

Benchmarking of Regulations on Energy Efficiency of Buildings

“Incentives & Punishments”

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Listing of Different Incentives across European Countries:

A whole range of incentives exists in the EPBD sector. These national or regional schemes are deployed to urge building owners and occupants to undertake refurbishment or renovation works in order to improve the energy efficiency of the national building pool. Such incentives exist mainly for residential Buildings but non-residential buildings are nowadays a centre of growing interest for governments since public buildings and companies plants are usually quite old and therefore not energy efficient.

You will find here a non exhaustive list of the different most applied incentives and their explanations. The list contains incentives deployed towards owners and occupants and incentives deployed towards companies. The targeted public will therefore be precised:

- **Direct Funding of Energy Repairs & Governmental Action Plans**

Government or local instances directly intervene in the cost of the building repair project by taking in charge a percentage of the project's cost. This incentive can be dedicated to private households as well as housing companies.

- **Direct Subsidies on Sustainable Energy Devices**

Government or local instances grant premiums or subsidies to equip existing houses with sustainable or more efficient energy devices (solar collectors, microCHP, heat pumps).

Note that these subsidies are not necessarily based on the same criteria and do not cover all the available technologies in all the countries. In some countries, the level of subsidies is defined on the overall energy performance of the installation while older version of subsidies schemes are simply based on the materials and systems utilized.

- **Financial Help for Low-Income Households**

National agencies or local instances also foster disadvantaged households in order to help them to obtain and maintain acceptable homes and to tackle fuel poverty.

- **Personal Tax Deduction related to Domestic Employment of Service Provider**

The State grants a fiscal incentive through tax reductions consisting in a percentage of the expenditures related to the acquisition of labour/services at home. This measure is dedicated to private households.

- **Lower VAT on Labour Costs and/or Materials**

Government adopt lower VAT rates on materials and services in the (sustainable) energy sector (insulation, heating system and solar thermal system). This measure can be applied for both households and companies that undertake the renovation or installation project.

- **Green Loans / Soft Loans**

Banks and/or national organisms grant loans with advantageous interest rates or even 0 interest rate to finance sustainable energy or energy repairs projects.

- **Rent Indexation Measures against Split Incentives**

In a owner-renter relationship, the incentives are creating an unbalanced situation. The owner that retrofits and increases the energy efficiency of his estate does often not benefit from the situation while the renter benefits of a lower energy bill. Therefore, in some countries or regions, the maximum rent an owner is allowed to ask for a house will be bind to the energy label.

- **“Feed-in” Laws**

In some countries, the electricity providing companies buy the energy surplus that comes from renewable sources. Households or industries that “over-produce” renewable energy can inject this surplus in the national grid with an advantageous price unit per kWh feeded in, the amount is thus calculated strictly on the surplus of kWh produced.

A second breed of “feed-in” scheme exists and is called “green certificates”. The value of such certificate is based on the environmental value of the renewable energy produced. The certificate can therefore be traded separately from the energy produced. Typically, one certificate represents a generation (and not production surplus) of 1 MWh of “green” energy. Note that in certain countries, both types of tariffs are applied.

- **Third Party Financing & “Intracting”**

Third Party financiers for energy projects are referred to as “Energy Service Companies,” or **ESCOs**. **ESCOs** are businesses that design, build, install, finance, and maintain projects designed to provide energy through energy generation and/ or reduced demands.

Intracting involves a city or community that reserves special funds for the energy improvement of buildings. This fund is spent as a investment and paid back by the energy savings. This return on investment is then again injected in the next energy efficient renovation

- **Government Subsidies to Industries and “Branch Agreements”**

Some governments encourage energy audits in the industries. By doing so, they attempt to accelerate the process of European CO2 emissions thresholds compliance at the national level. Such agreements variate from the simple subsidization of a part of the audit fees to an explicit agreement between a whole industry branch and the governmental authorities. Such branch agreements encompass clearly defined objectives to be reached on a given time period, a declaration of intent from the industry representatives. In return, the state subsidizes the audits and can also help to implement efficient analytical accountancy systems of fluids and energy (e.g: Energy Potential Scan in Netherlands)

- **Government Subsidies for Technical Development and Innovation**

Some governments foster innovation and new technologies and/or techniques development through active financing of the project research. Usually this help is provided through a national entity, e.g. national energy agencies.

Incentives and Punishment schemes of Member States:

The following part is dedicated to the benchmarking of MS's national EPBD policies, either in terms of incentives and punishments in case of non-compliance. The question of the compliance control will therefore also be tackled.

Information has been gathered at different rates depending on the country and the relative easy access to the information. Indeed, the EPBD regulations and incentive schemes are quite volatile at national level and they are far from being standardized since they are most of the time applied at a regional level and therefore highly customized. Having up to date data can be a tall order depending the country you investigate.

BELGIUM

Incentives:

Households and private persons

- **Subsidies (regional):**

- Low Income Subsidies:

- The Walloon region of Belgium grants subsidies to low income households in order to increase the energy efficiency of their habitation and ,by so doing, rationalize the energy use of the household. A wide array of actions dedicated to better energy efficiency are covered (new window frameworks, isolation, new boiler,...) by these subsidies according to the Walloon Government's ordinance of the 23 December 1998.

The criteria for the granting are based on the income of the household and are as following:

- 1.161.26€/month for households
 - 870.95€/month for isolated people
 - 580,63€/month for cohabitants

The amount of the subsidy goes up to 1365€per household and can be re-conducted after a period of 5 years.

- Low energy or passive construction and renovation:

- The Brussels region recently launched a subsidy scheme for new “low energy” and “passive” buildings as well as for renovations to fill in the low energy or passive criteria.

These subsidies are based on the floor surface (S) of the building, envelope excluded. The floor limit is settled to 150m² but if the building has a wider floor surface, the additional m² are still covered with a smaller amount for passive buildings.

Moreover, the region settled extra funds for “exemplar projects” that are cumulative with the previous ones. This “exemplar project” subsidy is based on the total surface of the building (envelope included).

	Criteria	New construction	Renovation
“Low Energy”	(<60 kWh/ m ² .an)	/	100€m²
“Very low Energy”	(<30 kWh / m ² .an)	/	125€m²
“Passive”	(<15 kWh / m ² .an)	100€m² (max 150m ²) + 50€m² (for S >150m ²)	150€m² (max 150m ²) + 75€m² (for S>150m ²)
“Exemplar projects”	jury	100€m²	100€m²

➤ **Fiscal Deductions (federal):**

The Belgian Ministry of Finance provides tax deductions on expenses related to energy efficiency measures. The deduction rate reaches 40% of the *effectively carried out works*, VAT included. The covered item are the following:

- Boiler replacement ;
- Boiler maintenance ;
- Solar Thermal Heating System installations ;
- Solar PV panels installation ;
- Geothermal System Installation ;
- Double-glazing ;
- Roof, walls and ceiling isolation ;
- Thermostatic valves installation or other equivalent system ;
- Energy Auditing

The maximum threshold of the premium is 2770€ Nevertheless, the ministry recently raised the threshold to 3600€ for works carried out on solar thermal heating systems and on solar PV panels installations.

It is to be noted that this tax deduction premium is cumulative with other incentives granted by regional organisms. Moreover, if the threshold for tax deduction is reached, the surplus of deduction can be postponed to the next fiscal year.

• **Green Loans (federal):**

The green loan granted by the ministry of finance is defined as a loan that is uniquely devoted to a range of expenses dedicated to energy savings. The covered items are the same as covered in the fiscal deduction schedule here above.

This green loan schedule provides 2 advantages granted by the Belgian State:

- An interest deduction of 1.5%
- A Tax reduction of 40% on the interests paid by the loaner.

Note that the current green loan schedule is a temporary measure included in the Economic Reflation plan law of the 27 March 2009. The schedule will end on the 31 December 2011.

Companies

- **Subsidy on patenting (regional):**

The region grants a financial help to companies that contribute to a better management of the energy consumption through the development of energy saving dedicated devices and products. The financial help covers the patenting procedure fees, technical tests and other administrative costs at a 50% rate .

- **Fiscal Deductions (federal):**

As for individuals, the Walloon government grants a deduction on tax based on the investment the company has made in order to save energy and improve efficiency. The deduction rate is 13.5%

- **Feed-in Tariff (regional):**

The Walloon Parliament adopted a measure in May 2007 stipulating the “principle of compensation”. This principle is applicable for powers equal or inferior to 10 kVA (10 KW).

Concretely, a private person or moral person can feed the national grid in with his “self-produced” green (solar, wind, cogen.) electricity. As direct effect, the house's electricity-meter start down- counting, it requires therefore specific electricity meters to be installed. By doing so, the green producer avoids consuming electricity from the grid and lightens his electricity bill.

However, a “surplus” of production (negative consumption) would not be paid back to the producer. In other words, the feed-in tariff is equal to the market electricity tariff but the limit is settled to the total consumption of the house and any surplus of production would not be eligible for refund.

N.B: the regional data are from the Walloon and Brussels region. The 3 Belgian regions have barely the same incentives but the rates and amounts may vary slightly. It has to be noted that the Flemish region recently adopted a global approach on subsidies that are no more technology oriented (heat pump, PV panels, isolation,...) but are based on the overall energy performance of the building without regarding the particular systems embedded.

Compliance control & Punishment:

The “EPB declaration” is a key document, common to all 3 Belgian Regions, that ensures the compliance of the building to the EP and indoor climate norms. This EPB-declaration must be fulfilled by an official expert recognized as such by the region and designated prior to the works kick-off.

The role of this expert is to control if yes or no the EP requirements are met. In case of non-compliance, an administrative fine is imposed. This fine varies in function of the requirement which is infringed and is proportional to the degree of infringement.

For instance, the fine for not respecting the maximum U-values is 60 euro per W/K. Example: if the Uvalue of a 90 m² roof is 0.55 W/m²/K, whereas the maximum allowed value is 0.3 W/m²/K, then the fine is $90 \times (0.55 - 0.30) \times 60 = 1350$ euro.

Similar fines exist for the energy performance (0.24 euro/MJ), overheating (0.48 euro per 1000 KWh and m³) and ventilation system sizing (4 euro per m³/h). These values are typically about 24 times the annual energy savings (at the fuel cost of 0.01 euro/MJ of 5-10 years ago).

This corresponds to a factor of 8 for a reasonable payback period, and an extra penalization factor of 3.

Experience and Impact:

➤ **Passive House in Brussels:**

Recently, a new passive house has been built in Brussels. The house has 150m² of floor (without envelope) and is 170m² envelope included.

The budget for construction (field price excluded) reached 300 000€ VAT and architect fees excluded. The total amount, tax and architect included, was about 400 000€

On this initial investment, the proprietor received a final refund of more than 56 000€ thanks to the different regional and federal incentives. Besides, the heating energy bill has been reduced by a factor of 10 to reach the 2200 kWh per year.

All in all, the payback period of the over-cost for such energy efficient construction is less than 5 years. This payback period has been the main concern for the regional authorities and remains a major incentive for people to invest in energy efficient constructions.

➤ **Impact on Building and Energy sectors:**

Belgium is one of the European countries where total energy consumption per inhabitant is the highest. In what concerns heating, the energy consumption is very high relatively to the neighbour countries while the isolation of dwellings is among the worst in Europe. This residential energy consumption currently represents a quarter of the total energy consumption in Belgium but the energy efficiency in the sector has improved for only 5% on a yearly basis. This is less than in the other sectors of consumption and less than the European neighbours.

Moreover, Belgium has a real estate pool that is old and quite badly isolated. About 15% of buildings use a boiler which is more than 20 years old and hardly 2/3 of dwellings have double-glazed windows.

The frequency of new constructions following low, very-low and passive energy standards is slightly increasing in Belgium since 2008 but remains anecdotal in a certain measure.

On the one hand, people are more and more exposed to the issues of energy savings and their impact on the environment and regional and federal authorities created new incentives to improve the general energy efficiency of the Belgian real estate pool.

On the other hand, while energy savings are a powerful incentive for people, it still difficult for a lot of households to dare investing in such plan because of the higher initial cost of energy efficient and passive constructions. Indeed, the subsidies are provided after investment and the delay of the obtaining of such subsidies is rather long, what implies an additional uncertainty.

The following tables show a rough distribution of passive houses across the different regions of Belgium for the year 2009.

Regions	Number of Passive houses on territory	# of households	% of households in passive building
Wallonia	12	1 485 090	0.0008%
Brussels	2	507 455	0,0004%
Flanders	31	2 576 974	0.0012%
Belgium	45	4 569 519	0.001%

FRANCE

Incentives:

➤ Subsidies

The Anah agency (*Agence Nationale de l'Habitation*) grants subventions in order to improve the comfort of private houses and to prevent energy poverty. These financial helps concerns “*principal*” housings that are more than 15 year old and are only dedicated to *modest proprietors* that are actually *occupying* it.

Also, it can be applied for *private fund backers* that engage themselves to respect a defined rent threshold and that strictly dedicate their dwellings to modest income households and individuals (social housing).

Finally, degraded co-proprieties are also eligible for the Anah's funds.

Minimum performance criteria of works and refurbishment are settled and correspond to the existing reglementation dedicated to *existing* buildings. The covered items are:

- Heating System upgrade
- Boiler replacement
- Wood (pellet) Heating System
- Solar Thermal Heating System
- Heat Pump
- Insulation works

The “eco-premium” granted by Anah amounts:

- 1000€for a modest occupant proprietor ;
- 2000€for a rented dwelling.

➤ Tax deduction

The French Ministry of Finance grants fiscal deductions on the income tax of households. These deduction are function of the realized expenses related to the improvement of the Energy Performance of the principal residence building. It applies for both owned and rented principal residence.

The eligibility criteria are as following:

- Fiscally domiciled in France;
- Occupied principal residence or rented principal residence (for more than 5 years);
- Individual house or apartment.
- The technical characteristics of used materials (R- and U-values, boiler output,...)

Mandatory conditions are:

- Works has to be conducted by the same company that provides materials (no intermediaries);
- The invoice of works has to clearly mention the “Material supplied, VAT included” as well as the technical characteristics of those materials.

The thresholds of eligible expenses are:

- 8000€for an isolated individual;
- 16000€for a couple + 400€per additional person in charge;
- 8000€per dwelling for funds baker with maximum 3 dwellings a year.

It is to be noted that the tax deduction is calculated on the basis of eligible expenses *minus* the already obtained subventions.

The following table shows the requirements on material used for the different eligible works

Thermic Isolation of Opaque Walls	Ground Floor – Envelope walls	$R \geq 2.8 \text{ m}^2 \text{ K/W}$
	Ceiling - Terrasses	$R \geq 3.0 \text{ m}^2 \text{ K/W}$
	Attics – Crawling roofs	$R \geq 5.0 \text{ m}^2 \text{ K/W}$
Thermic Isolation of Glazed walls	Windows or Patio Doors with PVC	$U_w \leq 1.4 \text{ W/m}^2 \cdot \text{K}$
	Wooden Windows or Patio Doors	$U_w \leq 1.6 \text{ W/m}^2 \cdot \text{K}$
	Metal Windows or Patio Doors	$U_w \leq 1.8 \text{ W/m}^2 \cdot \text{K}$
	Reinforced Isolation Glazing (low emissivity)	$U_g \leq 1.5 \text{ W/m}^2 \cdot \text{K}$
	Double Windows with reinforced glazing	$U_g \leq 2.0 \text{ W/m}^2 \cdot \text{K}$
	Isolating Window Shutters (minimal additional thermal resistance)	$\Delta R \geq 0.20 \text{ m}^2 \text{ K/W}$
Insulation	Partial or complete insulation of the heat/sanitary hot water production and distribution	$R \geq 1 \text{ m}^2 \text{ K/W}$
Heating & Hot Water	Gaz or Fuel Boiler	Condensation Boiler
	Solar Thermal panels	CSTBat certification Solar Keymark or equivalent
	Biomass or Wood (Water) Heating (Stove, Fireplace, Pellets...)	CO concentration $\leq 0.6\%$ Performance $\geq 70\%$ (manual) Performance $\geq 75\%$ (auto.)
	Geothermal Heat-pump with refrigerant fluid (ground/ground or ground/water)	CoP ≥ 3.3 Evaporation Temp: -5°C Condensation Temp: 35°C
	Geothermal Heat-pump with ethylene/glycol	CoP ≥ 3.3 Evaporator i/o T: $0^\circ\text{C} / -3^\circ\text{C}$ Condensator i/o T: $30^\circ\text{C} / 35^\circ\text{C}$
	Geothermal Heat-pump water/water	CoP ≥ 3.3 Evaporator i/o T: $10^\circ\text{C} / 7^\circ\text{C}$ Condensator i/o T: $30^\circ\text{C} / 35^\circ\text{C}$
	Heat-pump air/water	CoP ≥ 3.3 Evaporator air input T : 7°C Condensator i/o T: $30^\circ\text{C} / 35^\circ\text{C}$
Heating System Automatization	Individual or Collective Building	Centralized heating Regulation Thermostatic taps Electrical power management
	Collective Buildings	Balancing of heating installations for correct

		repartition of delivered heat Cascade Boilers Remote-controlled Boilers
Electricity Production	Solar, Wind, Biomass, Hydro	/

➤ 0% Green loan

This loan is dedicated to energy-renovation of buildings. After having identified the necessary works, the candidate has to produce estimates of for the different tasks and to fulfill a form available on the ADEME website. Then, he has to contact his bank and provide them with the paper work. Finally, at the end of the works, he has to provide the invoice documents to his bank in which he contracted the green loan.

The green loan takes two different forms following the kind of works that are conducted. The candidate can plan a bundle of works like insulation of envelope and/or windows, new heating system, etc. Or, he can opt for the improvement of global energy performance option. The criteria then vary in function of the option that is selected.

The eligibility criteria are as following:

- Proprietor, occupant, baker or civil society
- Principal residence, individual house or apartment built *prior* the 1st of January 1990

Mandatory conditions are:

- Materials and equipments must comply to minimal requirements;
- Materials and equipments must be supplied and installed by professionals;
- The works must be completed in the next two years following the contracting of the green loan.

The different loan amounts are the following:

- 20 000€ for a bundle of 2 different works;
- 30 000€ for a bundle of ≥ 3 different works
- 30 000€ for the “global energy performance” option

The payback period is limited to 10 years. Nevertheless, it can be reduced to 3 years on demand and extended to 15 years if the bank agrees.

The green loan is cumulative with the tax deduction if the demand of green loan has been emitted before the 31st of December 2010 and if the fiscal income of the households do not exceed 45 000€ for the ante-penultimate year preceding the demand.

The following table shows the material and equipments requirements for obtaining a 0% green loan with the “bundle of works” option.

Categories of eligible works		Characteristics and Performance
Roofing isolation	Attics	$R \geq 5 \text{ m}^2 \text{ K/W}$
	Crawling Roof	$R \geq 4 \text{ m}^2 \text{ K/W}$
	Roofing – Terraces	$R \geq 3 \text{ m}^2 \text{ K/W}$
Envelope Walls	In- or Outside Isolation	$R \geq 2.8 \text{ m}^2 \text{ K/W}$
Replacement of Windows and Patio Doors	Windows or Patio Doors	$U_w \leq 1,8 \text{ W/m}^2 \cdot \text{K}$
	Windows or Patio Doors with shutters	$U_{jn} \leq 1,8 \text{ W/m}^2 \cdot \text{K}$
	Second Windows placed in front of an existing one	$U_w \text{ ou } U_{jn} \leq 2,0 \text{ W/m}^2 \cdot \text{K}$
	External Door (if done with windows)	$U_w \leq 1,8 \text{ W/m}^2 \cdot \text{K}$
	Sas with 2 Doors (if done with windows)	$U_w \text{ or } U_{jn} \leq 2,0 \text{ W/m}^2$
Heating System installation/Replacement or Sanitary Hot Water production system	Boiler + management system	Condensation Boiler
	Heat Pump + management system	$\text{CoP} \geq 3,3$
	Heat Pump + SHW + management system	$\text{CoP} \geq 3,3$
Renewable Heating System	Wood boiler + management system	3 rd class at least
	Stove, closed fireplace.	Performance $\geq 70\%$
Renewable Sanitary Water Heating System	Solar sensors	CSTBat certification Solar Keymark or equivalent

The following table shows the energy performance requirements for obtaining a 0% green loan with the “global energy performance” option.

Energy consumption of the building (before refurbishment)	Required results
≥ 180 kWh/m ² per year	Max. 150 kWh/m ² per year
≤ 180 kWh/m ² per year	Max. 80kWh/m ² per year

➤ **Reduced VAT**

The normal VAT rate is 19.6% in France for what is construction works and materials. Some renovation works give access to a reduced VAT rate of 5.5%. The concerned works are exclusively works that refurbish at least 2/3 of the finishes elements or more than half of the structural works

The eligible individuals are:

- Occupying Proprietors
- Bakers
- Proprietors Unions
- “Free of charge” Renters and Occupants
- Real Estate Company

The eligible Buildings are:

- Buildings finished at least two years ago
- Principal or Secondary residence
- Individual Houses (stand alone) or Apartments

➤ **Tax Deduction on EPD (Energy Performance Diagnostic)**

When realizing an EPD, a tax deduction of 50% of the expenses (All Tax Included) can be deducted for the period from the 1st of January to the 31st of December. Such EPD tax deduction can be applied only once per periods of 5 years. The eligible buildings are houses or apartments bought more than 2 years ago.

Compliance control & Punishment:

When building a new edifice, every owner has to sign a commitment to comply with regulations with the building permit. By doing so, he becomes legally responsible for the compliance with national EP regulation. National authorities have then the legal power to proceed with control. When controlled, the owner must be able to prove that the building actually complies to regulation by delivering calculation notes and other written proofs from qualified professionals.

When renovating existing buildings, the building owner is also responsible of the compliance if the renovation works require a building permit. Nevertheless, even in case of lighter EP renovation, the owner has to select materials and systems that comply with the minimum requirements and, moreover, financial incentives are only granted when materials or systems are filling the norms. Note that if the owner is not himself a building professional, craftsmen and architects have the duty to provide advices.

The control mechanism is ensured by state employees from the CETE (Center of Technical and Equipment Studies). The delegated CETE employee has as duty to record any infringement of the housing and building code. They are allowed to visit any building within the three years after the construction site is finished. The control campaigns are thus planned on an annual basis and the focused sites are chosen thanks to representative criteria.

The control checks the following points:

- Analysis of plans, specifications, calculations
- On site checking
- Visit at commissioning

The main objective of such control is to check if calculations hypothesis were unbiased and if used product are filling the requirements. If a discrepancy between planned and realized plans is detected, the calculations have to be updated and the compliance with expected performance has to be again justified by technical papers.

An official national method to perform EP regulation controls has been released in 2008. It still operational but controllers encounter some difficulties to fully evaluate the performance and especially the efficacy of used materials. Effectively proving the impact of mishandled

materials (insulation mostly) on the performance and chiefly the link between mishandling and non-compliance is not a simple task as law requires robust evidences. A certain expertise is therefore required.

In case of non-compliance with construction regulation, the owner's responsibility is engaged and he incurs a financial penalty up to 45000€ Nevertheless, the attorney general use to first compel the owner to undertake corrective measures and justify the rectifications for a given due-date. Then, if the undertaken actions are non-satisfactory, the attorney general launches the legal procedure. A new due-date and a contractor are designated to proceed with remedial actions on the owner's debt. Finally, if the delay is over-passed or if it is objectively too late for corrective measures, the financial sanction is set. The ultimate measure of the attorney general is the destruction of the building or part of the building that is not fulfilling the requirements. Of course, this last measure is an extreme case that is most of the time unnecessary.

Experience and Impact:

The impact of the adopted measures on the value of properties is designated as low. Following experts, the renting value of the property is more influenced by the real estate crisis and the decline of a creditworthy demand for housing. The long term perspectives in unoccupied areas are not favourable for low energy buildings. Generally speaking, the French property owners are very sceptical towards the EPBD Recast and its impact on the real estate market is expected to be rather negative.

Identified problems are the education of end-user concerning the EPBD norms while the cost/quality ratio of certifications is also questioned by experts. The training of certifications experts is not clearly managed and the cost of the certificate is not prohibitive neither cheap. A new calibration of these two aspects is therefore expected in the near future.

GERMANY

Incentives:

➤ Green loans

„Energieeffizient Bauen“ (Energy-Efficient Construction) program is conducted by the German national bank *KfW*. This loan consists in a long-term reduced interest loan dedicated to new constructions.

The eligible individuals are:

- Anyone investing in the construction of a new residential building.

The eligible investments are:

- The construction, production and first acquisition of *KfW Efficiency Houses*; the required energy standard must be confirmed by an energy expert.
 - *KfW Efficiency House 55*:
 - ❖ The annual primary energy consumption Q_p and the specific transmission heat loss $H_{T'}$ must not be more than 55% of the values admissible for a new building in accordance with the *EnEV₂₀₀₇* and the annual primary energy consumption must not be more than 40 kWh per m² of building floor area (A_N);
 - ❖ Passive houses are financed under this variant if the annual primary energy consumption is not more than 40 kWh per m² of building floor area and the annual heating requirement Q_h is not more than 15 kWh per m² of living space.
 - *KfW Efficiency House 70* :
 - ❖ The annual primary energy consumption Q_p and the specific transmission heat loss $H_{T'}$ must not be more than 70% of the values admissible for a new building in accordance with the *EnEV₂₀₀₇*¹ and the annual primary energy consumption must not be more than 60 kWh per m² of building floor area (A_N).

¹ *EnEV* stands for *Energieeinsparverordnung* (Energy Conservation Ordinance)

The amount of the loan evolves as following:

- Long-term, reduced-interest loan with a maturity of up to 30 years including up to 5 repayment-free start-up years
- Fixed interest period of up to 10 years
- Up to 100% of the building costs but not more than EUR 50,000 per housing unit
- Repayment scheme consists in quarterly annuities

„Modernisieren mit Köpfchen“ (Housing Modernisation) program is another green loan scheme dedicated to building renovation and refurbishing.

The eligible individuals are:

- Anyone investing in the modernisation and rehabilitation or refurbishment of residential buildings (no nursing or other types of homes or hostels, holiday homes or weekend cottages)

The eligible investments are:

- Modernisation and rehabilitation of residential buildings („Standard“ scheme)
 - Improvement of the utility value in general housing conditions (e.g. home floorplan, sanitary installations, balconies/loggias, lifts)
 - Repair or replacement of defective building components (e.g. windows, floors)
 - Construction measures after partial deconstruction
 - Renewal of central heating installations or their components
 - External areas of multi-family buildings (e.g. greens, external facilities, playgrounds)

Note that the measures must comply with the minimum technical requirements.

The amount of the loan evolves as following:

- In the form of a long-term, reduced-interest loan with a maturity of up to 30 years including up to 5 repayment-free start-up years
- Fixed interest period of up to 10 years

- Up to 100% of the financeable costs, Standard - maximum of EUR 100,000 per housing unit.
- Senior housing conversion - maximum of EUR 50,000 per housing unit
- Repayment scheme consists in quarterly annuities
- Commitment fees are charged at 0.25% per month

➤ Subsidies

The German national bank *KfW* provides also grants for Energy-Efficient Rehabilitation. These grants replace the former „CO₂ Building Rehabilitation Programme“.

The eligible individuals are:

- Anyone investing in the rehabilitation and refurbishment of residential buildings

The eligible investments are:

- Rehabilitation or refurbishment measures aimed at reducing energy consumption
A repayment grant is given if the KfW Efficiency House standard is achieved
- The acquisition of newly rehabilitated or refurbished residential buildings
 - KfW Efficiency House 100 (EnEV₂₀₀₇):
 - ❖ The annual primary energy consumption Q_p and the specific transmission heat loss H_T' must not be more than 100% of the values admissible for a new building in accordance with the EnEV2007.
 - KfW Efficiency House 70 (EnEV₂₀₀₇):
 - ❖ The annual primary energy consumption Q_p and the specific transmission heat loss H_T' must not be more than 70% of the values admissible for a new building in accordance with the EnEV₂₀₀₇ ;
 - Individual measures or free combination of measures in compliance with the minimum technical requirements defined in the Annex to the Information Sheet.

The amount of the grant evolves as following:

- Individual measures: 5% grant to the investment cost - max. EUR 2,500
- KfW Efficiency House 100 - 10% grant to the investment cost – max. EUR 7,500
- KfW Efficiency House 70 - 17.5% grant to the investment cost – max. EUR 13,125

➤ **Tax deduction & Lower VAT**

The German government stopped the tax deduction scheme in 2009 and never applied Lower VAT on renewable energy equipment and labour. Germany with Denmark, Estonia and Lithuania refuse to discuss the application of such scheme at the European level because they think VAT cuts and green taxation on goods and services may considerably shrink tax revenues and put more administrative burdens on business and governments.

Compliance control & Punishment:

Compliance with both EP certification and EP requirements for new buildings and buildings undergoing major renovations is in the hands of the federal states. There is no authority that checks the EP certificates for existing public buildings or buildings that are sold or let. Here the responsibility is with the building owner as defined in the German energy decree.

The compliance check by the public authority is organized differently in each state. It varies from the simple check of completeness of all documents and plausibility to random expert checks at the construction site. The previously unreleased CO2 building report 2009 by the German Ministry for Transport, Building and Urban Affairs states that 70 % of the German citizens support the compliance check of the requirements for energy efficient renovations. A special type of compliance check was developed for the updated energy decree of 2009: the contractor's declaration. All contractors having made changes at existing buildings that fall into "major renovations", or having added insulations to attic ceilings or having replaced heating boilers have to sign a document declaring that these changes fulfill the requirements defined in the energy decree. The building owner has to keep the declaration for at least 5 years and to show it to the authorities if requested.

For what concerns infringements, the German energy decree defines in § 27 the following regulatory offenses:

- Missing inspections or inspections carried out by unauthorised personnel;
- Installation of boilers without CE label;
- Lacking insulation of heating pipes;
- Inappropriate control system for heating system;
- Incomplete, incorrect or delayed energy performance certificate;
- Issuing of EP certificates by unauthorized personnel;
- Incorrect or lacking confirmation by construction companies regarding the compliance with EP requirements for major renovations and renewed building components or systems.

The corresponding penalties are defined in the Energy Saving Act of 2009 (Energieeinsparungsgesetz – EnEG)]. Here, penalties between € 5,000 and € 50,000 are defined for:

- Regulatory offences against the thermal protection and energy efficiency of building systems requirements (EP requirements) and regulatory offences against the inspection of building systems and the installation of heating control systems: 50,000 €
- Regulatory offences against the issuing of EP certificates (missing, delayed, incorrect or issued by unauthorised personnel): 15,000 €
- Regulatory offences against the compliance check procedure or incorrect or missing confirmation of private construction companies concerning the compliance of EP requirements for major renovations or renewal of components or systems: 5,000 €

There are also regulatory offences against the Renewable Energies Heat Act as defined in § 17 of the act. Here the offences are divided into:

- Not covering or not correctly covering the generated energy by renewable energy (as required): max. 50,000€;
- Not providing (not correctly or in time providing) the proof for covering the generated energy by renewable energy: max. 50,000€
- Presenting an incorrect ratio of the covered generated energy by renewable energy: max. 50,000€;
- Not keeping the proof for at least 5 years: max. 20,000€

Experience and Impact:

Germany has been a pioneer of renewable energy incentives with the early feed-in law for wind electricity that has existed in Germany since 1991. Germany still today the front runner on developing RE, not only in Europe, but world-wide. Nevertheless, the government is a bit concerned with the different schemes that are offered.

Indeed, Fiscal advantages are weighing on the state's finances while German constructors of renewable technologies are facing an intense competition from Eastern countries and especially China. The German PV industry, for example, is bullied by low cost Chinese manufacture. Recently, the German government as well as French and Italian ones, decided to slash feed-in tariffs for PV power which is the final of Renewable Energy Market in Germany. Incentives are effective but need a strong commitment in terms of financing and the current period is not favourable for such financial devotion.

Besides, the impact of German measures on rental value is relatively low. This is best explained by the simple fact that tenants are not willing to pay higher rent, especially during this downturn period. It seems that traditional renting criteria, location and characteristics, still are the most significant arguments to rent a property. Energy standards are not yet familiar enough despite an increasing awareness of people on energy savings and renewable energies. Moreover, in areas with high rate of unoccupied rental flats, tenants take higher interest in low energy efficient dwellings with low rent than in high-energy efficient buildings with high rent.

Despite the different incentives that are provided, the surplus of starting investment needed to reach energy efficiency still prime on the future return on investment of the project. People are not yet eager to contract higher loans, even with advantageous interest rates.

SPAIN

Incentives:

➤ **Green loans**

Low-interest loans that cover up to 80% of the reference costs are available in Spain. These “green loans” are granted in the framework of the National Energy Efficiency plan 2008-2012 and aim at promoting energy efficient new buildings as well as existing building renovation. These loans concerns buildings with A or B class of energy. Spain has budgeted €209M for this scheme.

➤ **Subsidies**

The Spanish National Energy Efficiency plan 2008-2012 also provides direct subsidies to building owners. These subsidies are spread at the regional level in order to fine-tune the offer to the specific demand of regions. The scheme encompasses 3 main areas of interest that are subsidised:

- Renovation of Building envelope: public funds = 175.15 k€
- Energy Efficiency Improvements for HVAC systems: public funds = 243.315 k€
- Energy Efficiency Improvements for Lighting systems: public funds = 176.292 k€

Spain has also launched a new strategic plan to invest in company projects dedicated to better energy efficiencies and energy savings. The government plans to inject 610 M€ in this project.

Regional subsidies dedicated to specific renewable energy source technologies are also being implemented. Both solar thermal and PV energy, wind power, geothermal and biomass are covered. Nevertheless, the regional overheads have some freedom and some regions focus on specific technologies. Last years, the focus has been put on geothermal and biomass technologies since others were already quite well developed across the country.

➤ Tax deduction

The Spanish government applies tax deduction for investments in technologies. The tax deduction is technology oriented and specifically dedicated to middle- and large-scale projects and companies. Feed-in tariffs being more likely used to foster implementation of renewable energy sources in houses.

Compliance control & Punishment:

In Spain, EP requirements and Certification are also taken in account during the project phase. The delivery of the building permit is bound to the compliance of existing norms. But the effective control occurs later when the building is finished, as built.

The control duty and power are granted to each regional government. Most of the 17 regions are working in the development of the administrative procedures, for registry, control and inspection. The implementation of laws has been quite hectic for certain regions but now, each of them issued a decree.

In Spain, there are three different laws that could be applicable depending on what parts of the regulations have not been fulfilled. If the building does not comply with the requirements specified in the CTE, the applicable law would be the Law 38/1999 for the Ordination of the Building Sector (LOE), in this law the different actors participating in the construction process are liable for the defects that compromise the stability of the building during 10 years and for defect that compromise its habitability (insulation, installations...) during 3 years. This law obliges the people participating in the construction to take an insurance to cover the possible defects that could arise during the use of the building.

If the building installations do not comply with the requirements specified in the RITE the applicable law would be the Industry Law (Law 21/1992) which states different penalties going from economic fines to activity suspensions.

If the EPC has not been issued according to the building project or the final building the applicable law would be the General Law for the Defence of Consumers and Users (Law 26/1984). This could result in administrative penalties which would not substitute the possible civil or penal responsibilities which will be applicable. The expenditure and register of an EPC does not imply the fulfillment of the CTE and the RITE.

The regions can state a specific set of sanctions. Some of them have done so. Most of the technical staff at the responsible organisms has been trained for understanding the basics of the procedures. Unfortunately, there are not enough man-power for undertaking all the control.

Experience and Impact:

In Spain both PV and Wind energy are well spread across the country. The different incentives and especially the relatively high feed-in tariffs and premiums accelerated the development of these RES² in the different regions.

Concerning the introduction of renewable energy sources in the building sector, solar energy is mandatory for all Domestic Hot Water (DHW) installations, in all types of buildings with a DHW demand. This has been a huge impact in the sector, as the typical fraction to be covered by solar energy is 70%. Photovoltaic solar energy is also mandatory for almost all non residential buildings, with a minimum power which is depending on the building size; the minimum being 6.25 kWp.

But a shortcoming of the Spanish success is that the very attractive FIT and other incentives involuntarily contributed to the development of bad practices. The favourable conditions provided a score of projects. Administrative bodies were suddenly overwhelmed by the exponential growth of submitted projects and the back office did not follow the pace. The consequences were a consequent number of cases of administrative corruption as well as the asphyxia of non-PV projects because of the too numerous PV projects that have been submitted.

One other drawback of the Spanish system is the lack of harmonization between the different regions' policies, especially in terms of urbanism. Such discrepancies represent barriers to the quick obtaining of building permits.

² Renewable Energy Sources

ITALY

Punishments:

In Italy, two levels of penalties do exist. The first one at a national level based on the national norms and EPBD requirements. The second is at the regional level and often consists in an interpretation of national norms or in additional fees for infringements.

➤ **National level**

- Qualified designer, who releases a technical report or energy certificate not complying to the standard: *Fine = 30% of his parcel ;*
- Qualified designer, who releases a false technical report or energy certificate: *Fine = 30% of his parcel ;*
- Work director who does not subscribe the technical report assessing that it is describing the building as it was built: *Fine = 50% of his parcel ;*
- Work director who does a false declaration: *Fine= 5000 €;*
- Building manager who does not provide maintenance: *500 € ≤ Fine ≤ 3.000 € ;*
- The control or maintenance operator who does not release or give out a false check document: *1.000 € ≤ Fine ≤ 6.000 € ;*
- The builder or building company which does not provide the energy certificate as original: *5.000 € ≤ Fine ≤ 30.000 € ;*

➤ **Regional level (examples from Lombardia)**

- Certifier who produce a certificate not complying to the standard:
Fine from €500,00 to €2.000,00 ;
- If the certificate assesses an energy class higher than the real one:
Additional Fine of 10 €/m² of useful surface and the certificate has to be redone ;
- If the designer releases a false technical report: **Fine from €2.000,00 to €10.000,00**
Moreover, the fine is increased of 50% if through such T.R. the tenant got access to subsidies or others facilities otherwise not possible ;
- Work director who realizes the construction not as described in technical report :
Fine from €5.000,00 to €15.000,00 ;
- Owner, who accepts as the work director has done, if the real energy performance is lower of what described in the technical report : **Double the fine and has to adequate the building to the Community requirements ;**
- Who does not provide the energy certificate when selling the building / flat:
Fine from €5.000,00 to €20.000,00 ;
- Who rents a flat and does not provide a copy of the energy certificate :
Fine from €2.500,00 to €10.000,00 ;
- An Energy Service Company which does not provide the energy certificate after 6 month from the contact signature : **Fine form €500,00 to €2.000,00 ;**
- If a designer, the work director or the certifier has got a fine he will be denounced to his professional association:
The certifier cannot do any certificate for 6 month.

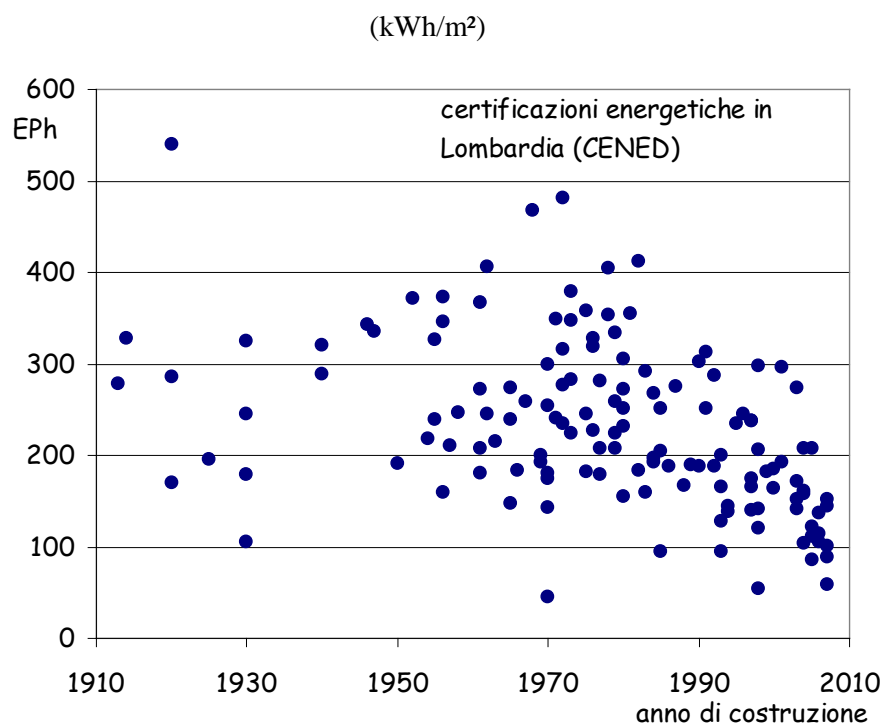
The second time he is getting a fine, he will be deleted from the register for 2 years, after which he has to follow an qualification course.

Italy counted in fall 2007 about 9800 qualified certifiers but only 7000 of them were officially registered in the national index. Between fall 2007 and fall 2009, 154 589 certificates have been issued for Lombardia and among them, 90 000 energy certificates have been controlled.

Impact and Experience:

The certification campaign and the established punishment framework produced a positive effect on the average consumption of Primary Energy for Heating (EPH). The following graph shows us this evolution:

Evolution of EPH in Lombardia (1950 – 2010)



SWEDEN

Incentives:

➤ **Subsidies**

The Swedish government has decided to abolish the subsidies on, for example, energy efficient windows ($U < 1.0$), wood pellets or heat pumps. They abolished it because of the success of the measure and its cost for the State treasury. Instead Sweden decided to apply a tax deduction scheme.

➤ **Tax Deduction**

The Swedish government recently applied a new tax deduction scheme, in replacement of the previous subsidy plan, to foster renovation of family houses and other energy improvements. The amount of the tax deduction goes up to maximum SEK 100 000 (about 10400 €) and is only applied on the amount of the work expenditures and is not linked to the technology used.

HUNGARY

Incentives:

➤ Subsidies

The Hungarian government deployed a subsidy scheme based on the energy efficiency level of the benefiter building. Depending on the category of design requirement (C to A+) that is reached, the subsidies can cover from 30% to 60% of the project cost.







Design Requirement Category (% traditional energy consumption)	% of investment refund
C (100% - 96%)	30%
B (96% - 76%)	40%
A (76% - 56%)	50%
A+ (<55%)	60%

➤ Green loans

Green loans are available only for A+ Buildings. The amount of the granted loan can reach 60% of the planned investment.

➤ Tax Deduction

The Swedish government recently applied a new tax deduction scheme, in replacement of the previous subsidy plan, to foster renovation of family houses and other energy improvements. The amount of the tax deduction goes up to maximum SEK 100 000 (about 10400 €) and is only applied on the amount of the work expenditures and is not linked to the technology used.

Summary Table of Incentives		DE	IT	FR	Hu	BE	SE	
								
		YEAR	2009	2009	2009	2009	2009	
FINANCIAL	Direct Funding of Energy Repairs		Yes	Yes	Yes	Yes	Yes	Stopped
	Financial Help for Low-Income Households		Yes	Yes	Yes	No	Yes	No
	Green Loans / Soft Loans		Yes	Yes	Yes	Yes	Yes	No
	Third Party Financing		Yes	Yes	Yes	Yes	Yes	No
TAXES	Tax Deduction		Stopped (2009)	Yes	Yes	No	Yes	Yes
	Lower VAT on Labour and Materials		Stopping	Materials	Labour & Material	No	Labour	n.a.
TECHNOLOGY SPECIFIC	Subsidies on Sustainable Energy Devices		Yes	Yes	Yes	Yes	Yes	Yes
	Feed-in Tariffs	per kWh (€/kWh)	Yes	Yes	Yes	Yes	No	n.a.
		Green Certificates	No	Yes	Yes	Yes	Yes	n.a.
OTHERS	Rent Indexation (Owner-Renter Balance) ³		n.a.	n.a.	n.a.	No	n.a.	No

³ At this moment, the sole case of rent indexation has been found in the Netherlands.

