

The Eighth Global Conference on Environmental Taxation
18-20 October 2007, Munich, Germany
*“Innovation, Technology and Employment:
Impacts of Environmental Fiscal Reforms and Other Market-Based Instruments”*



BUILDINGS AND SUSTAINABLE URBAN DEVELOPMENT: CHALLENGES AND OPPORTUNITIES FROM AN ITALIAN CASE STUDY

Andrea Zatti

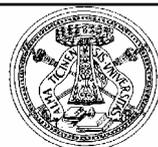
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The Building and construction sector is a key sector for sustainable development (UNEP, 2007)



- **The construction, use and demolition of buildings guarantee positive social and economic outcomes which benefit several key human activities and needs (living and public health, leisure and socialization, services and production, public services)**
- **On the other hand, buildings**
 - **take up land and interfere with the urban landscape**
 - **alter the natural conformation and life cycle of the surrounding area**
 - **use natural resources, materials and energy, contributing to substantial global and local concerns as green house gas emissions, waste generation, water use and discharge, raw materials depletion**
 - **interact with other social infrastructures (transport, water, waste), determining the efficiency and sustainability of the whole urban system**



Buildings and energy issues

- **Building operational energy requirement of the domestic and service sectors accounts for around 41% of all final energy consumption in Europe (EU-15) and represents the first emitter of CO₂ (36%) if electricity is included in the final sectors**
- **That figure is continuously growing as standards of living increase and use of air-conditioning and other domestic energy-related technologies becomes more widespread**

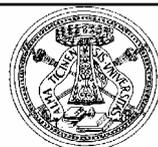


"despite significant gains in the efficiency of many household appliance and other measures to reduce the energy-intensity of space heating, household energy demand continues to rise, although more slowly than in the past" (OECD 2002).

Opportunity/necessity of a stronger policy guidance



- Measures are cost-effective in terms of social welfare and are frequently the cheapest way to attain predefined targets of carbon dioxide emissions reduction
- “policy gap” in this area with respect to initiatives directed to new power plants or to the development of renewables
- Building sector is very disperse and many obstacles (financial constraints, hidden costs, cost perception gap, incomplete information, split incentives) can hamper the diffusion of energy efficiency and energy demand management measures, even when they are cost effective
- Buildings have a long useful life which makes it difficult to prompt the retrofiting of existing technologies and cause high inertia to incorporate changes
- A building is a structure more complicated than many other engineering systems: multidisciplinary competences, difficult standardization of practices and difficult enforcement of standards



Focus of the analysis

A policy mix of economic instruments, regulation, information and appropriate institutional responses working together can provide the recipe for success.

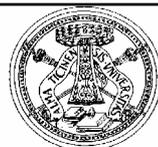
We will focus mainly on the application of three of these instruments in the Italian recent experience

- a) building energy regulations**
- b) home energy ratings**
- c) economic incentives**

The Energy Performance Building Directive 2002/91 (EPBD)

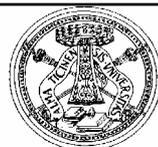


- **The EPBD sets up a general framework which has to be implemented by the EU's 25 Member States within January 2006 (grace period until 2009)**
 - Minimum requirements for the energy performance of all new buildings.
 - Minimum requirements for the energy performance of large existing buildings (>1000 m²) subject to major renovation (> 25% of the building shell involved)
 - Energy certification of all buildings when they are new, sold or rented
 - Regular mandatory inspection of boilers and air conditioning systems



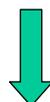
The role of national transpositions

- **to clearly set the primary indicators to be used to assess building energy performance**
- **to define the calculation method to be used to assess the building's energy performance**
- **to establish minimum energy performance requirements**
- **to fix requirements for renewable energies in the building sector**
- **to delimitate the exact scope of the regulation, in order to define the involvement of existing dwellings**



The Italian past experience

- **The first legislative acts related to the building energy issues date back to the mid 1970s**
- **Law 10/91 anticipated many of the contents of the EPBD (energy certification; minimum performance standards, periodic inspections and maintenance) but experienced very feeble application rates:**
 - **lack of implementing decrees**
 - **lack of control and enforcement (formally demanded to local authorities)**
 - **lack of accompanying measures (fiscal incentives, information and education, technology transfers)**



the impact of the normative prescriptions on the way building were constructed and retrofitted has been only marginal

Legislative decrees 192/2005 and 311/2006



- **Upper limits to the annual primary energy consumption for heating. Limits vary according to the climatic zone (heating degrees days-DD) and to the ratio of exposed surface area to building volume (S/V), allowing higher energy consumption for buildings with lower compactness**
- **Upper limits for thermal transmittance coefficient U (W/m²K) for each envelope components (roof, walls, floors, windows) of new or renovated dwelling, or in the case of the refurbishment or replacement of the single component**
- **Minimum level for the global performance of the thermal system**
- **Other mandatory requirements solar thermal systems, shading devices, condensation control, thermoregulation, high mass construction**
- **Compulsory Energy performance certification for new dwellings and in the case of complete renovation of existing dwellings with floor area > 1000m². · Obligation extended to buildings > 1000m² put on the market from 1st of July 2007; for buildings < 1000m² put on the market from 1st of July 2008; for single flat put on the market from 1st of July 2009**

Upper limits of primary energy consumption for heating (kWh/m² year): residential buildings



S/V		Climate zone										
		A		B		C		D		E		F
		< 600 DD	601 DD	900 DD	901 DD	1400 DD	1401 DD	2100 DD	2101 DD	3000 DD	> 3000 DD	
≤0,2	until 31/12/07	10	10	15	15	25	25	40	40	55	55	
	from 1/1/08	9,5	9,5	14	14	23	23	37	37	52	52	
	from 1/1/10	8,5	8,5	12,8	12,8	21,3	21,3	34	34	46,8	46,8	
≥0,9	until 31/12/07	45	45	60	60	85	85	110	110	145	145	
	from 1/1/08	41	41	55	55	78	78	100	100	133	133	
	from 1/1/10	36	36	48	48	68	68	88	88	116	116	

Other prescriptive standards established by legislative decrees 192/2005 and 311/2006

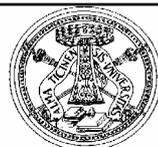


	Minimum standard	Scope
Solar thermal plants	Minimum coverage (50%) of DHW (20% in historical city centre)	New dwellings, complete renovation of existing dwellings > 1000 ² , new installation or renovation of the heating system
Photovoltaic	Adoption of photovoltaic plants (technical requirements to be ruled)	New dwellings, complete renovation of existing dwellings > 1000 ² ,
Global performance of the thermal system	$\eta_g = (75 + 3 \log P_n) \%$	New dwellings, complete renovation of existing dwellings > 1000 ² , new installation or renovation of the heating system
Thermoregulation	Adoption of a central system and of modular devices in single rooms	New dwellings, complete renovation of existing dwellings > 1000 ² , new installation or renovation of the heating system, boiler replacement
Thermal transmittance of internal walls and floors	$U (W/m^2K) < 0,8$	New dwellings, complete renovation of existing dwellings > 1000 ²
District heating	Mandatory predisposition if the district heating network is closer than 1000m or if it is provided by the Master Plan	New dwellings, complete renovation of existing dwellings > 1000 ²
Shading devices	Mandatory adoption	New dwellings, complete renovation of existing dwellings > 1000 ²
Mass construction	Surface mass > 230 kg/m ²	New dwellings, complete renovation of existing dwellings > 1000 ²

Legislative decrees 192/2005 and 311/2006 - Critical issues



- The integrated energy performance of building is evaluated considering only thermal energy consumption for heating in the heating season, not air-conditioning, ventilation, hot water supply and lighting
- Restricted interpretation of major renovations compared to EPBD
- The performance-based approach has been substantially contradicted by the adoption of several minimum standards regarding single building elements
- Technical implementing decrees, even in this case, lacking so that the come into force of the main dispositions has been until now postponed
- Regional governments are given the power to directly implement the EPBD, adopting their own indicators and calculation methods for energy standard and certification



Regional laws issued

- Liguria, Piemonte, Lombardia, Province of Bolzano and Province of Trento
- Only in the latter three cases energy regulation and certification are effective and technical decrees concretely approved
- Indicators implemented in the energy certification of building, as well as scorecards and calculation methods, are not the same in the three cases, so that worries expressed by building operators and designers seem to be confirmed

Provisions of the building energy regulation adopted in the Lombardia region



- Anticipation of national minimum standards from the 1st of January 2010 to the 1st of January 2008.
- Major renovations are considered those where more than 25 % of the building shell undergoes renovation, independently of the dimension, so that the limit of 1000 m² has no importance.
- It provides for the mandatory energy performance certification of rented dwellings from 1st of July 2010.
- The labelling of buildings (from A+ to G) is based on the annual primary energy consumption for heating, but the certificate has to report even values concerning annual primary energy consumption for cooling and hot water, as well as the contribution of renewable energy. The rating mechanism is independent from the ratio S/V, so that a less compact dwelling has to provide higher efforts to obtain the same rating.
- Regulation and certification schemes and indexes are coordinated to avoid that the energy analyst is forced to learn two different calculation codes, one for regulation proposals and the other one for certification.
- It has eliminated the mandatory adoption of photovoltaic plants in new buildings.

Energy certification in the Lombardia region



ALLEGATO C – ATTESTATO DI CERTIFICAZIONE ENERGETICA

ATTESTATO di **CERTIFICAZIONE ENERGETICA**

Data di emissione: 21 GIUGNO 2008

REGIONE LOMBARDBIA
RETI SERVIZI DI PUBBLICA UTILITÀ E SVILUPPO SOSTENIBILE

Numero di protocollo: AA - A.1 - 0000001 - 08

Comune di _____ (____) Logo _____

Ubicazione: Civico 00 Via Roma
Destinazione d'uso: Interni 00 Residenziale
Anno di costruzione: 2008
Superficie utile [m²]: 100
Combustibile: Metano
Proprietario: Massimo Rossi

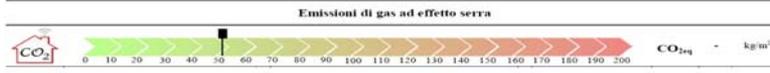
Classe energetica – zona climatica E

A2	≤ 14 kWh/m ²
A	≤ 29 kWh/m ²
B	≤ 58 kWh/m ²
C	≤ 87 kWh/m ²
D	≤ 116 kWh/m ²
E	≤ 145 kWh/m ²
F	≤ 175 kWh/m ²
G	≤ 175 kWh/m ²

Immagine dell'edificio o planimetria dell'unità immobiliare

Principali indicatori di prestazione energetica

Fabbisogno specifico di energia primaria per la climatizzazione invernale	EP_H - kWh/m ²	Fabbisogno specifico di energia primaria per l'acqua calda sanitaria	EP_W - kWh/m ²
Fabbisogno energetico specifico dell'involucro (climatizzazione invernale)	EH - kWh/m ²	Fabbisogno energetico specifico totale per usi termici (riscaldamento e acqua calda)	EP_T - kWh/m ²
Fabbisogno energetico specifico dell'involucro (climatizzazione estiva)	EC - kWh/m ²	Contributo energetico specifico da fonti rinnovabili	E_{FER} - kWh/m ²



Possibili interventi migliorativi del sistema edificio-impianto

Sistema	Intervento	Priorità bassa	Priorità media	Priorità alta
Edificio	Coibentazione delle strutture opache verticali	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Coibentazione della copertura	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Coibentazione dei pavimenti - solai	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Coibentazione delle chiusure trasparenti	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impianto	Sostituzione generatore di calore	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Adeguamento sistema distribuzione	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Adeguamento sistema emissione	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Adeguamento sistema regolazione	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Il Comune _____ Il Certificatore _____

CENED puni energia

Economic incentives at the national level

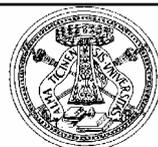


- **The role of economic incentives is crucial above all for existing buildings, for whom it is less likely to control the energy use with regulations since tighter mandatory standards are more difficult to be enforced and controlled and, at the same time, can prevent and delay the take-up normal maintenance and major renovations.**
- **Financial support schemes through public subsidies, grants or cheap loans become therefore rational methods to overcome hurdles concerning old building energy retrofitting (budget constraints, inertia, technology lock-in and hidden costs) and to cut the energy use and promote on-site renewable energy.**
- **The current energy efficiency of the housing stock in Italy is modest, with much room for improvement, since 70% of the building stock has been constructed before the mid of the seventies, when first building energy regulations came into force**

Economic incentives: feed-in tariff for PV plants



- Incentives awarded, with a higher support to small-scale plants, both to self-consumed energy (valued through a net metering system) and to energy put on the grid.
- The cost required to pay the premium for photovoltaic power systems is put directly on a specific entry of the electricity bills.
- Great success in terms of applications received and admitted to the incentive (390MW), but after two years only 24 MW are operative, since procedural inefficiencies and grid-connection delays have until now strongly hampered the implementation process.



Economic incentives: Energy Efficiency Titles (EET)

➤ **EET system combines:**

- (a) **command and control measures (mandatory quantitative obligations on electricity and natural gas distributors)**
- (b) **market based instruments (tradable certificates)**
- (c) **elements of tariff regulation: at the end of each compliance period, distributors surrendering to the AEEG a number of certificates corresponding to the obligation receive a contribution (fixed for the period 2005-2009 at 100€/Toe saved), whose cost is translated into the final energy tariff**



Energy consumers pay a surcharge on their energy bills which works as an incentive for the diffusion of energy efficiency measures among end-users through the action of energy service companies (ESCO)



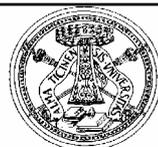
Buildings efficiency and EET

- replacement of incandescent lamps with compact fluorescent lamps
- replacement of hot-water heaters with gas heaters
- installation of new high efficiency gas boilers
- replacement of single-glazing window panels with double glazing
- increased thermal insulation of external walls of buildings
- installation of photovoltaic systems with peak power below 20 kW
- installation of solar heaters for sanitary hot water production
- installation of air operated, electric heat pumps in new or re-structured buildings replacing gas boilers
- medium-low power co-generation plants
- replacement of refrigerators, freezers, combine fridge-freezers, laundry machines, dishwashers with similar products having high efficiency
- low flux shower
- aerated jet breakers for water taps

Economic incentives: financial grants (1)



- **The national budget law for the year 2007 has introduced a package of economic incentives for building energy retrofitting to support and complete the compulsory provisions established by Legislative decrees 192/2005 and 311/2006 (National decrees)**
- **Tax credits:**
 - refurbishment of existing buildings which enables a saving of the global annual primary energy consumption for heating by at least 20%, compared to minimum standards established by the national decrees: 55% of total expenditures up to a ceiling of 100.000€
 - increasing the thermal transmittance for walls and windows so to obtain minimum standard provided by national decrees by the 1st of January 2008: 55% of total outlays up to a ceiling of 60.000 euro
 - to install solar thermal systems: 55% of total outlays up to a ceiling of 30.000 euro
 - to renovate the thermal system with the take-up of condensing boilers: 55% of total outlays up to a ceiling of 60.000 euro
 - replacement of refrigerators, freezers and their combinations with new A+ rated (minimum) appliances: 20% of total outlays up to a ceiling of 200 euro for single appliance



Economic incentives: financial grants (2)

- measures must be affirmed by qualified experts
- pertaining dwellings must get the energy performance certification in accordance with national decrees (incentives become therefore an implicit stimulus also to extend energy performance rating beyond building categories for whom it is compulsory)
- tax credits applies both to owners and to tenants; to residential, tertiary and industrial buildings
- incentives are compatible with local incentive schemes and with the EET system



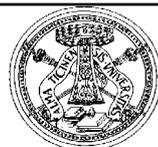
Economic incentives: financial grants (3)

- New dwellings: direct grant to cover 55% of the extra costs incurred for the construction of large new buildings (>10.000 m³) able to reduce thermal energy consumption for heating in the heating season by at least 50% compared to national mandatory standards.

Economic incentives: critical issues (1)



- **administrative procedures and technical parameters to rely on (PV, EET, assessment procedure for energy certification, technical requirements to assess the tax-credit eligibility of large new buildings)**
- **risk of delay for grants attribution, above all for condominiums (grants are ensured until the end of 2007, even if the new Budget Law bill for 2008 provides for an extension of the package until 2010)**



Economic incentives: critical issues (2)

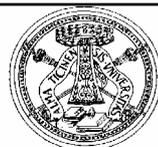
➤ **Improve economic rationality:**

- Lack of gradualism and threshold effect
- Need to better commensurate incentives to projects dimension, to effective extra costs and to payback periods (as required by the EPBD)
- Penalization of comprehensive building retrofit projects



Avoid Cream Skimming

[even in the EET mechanisms, where single projects presented through standard evaluation methods are clearly facilitated, with the result that the largest share (around 2/3) of actions has been until now concentrated in small-scale and low capital cost measures (above all lighting system)]



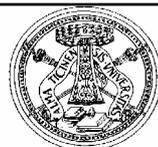
The role of local governments

- **Regional laws and municipal regulations have a central role in influencing building design and construction techniques**
- **Yet, this role has been interpreted in a biased way: building codes have mainly focused on a narrow range of specific concerns (health and safety, preservation of the urban landscape, observation of distances and views, and prevention of noise pollution) but have not fully grasped the important role that buildings can have on energy consumption, natural resource depletion and urban pollution**
- **Existing plans and building rules have even hampered energy efficiency retrofits, for example adopting building indexes based on the ratio of empty for full cubic meter to building square meter or not allowing further increases of volume, reduction of the distances between buildings or reductions of the height of single floor**

The role of local governments: the emerging of a new trend



- **This scenario initiated to change in the second half of the 1990's, when energy conservation and environmental issues began to move higher on the priority lists of regional and local governments**
- **Lombardia, for instance, established in 1995 new rules in order to exclude from volume calculation the extra-thickness of walls and roofs implemented to increase thermal insulation level. Many other regions followed the same direction in the subsequent years (Veneto, Puglia, Piemonte)**
- **An important step has been represented in 1998 by the "Voluntary Code for energy and environmental quality of buildings and open spaces" signed by a set of public administrations which committed themselves to foster sustainability in their choices and normative acts (mainly master plans and building codes)**
- **Some local authorities have begun to concretely include environmental and energy performance requisites in house planning and construction codes, providing some supporting policies to grant best practices as well**

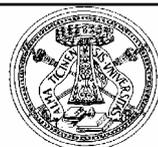


The role of local governments: the strengthening of the process

- **20% of Communes (22 Cases) out of the 107 Capitals of the Italian Provinces have revised their building codes in the period 2000-2007 with the insertion of energy and environmental-related issues.**
- **To rely on a wider sample, we have investigated 28 further experiences of other (small and medium) municipalities which have carried out the same kind of experience.**

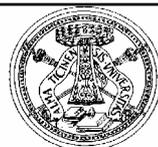


- **Extreme heterogeneity in terms of instrument adopted (mandatory standards vs fiscal incentives), themes involved (energy, water, materials, wastes, etc) and indicators implemented.**
- **We have found more than 100 different indicators (being compulsory or voluntary) in the regulations analysed, to testify how the topic of building sustainability can be mixed and subject to different interpretations.**



The role of local governments: a case study of 50 Italian building regulations

Instruments	Only standards	Compulsory standards + Incentives	Only incentives	Not defined*
N. of cases	15 (30%)	15 (30%)	18 (36%)	2 (4%)
Themes involved	Only energy	Energy + water	Various	Not defined*
N. of cases	8 (16%)	16 (32%)	24 (48%)	2 (4%)



A case study of 50 Italian building regulations : compulsory requirements

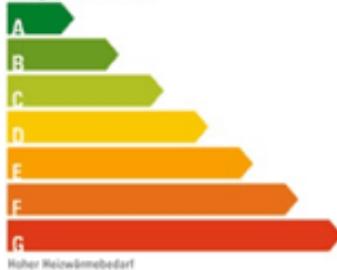
- **Local prescriptions have foreran national and regional laws, bringing about, through a bottom-up process, the opportunity/necessity to integrate energy and resource issues in regulative and fiscal measures. Many of the (energy) requirements commonly found in local building codes have been in fact transposed in the national decrees on building energy regulation, through a process where decentralised practices have verified and tested the technical and economic viability of different measures**
- **The approaches followed are very heterogeneous (see Bolzano and Carugate)**
- **Some intermediate governments (i.e: Province of Milan, Toscana and Emilia Romagna Regions) have taken initiatives to support Communes through the formulation of guidelines and technical annexes which can represent an useful framework for the territory and an important point of reference for local authorities. Prescriptions and measures contained in these guidelines have of course no legal power, but can furnish a support, above all for small and medium administrations who often lack of specific competences on these subjects, to insert energy and environmental issues in their building regulations.**

The case of Bolzano (100.000 inhabitants)



Wärmeschutzklassen

Niedriger Heizwärmebedarf



Stufung

$HWB_{\text{net}} \leq 30 \text{ kWh}/(\text{m}^2 \cdot \text{a})$

$HWB_{\text{net}} \leq 50 \text{ kWh}/(\text{m}^2 \cdot \text{a})$

$HWB_{\text{net}} \leq 70 \text{ kWh}/(\text{m}^2 \cdot \text{a})$

$HWB_{\text{net}} \leq 90 \text{ kWh}/(\text{m}^2 \cdot \text{a})$

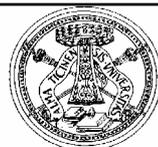
$HWB_{\text{net}} \leq 120 \text{ kWh}/(\text{m}^2 \cdot \text{a})$

$HWB_{\text{net}} \leq 160 \text{ kWh}/(\text{m}^2 \cdot \text{a})$

$HWB_{\text{net}} > 160 \text{ kWh}/(\text{m}^2 \cdot \text{a})$

Hoher Heizwärmebedarf

- Compulsory energy labelling since 2002 for new dwellings and for major renovations (> 50% of floors involved)
- 2005: all new buildings must achieve at least the "C" rating (< 70 kWh/m²y) to get the declaration of habitability
- 2007: new dwellings and major renovations must achieve of the "B" rating and the coverage of at least 50% of DHW and of 25% of total thermal energy demand through renewable energy



The case of Carugate (12.000 inhabitants)

- **2003: detailed list of prescriptions concerning energy and environmental issues: building orientation; shading devices; natural ventilation; energy saving bulbs in open and common spaces of dwellings; local thermoregulation; condensing boilers; individual metering for heating and water; double glazing; tighter thermal insulation limits for the building envelope; rainfall catchments systems; solar thermal system for DHW > 50%.**

A case study of 50 Italian building regulations : economic incentives (1)



- 1) Building licence fee allowances are applied in 27 out of 33 cases**
 - Allowances accorded by local governments are very diversified (ranging from 15% to 100%) and the economic value of this incentives is very difficult to be quantified since each Comune can fix its own fee. Approximately fees for residential buildings range from 10€/m² to 150€/m².

- 2) Higher construction volumes (up to 15%) with respect to indexes established by the local Master Plan (11 cases). In 5 cases both fee allowances and higher construction volumes have been applied, cumulatively or as alternative options**
 - Only for new buildings

- 3) Tax credit on the local property tax (3 cases), mainly accorded to expenditures incurred during the renovation**

A case study of 50 Italian building regulations : economic incentives (2)



The quantification of incentives is based on different instruments:

- Mainly energy related issues (10 cases)
- Wider scoring mechanisms (23 cases)
 - ANAB (100 actions) elaborated by the national association of green designers and architects
 - Itaca Protocol (elaborated by a working group with Regions, Universities, Ministry of Public Works)

The Itaca Protocol is a building environmental performance assessment tool which draws on the Green Building Challenge experience and refers to several thematic areas: quality of the external environment; resources consumption; environmental pollution; indoor environment; building management and maintenance; transport

- The wider protocol includes 70 parameters, while a simplified version is available with 28 parameters
- Many local regulations and regional guidelines draw on the ITACA Scheme
- The Protocol has been approved by the *Conference of the Regions* and represents the term of reference of a regional bill-scheme on sustainable building

A case study of 50 Italian building regulations : economic incentives (3)



- **The economic rationality of existing schemes must be improved**
→ **Value for money (Only in one case there is an explicit attempt to proportionate the subsidy to extra costs)**
- **The adoption of extensive evaluation methodologies is attractive but must be assessed in terms of administration costs and enforcement capabilities (in two cases minimum scores are required....)**
- **Local governments have enough instruments to influence the environmental performance of new buildings, but...**

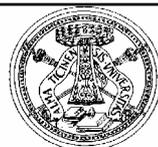
- **Few points of leverage to encourage the upgrading of the existing stock (lower construction fees, scarce opportunities of volume extension, low property tax compared to refurbishment costs)**



A case study of 50 Italian building regulations : building certification

- **Some municipalities (8 cases) have developed their own energy/environmental certification schemes well in advance the provision of the national law**
- **3 cases: energy performance certification**
- **5 cases: Eco-homes rating where energy is generally only one of the issues considered**
- **Schemes are very heterogeneous**





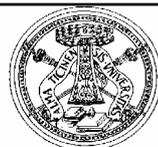
Conclusions

- ❖ **Last 6-7 years have seen a significant ramp-up in commitments and activities**
- ❖ **Regulations and initiatives on energy saving in the residential sector are very recent, and it is too early to assess the results**
- ❖ **Local authorities have played a central role, focusing on new issues and experimenting new opportunities**
- ❖ **The process has to be interpreted as a dynamic path, subject to continuous improvements through trials and errors**



Conclusions: key factors (1)

- ❖ **Better vertical and horizontal coordination of initiatives to avoid duplications and excessive complexity for operators**
- ❖ **More consolidated methods and tools to improve the environmental performance of buildings are necessary, such as checklists, whole building ratings and evolutions, building material standards.**
- ❖ **Concerns about administration costs and enforcement credibility (it is for example esteemed that 1.000.000 of energy certificates have to be produced within 2009). Italian public administration has to send clear signals to the market...**



Conclusions: key factors (2)

- ❖ **National incentives have a crucial role to promote the environmental upgrading of existing buildings**
- ❖ **The rationality of economic packages has to be improved to favour more comprehensive projects and to avoid cream-skimming**
- ❖ **A higher attention has to be directed to more vulnerable categories since the problem of fuel poverty is not addressed in the present scenario**