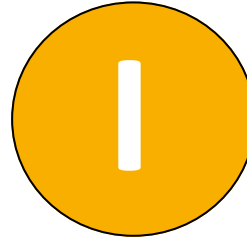
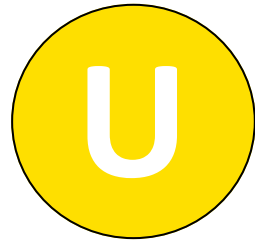
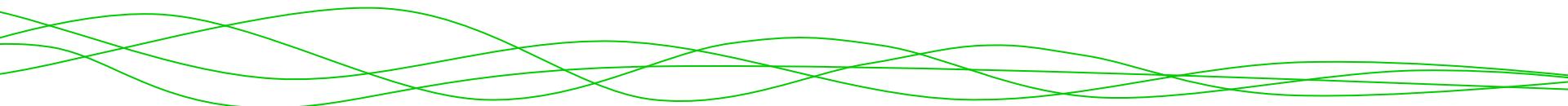
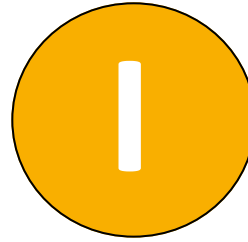
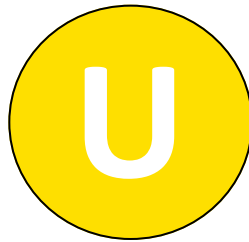


IT'S



TIME



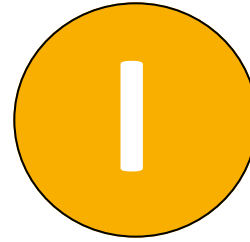
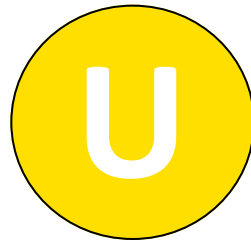


FINANCING SUSTAINABLE BUILDINGS

“Quizzing the Stakeholders”

Introductory Remarks:

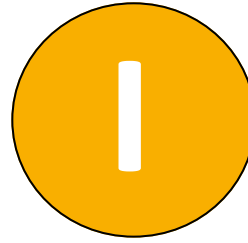
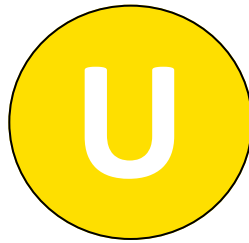
Adam McCarthy, President, EuroACE



FINANCING SUSTAINABLE BUILDINGS

“Quizzing the Stakeholders”





FINANCING SUSTAINABLE BUILDINGS

“Quizzing the Stakeholders”

Introductory Remarks: Adam McCarthy, President, EuroACE

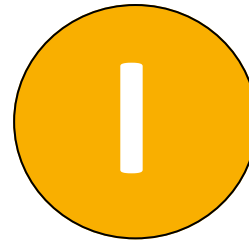
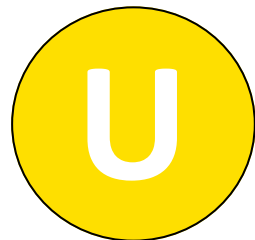
Moderator: Nick Andrews, Fleishman Hillard

-  **Quiz Session 1: Sustainable Buildings - What are the benefits ?**
Lone Feifer, Programme Director Sustainable Living in Buildings, VELUX A/S
-  **Quiz Session 2: EU Policies for Buildings - What next?**
Pavel Misiga, DG Environment, European Commission
-  **Quiz Session 3: Financing Models - Which are successful and why?**
Alexander Paskov, Johnson Controls

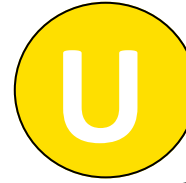
Conclusions: Adrian Joyce, Secretary General, EuroACE

Session 1

IT'S



TIME



“Quizzing the Stakeholders”
FINANCING SUSTAINABLE BUILDINGS

Session 1

Sustainable Buildings - WHAT ARE THE BENEFITS ?

Lone FEIFER,

Programme Director Sustainable Living
in Buildings, VELUX A/S

Sustainable Buildings – what are the benefits?

EuroACE at EUSEW 2013

25.06.2013

Lone.Feifer@velux.com

Programme Director Sustainable Living in Buildings

VELUX Group

Agenda

- ▶ Background
 - ▶ VELUX platform, Sustainable Living in Buildings
 - ▶ Active House Alliance & Principles
 - ▶ The Experiments in Model Home 2020



- ▶ Facts & documentation
 - ▶ Benefits of sustainable buildings
 - ▶ Creating jobs
 - ▶ Additional cost range
 - ▶ Health & Productivity
 - ▶ Large toolbox



- ▶ Conclusions

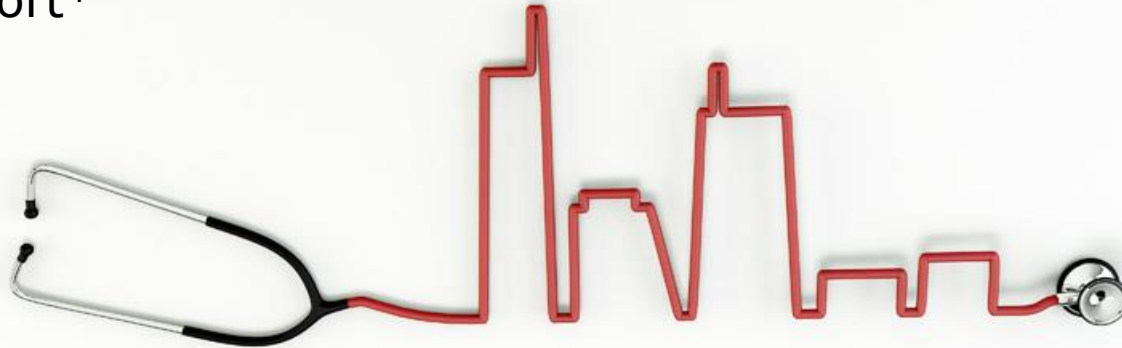
VELUX commitment

- ▶ Sustainable Living in Buildings is our commitment to people and planet.
- ▶ We engage with key stakeholders and deliver products and solutions, made to optimise human health and well-being and minimise environmental impact.



Point of departure

- ▶ People spend **90 %** of our time inside buildings, which
- ▶ represent **40 %** of the energy consumption, however up to
- ▶ **30 %** of the buildings may represent a negative influence on our health & comfort*



- ▶ - or could the challenges be tackled in one solution?
- **Sick building syndrome (SBS)** is a combination of ailments associated with an individual's place of work or residence. A 1984 [World Health Organization](#) report into the syndrome suggested up to 30% of new and remodeled buildings worldwide may be linked to symptoms of SBS. Most of the sick building syndrome is related to poor [indoor air quality](#)

Building a new model



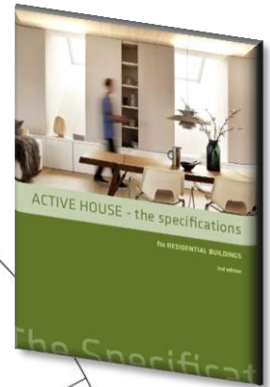
“You never change things by fighting the existing reality.
To change something, build a new model that makes the existing model obsolete.”
– **Richard Buckminster Fuller**

Active House radar

- the holistic approach

- Active House principles

- Comfort
 - Daylight
 - Thermal environment
 - Indoor air quality
- Energy
 - Energy demand
 - Energy supply
 - Primary energy performance
- Environment
 - Environmental load
 - Freshwater consumption
 - Sustainable Construction



The experiments for 2020 - the MODEL HOME programme

VELUX®



- ▶ *One experiment is better than a thousand expert assumptions*
Villum Kann Rasmussen, Founder of VELUX

- ▶ **Six 1-to-1 experiments** that demonstrate 2020 regulations, based on the **Active House** principles
- ▶ **All projects** are monitored in use, to gain learnings and experiences
- ▶ = we can fulfil 2020 regulations with today's knowledge and products



6 houses in 5 countries 2009-2011



Carbonlight Homes, UK



Home for Life, DK



Green Lighthouse, DK



LichtAktiv Haus, Germany



Maison Air et Lumière, France








Sunlighthouse, Austria

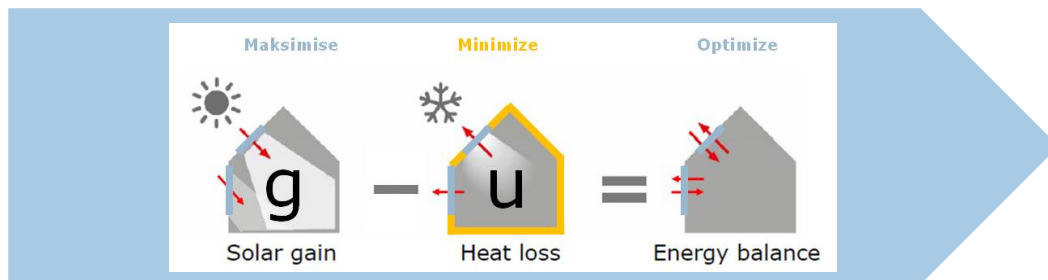


VELUX products and solutions

- key aspects of sustainability



-   **More daylight**
 -  **More fresh air**
 -  **Better view**
 -  **Intelligent control**
- ▶ All-seasons focus on
 - ▶ Winter AND summer comfort
 - ▶ Natural ventilation
 - ▶ Primary source of ventilation
 - ▶ Chimney effect
 - ▶ High daylight quality
 - ▶ Factor, not percentage
 - ▶ Strategically placed windows
 - ▶ User control
 - ▶ Manual override
 - ▶ Security
 - ▶ Energy efficiency by design
 - ▶ Dynamic sun screening
 - ▶ Use of Energy Balance



Benefit Facts

For quiz and qualification



Jobs created as output of energy efficiency

- ▶ An average of 19 jobs is created per €M invested into energy efficiency
- ▶ Public sector renovation policy would result in energy savings of 56% and carbon savings of 86%
- ▶ Total benefits to society amount to nearly €200bn



RESULTS TO 2050		Scenarios	
Description	Units	Baseline	3% public sector target
ENERGY SAVING			
Annual Energy Saving in 2050	TWh/a	9	55
2050 saving as % of today	%	9%	56%
CARBON SAVING⁵			
Annual CO2 saving in 2050	MtCO2/a	18	22
2050 CO2 saved (% of 2010)	%	72%	86%
CO2 abatement cost	€/tCO2	-19	-111
COSTS AND BENEFITS			
Investment Costs (present value)	€bn	6	34
Savings (present value)	€bn	16	103
Net saving (present value)	€bn	10	70
Net saving to society - including externality	€bn	29	192
Internal Rate of Return	IRR	10.1%	12%
EMPLOYMENT IMPACT			
Average Annual Net Jobs Generated		4,500	29,000

Documentation & Reference:
EuroACE

http://www.euroace.org/LinkClick.aspx?fileticket=3R8RB3xG_YU%3d&tabid=69

Instant payback time & getting the proportions right

VELUX®

- ▶ Up to 5 – 10 % increase of productivity due to improved indoor climate
- ▶ Cost-benefit simulation = an annual increase in productivity can be worth min 10 times as much as the increase in annual energy and maintenance costs, when improving the perceived air quality in office buildings
- ▶ a pay-back time of only 4 months due to the productivity gains achieved.



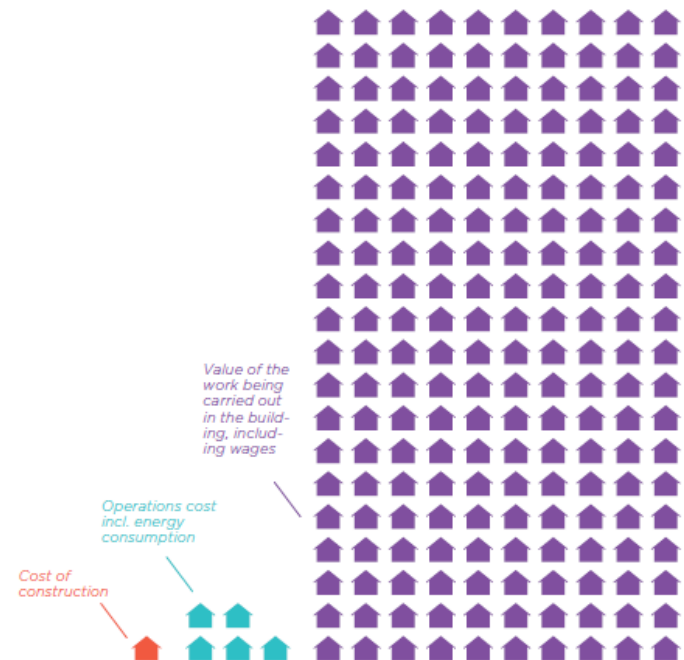
Documentation & Reference:

Olesen, B. Productivity and Indoor Climate

http://activtek.eu/mx/lib/Bjarne_Olesen.pdf

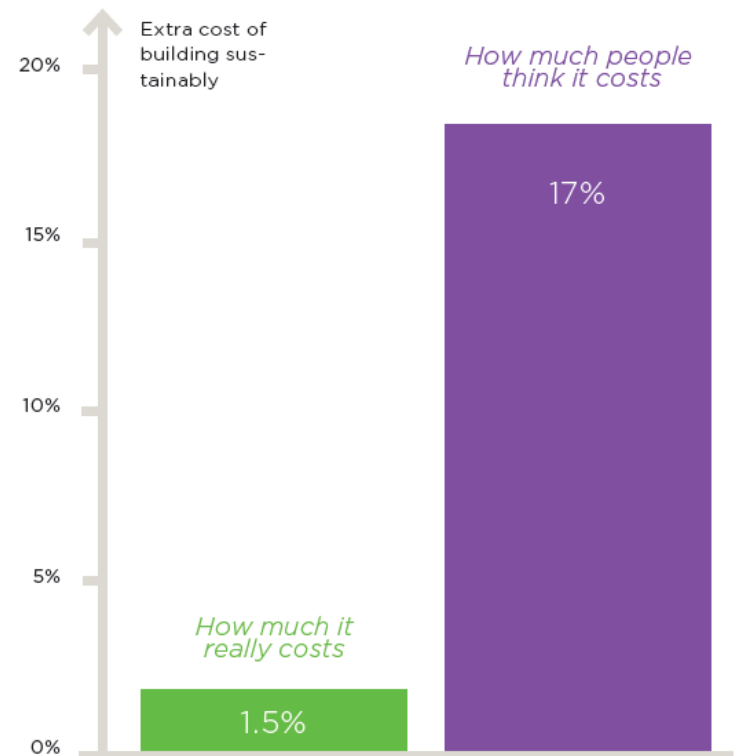
Sustainia Sector Guide to Buildings

http://issuu.com/sustainia/docs/buildings_sector_guide?e=4517615/2577595



Additional costs of building sustainably

- ▶ The cost of building sustainably is often much lower than expected
- ▶ Extra costs associated with 146 energy efficient buildings were between 0 and 3 % compared to normal houses
- ▶ The public perception is that building green would add an average of 17 % to the cost of building



Documentation & Reference:

Sustainia Sector Guide to Buildings

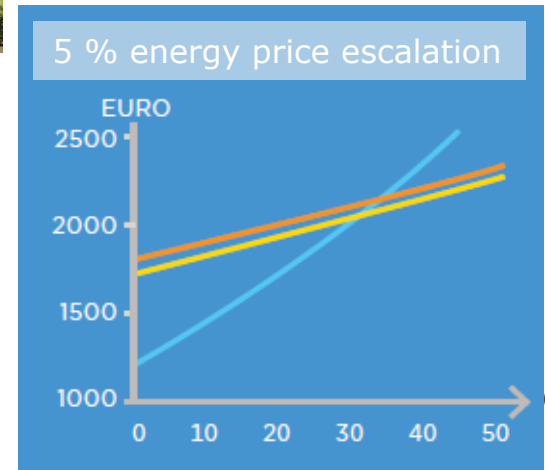
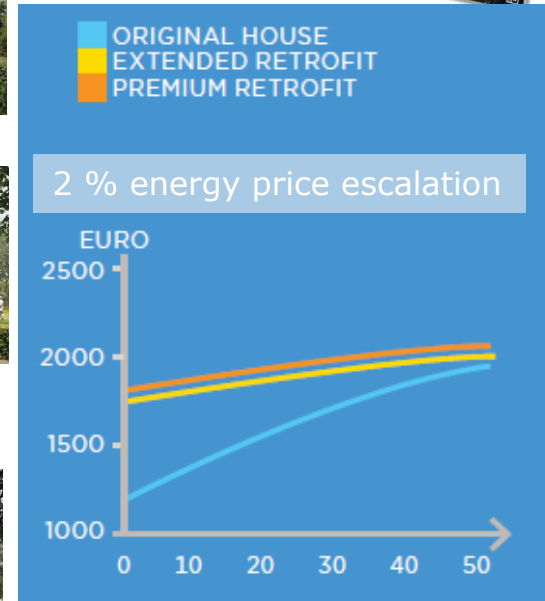
http://issuu.com/sustainia/docs/buildings_sector_guide?e=4517615/2577595

Source: Adapted from Kats, G (2010) "Greening our built world: Costs, benefits and strategies", Island Press. Based on 2007 opinion survey by WBCSD.



Cost savings not a matter of course

- ▶ Original 1954 house 102 m²
- ▶ Extended retrofit 148 m²
 - ▶ Envelope energy upgraded
 - ▶ New extension added
 - ▶ Air-to-water heat pump
 - ▶ Solar thermal collectors
- ▶ Premium retrofit 189 m²
 - ▶ PV cells added



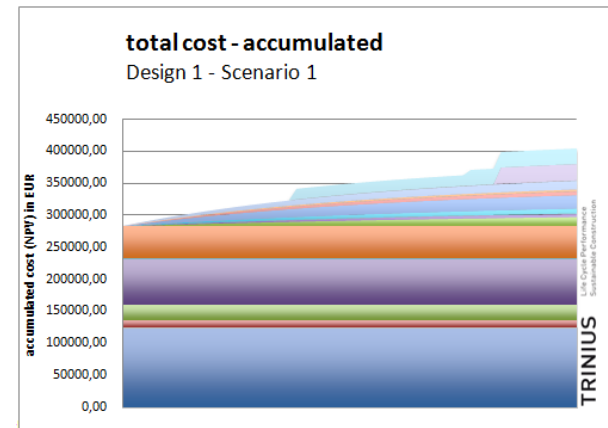
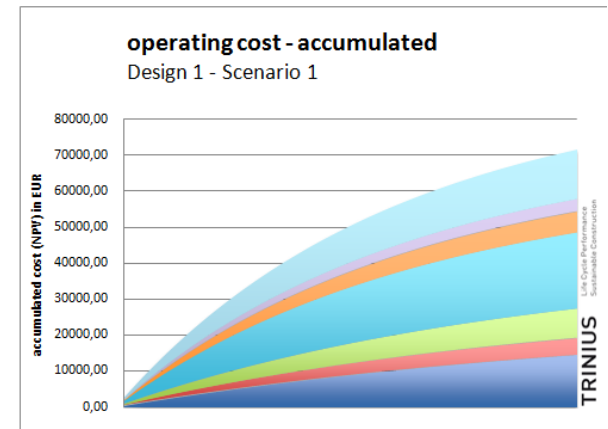
Documentation & Reference:

Sustainia Sector Guide to Buildings

http://issuu.com/sustainia/docs/buildings_sect_or_guide?e=4517615/2577595

Look at costs in a life-cycle perspective

- ▶ Optimal costs is different than initial cost
- ▶ Quality is proven over time; to sustain = to last long; i.e. Invest in high quality, and maintain wisely
- ▶ Maintenance & production energy also reflected
- ▶ High initial investment could be long-term affordable



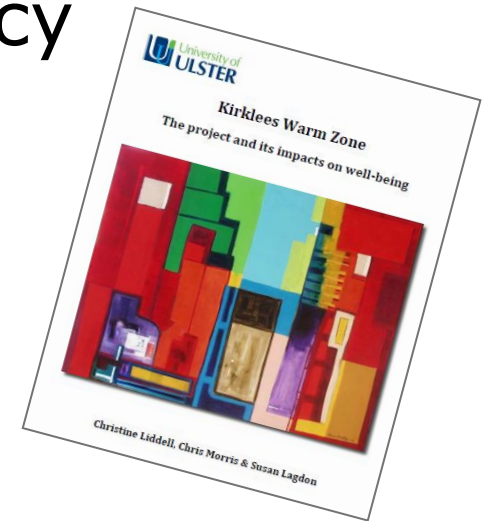
Documentation & Reference:

LCC tool for climate renovation / Wolfram Trinius
Sustainia Sector Guide to Buildings

http://issuu.com/sustainia/docs/buildings_sector_guide?e=4517615/2577595

Health benefits of energy efficiency

- ▶ Multiple benefits of energy efficiency of buildings
- ▶ 1 £ invested in Energy Efficient renovations can reduce public finances by £0,42



Documentation & Reference:

University of Ulster,

Kirkless Warm Zone, the Project and its Impact on well-being, University of Ulster, Liddell, Morris, Lagdon, 2011



Top reason for building sustainably

- ▶ Social factors rated as most important for building sustainable
- ▶ Greater health & well-being up by 88% as a top reason from 2008-2012
- ▶ Increased worker productivity tripled in impact rating

Most Important Social Reasons for Building Green (According to Respondents in 2008 and 2012)

Source: McGraw-Hill Construction, 2013



Documentation & Reference:

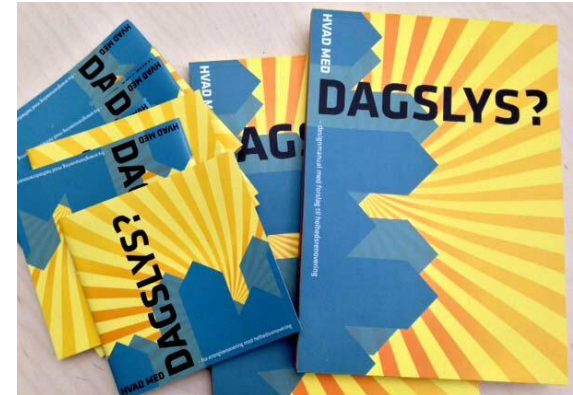
McGraw Hill report World Green Building Trends, 2013

<http://www.construction.com/about-us/press/world-green-building-trends-smartmarket-report.asp>

Many tools for energy efficiency - e.g. daylight



- ▶ Daylight can be the first tool for achieving energy efficiency
- ▶ Study by Henning Larsen Architects, Sattrup & Algreen analyses the combined effects of
 - ▶ Costs expenditure
 - ▶ Energy consumption
 - ▶ Daylight Factor
- ▶ Property value in cities are closely linked to daylight access



Assessment level 3:	Refurbishment cost per room [DKK]	Energy consumption [kWh/m ²]	Daylight factor (average)
Individual apartment			
1 Original situation	-	165	1,92%
2 100 mm interior insulation + mechanical ventilation	38.000	108	1,73%
3 Additional window panes to cover existing windows	2.000	127	1,55%
4 Installation of new windows, double-glazed	36.500	126	1,66%
5 Installation of new windows with solar control glass, triple-glazed	39.500	125	1,17%
6 Enlargement of windows for glass doors (French window), double-glazed	82.000	126	2,48%
7 Installation of a glazed wall running along entire side of room, triple-glazed	136.000	114	3,69%
8 Installation of French windows, double-glazed + 100 mm interior insulation + mechanical ventilation	88.000	73	2,29%

Documentation & Reference:

Hvad med dagslys?

<http://www.dagslysrenovering.dk>

http://da.velux.com/current_issue/insight_insider/kobenhavn

Conclusions 25.6.2013

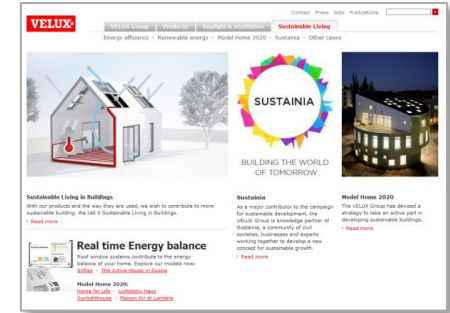
- ▶ Tomorrows buildings are here today
 - ▶ We can build and renovate houses that fulfil 2020 targets with the products, knowledge and approach of today. Why wait?
- ▶ Several benefits and potential of sustainable buildings, climate renovation and energy efficiency
 - ▶ On jobs, productivity, promotion of health and well-being
 - ▶ extra cost of building sustainable is lower than typical expectations
 - ▶ Motivating factors comfort & well-being
 - ▶ minimise resource use, generate less waste
 - ▶ Improvement of indoor climate lead to higher productivity
 - ▶ Health benefits & public finances
 - ▶ daylight as a first tool to energy efficiency
 - ▶ Top social reason health & wellbeing
 - ▶ focus on performance throughout life-cycle





Read and view more

- ▶ VELUX demonstration projects, newsletter, blogs: www.velux.com/sustainable_living



- ▶ Active House newsletter & community: www.activehouse.info



- ▶ Film on daylight and climate renovation: <http://press.velux.com/Stories/climate-renovation-demands-daylight/s/ce000d9a-84e6-4d65-980f-5471b8b543a1>



Bringing light to life™

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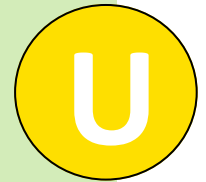
Q & A

Sustainable Buildings WHAT ARE THE BENEFITS ?

Lone FEIFER,

Programme Director Sustainable Living in Buildings,

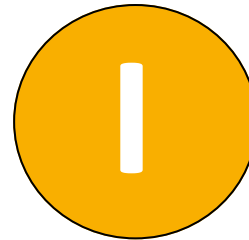
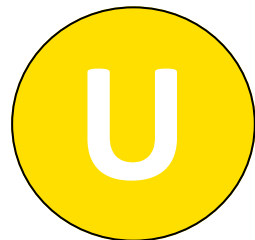
VELUX A/S



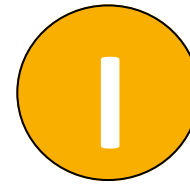
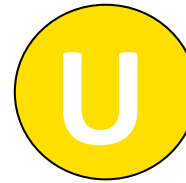
Session 1

Session 2

IT'S



TIME



“Quizzing the Stakeholders”
FINANCING SUSTAINABLE BUILDINGS

Session 2

EU Policies For Buildings - WHAT NEXT?

Pavel MISIGA,

DG Environment, European Commission



EU Policies for Buildings: What Next?

Pavel Misiga
Eco-innovation and Circular Economy
Directorate General for Environment

pavel.misiga@ec.europa.eu



Resource use

40% of our final energy consumption

35% of our greenhouse gas emissions

50% of all extracted materials

30% of our water consumption

33% of total generated waste

Example of embedded energy

An investment of 100.000 Euros...

- **..in a photovoltaic panel would save 75 tonnes of CO₂ over 30 years**
- **..in low carbon concrete would save 663 tonnes of CO₂ immediately**

Which investment will be made?

Why this initiative now?

- **Resource efficiency roadmap, 2011**
 - Existing policies, mainly on energy efficiency, need to be complemented with policies for resource efficiency looking at a wider range of resource use and environmental impacts, across the life-cycle of buildings.
- **Strategy for the sustainable competitiveness of the construction sector, 2012**
 - Resource efficiency is a main challenge. Highlights areas for future development such as the assessment of the environmental performance of buildings.

Scope

- **Environmental aspects of sustainability, i.e. "green buildings"**
- **Provide a holistic approach regarding resources and life-cycle impact of the sector.**
- **Resources to be looked at:**
 - **materials (including waste)**
 - **water**
 - **embedded energy**
- **Type of buildings covered:**
 - **residential**
 - **non-residential (excluding industrial buildings and infrastructure)**

What actions are already taken?

■ Energy efficiency

- Energy Performance of Buildings Directive
- Energy Efficiency Directive
- Energy Labelling and Eco-design Directives

■ Waste Framework Directive

- Review targets related to waste management

■ Member States

- I.a. regulate the calculation and reporting of environmental impacts

Objectives

■ Overall:

- **Reduce environmental impacts by improving overall resource efficiency and, as a consequence, improve the related competitiveness**

■ Specific:

- **Raise awareness and demand among private consumers, developers and public purchasers**
- **Improve knowledge and information on resource use**
- **Remove barriers created by different sets of requirements on environmental performance**
- **Improve material efficiency, including prevention and management of waste**

Areas to be considered for future work

- **Establish and promote an assessment framework for the environmental performance of buildings, taking into account the building as a system, building components and construction products**
- **Provide information on the environmental performance of buildings to supply chain and clients**
- **Recommend reporting requirements for buildings and components**

Areas to be considered for future work

- **Establish comprehensive GPP criteria for different categories of buildings**
- **Advice MS in developing/reforming financial incentives for green buildings, including linking to the existing/emerging incentives for improved energy efficiency**
- **Promote efficient material management, in particular support markets for secondary construction materials**

How to define green buildings?

- **What aspects of resource use, beyond energy efficiency, should be taken into account?**
- **What knowledge do we need to develop a definition?**
 - **Do we have this knowledge or how could we get it?**

Assessment approaches?

- **How can the environmental assessment of a building be done in practice?**
- **What are the areas to be covered/indicators to be used?**
 - **How to take into account local conditions?**
- **What could performance levels, once known, be used for?**
- **Do cost-effective assessment schemes exist for the majority of buildings in Europe?**

Incentives?

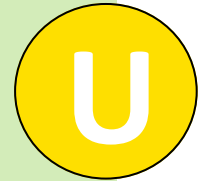
- **How to tackle split incentives in the supply chain, i.e. uneven distribution of costs and benefits?**
- **Are incentives needed for green buildings?**
 - Demand side? Supply side?
- **What kind of incentives would be most cost-effective? At what level?**

Q & A

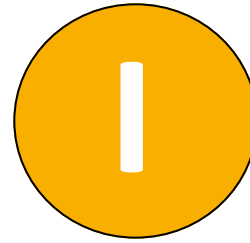
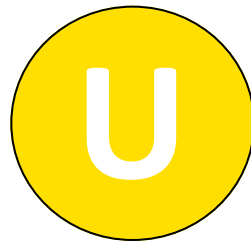
EU Policies For Buildings - WHAT NEXT?

Pavel MISIGA,

DG Environment, European Commission



Session 2



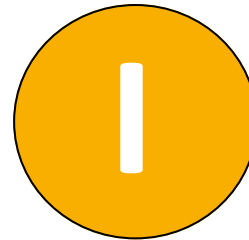
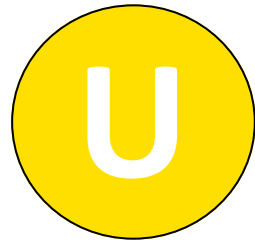
FINANCING SUSTAINABLE BUILDINGS

“Quizzing the Stakeholders”

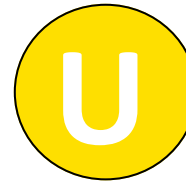


Session 3

IT'S



TIME



“Quizzing the Stakeholders”
FINANCING SUSTAINABLE BUILDINGS

Session 3

Financing Models - WHICH ARE SUCCESSFUL AND WHY?

Alexander Paskov,

Johnson Controls

Financing – Financing Structures that Work



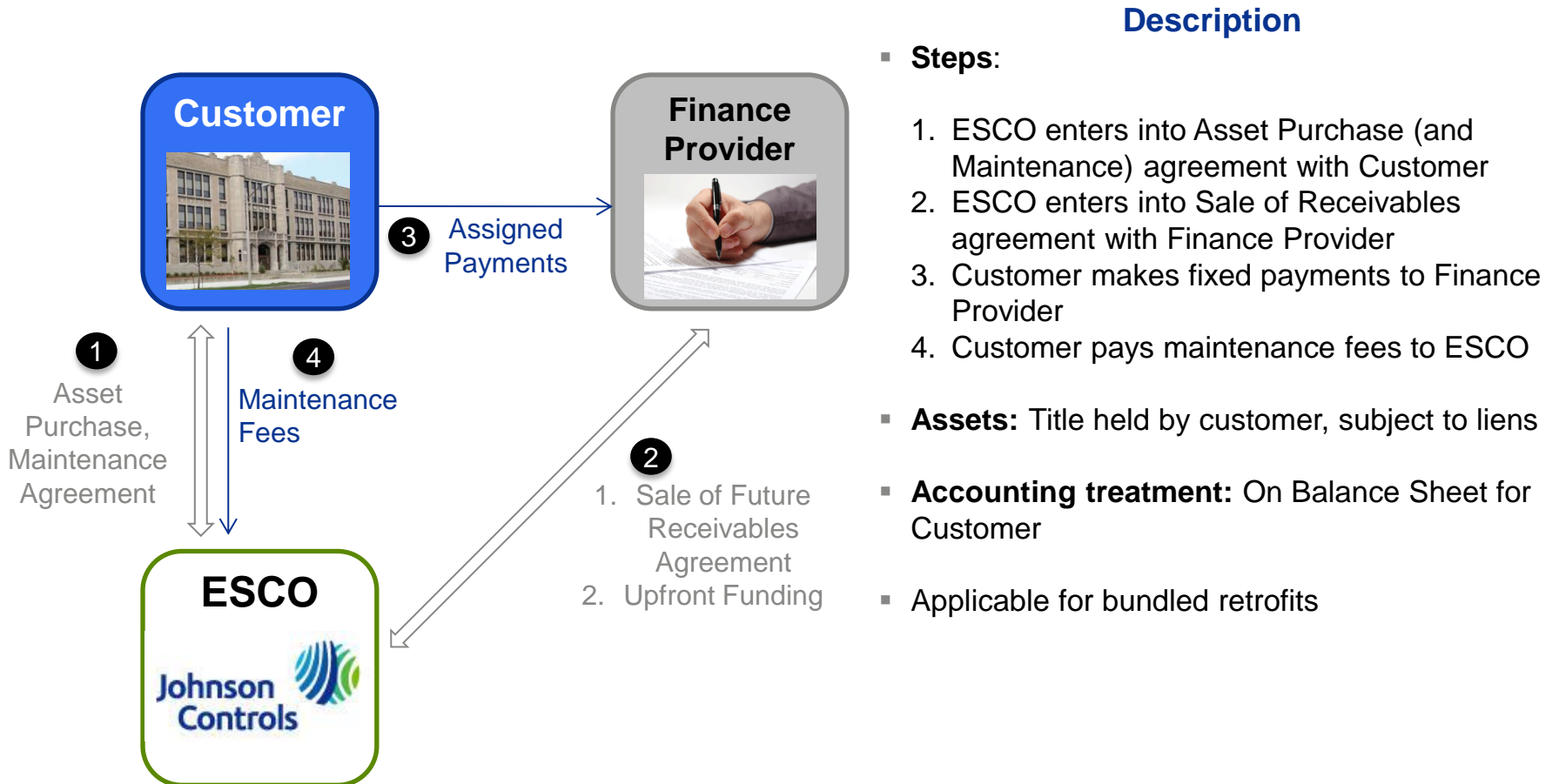
Alex Paskov
Director Structured Finance EMEA,
Johnson Controls International



June 25, 2013

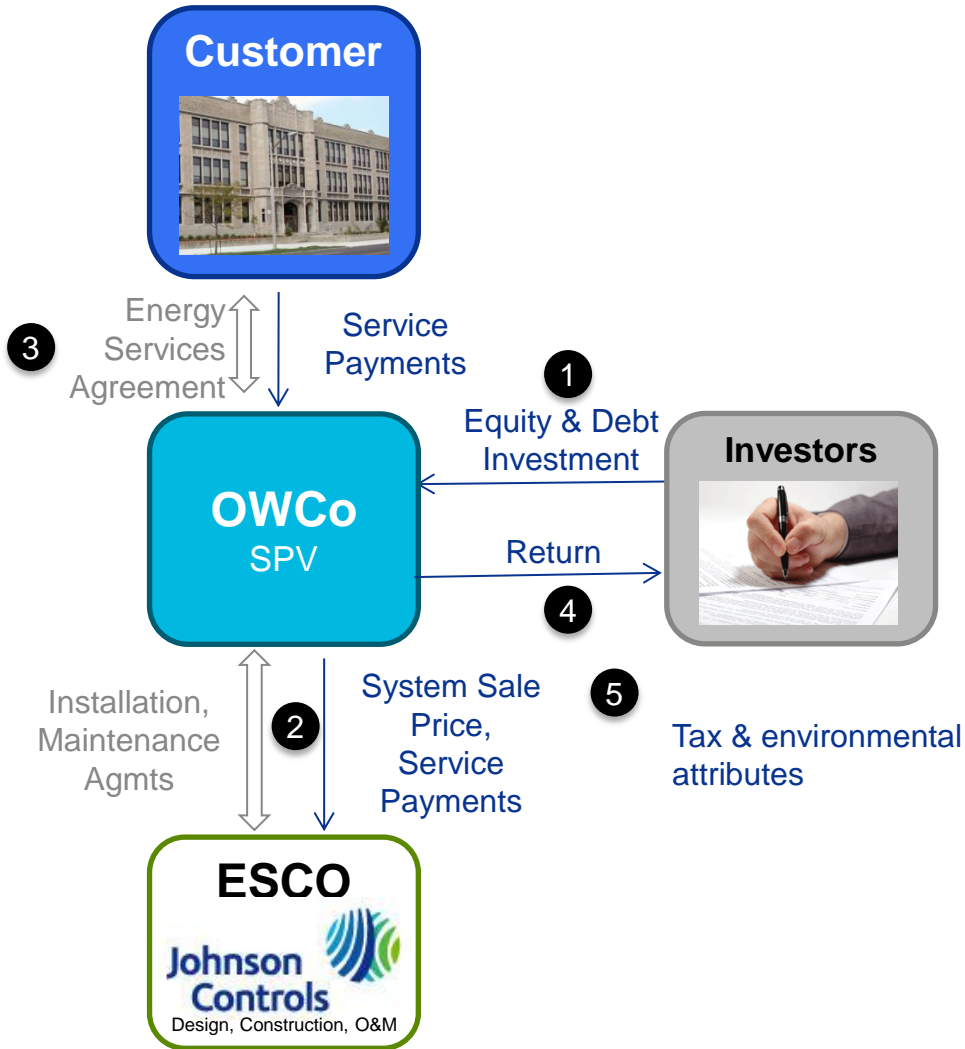
Energy Solutions Financing Structures

Sale of Receivables / Forfeiting Model – executed



Financing Structures

Energy Services Agreement (ESA) - executed



Description

- **Steps:**
 1. Investors fund an SPV (OWCo)
 2. ESCO sells OWCo assets. JCI enters into Asset Purchase and Maintenance agreements with OWCo
 3. Customer enters energy service agreement (ESA) with OWCo for beneficial use of assets for fee based energy savings
 4. OWCo provides return to investors
 5. OWCo gets benefit of tax & environmental attributes
- **Assets:** Title held by OWCo with customer right to purchase, renew or remove at end of term
- **Accounting treatment:** Services Agreement - *Off balance sheet*
- Available for bundled retrofits and individual assets

Contact

Alex Paskov – Director, Structured Finance EMEA

- Energy Solutions, Building Efficiency, Johnson Controls International

- Alex.Paskov@JCI.com

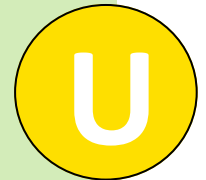
- (+32) (0) 473 430 352

Q & A

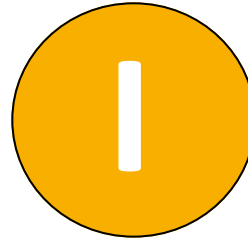
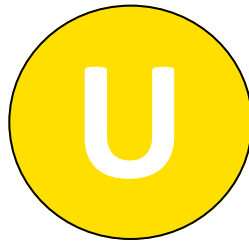
Financing Models -WHICH ARE SUCCESSFUL and WHY?

Alexander Paskov,

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Session 3



FINANCING SUSTAINABLE BUILDINGS

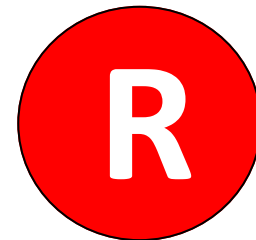
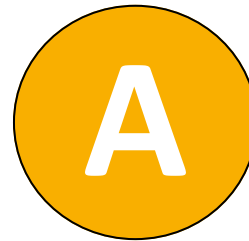
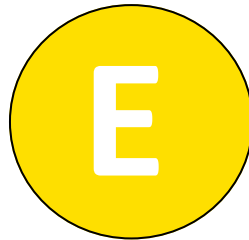
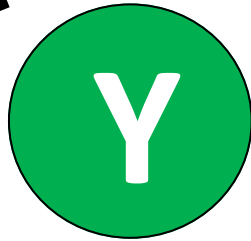
“Quizzing the Stakeholders”

Conclusions:

Adrian Joyce, Secretary General, EuroACE



See you next



Information:

Lunch – Brasserie Van Maerlant

The Van Maerlant Building is opposite the Committee of the Regions' building (CoR):

- Leave the CoR building
- Cross the road at the next traffic light
- Walk back down to the Van Maerlant Building
- Lunch will be served on the first floor.