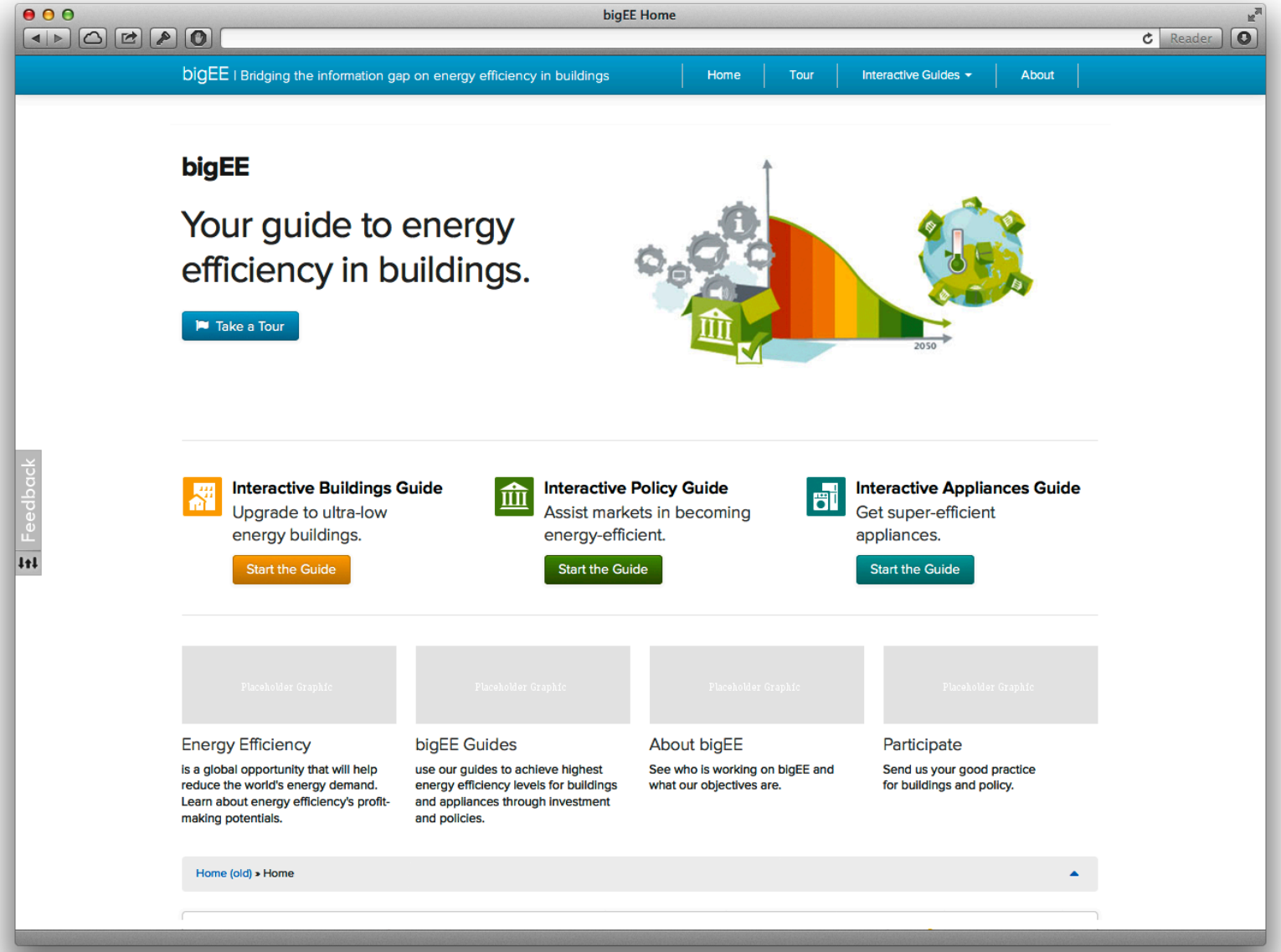
and will include information on

- technologies
- potentials
- policies and measures
- good practice

on

- international and
- national level.

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is a global opportunity that will help reduce the world's energy demand. Learn about energy efficiency's profit-making potentials.
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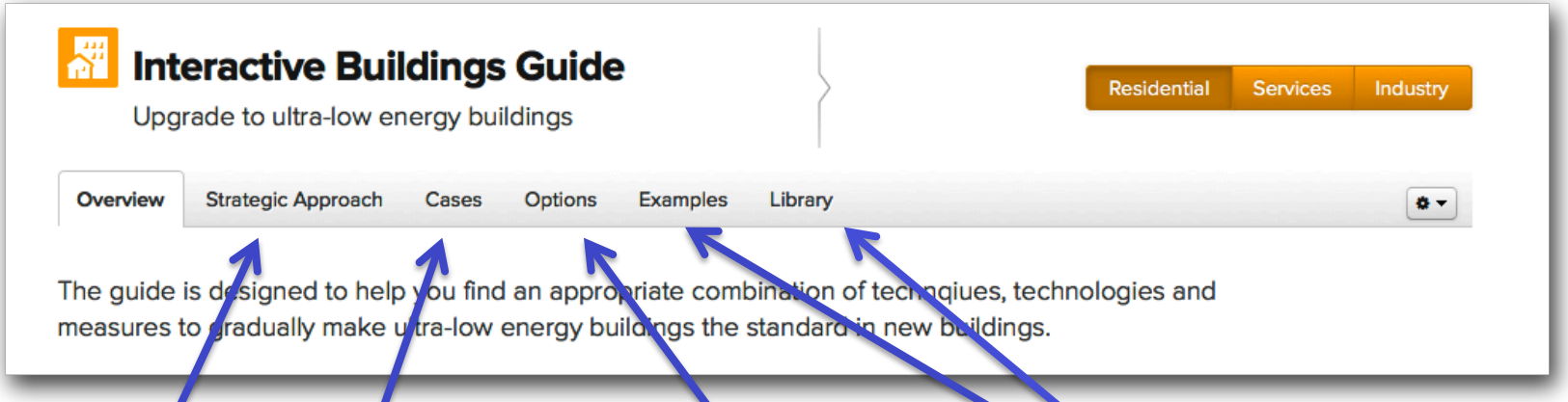
Guide through building section: Main features



Description of how to reach energy efficient buildings

Hints and tips how to reach energy efficient buildings according to climate and building type

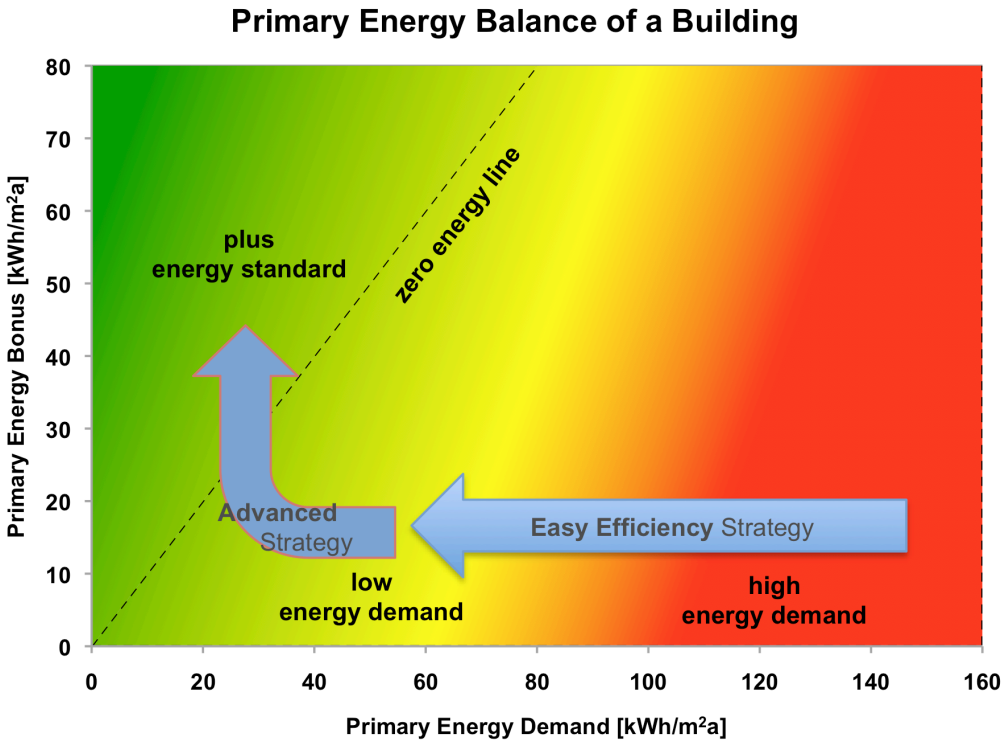
Detailed information:
- Passive techniques
- Active technolgies
- User behaviour and energy management to reaching energy efficient buildings

Good Practice Examples of energy efficient buildings

Background information

A global step wise approach to efficient buildings

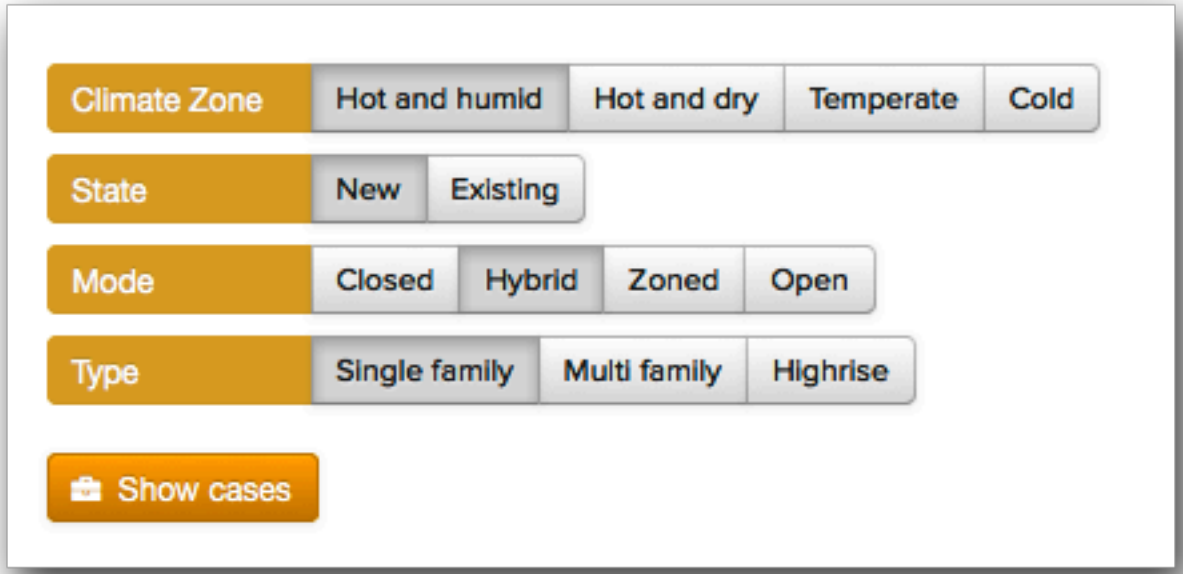
2-step strategy towards highly-efficient building performance with net surplus energy



1. Reduce unsustainable energy demand from a high to a low level by designing more efficient demand and supply performance **(Easy Efficiency)**

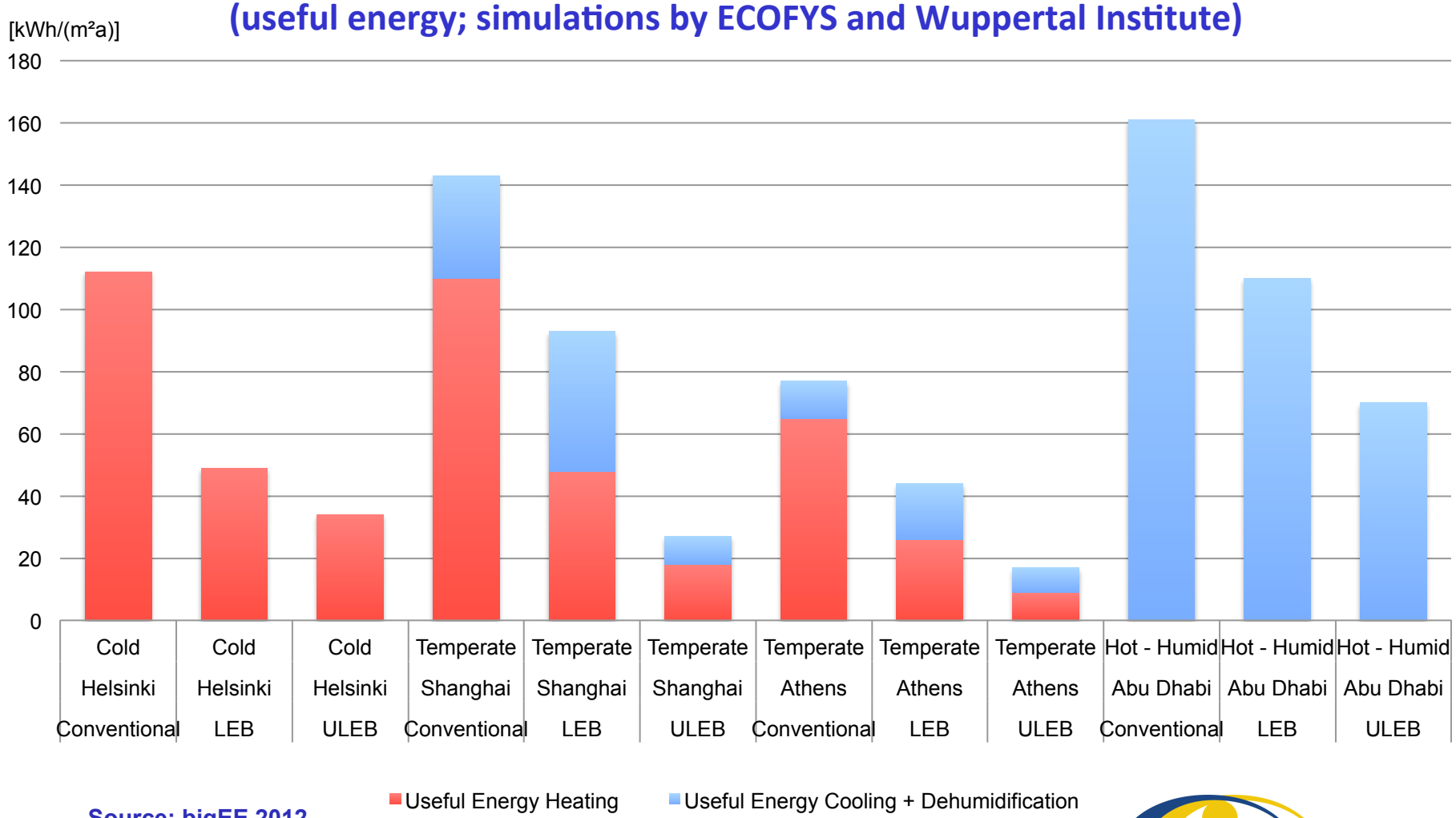
2. Set more ambitious standards and implement onsite green power generation systems to deliver surplus energy within an annual energy balance **(Advanced)**

Cases: Dynamic selection of building characteristics possible



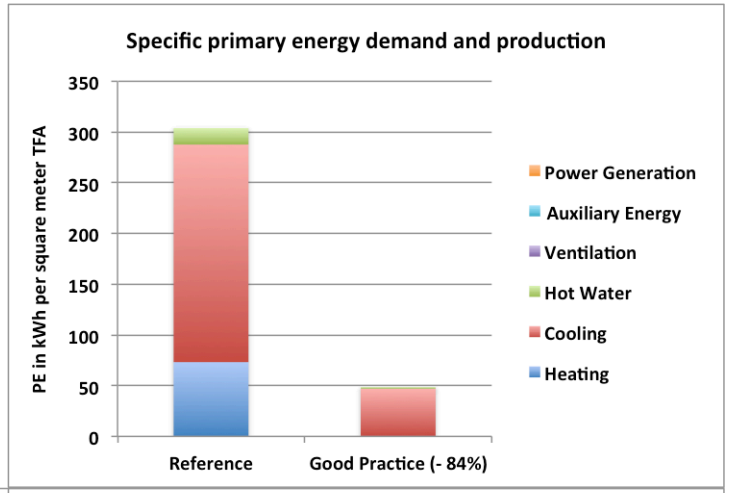
How climate zones influence building standards

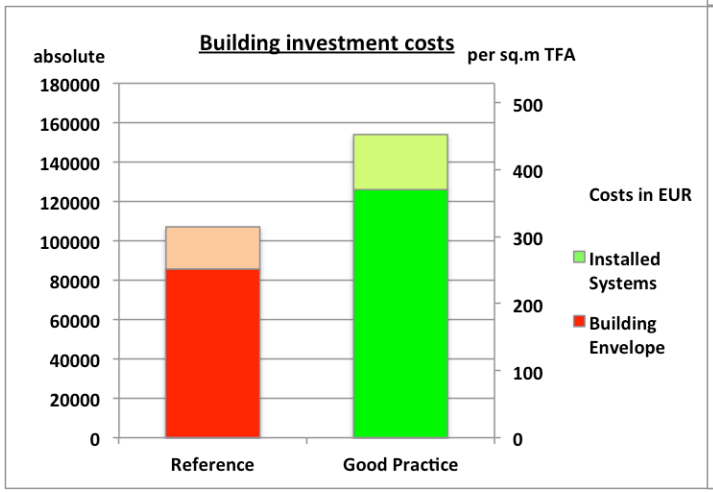
Comparison of simulation results of buildings (useful energy; simulations by ECOFYS and Wuppertal Institute)

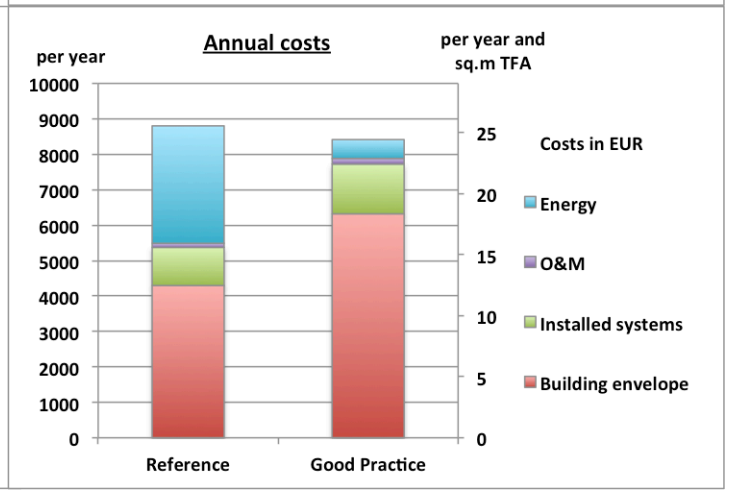


Source: bigEE 2012

New Buildings: Good Practice Example in Jordan

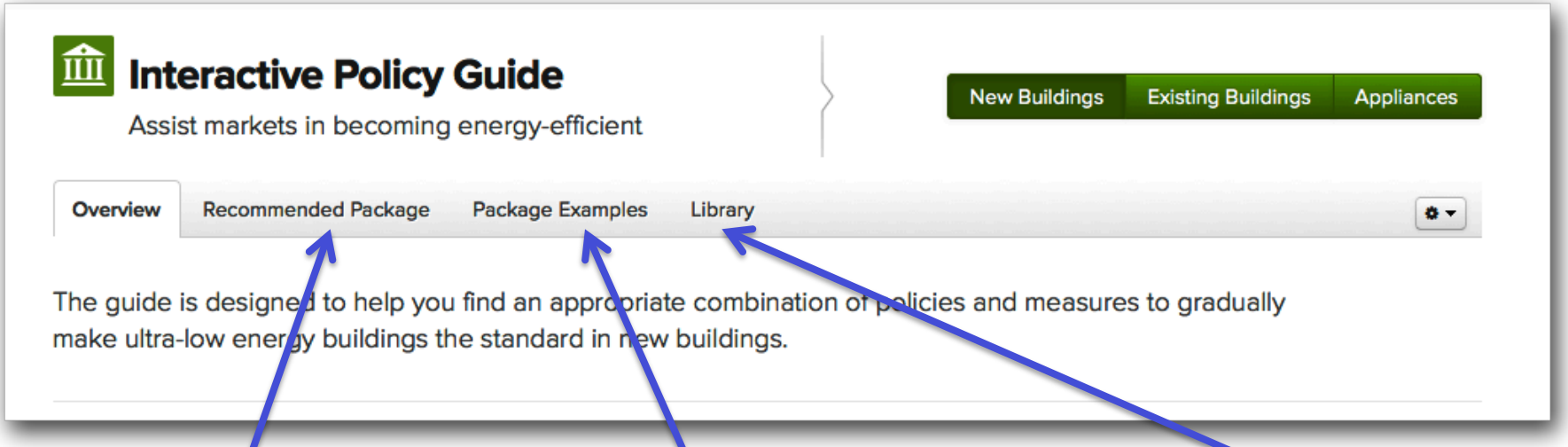






Source: bigEE 2012

Interactive Policy Guide: Main features



Elements of the package:
- General Description
- Good Practice Examples

Good Practice Policy Packages
- Gathered according to a standardized template

Background information:
- Why policy is needed
- How to implement policies
- Policies need to interact
- ... Other: brochures, papers, etc.

Source: bigEE 2012

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Assist markets in becoming energy-efficient

New Buildings | Existing Buildings | Appliances

Overview | **Recommended Package** | Package Examples | Library

Feedback

Governance framework for energy efficiency

- Energy efficiency targets and planning
- Energy efficiency policy infrastructure and funding
- Eliminating distortions

Specific policies and measures for energy efficiency in new buildings

- Regulation
- Information
- Incentives & financing for energy efficiency investments
- Capacity building & networking
- Promotion of energy services
- RD&D and BAT promotion

← Explore policies and measures

Policies need to interact

Read here which policies to combine and how they should work together to improve energy efficiency in new buildings.

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Governance framework for energy efficiency

- Energy efficiency targets and planning
- Energy efficiency policy infrastructure and funding
- Eliminating distortions

Specific policies and measures for energy efficiency in new buildings

- Regulation
  - Minimum energy performance standards (MEPS)
  - Other legal requirements
  - Revision of landlord and tenant laws
- Information
- Incentives & financing for energy efficiency investments
- Capacity building & networking
- Promotion of energy services
- RD&D and BAT promotion

Minimum energy performance standards (MEPS)

By setting a limit for the allowed maximum energy consumption of new buildings and existing buildings undergoing retrofit, at least the most inefficient building designs, technologies and components are excluded from the market. The legal requirements should be strengthened step by step every three to five years, while enabling the markets to adapt and gain from energy-efficient buildings. The target should be that after ten to 15 years very low energy levels – ULEB for the buildings as a whole – have been reached. An effective control and enforcement regime is essential to ensure compliance with the standards.

Implementation tips

- The standards should be well-grounded in evidence, e.g. by reference to life-cycle cost studies and evaluations of demonstration buildings.
- Investors, building designers, and building contractors should be well prepared and sufficiently skilled to implement the standards (e.g. through complementary information and training programmes).
- Achievable energy and cost savings should be clearly communicated so as to avoid the impression that the requirements only impose a burden.
- Sufficient resources must be available for monitoring and enforcement (compliance control).
- Sufficiently stringent penalties will help to ensure maximum compliance.

Detailed description

Discover many in-depth details about this policy type.

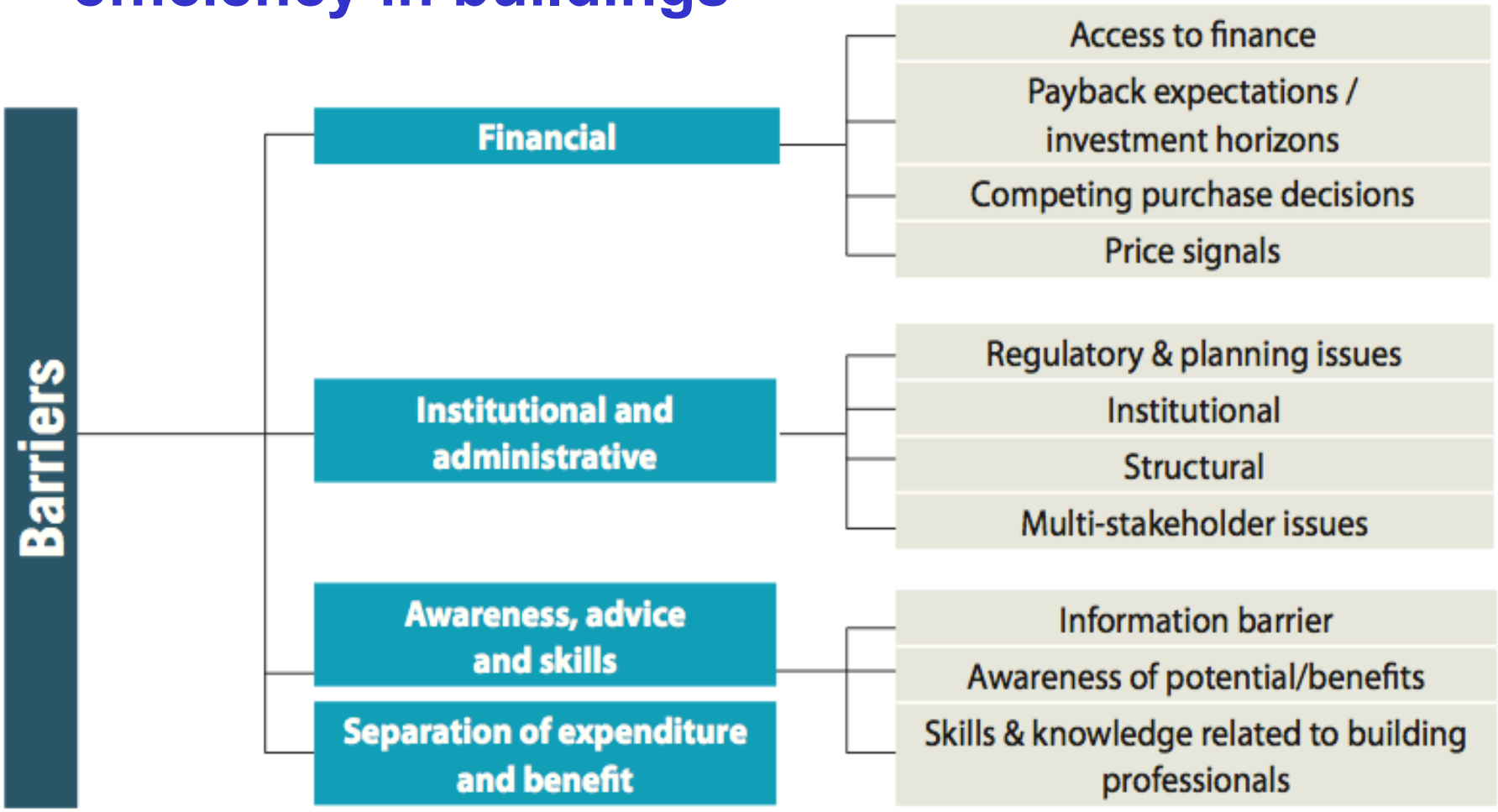
Show details about this policy type →

Good practice examples

There currently are no good practice policy examples at this time.

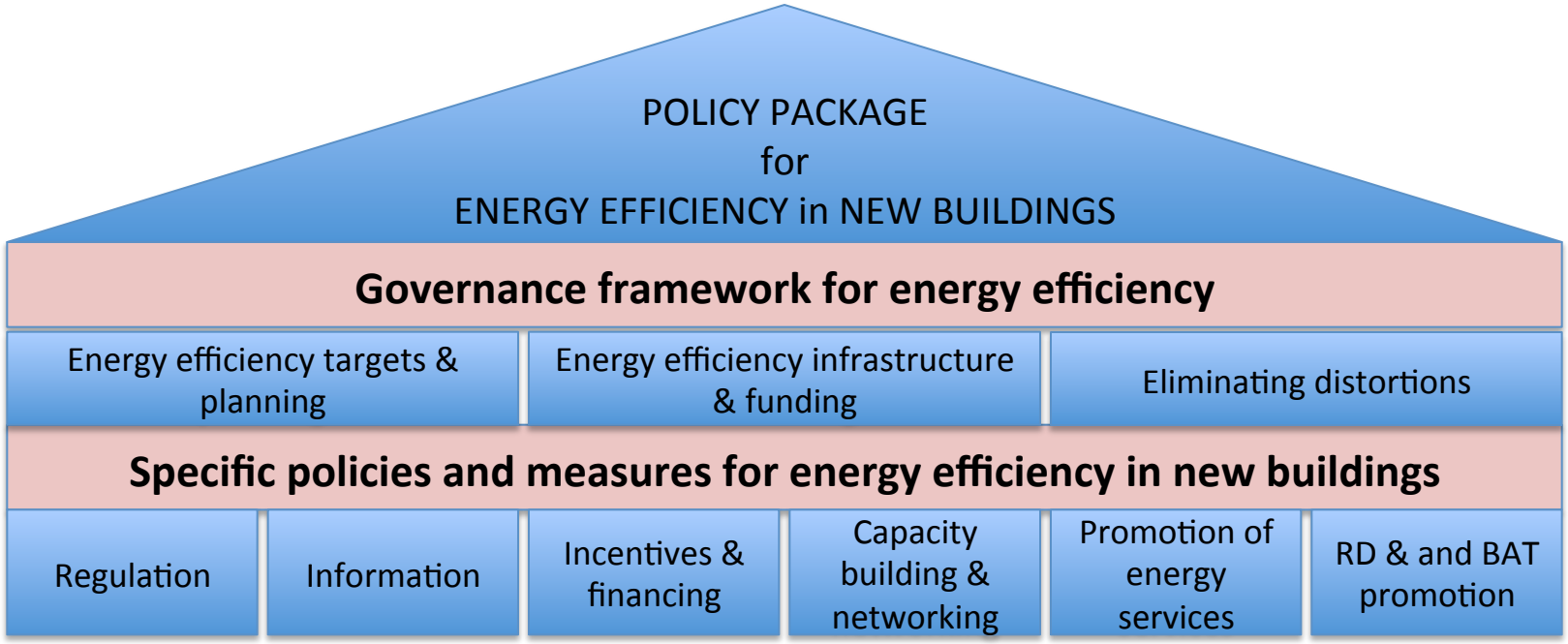
P&M to overcome barriers for efficient and green buildings

Classification of barriers for energy efficiency in buildings



Source:BPIE 2012

No silver bullet to foster efficiency in buildings
Policy packages are needed!



Is efficient sufficient?

The bigEE “discussion corner”

25% less energy/raw materials per $ GDP are "eaten up" by 82% global economic growth! Only an integrated approach "efficiency + sufficiency + consistency" leads to sustainable development

Reduction of specific impacts per product/service

Efficiency

Rebound Effect:
Efficiency gains are „eaten up" by increased demand

Sustainability

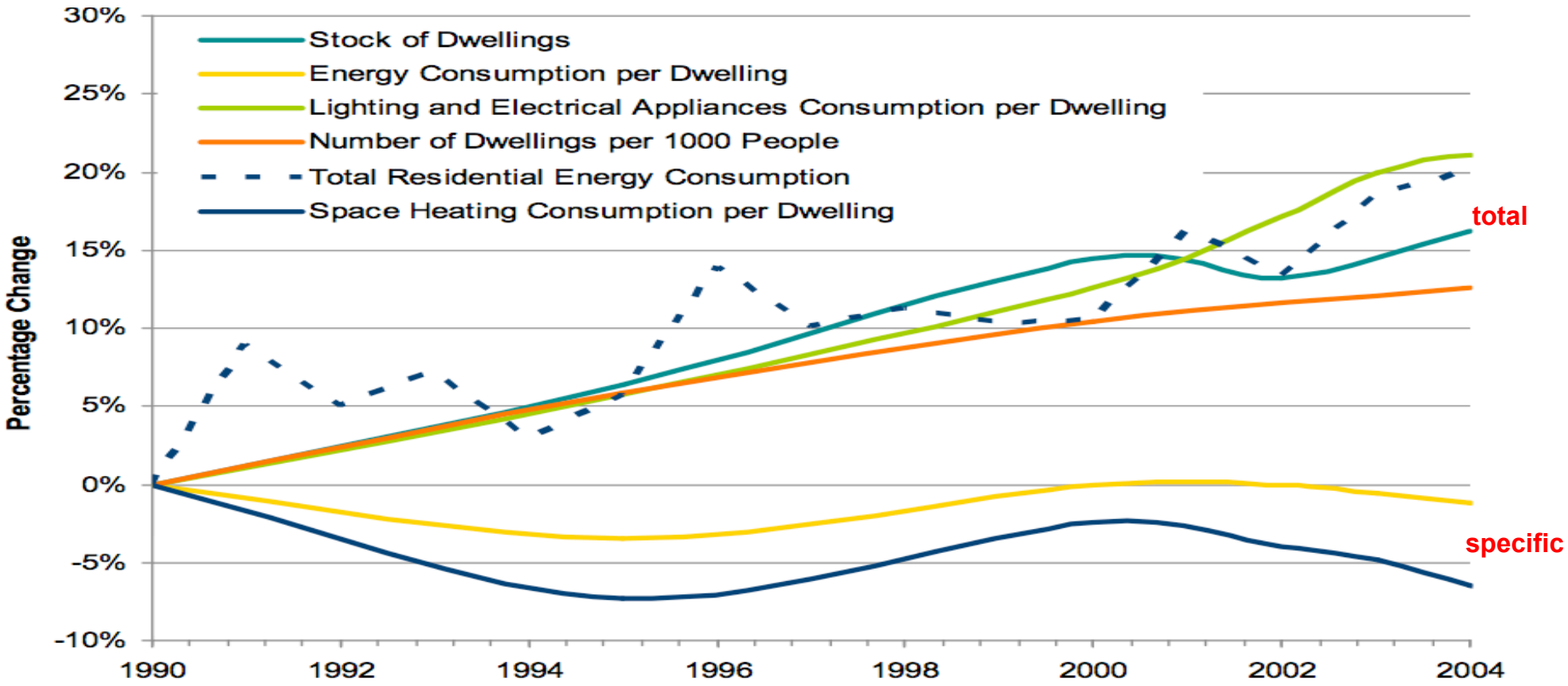
Sufficiency

Consistency/Resilience

Sustainaible patterns of consumption and production

More dwellings and more consumption of appliances have overcompensated the specific efficiency gains in buildings!

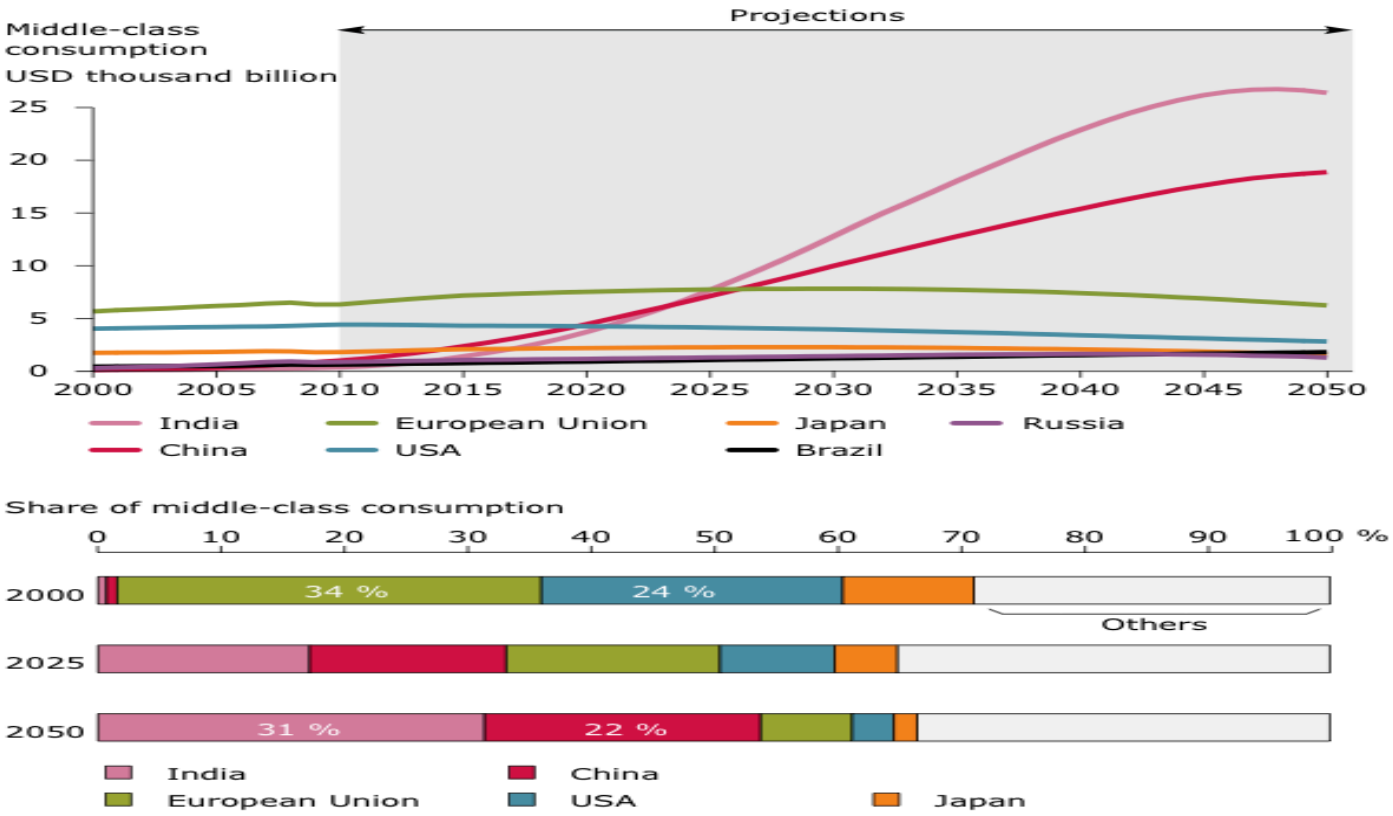
Trends in EU Housing Efficiency, 1990-2004



Source: Is efficient sufficient? ECEEE 2010

Steep growth of „the middle/consumer classes“ in CIT

In 2050 50% of „middle classes“ consumption in China and India



Note: In this study 'middle class' is defined as households with per capita daily spending of between USD 10 and 100 purchasing power parity (PPP).

Source: Kharas, 2010; EEA, SOER, 2010

New policy packages needed

to reduce rebound effects and encourage life style changes!

„The older I get the more I like regulation“
(Eoin Lees, Former Head of Energy Savings Trust/ UK)

System adjustments

- **Direct:**
  - Binding energy saving targets (EU 2011/2012)
  - Energy efficiency obligations for utilities (EU ESD 2012)
  - Reduction of subsidies and internalizing ext. cost of nuclear/fossil fuels
  - Caps, e.g. dynamic standards for fleet consumption of cars (EU)
  - Bonus/malus regulations e.g. for cars („feebates“)
  - More ambitious targets for EU ETS
  - Progressive standards (e.g. ICT)
  - Ecotax
- **Indirect:**
  - Structural change to less resource intensive sectors (i.e. services)
  - Promotion of renewable energy in coordination with energy efficiency
  - “ProgRress” (German Program Ressource Effciency)

Behavioral change

- Sustainable consumption, promotion of common goods, education…
- Reducing societal disparities (e.g. income, wealth, access)…

Thank you!

Please contact us at

bigEE@wupperinst.org