Energy Efficiency in New Buildings The Danish Experience

Webinar 6 June 2013

Jesper Ditlefsen Head of Section Danish Energy Agency





Energy Efficiency in New Buildings

Toolkit by the Low Carbon Transition Unit, Danish Energy Agency



CESC webinar 6 June 2013

Peter Larsen Head of Section Danish Energy Agency





Our work

The Low Carbon Transition Unit (LCTU) within the Danish Ministry for Climate, Energy and Building was established in 2012 and assist growth economies and developing countries in their implementation of comprehensive, real and measurable GHG reductions and Low Emission Development Strategies.

Baselines

Cross cutting analytical workstreams

UNEP Risø Centre through dialogue and exchange of experiences in a group of developing countries, in the promotion of transparent, robust and credible GHG emissions baselines, i.a. by discussing commonalities and lessons learned across countries.

We are engaged together

with the OECD and the

Reduction potentials

We conduct analyses of energy systems and reduction potentials in developing countries using the Danish Energy Agency's global carbon market model, COMPARE and our specially developed Emission Reduction Tool.

Energy Policy Toolkits

We share tangible Energy Policy Toolkits to provide guidance and give recommendations to developing countries on how to design and implement GHG reduction measures as well as national and cross sector Low Emission Development Strategies (LEDS).

Financing mechanisms

We work with various financing mechanisms in our bilateral country programmes to promote low carbon emissions investments in the energy sector. We are also engaged in a number of multilateral forums that address climate financing.

Multilaterally: networks and partnerships Systematic underpinning of GHG reduction measures and initiatives (including NAMA and MRV)

We are engaged in a number of multilateral networks and partnerships with the aim of systematically underpinning GHG reduction measures. Our engagements include: CCAP MAIN, UNEP FIRM, GGGI, The World Bank's Partnership for Market Readiness, Chile MAPS and the Nordic Pilot NAMA under the Nordic Partnership initiative.

Bilaterally

We work together with South Africa to promote increased integration of renewable energy – particularly wind power - in the national electricity supply. We also assist South Africa in the area of energy efficiency.

South Africa

Vietnam

We work together with Vietnam on low carbon transition within the energy sector, specifically targeting energy efficiency initiatives. The aim is helping small and medium-sized enterprises in Vietnam - with a focus on brickworks, ceramics and food processing industries. We also assist in implementing new requirements for energy-efficient buildings.

Mexico

We work together with Mexico to assist in their low carbon transition by addressing specific challenges in areas of climate change mitigation, renewable energy integration and planning, and energy efficiency in non-residential buildings and larger industry.

AGENCY

Effects in 2020 of agreed policies

These are the headline results for 2020:

More than **35%** renewable energy in final energy consumption

Approximately **50%** of electricity consumption to be supplied by wind power

7.6% reduction in gross energy consumption in relation to 2010

34% reduction in greenhouse gas emissions in relation to 1990



Sharing our experiences...





Energy policy toolkits







More information at:

www.ens.dk/LCTU

• Peter Larsen (pla@ENS.DK)



Slides by Jesper



"Stamps of Approval" by Postnergy Efficient Office Buildings in Malaysia – Hot and Humid





Reduce Internal Electricity Consumption and thereby Reduce Chiller Energy also



Energy Efficient Ventilation

Optimisation of the LEO Building

70 kWh/m²year : Base Case

35 kWh/m²year

Increase of Duct size

20 kWh/m²year

Energy Efficient Fans and Motors

7 kWh/m²year

Variable Speed of Fan (VSD)





Daylight Optimized Architecture In the Tropics

(ZEO Building in Malaysia, IEN Consultants)

- Thermal Insulation in Roof (100mm)
- Glare Protection : Fixed Blinds
- Shading and light redirection Exterior Light Shelf





Spectrally Selective Glazing is Optimal in the Tropics





Energy Efficient Lighting Daylight is the best and cheapest



AGENCY



EN ERGY

Economic feasibility of EE Buildings

- ➤ LEO Building : 50% savings, 5% extra costs
- GEO Building (experimental): 50% savings, 5% extra costs IEN Consultants Sdn Bhd
- Diamond Building : 65% savings, 4% extra Costs,
- KL Eco City Office Tower 3 (2013) : 50% savings, 3% extra costs New, not included in the Energy Policy Toolkit
- KL Eco City, Office Tower 3 for the KL City Council (DBKL)
- Energy Index : 105 kWh/m²year against normal 210 kWh/m²year (50% down)
- Extra Costs for Double Solar Control Glazing : 1.2 million US\$
- Consequential Cost Savings on Chiller Investment : 0.58 million US\$
- > Integrated Energy Design reduces extra costs and improves economic feasibility







Overall key points

- The potential for energy efficiency in new buildings is
 - *Huge* and its realisation is
 - Cost efficient
- However, <u>market failures</u> such as split incentives mean that many new buildings are built with poor energy performance...



• Therefore <u>regulation</u> and effective implementation and enforcement is crucial and spurs <u>innovation</u>.

