

Financing of Sustainable Buildings Retrofit EuroPhit Financial Workshop Barcelona 25. November 2015

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1. Promotion of Energy Efficient Buildings
2. The Financial Face of a Project
3. Financial Instruments
4. Discussion and Questions



Part 1

Promotion of Energy Efficient Buildings



The challenge: European Objective

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Article 9 of the recast EPBD requires that "Member States shall ensure that (a) by 31 December 2020 all new buildings are nearly zero-energy buildings; and (b) after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings". Member States shall furthermore "draw up national plans for increasing the number of nearly zero-energy buildings" and "following the leading example of the public sector, develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings".



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What you need to know – technical aspects

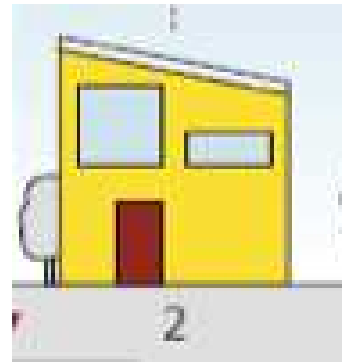
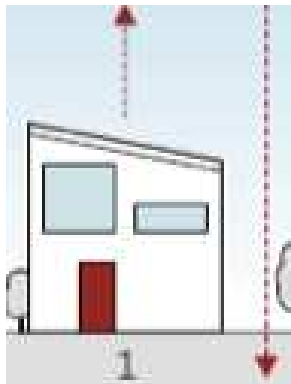
Holistic target based approach: Consider the entire building and not just a part of it. What is my final objective in terms of energy consumption (kWh/m²/year) → even for step-wise refurbishment

Target value for primary energy: The same amount of consumption for electricity, oil, gas or RE *is different* in terms of **primary energy**

Reliable calculation tools: For base case as well as actual savings (PHPP → passive house calc. tool)

Certification systems: To know whether particular efficiency targets have been reached (especially for step-by-step refurbishment)



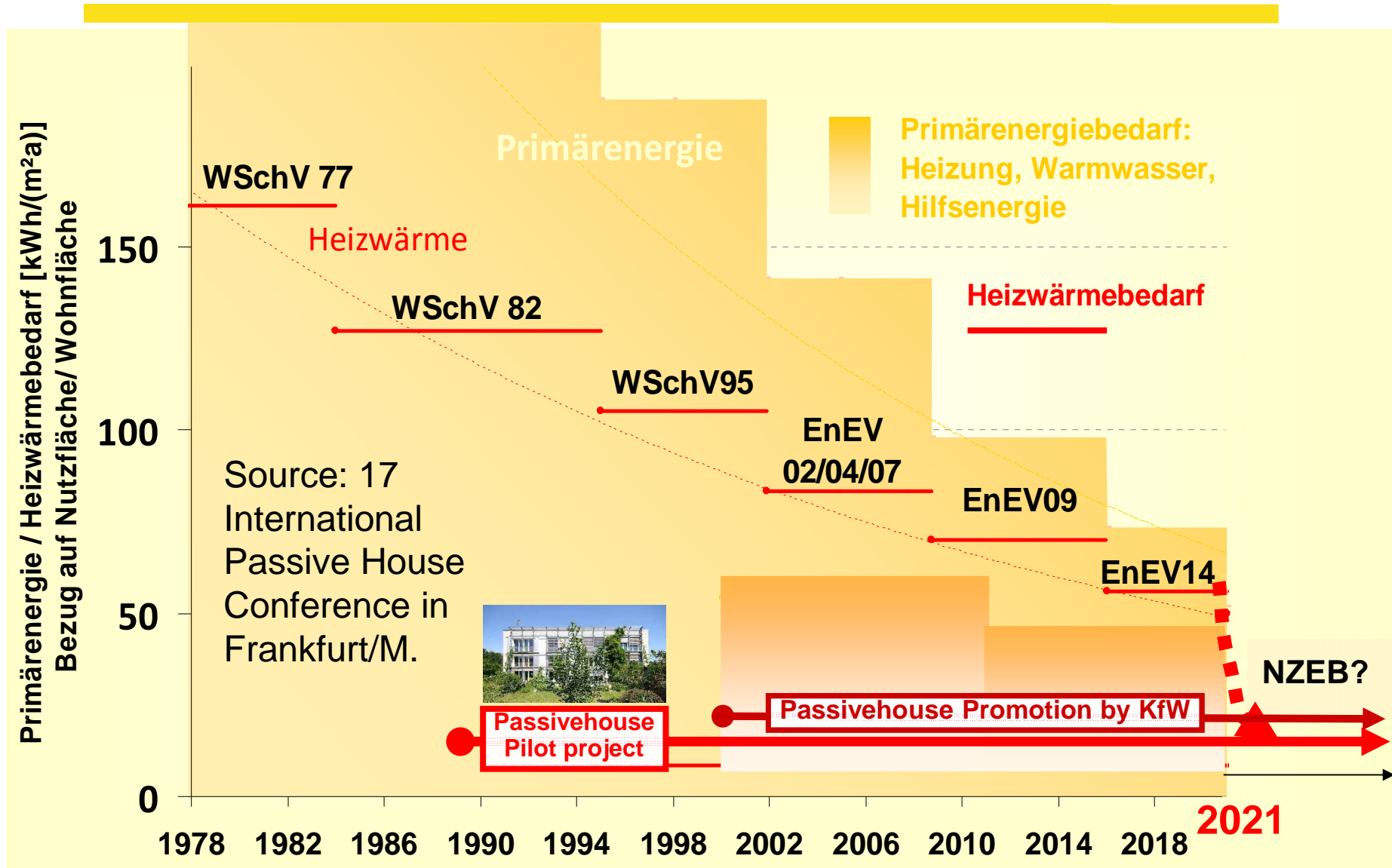


Certification is necessary to prove the achievement of individual steps (especially to outsiders like banks)



Germany | Building Energy Performance Standards

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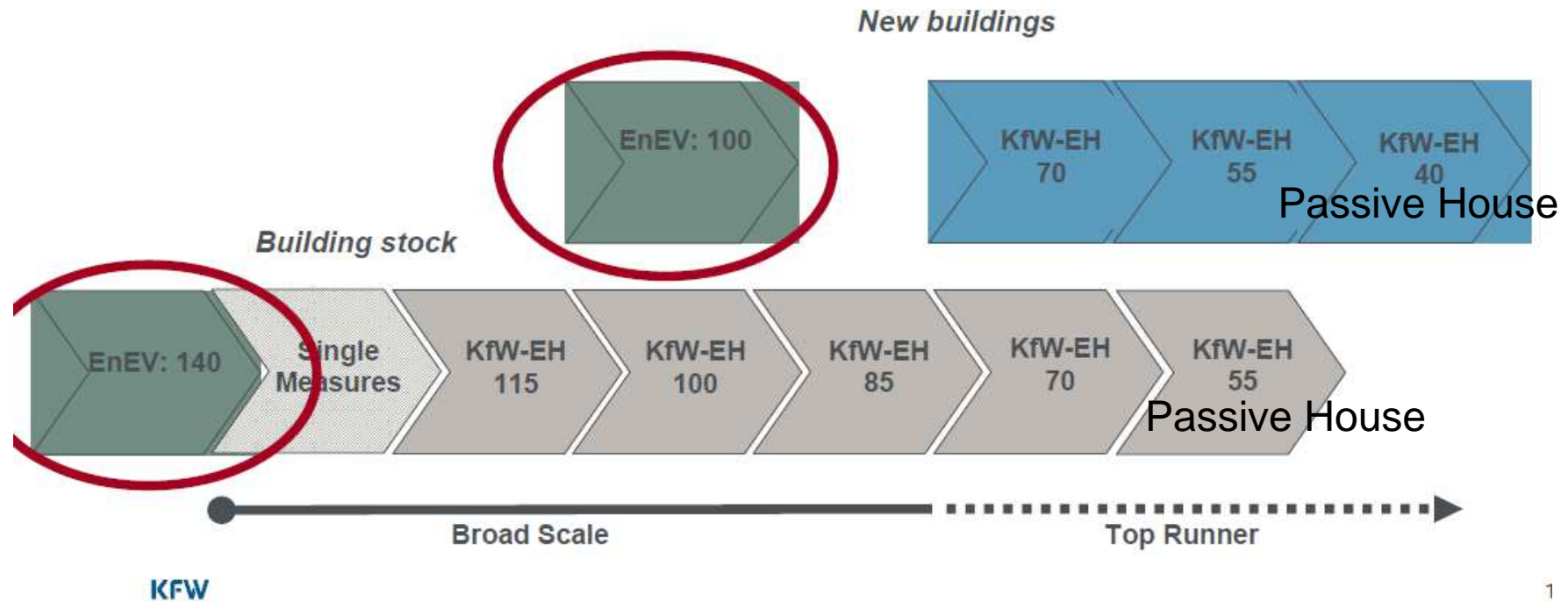
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Passive House Institute

KfW Promotion: The benchmark is the legal requirement

For Passive Houses: International Passive House Standard with PHPP



EU Funding for Energy Efficiency in Buildings

<http://www.buildup.eu/financing-schemes/>

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BUILD UP
energy solutions
for better buildings

Financing Schemes
THE EUROPEAN PORTAL FOR ENERGY EFFICIENCY IN BUILDINGS

News | Events | Publications | Links | Cases | Tools | People | Blogs | Communities | Financing | Training | Country Facts | Overview Articles | Webinars

Home » Financing Schemes » Browse all

About Financing Schemes

In this section of BUILD UP you can find information involving financing schemes for investments in energy efficiency and renewable energy measures in buildings.

Within each scheme you will find a description of the scheme but also useful information relevant to the scheme such as best practice guidelines, links to finance providers, case studies, updates/amendments to schemes, application procedures etc.

You can contribute to the financing schemes section by providing relevant content to the general BUILD UP sections (events, publications, cases etc). Selecting the theme "Financing, socio-economics" and relevant tags (keywords) for the material that you upload, will help the Financing Schemes section maintainers identify this content and link it to a financing scheme if deemed relevant.

[Hide this description]

Financing Schemes

National/Regional schemes for Residential Buildings

In this category you will find a list of the existing national and regional funding mechanisms that promote energy efficiency and renewable energy in new and existing **residential buildings**...

Tags: energy efficiency finance in residential buildings | energy efficiency funds | national financing mechanisms | national funds | renewable energy funds

National/Regional schemes for Non-Residential Buildings and other Facilities

In this category you will find a list of the existing national and regional funding mechanisms that promote energy efficiency and renewable energy in **non-residential**...

Tags: energy efficiency funds | energy efficiency in non residential buildings | national financing mechanisms | national funds | renewable energy funds

National/Regional schemes for Municipalities, Social Housing, Companies, Enterprises

In this category you will find a list of the existing national and regional funding mechanisms that are aimed at **legal persons**, e.g. companies, SMEs, municipalities, homeowners...

Tags: cities and municipalities | companies | energy efficiency funds | national financing mechanisms | national funds | renewable energy funds | SMEs

National/Regional schemes for Individuals (homeowners & tenants)

In this category you will find a list of the existing national and regional funding mechanisms that are aimed at **natural persons**, usually in the form of an owner or tenant of a...

Tags: energy efficiency funds | homeowners | individual | national financing mechanisms | national funds | renewable energy funds | tenants

European wide funds

Financing Schemes

Click concepts below to obtain a list

5 Schemes	32 Countries	193 Publications
82 News	238 Links	4 Events

Latest | Most Visited

Overview Articles

- State of the Energy Union: EU on track to meet targets
- Commission requests FRANCE and the NETHERLANDS to fully transpose the EU...

View All

Highlighted Cases

- Faculty of Technical Sciences building of Innsbruck University
- Vacuum Insulation Panel (VIP) technology provides luxury finish to mixed...

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BUILD UP Financing Schemes

BUILD UP energy solutions for better buildings

Financing Schemes

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About Financing Schemes

In this section of BUILD UP you can find information involving financing schemes for investments in energy efficiency and renewable energy measures in buildings.

- Grant programs
- Credit lines and guarantee schemes
- Redemption Grants
- EU Funding for Sustainable Energy in Buildings
 - Europe-wide funds
 - National and Regional schemes
 - National/Regional schemes for Individuals
 - National/Regional schemes for Individuals for Municipalities/Social Housing
 - National/Regional schemes for Residential Buildings
 - National/Regional schemes for Non-Residential Buildings
- European Development Financial Institutions
 - CEB/EIB/EBRD
 - National Development Institutions (like KfW)

Sort by in order | Show results per page

LIFE (2014-2020) and PF4EE, the financial instrument for energy efficiency
18689 visits | Building Energy related activities by the European Commission (directives and regulations)

COSME – the Programme for the Competitiveness of Enterprises and Small and Medium Enterprises (SMEs)
936 visits | Building Energy related activities by the European Commission (directives and regulations)

Horizon 2020 Framework Programme
4443 visits | EU funded energy related research projects (FP6, FP7)

European Structural and Investment Funds (ESI) 2014-2020
4726 visits | Building Energy related activities by the European Commission (directives and regulations)

Structural and Cohesion Funds 2007-2013
1962 visits | Building Energy related activities by the European Commission (directives and regulations)

Financial incentives supporting EPBD recast objectives (Article 10, Directive 2010/31/EU)
2238 visits | Information on legislation

Support schemes promoting the use of energy from renewable sources (as per Directive 2009/28/EC)
1613 visits | Information on legislation

Intelligent Energy – Europe programme (IEE)
2522 visits | Intelligent Energy Europe projects



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[Home](#) > [Financing Schemes](#) > [National/Regional schemes for Residential Buildings](#)

National/Regional schemes for Residential Buildings

National, Regional, Local

Scheme Contents

5 Items

▶ [Advanced Search](#)

Search

Sort by **Most Recent** in **DESC** order | Show **10** results per page

[Programa Geotcasa / Geotcasa GIT \(Geotcasa / Geotcasa GIT programme\) - Spain](#)

1719 visits | [National official sites](#)

[Programa Solcasa / Solcasa GIT \(Solcasa / Solcasa GIT programme\) - Spain](#)

1730 visits | [National official sites](#)

[Programa Biomcasa II / Biomcasa GIT \(Biomcasa II / Biomcasa GIT programme\) - Spain](#)

1599 visits | [National official sites](#)

[Ayuda a la rehabilitación de viviendas destinadas al arrendamiento \(Aid for the rehabilitation of dwellings that will be rented\) - Spain](#)

1756 visits | [National official sites](#)

[Ayudas para la rehabilitación de la vivienda \(Grants for housing rehabilitation\) - Spain](#)

1345 visits | [National official sites](#)

[View All Schemes](#)



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And in Spain

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Sources: <https://www.larioja.org/npRioja/default/defaultpage.jsp?idtab=493702&IdDoc=822797>

The screenshot shows the website larioja.org with a navigation menu on the right containing: La Comunidad, El Presidente, El Gobierno, and Oficina electrónica. A search bar is visible with the text 'Búsqueda Avanzada'. The main content area features a news article titled 'Cálculo del importe de las ayudas a la rehabilitación edificatoria'. The article includes an 'AVISO' (warning) about browser compatibility and a list of conditions for aid, such as 2.000 euros for conservation and 4.000 euros for accessibility. A sidebar on the left lists various housing-related topics like 'Mediación desahucios' and 'Ayudas afectados por desahucios'.



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And in Spain

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Sources: <https://www.larioja.org/npRioja/default/defaultpage.jsp?idtab=493702&IdDoc=822797>

Grants: State Plan for promotion of rental housing, the edificatoria rehabilitation and regeneration and urban renewal 2013-2016 (Estatal de fomento del alquiler de viviendas, la rehabilitación edificatoria y la regeneración y renovación urbanas 2013-2016).

Maximum amount of subsidies is 11,000 Euros per household and per 100 m² of floor space... if at least 50% of the total annual energy demand for heating and cooling of the building is reduced. Conditions:

- 2.000 Euros for conservation actions if the further actions that are eligible for this program are undertaken simultaneously to improve the quality and sustainability. Will increase by 1,000 Euros under certain conditions
- 2,000 Euros for projects improving the quality and sustainability, where the conditions are set out in Article 20.2 of Royal Decree 233/2013, of April 5, or 5,000 Euros maximum.... if at least 50% of the total annual energy demand for heating and cooling of the building will be reduced.
- The amounts mentioned above may be increased to 12,100 Euros, in the case of buildings declared cultural interest or who have comprehensive protection in the instrument of urban planning.
- The maximum total amount of subsidies to be granted by building shall not exceed 35% of the eligible costs of the action. (Exceptions up to 50%)



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ELENA - European Local ENergy Assistance



**Europäische
Investitionsbank**

EIB ELENA
Big investment
projects
> 50 million €

KfW

KfW ELENA
investment projects
< 50 Mio. €

Several facilities



CEB
COUNCIL OF EUROPE DEVELOPMENT BANK

CEB ELENA
Social investment
projects
< 50 Mio. €



European Bank
for Reconstruction and Development

EBRD ELENA
Focus on
municipalities
< 50 Mio. €

Part 2

The financial face of a project

- Making a project bankable:
 - Risks
 - Cash flow as basis for financing
- Refurbishment cost and “anyhow”-cost



Is the project bankable? →→ **RISKS**

EuroPHit

1. Technological risk

- Quality of design and construction, novelty of technology
- Expected savings will not be reached
- End-user behaviour affecting energy savings

2. Financial risk

- Price changes
- Budgeting of energy cost savings:
 - Are savings recognised as such?
 - Can they be separated from other cash flows?

4. Maturity match and country-adapted repayment periods:

- Maturities (=repayments to banks) must match annual cash flow derived from the project-savings (Debt service ratio). Sometimes this leads to unusually long repayment periods

5. Creditworthiness of borrower (private/municipalities/institution etc.) and /or collateral (also: equity and “anyhow cost”)

6. Participation of public institutions (reduces risk)



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The basis for financing is the financial soundness of a project

The basis for financial soundness is the cash flow.

- Economic benefits (externalities) are not considered, but they can serve as justification for public supports,
- Cash flow from energy efficiency projects consists of:

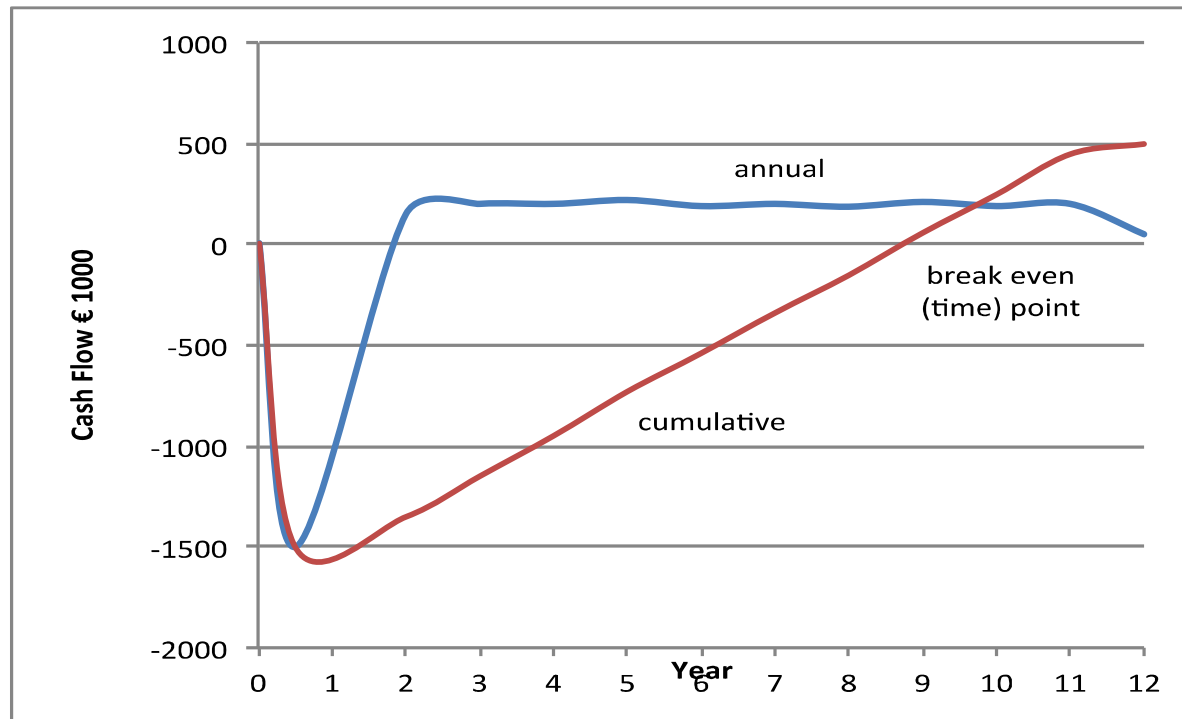
Inflows	Outflows
Savings from efficiency gains	Equity share at investment cost
	Operation cost
Higher rents (house-owners)	Higher rents (tenants)
Loan disbursements	Repayment/interest for loans

- Savings will arrive as avoided outflows.
- Savings usually fluctuate, they also depend on price developments, weather or user behaviour and can only be measured if the base case values are known
- They do not always arrive at the same place as the outflows (investment versus operating budget; tenant versus landlord) -> conflict lines

- ❖ Usually houses undergoing energy efficiency refurbishment do also need other renovation,
 - ❖ e.g. the heating system is already 20 years old, the walls need repainting, the windows are close to breakdown and the roof is leaking.
 - ❖ It is advisable to couple energy saving measures with other, e.g. maintenance measures that are necessary or planned anyhow. For instance, a wall needing a new plastering can be insulated at the same time. In this case, only the additional costs are counted as energy efficiency investment.
- ❖ Energy savings alone can seldom recover total refurbishment cost. Therefore energy related cost and “anyhow cost” (incidental cost) have to be separated.



Typical cash flow profile of an energy efficiency project



investment phase repayment phase

Cash flow example: Housing refurbishment (Rental homes)

in 1000 €		C	D	E	F	G	H	I	J	K	L	M	N
Year		0	1	2	3	4	5	6	7	8	9	10	
4	1. Revenue	0	169	169	169	169	169	169	169	169	169	169	
5	Renovation rent increase		85	85	85	85	85	85	85	85	85	85	
6	Rent increase energy efficiency		84	84	84	84	84	84	84	84	84	84	
7	2. Investment (energy efficiency part)	625											
8	3. Maintenance cost (2% ann.increase)		0,0	6,0	6,1	6,2	6,4	15,0	6,6	6,8	6,9	7,0	
9	4. Project Cash Flow (energy)	line 6-8	-625	84,0	78,0	77,9	77,8	77,6	69,0	77,4	77,2	77,1	77,0
10	4a. Project cash flow after tax	line 9-18		83,5	78,0	77,9	77,8	77,2	69,0	75,7	74,9	74,1	73,3
11	5. Equity		125										
12	7. Loan Finance												
13	8. Loan disbursement+debt service	line 14+15	500	70,0	70,0	68,0	66,0	64,0	62,0	60,0	58,0	56,0	54,0
14	8.1 Principal	line 16 *c15		50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	
15	8.2 Interest	4%		20,0	20,0	18,0	16,0	14,0	12,0	10,0	8,0	6,0	4,0
16	Loan Balance		500	500,0	450,0	400,0	350,0	300,0	250,0	200,0	150,0	100,0	50,0
17	Net Cash flow before tax	line 9-11-13	-125	14,0	8,0	9,9	11,8	13,6	7,0	17,4	19,2	21,1	23,0
18	Profit before tax**)			1,5	-4,5	-2,6	-0,7	1,1	-5,5	4,9	6,7	8,6	10,5
19	Profit tax 35%	35%	-125	0,5	0	0	0	0,4	0	1,7	2,4	3,0	3,7
20	Net Cashflow after tax	line 17-19	-125	13,5	8,0	9,9	11,8	13,2	7,0	15,7	16,9	18,1	19,3
21	Plus repayment subsidy 15% (tax free)	15%		7,5	7,5	7,5	7,5	7,5	7,5	7,5	7,5	7,5	7,5
22	Net cash flow after tax+subsidy		-125	21,0	15,5	17,4	19,3	20,7	14,5	23,2	24,4	25,6	26,8
22	Net cash flow after tax+subsidy		-125	21,0	15,5	17,4	19,3	20,7	14,5	23,2	24,4	25,6	26,8
23	Pre Tax financial IRR*)	2,4%	Sensitivity analysis: If additional income -10%:										
24	After tax financial IRR*	1,1%	After tax IRR -9,1%; DSR in year 2 below 1										
25	After tax/subsidy financial IRR*	9,8%											
26	*) refers to equity		**) For profit principal repayment has to be re-added and depreciation (here 10 years) deducted										
27	Debt service cover		1,20	1,11	1,15	1,18	1,21	1,11	1,29	1,33	1,38	1,43	
28	Debt service cover after-tax		1,19	1,11	1,15	1,18	1,21	1,11	1,26	1,29	1,32	1,36	
29	Debt service cover after subsidy		1,30	1,22	1,26	1,29	1,32	1,23	1,39	1,42	1,46	1,50	
30	Economic IRR												
31	Total investment (energy)		-625										
32	Project cash flow	line 9	-625	84	78	78	78	78	69	77	77	77	77
33	Total cash flow + repayment subsidy		-625	92	86	85	85	85	77	85	85	85	84
34	Economic IRR*)	4,1%											
35	Economic IRR incl. repayment subs.*)	6,0%											
	*)No externalities included												

Part 3:

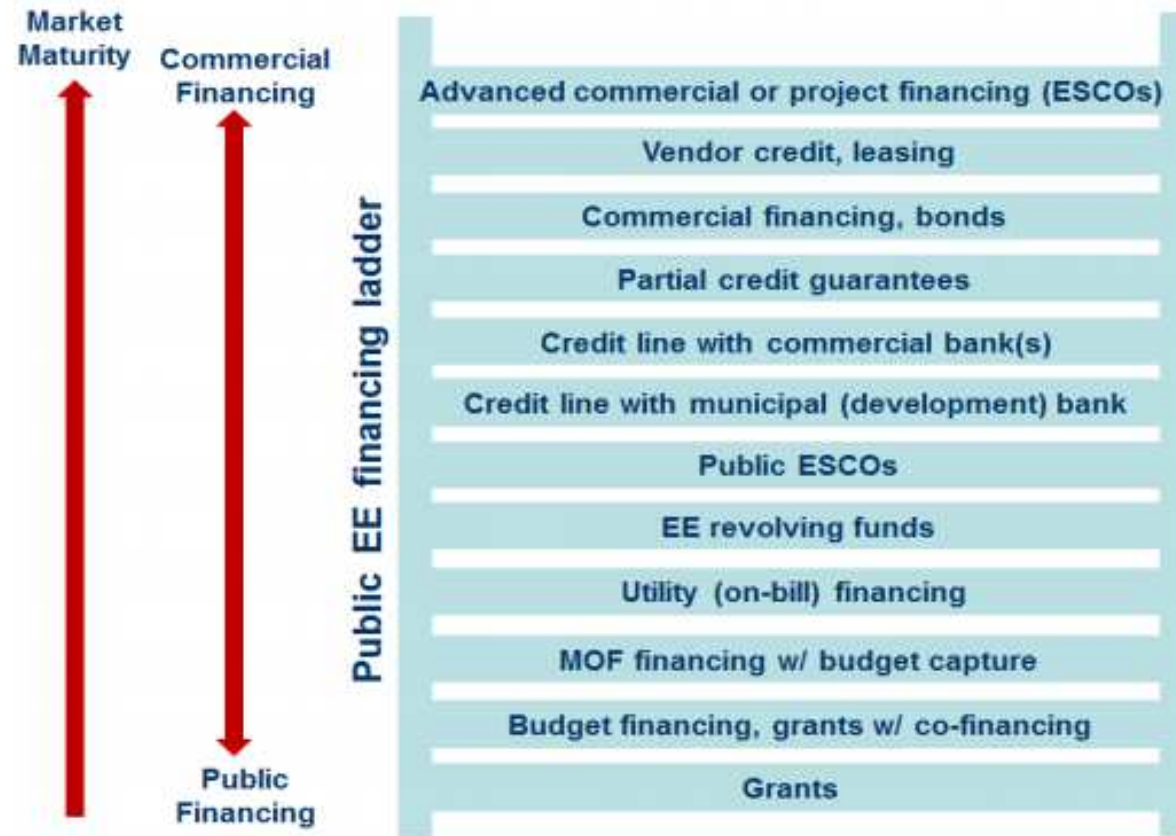
Financial Instruments for Energy Efficiency Investments in Buildings

- Debt financing
- ESCO financing
- Forfaiting
- (Leasing)
- Public supports



Financing ladder for public buildings

The Financing Ladder for Public Building EE



Source: J. Singh WB



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Debt financing, Credit lines, Revolving funds,

- **A conventional bank loan is the simplest form of debt**
- **As recourse financing:**
 - Creditworthiness of borrower, not necessarily project
- **As project finance:**
 - Private house-owner: Standardised procedures, normally under a public programme requiring standardised technical as well as financial ratios
 - Community: Cash-flow must be sufficient for loan-service
 - Separate finance for “Anyhow” part” (equity or recourse financing)

EPC and ESCO FINANCING :

- **EPC (Energy performance contracting)** refers to the contractual arrangement between a provider of energy services and the customer
- **ESCO (Energy service company):** “Natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer’s facility or premises” (*Energy Efficiency Directive (EED, 2012/27/EU)*)
- **ESCO by itself is not yet a financing solution.** Depending on the share of hardware/equipment to be installed upfront there is still a financing problem for the ESCO which might also affect the customer: Financial solutions like project finance or forfeiting will have to be applied

Various level of ESCO involvement



Source: ESMAP



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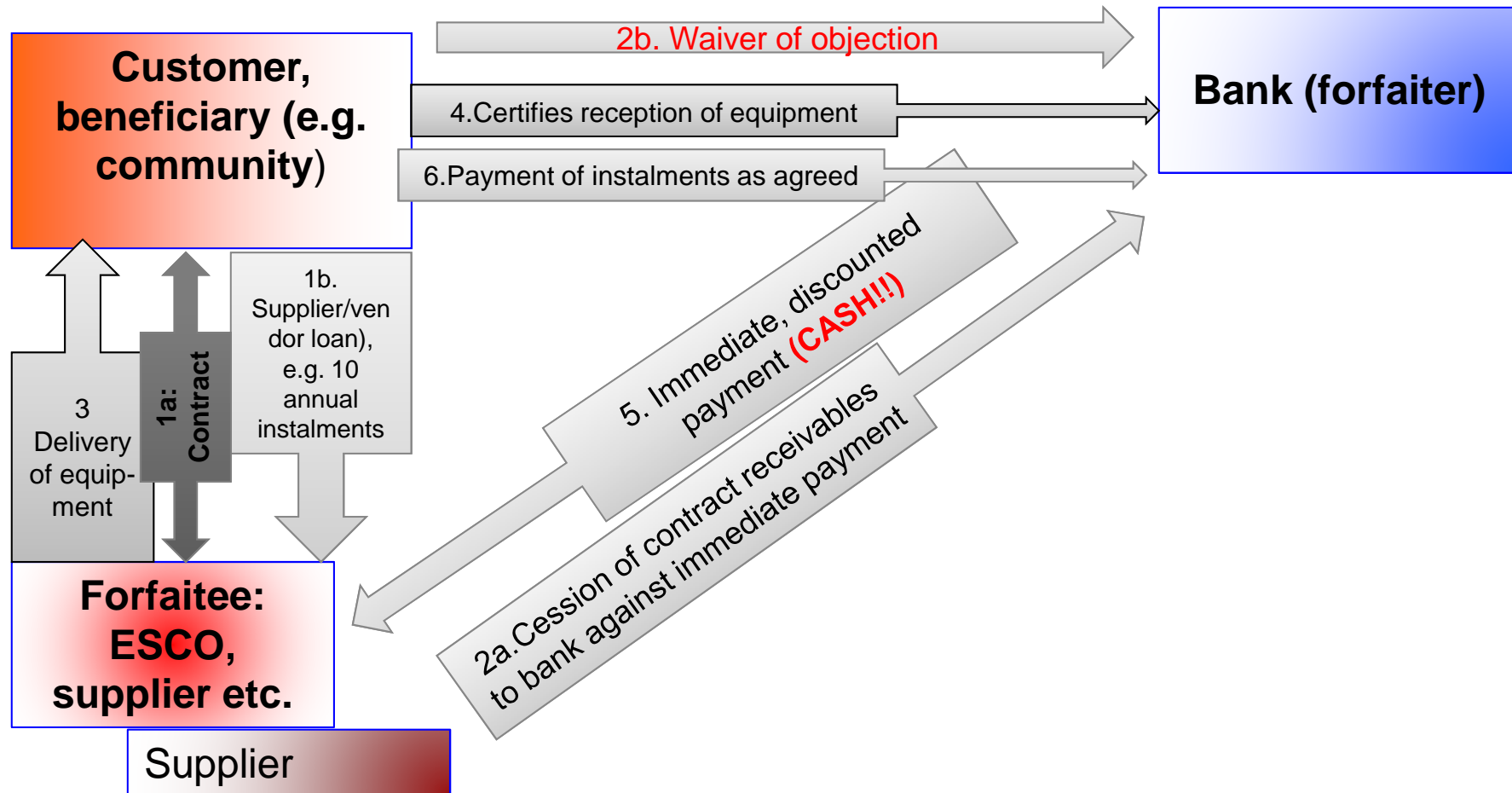
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FORFAITING:

- **Financing a forfait means:**
 - Selling a receivable for a discounted lump sum to a bank (forfaiter), normally on the basis of bills of exchange
 - Example: A sum of € 1 Million in 10 annual repayment instalments, discounted at a forfaiting fee of 4% annually yields an immediate payment of € 880.000 (minus around 0,25% provision fee etc.)
 - Passing on all accountability from the financial obligation, meaning: There is no more financial obligation from the side of the seller of the receivable (e.g. ESCO) in case of breach of contract, non fulfilment etc.
 - This “abstractness of the forfaiting document” will be further emphasised by a “waiver of objection”, which means the customer waives his right to object legally against his repayment obligation because of any dispute (like non fulfilment of conditions, late delivery, warranties etc.)

FORFAITING:



Forfeiting pros and cons:

- Immediate cash for the contractor (ESCO etc.)
- For the contractor: **The debt is not booked on his balance sheet**, so the potential for further debts remains unlimited (in principle)
- Forfeiting needs **immaculate creditworthiness** of the debtor and/or the project (otherwise it becomes expensive or impossible)
- The debtor is always the institution which receives the investment (never the ESCO or the supplier)
- The **waiver of objection** poses the problem that the investor cannot stop the payments any more if contractual obligations are not reached
- This can, however, be avoided if the **operational part is separated from the investment part** (Operation cost normally need no financing anyway)

Public Supports: from EU, Government, Regional Government, City etc.

Public supports can help:

- To shorten the long repayment periods and to make a project financeable by market based instruments
 - To create trust for a refurbishment project in order to find financing sources, especially in countries where the type of project is still unknown
 - To improve the cash flow and the net-present value of a project in order to find project sponsors (equity as well as loan financing)
 - To compensate for external, but intangible benefits (like CO₂ reduction)
 - To reduce technical risks for the forerunners and to ease market introduction for new technologies and approaches
- **But for Buildings outside the public sector: they will always require additional market based financing (Ideal: combination of both)**



Budgetary effects and external effects

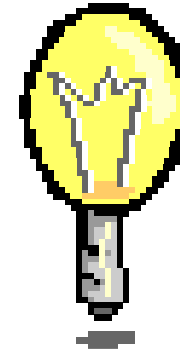
Public supports create investments and they can contribute to achieve external effects like GHG savings, health improvements etc.

- Theoretically a 20% subsidy for an investment project can generate VAT incomes for the government. With a 20% VAT it could be up to budget neutral (if the subsidy creates 100% incremental investments)
- In addition there are multiplier effects
- The Swiss Prognos AG, for example, estimates –in the basic scenario- the following values: (Bn Euro) Subsidy fund 25 → investments → 428 → tax revenue 39 → total value added → 80 energy cost savings 92 and CO2 reduction 15,6 Million ton p.a.
- **The evaluation of external effects like GHG savings, depends on the value attached to a ton of CO2 savings (the report assumes 70 €, but estimates range between 5 € on the market up to 95 € per ton saved)**



Part 4

Discussion and questions



Thank you

for further information see:

**Financing of Sustainable
Housing Retrofit
Guidelines for Financial
Institution**

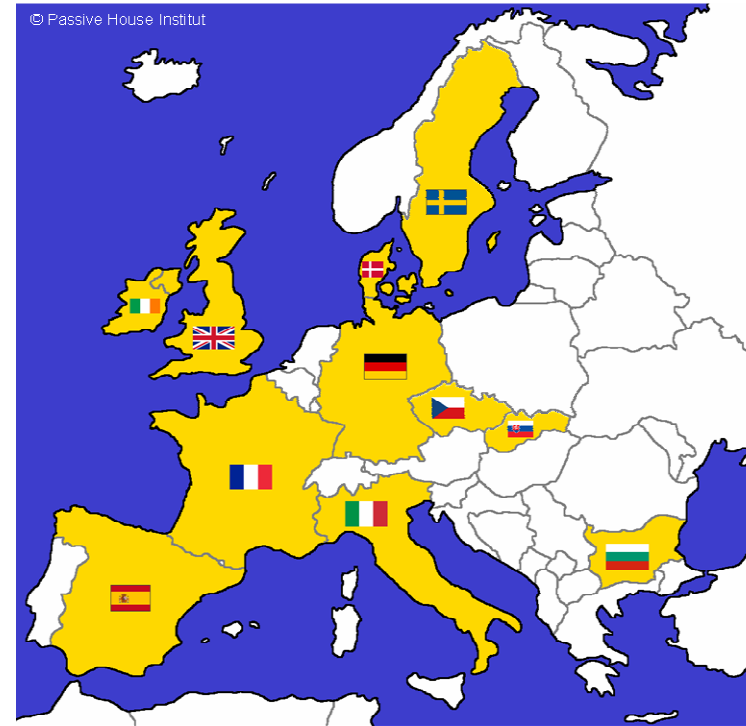
<http://europhit.eu/downloads>
(go to financial guidelines)



**Thank you
for your attention**

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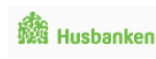
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