



From sustainability to performance

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metrics

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Key figures of CDC group

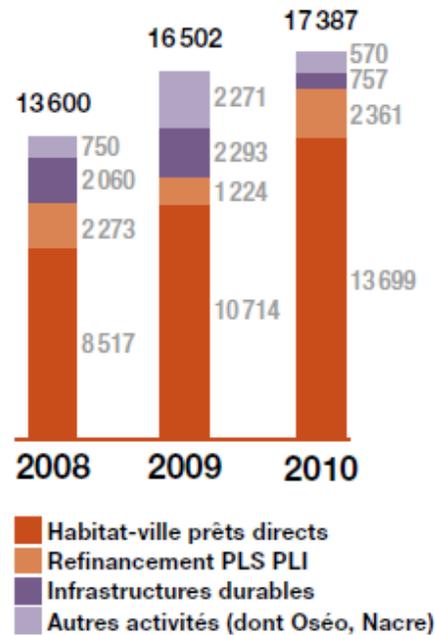
Financial figures for 2011

- Equity :
 - **€ 20.2 billion**
- Consolidated assets (except saving funds) : **€269.5 billion**
- Saving funds managed by Caisse des Dépôts : **€224.9 billion**
- Rating :
 - **AAA (Fitch) / Aaa (Moody's) / AA+ (S&P's)** (23/01/2012)

Extra financial figures for 2011

- **37 000** employees, plus Veolia Transdev with 102 000 employees worldwide
- **25 regional offices** in mainland France and the overseas territories leverage all of the Group's expertise and financial capacities
- A footprint in over **80 countries**
- Caisse des Dépôts has been entrusted with managing close to €7 billion of the « Programme d'investissements d'avenir » in France

Investment from savings



**16 billions € of Loan contracts
were signed in 2010
for social housing
and urban development**

133 000

New social housing in 2011

Elan 2020 : a strategic plan to meet the constantly evolving needs of the country

- Elan 2020 provides the Group with a long-term development strategy complete with clearly-defined objectives and targets.
- It has forged the Group's identity as a long-term investor with four strategic priorities for tackling the country's constantly evolving needs : private equity (SME's, ...), housing and the city, universities and the knowledge-based industry, sustainable development.
- €3.7 billion worth of equity invested since 2007 in the four strategic priorities, i.e., 40 % of the Group's annual earnings

**Sustainable
development**



Housing and the city

Private equity



**Universities and knowledge-
based industry**

Actual questions and development

- Stakeholders initiative
 - Long term investment club
 - UNEP FI , PRI
- Financing challenge of energy efficiency
- Urban development
- Energy efficiency and linked infrastructure
- Data & information
- Sustainable portfolio management

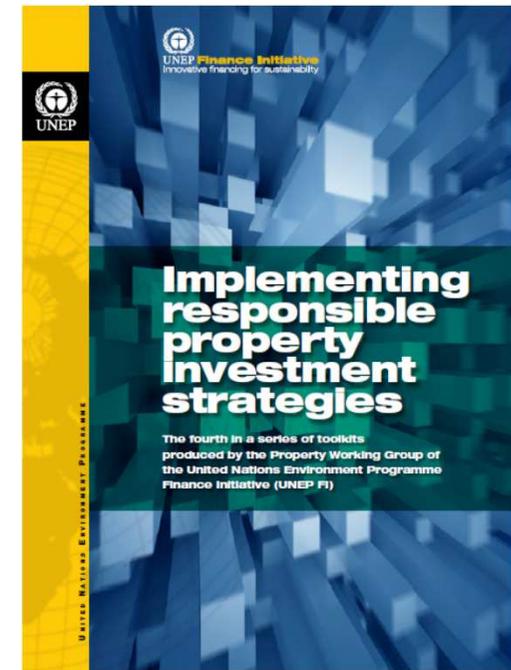
four general recommendations, which could be acted upon in various ways:

- Reassert the necessity for a financial institution to assess the risks of assets taking into account the nature and the duration of the liabilities;
- Design a model of assessment of financial risks that recognises the positive effect of long-term liabilities;
- Include in the definition of long-term liabilities, which are essential to long-term investment, liabilities that are statistically stable in the long term;
- Promote the creation of long-term savings by creating suitable investment instruments.

The UNEP FI Property Working Group (PWG)

The PWG has become a global centre of excellence on responsible property investment (RPI), covering the following aspects:

- RPI best practice case studies
- Implementation of the PRI with respect to property portfolios
- Differences between responsible investment in equities and property
- Advancing the integration of ESG issues into property as part of fiduciary responsibility
- Sustainable building indicators benchmarks
- RPI and international climate change policy



To learn more about the PWG:

http://www.unepfi.org/work_streams/property/index.html

Energy efficiency

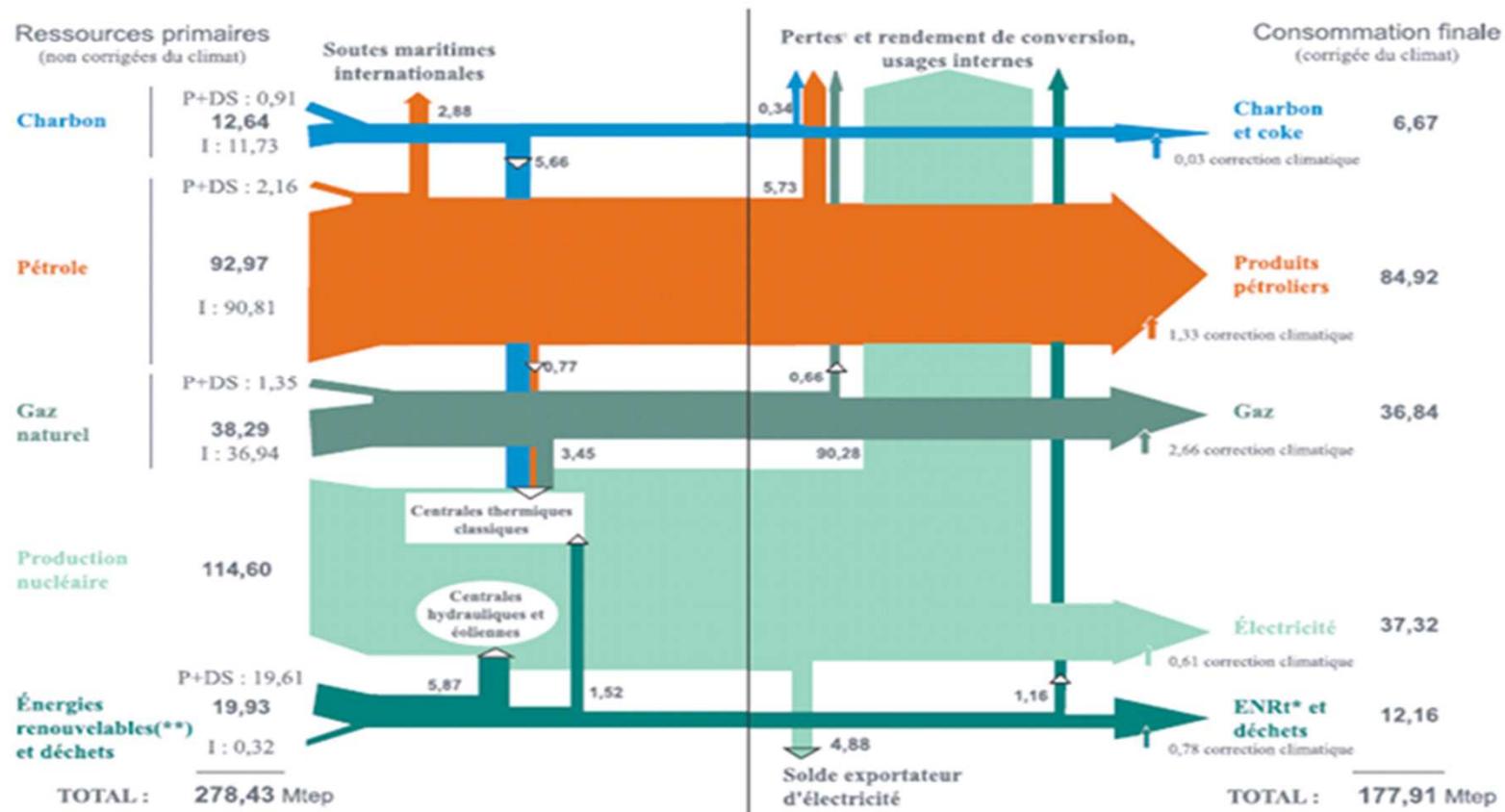
- 2 main reasons:
 - Energy security
 - Risk management (social & financial...)

- 4 means :
 - Energy conservation (linked to demand side)
 - Data accuracy and follow up
 - Push & pull strategy :regulation and energy taxes but moreover, make efficiency trendy (highest confort and lowest consumption)
 - Innovative local technologies(solar cooling...)

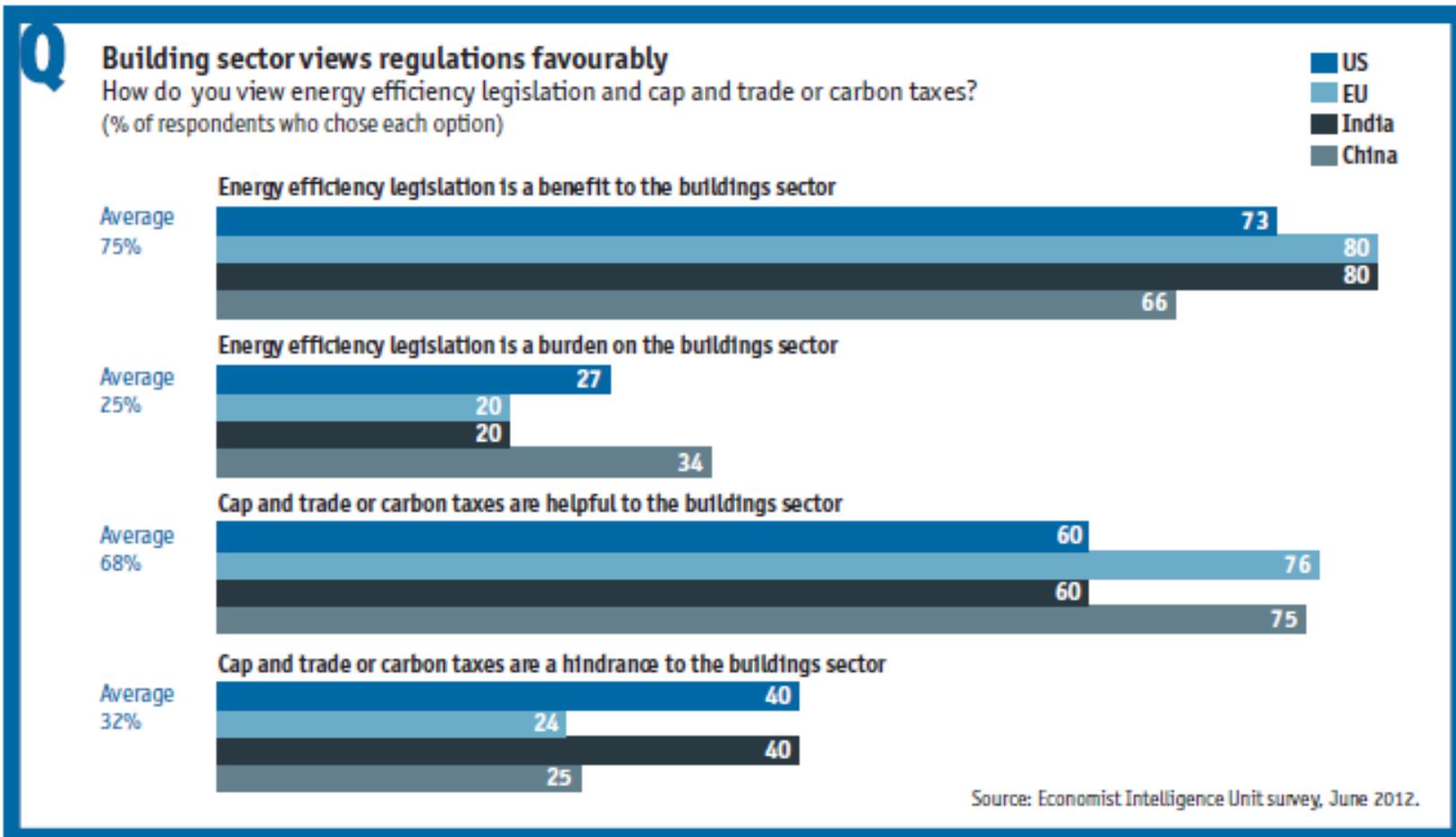


Metered or primary energy ?

Bilan énergétique de la France en 2007 en Mtep



Regulations wishes, but ...

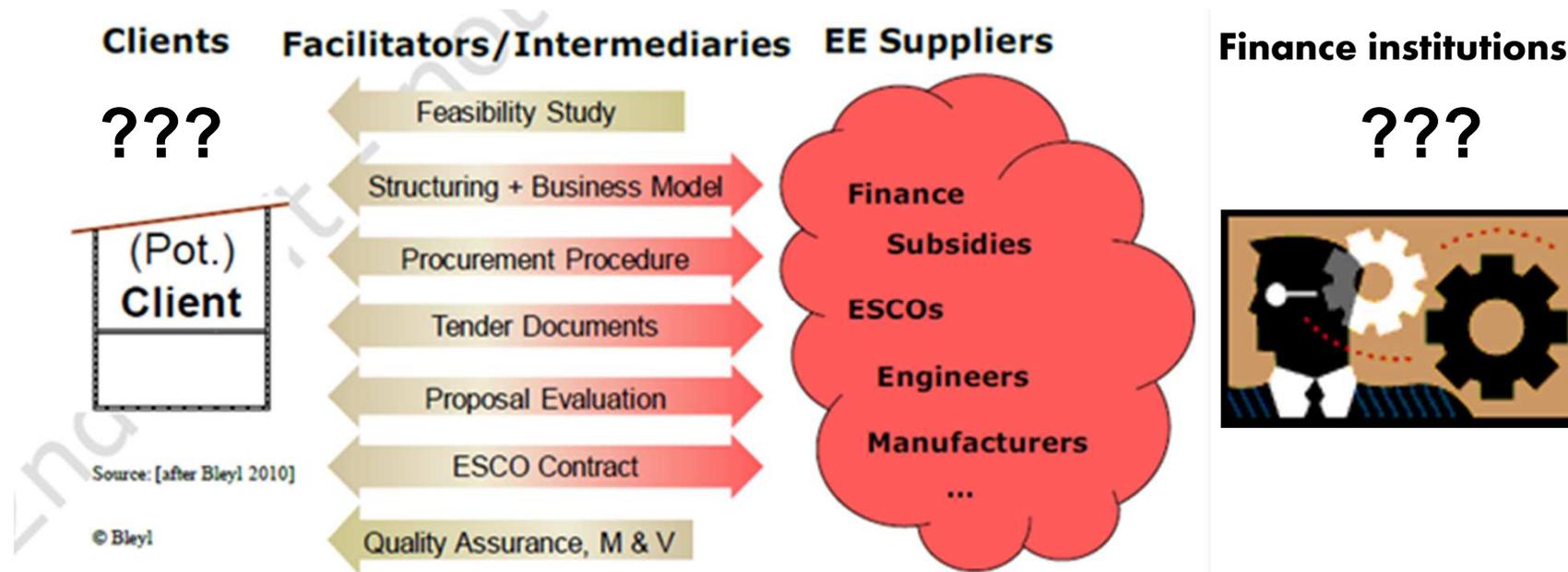


Energy Efficiency

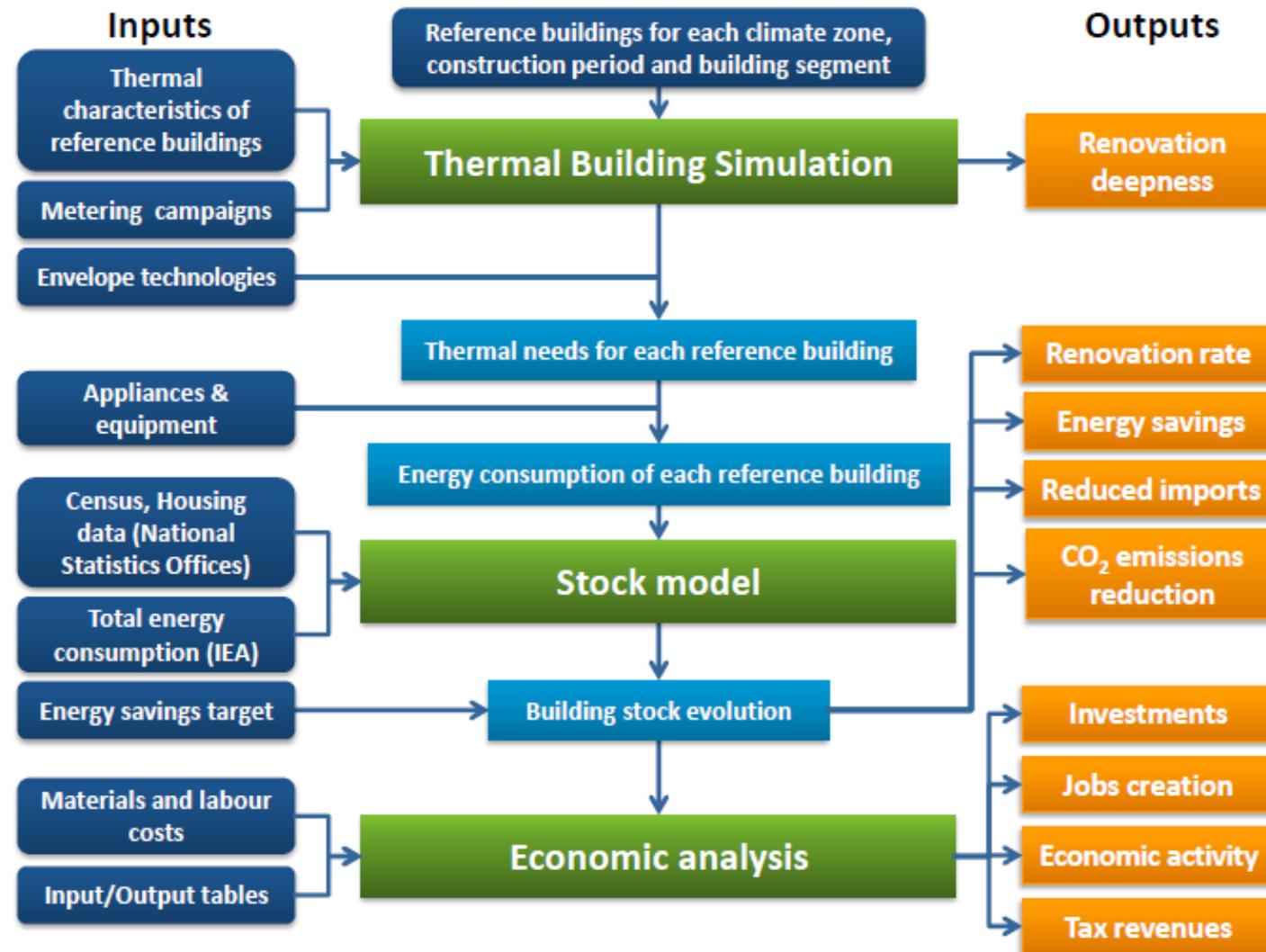
- Act simultaneously on housing and workplace : transport demand
- Act on food production and access :urban & countryside contracts?
- 4 Pilars :
 - Demand reduction : energy efficiency ;
 - Energy production: centralised and decentralised based on renewables and energy re-use
 - Energy storage : free energy transfer and peak reduction
 - Grid (electric, heat , cool) adaptation : synergy grids

There is no competition but complementary actions through dynamic plans and investment efficiency

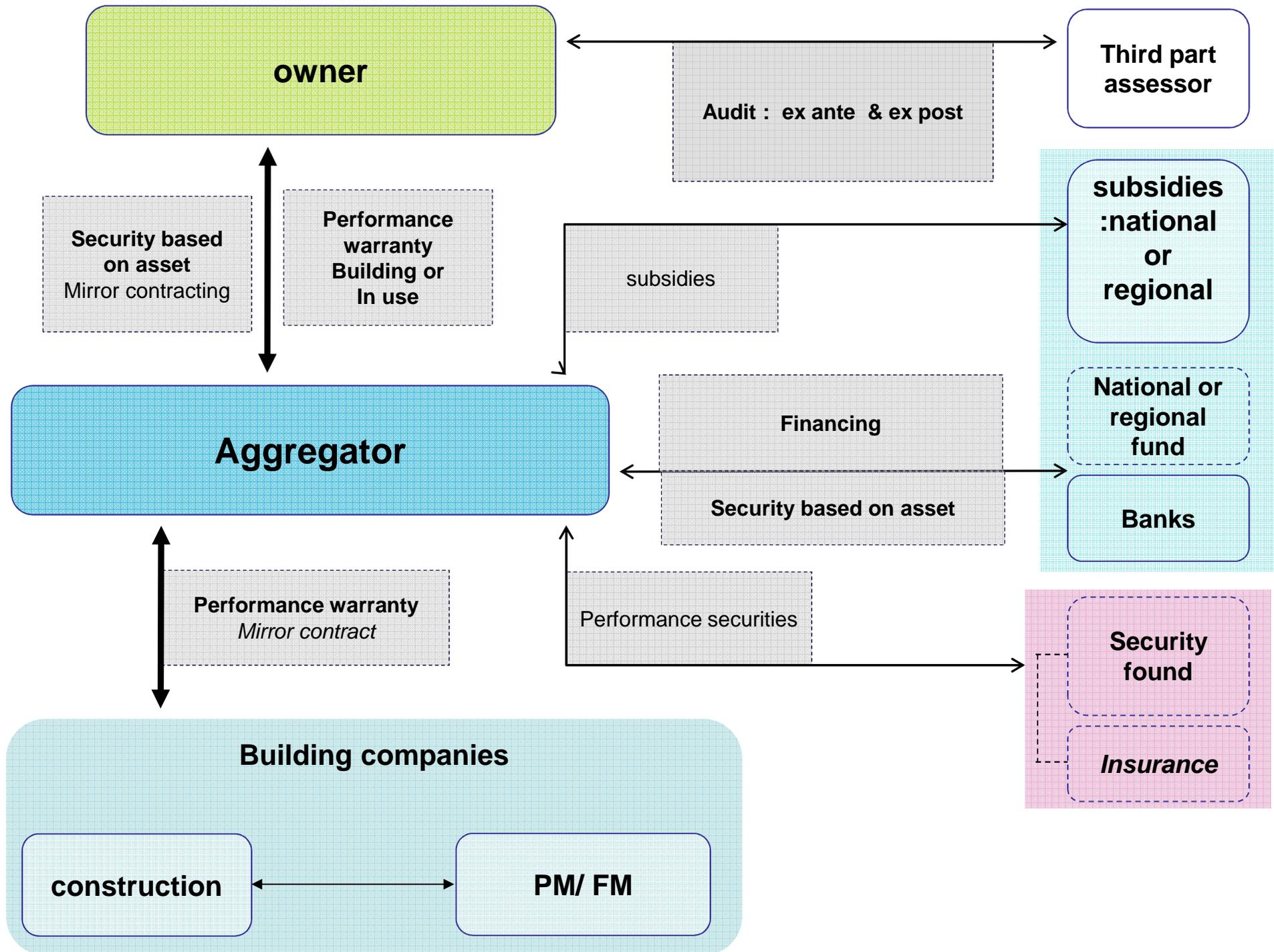
Energy efficiency market



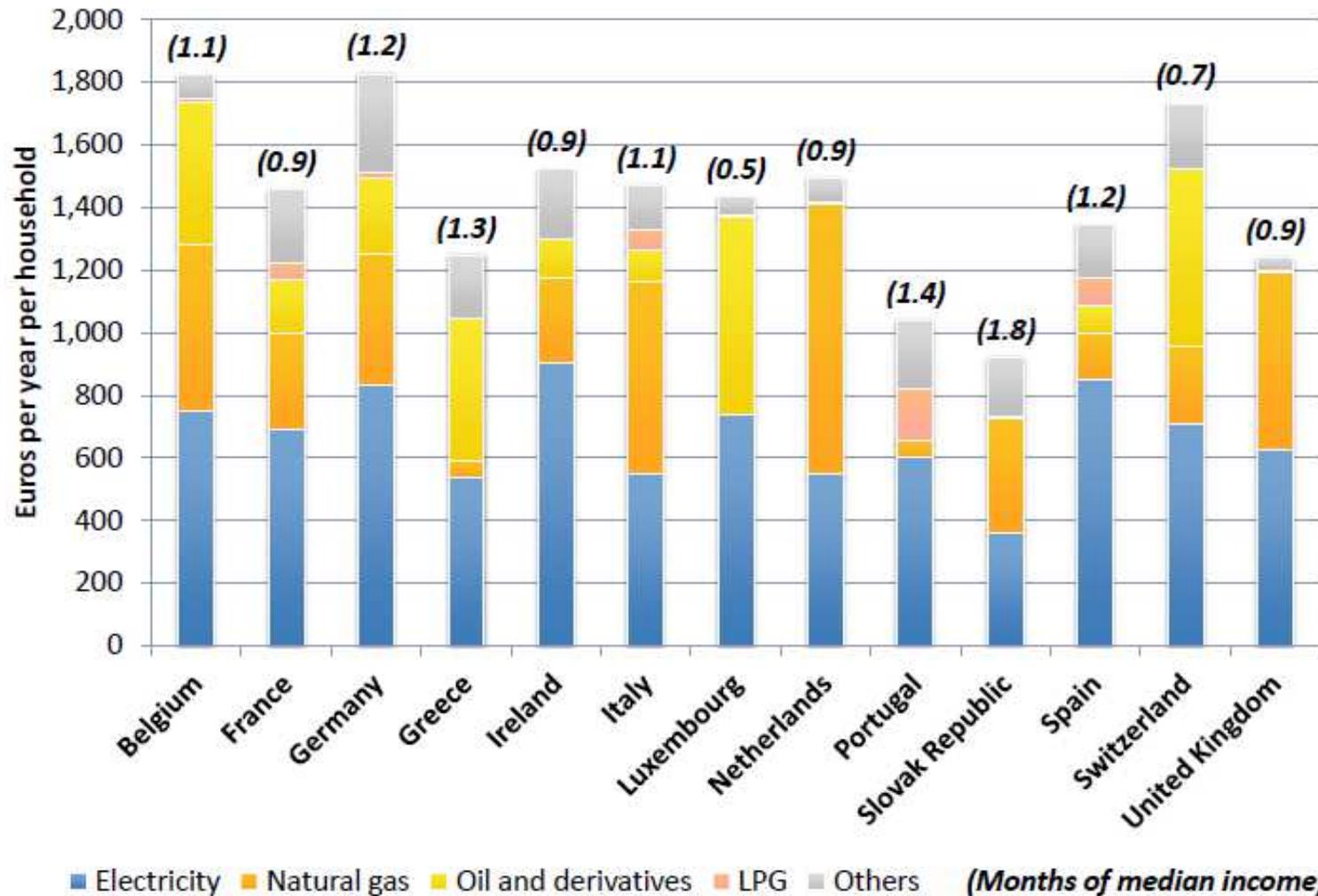
SBC methodology to determine the pathway to low energy building stock and its societal benefits



SBC model structure and flowchart



Annual expenditure on residential energy consumption places a heavy burden on European households



(Months of median income)

Source: IEA Statistics and Eurostat



Energy linked to a building: 4 main blocks

Building energy

Actual new building:
130 to 250 kWh_{ep}/m²/an

NZEB :
40 to 65 kWh_{ep}/m²/an

Specific electricity

Housing :
10 à 50 kWh_{ep}/m²/an

Office:
30 to 300 kWh_{ep}/m²/an

Embodied energy

New building :
≈ 800 to 2 000 kWh_{ep}/m²

« As usual » or tall building:
≈ 2 000 to 12 000 kWh_{ep}/m²

Transport

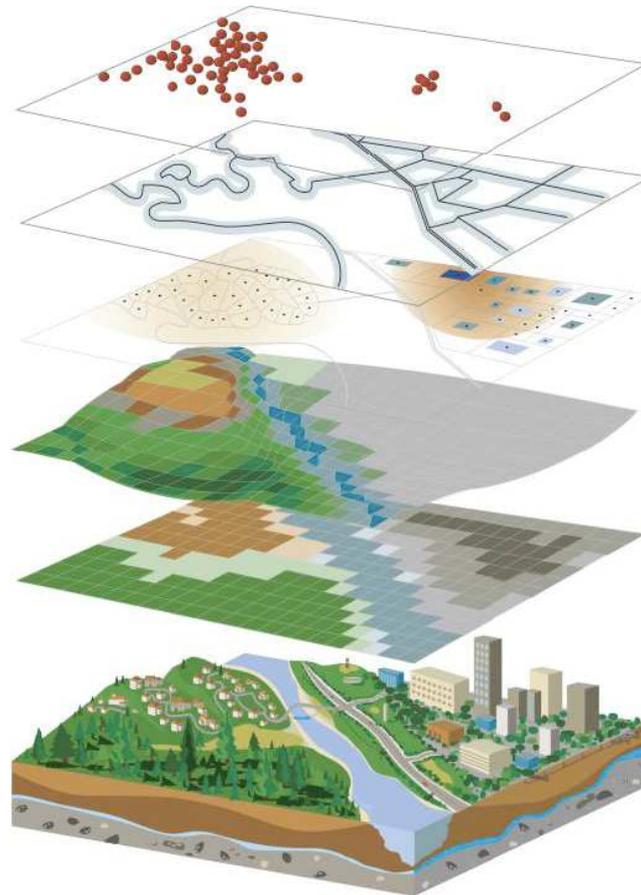
French average daily distance:
16km

20 km :
by car : 6450 kWh_{ep}/an
bus: 630 kWh_{ep}/an

Public transportation



Urban morphology and flows



People

Infrastructure, connectivity
mobility

Land use

Flows : people and
goods

Land property and
regulations impact

Build shape, energy impact
and waste management

Rotterdam: REAP methodology

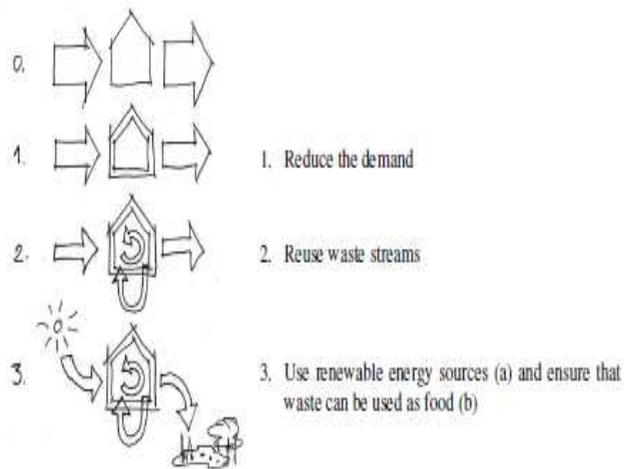


Figure 4: Principle of the New Stepped Strategy [Dobbelsteen, 2008]

THE AMSTERDAM GUIDE TO ENERGETIC URBAN PLANNING
ANDY VAN DEN DOBBELSTEEN

Energy Potential Pile - De Groene Compagnie (DGC)

Energy Potencies

DGC
(700ha)

Sun
9440 kWh_{th}/ha
6750 GWh_{th}

Wind, 100m
228 kWh_{th}/ha
140 GWh_{th}

Wind, 30m
36 kWh_{th}/ha
3 kWh_{th}/turbo

Water, household
4.7 kWh_{th}/ha
1.2 GWh_{th}

Residual heat
Kogge
2x 70 GWh_{th}

Biomass
Residue maintenance
4.7 kWh_{th}/ha
Forest maintenance
10.9 kWh_{th}/ha

Underground upto -50m
vertical heat exchange (VHE)

Aquifers
heat/cold storage

Geothermal, -3000m
105 °C

Energy demand 3000 households:
10.6 GWh_{th}
26.9 GWh_{th}

Applied

TV on roofs
12 GWh_{th}
Solar collectors on roofs
25 GWh_{th}

Wind, large turbines
140 GWh_{th}

Wind, turbo's
33 GWh_{th}
(Broersma)

Water, incineration
1.2 GWh_{th}

Residual heat
Kogge
140 GWh_{th}
Jorden Wylde
15 GWh_{th}

Biomass
Maintenance DGC
1.1 GWh_{th}
Chicken manure gasification
1.7 GWh_{th}
Municipal surroundings (radius 10km)
33 GWh_{th}

Suitability underground HE
very suitable
suitable

Suitability for aquifers
very suitable
suitable
unsuitable
restricted area

Geothermal
ge-HE zone

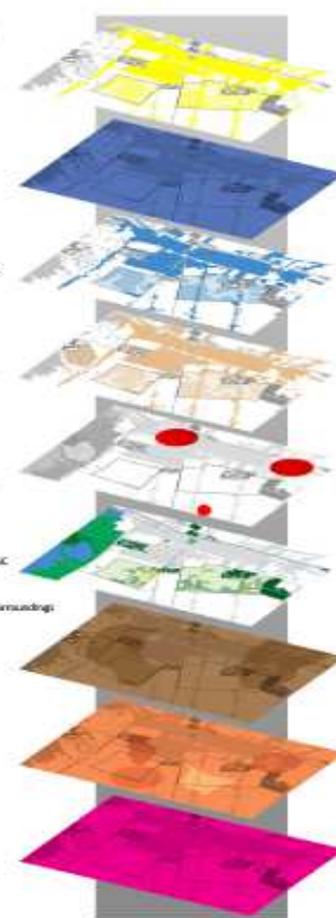
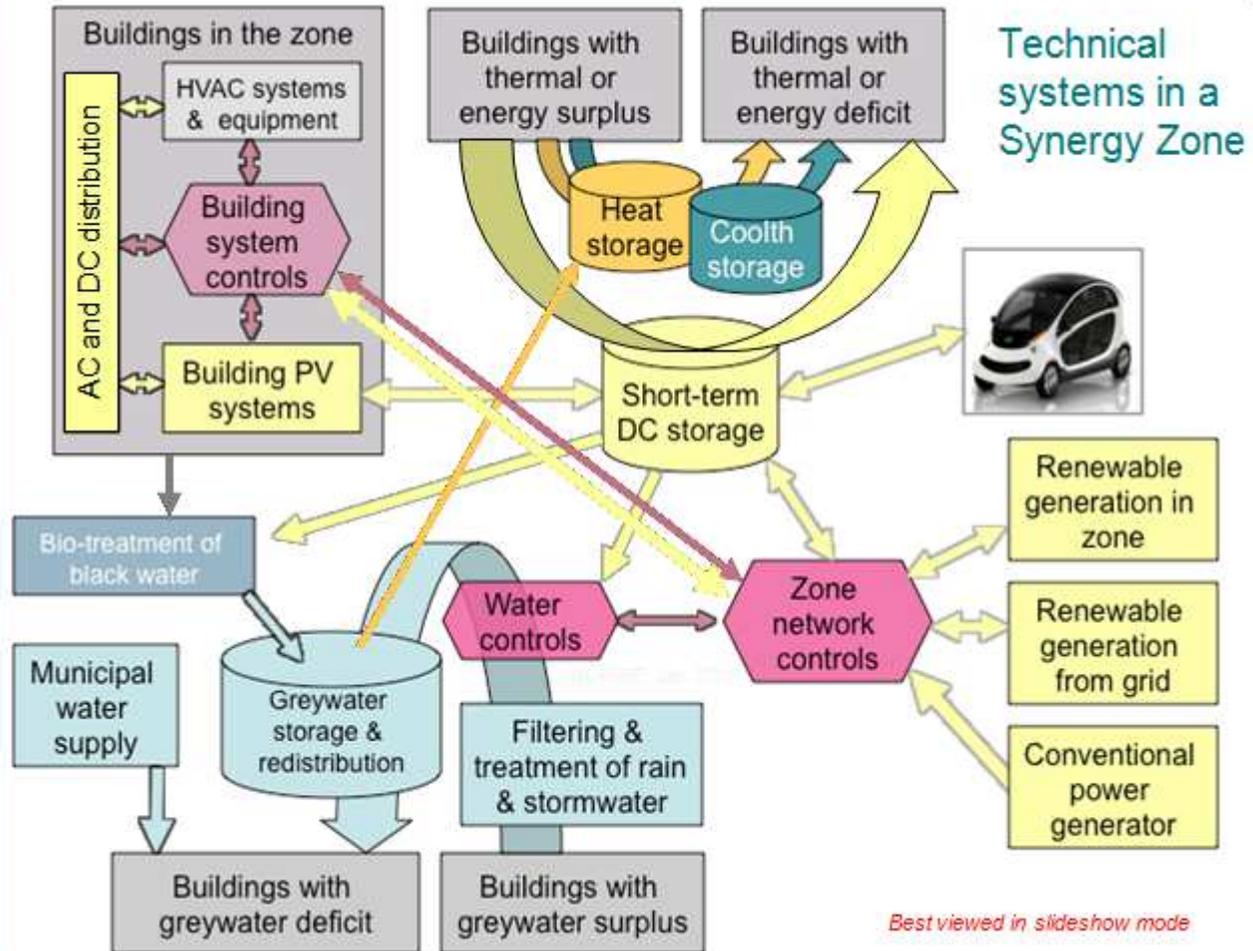


Figure 3: Energy potential map for the expansion plan of Hoogezand-Sappemeer, depicting energy potentials at various heights and depths, enabling calculations of the total energy yield possible [Broersma et al., 2010]

SYNERGY GRID WORKING GROUP II SBE



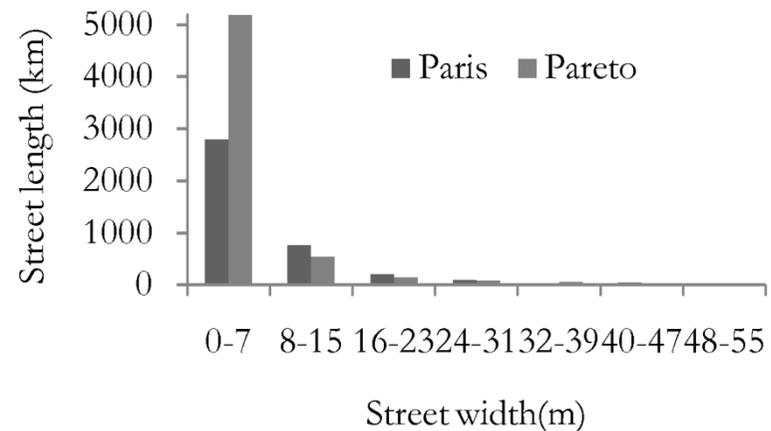
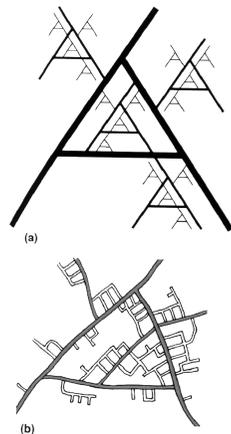
Which changes are needed in EU?



- Reduced consumption of space per person
- More community
- Less general consumption
- More healthy lifestyles
- Less mobility

International Institute for Urban Morphology

- Cities have the common feature of all living bio-organ, it is self-learning, self-improving.
- Cities are never independent: they are always interdependent on villages, hinterlands, and other cities, etc,
- proclamation of physics and philosopher Ilya Prigogine that “human being has entered the era of “certainty decay”. “, 'uncertainty' is the only certain element”
- “the future of cities is a series of unconscious events. Only those decision makers who embrace this philosophy would lead forward and succeed”.



Commentary on chinese eco cities by Qiu Baoxing 2012

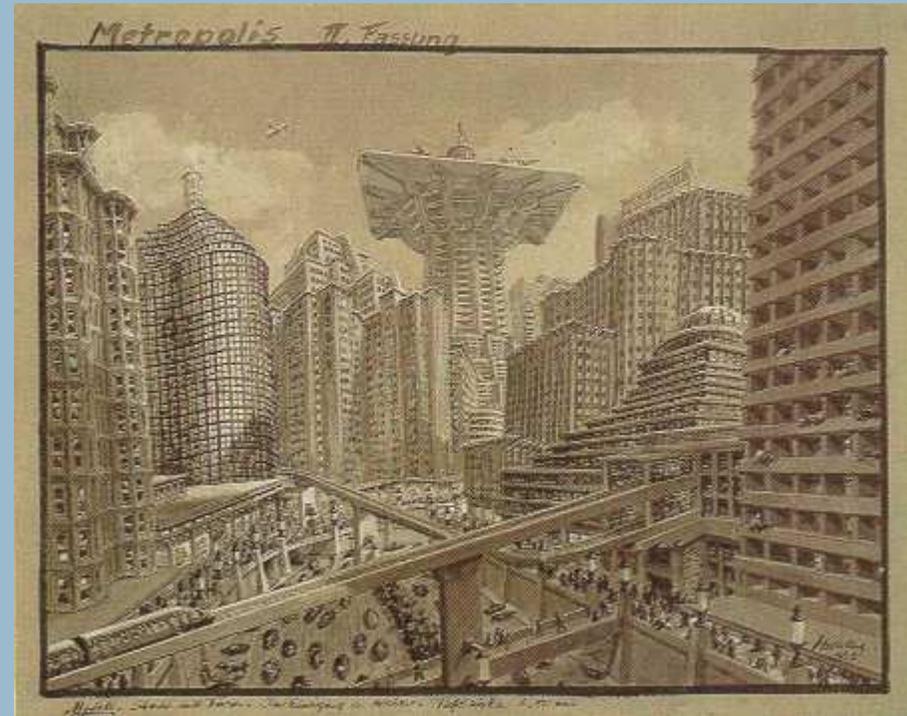
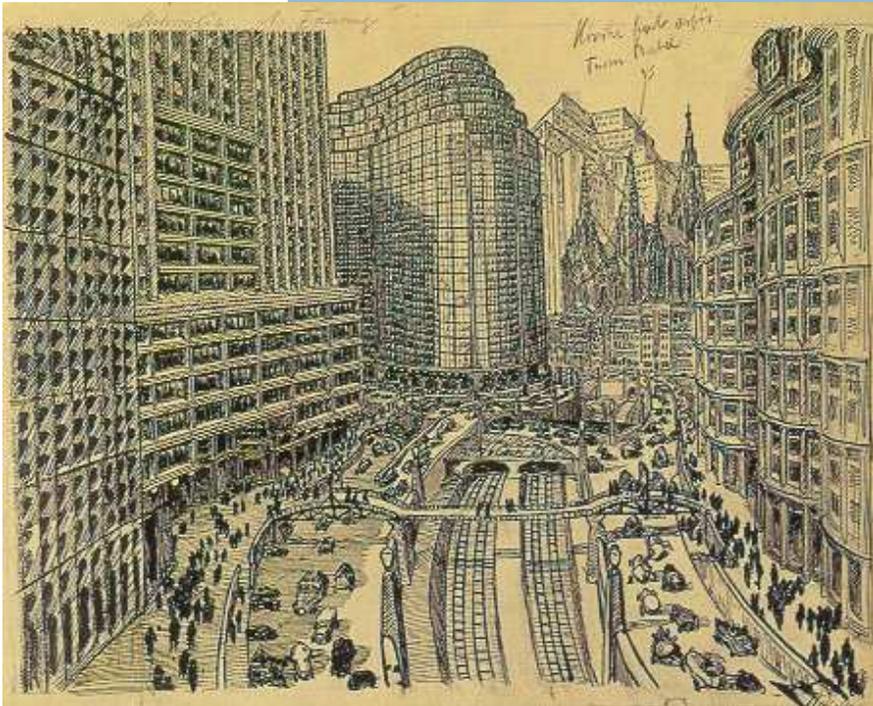
Conference on Urban Development and Planning in Guilin,

source : cecilia Springer

- **urban density**, a characteristic not often considered in the planning of eco-cities, which tend to be less dense than pre-existing Chinese cities. Although China's urban density was expected to increase due to the influx of rural workers, it has actually stayed stable and, in some case, decreased throughout the past several years. three factors in this trend: parks, plazas, and highways –
- He criticizes Western planners as well. He was spot on in identifying Le Corbusier's Radiant City plans as an unexpected source of low density, energy-inefficient building.
- **City diversity**. Vice Minister Qiu advocated for diversity in city transportation systems, as well as among the residents of the city. City diversity is an essential part of making a city liveable and self-sustaining.
- **Preservation** of pre-existing urban areas, rather than building new ones. He emphasized the value of history and culture in urban development, citing the dense and beautiful streets of Paris. Historical preservation is not frequently associated with urban planning in China

Can we set forth a bold vision of city planning based on Western experience adapted to local needs?

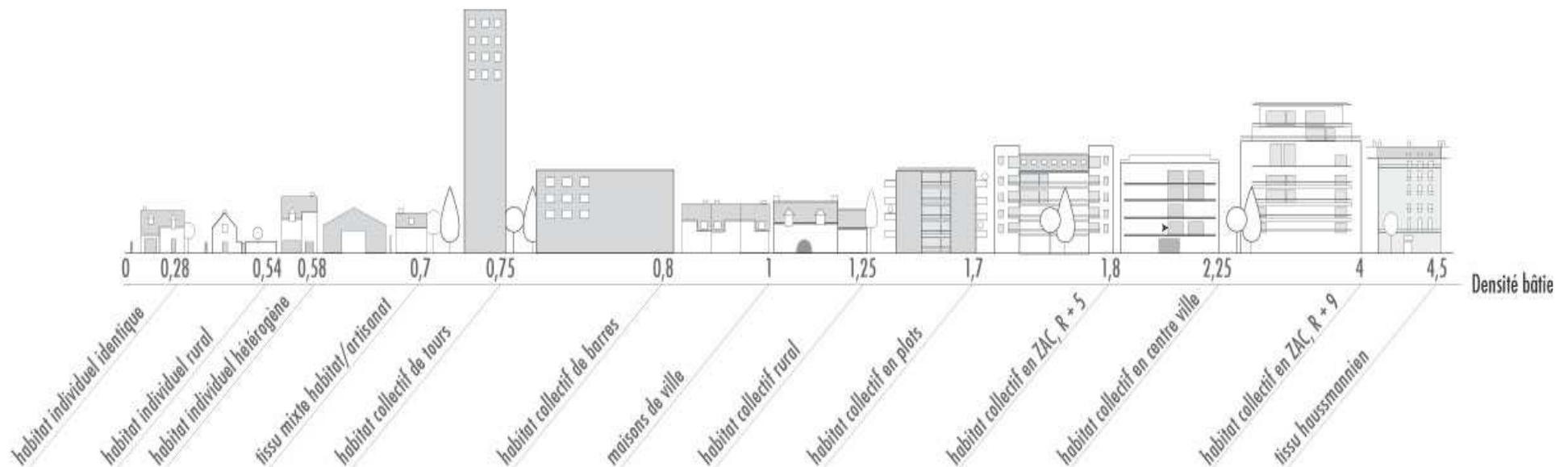
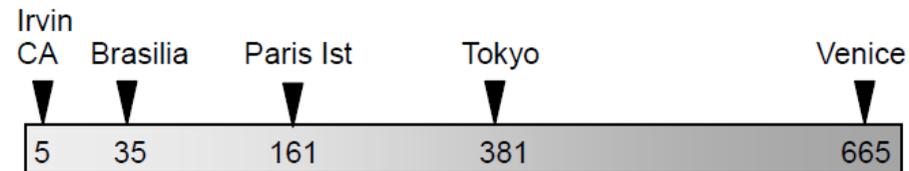
Early 20th century future vision



Verticality and density

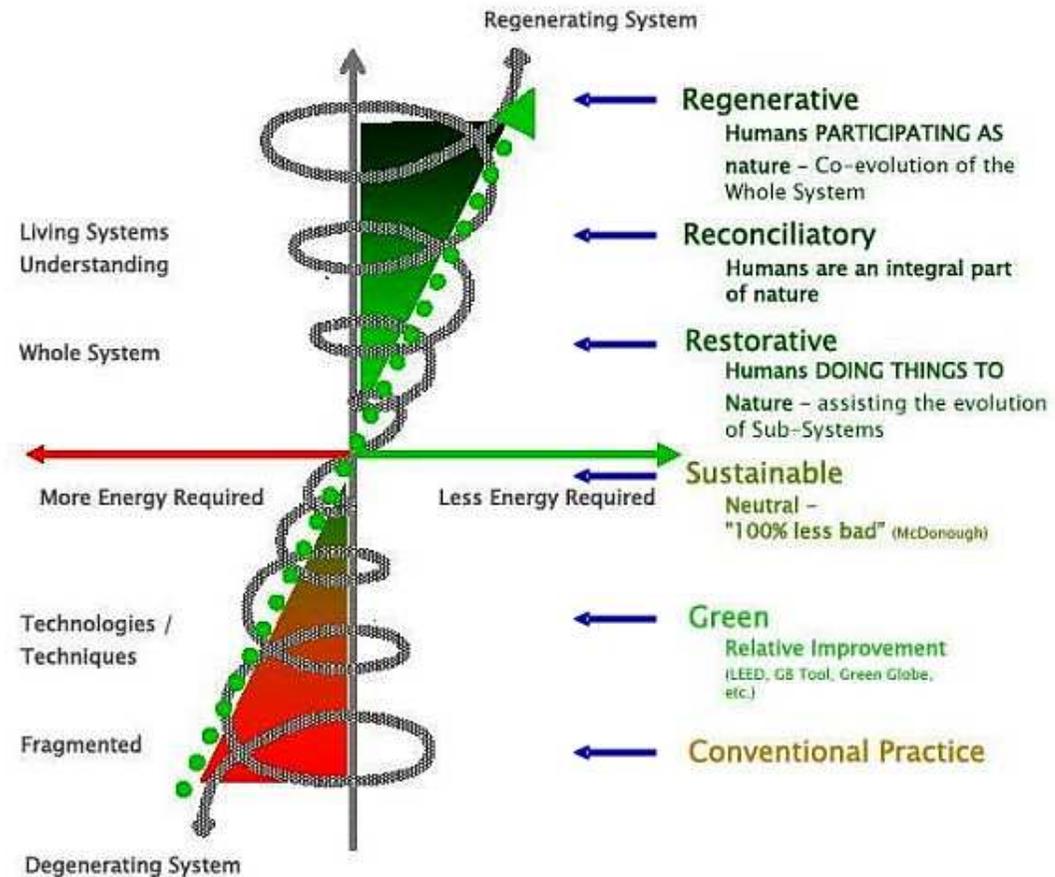
Synergy can be understood as the combined power of a group of things when they are working together which is greater than the total power achieved by each working separately

$$\text{connectivity} = \frac{\text{number of intersections}}{\text{selection area (km}^2\text{)}}$$



« positive » metabolism

From simplicity to
complexity :
End of certainty to
an open world of
possibilities

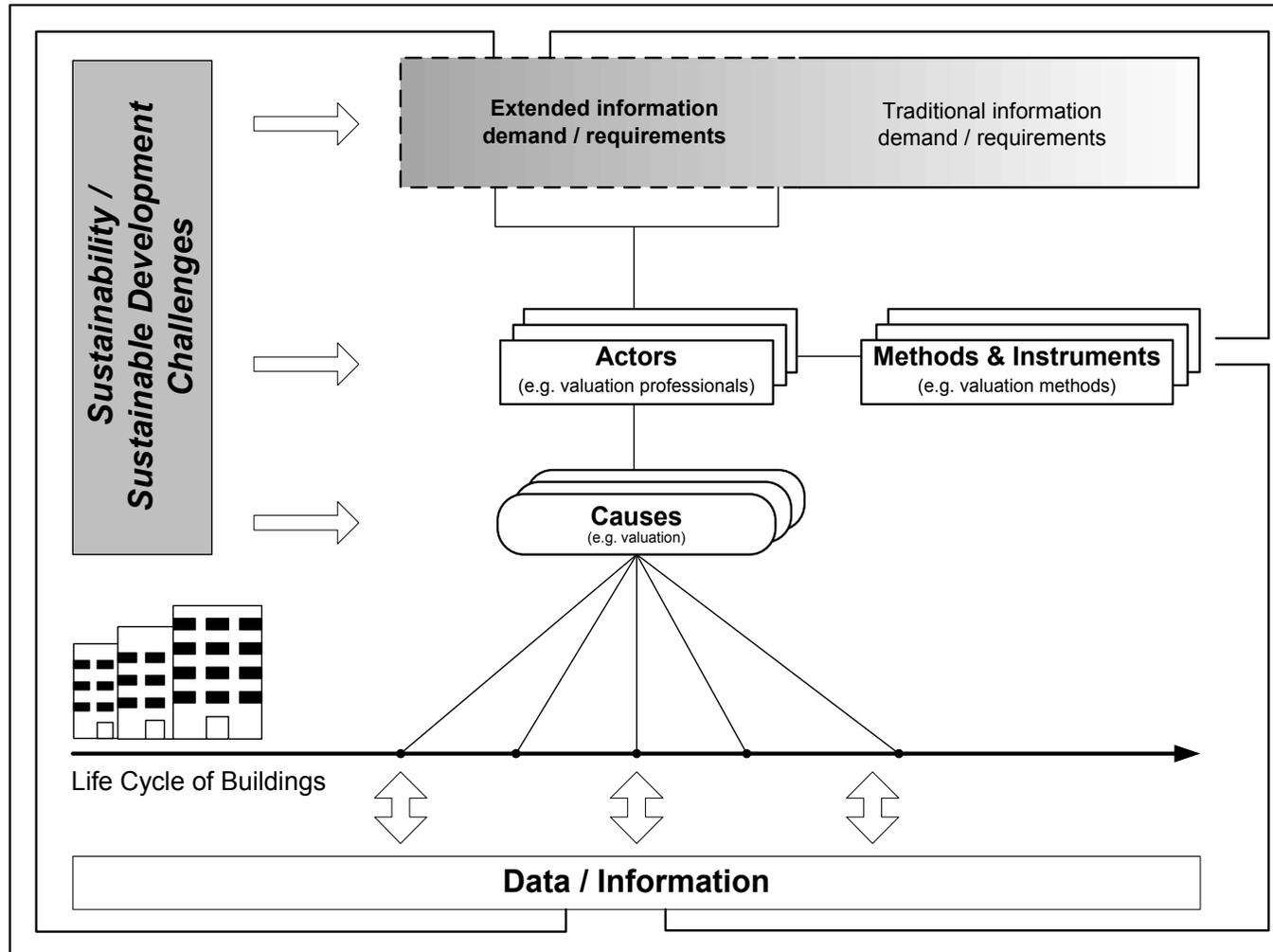


Building Long Term Value Assessment :

- Location
 - Connectivity infrastructure
 - Local services and shops (density)
 - Security
 - Attractivity (image...)

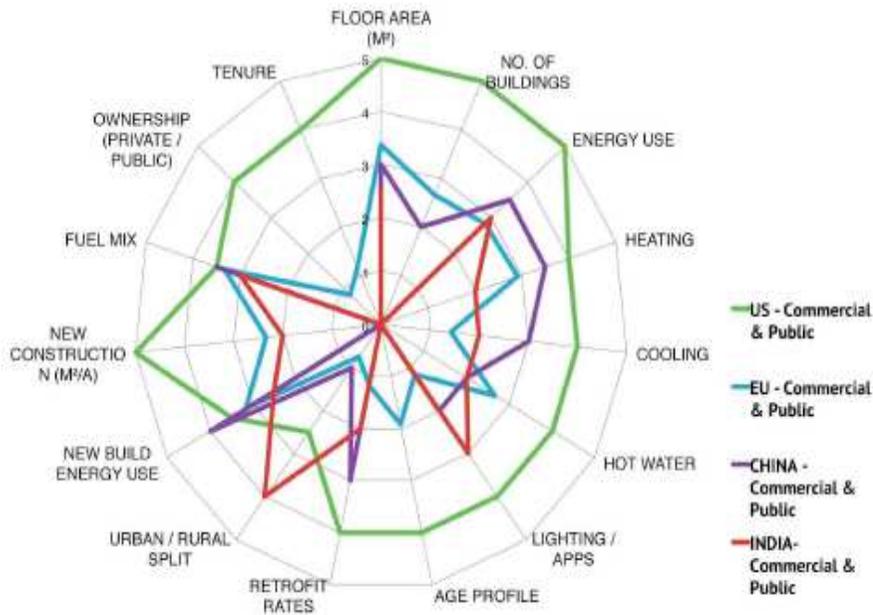
- Quality
 - Indoor environmental quality
 - Energy performance
 - Lifespan
 - Flexibility / Mutability

Life cycle and building information

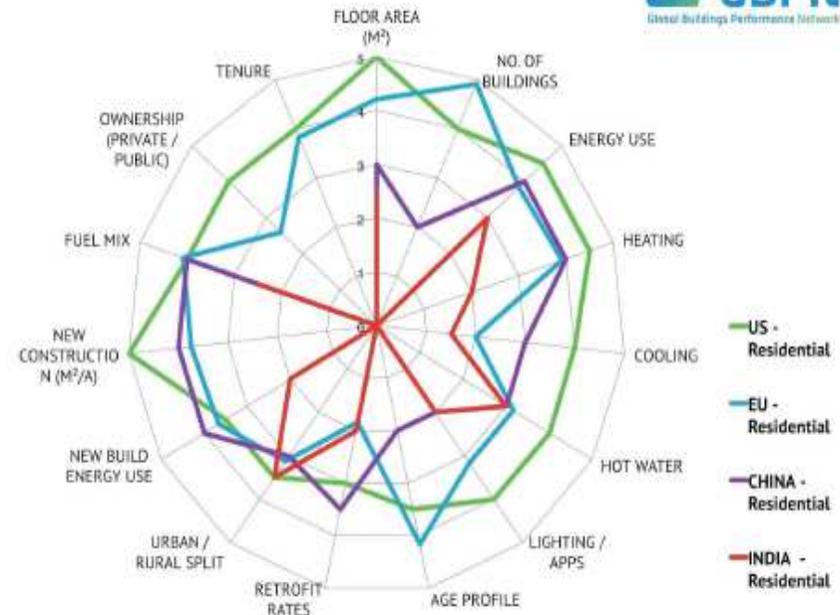


Data accuracy

COMMERCIAL AND PUBLIC BUILDING DATA QUALITY IN FOUR REGIONS



RESIDENTIAL BUILDINGS DATA QUALITY IN FOUR REGIONS



■ 0 : no data – 5 fully reliable

Data flows by stakeholders : translation

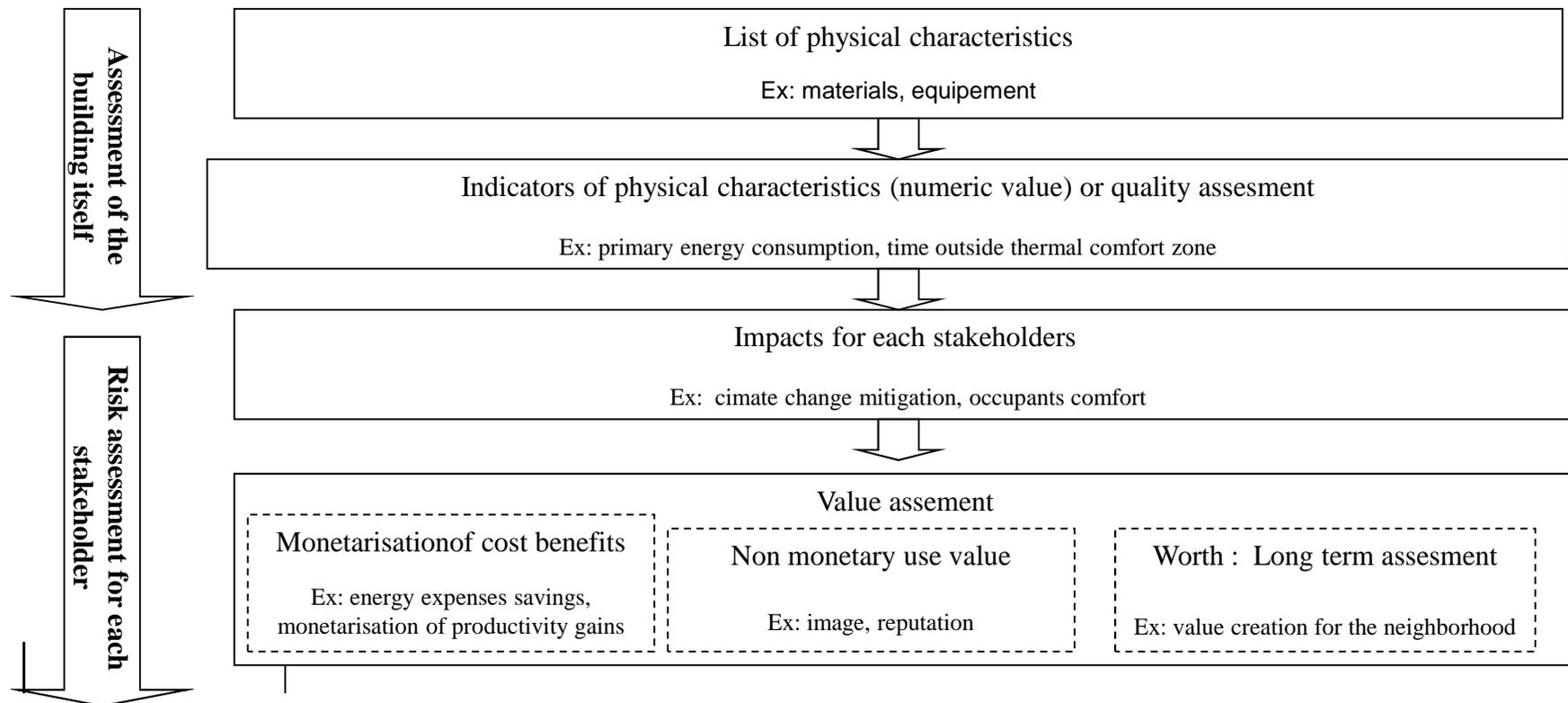
Building
Life cycle

Development

Construction

In Use

Refurbishment



Risk management

Q

Companies use energy efficiency investments to manage a diverse set of risks

How does your company use energy efficiency investments as a risk management tool?*

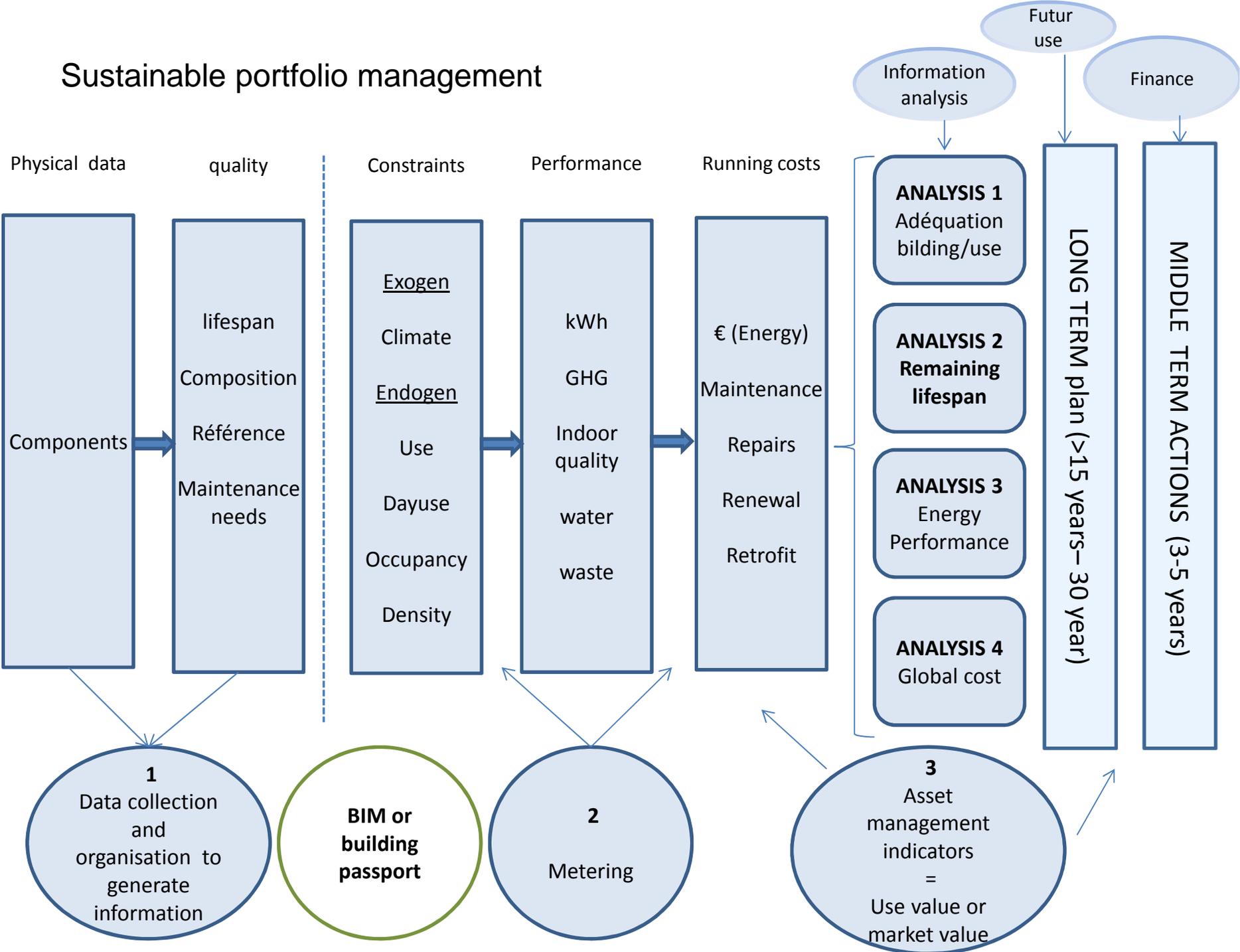
(% of total respondents who chose each risk type)



*5% did not answer.

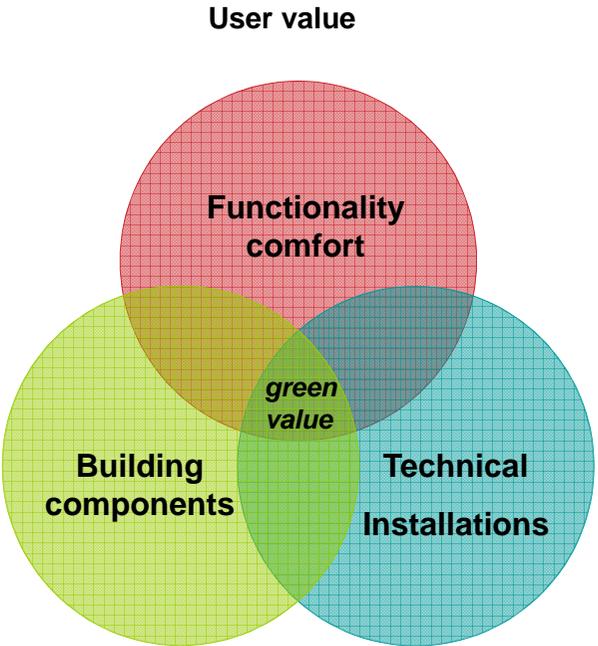
Source: Economist Intelligence Unit survey, June 2012.

Sustainable portfolio management



Building-centered model

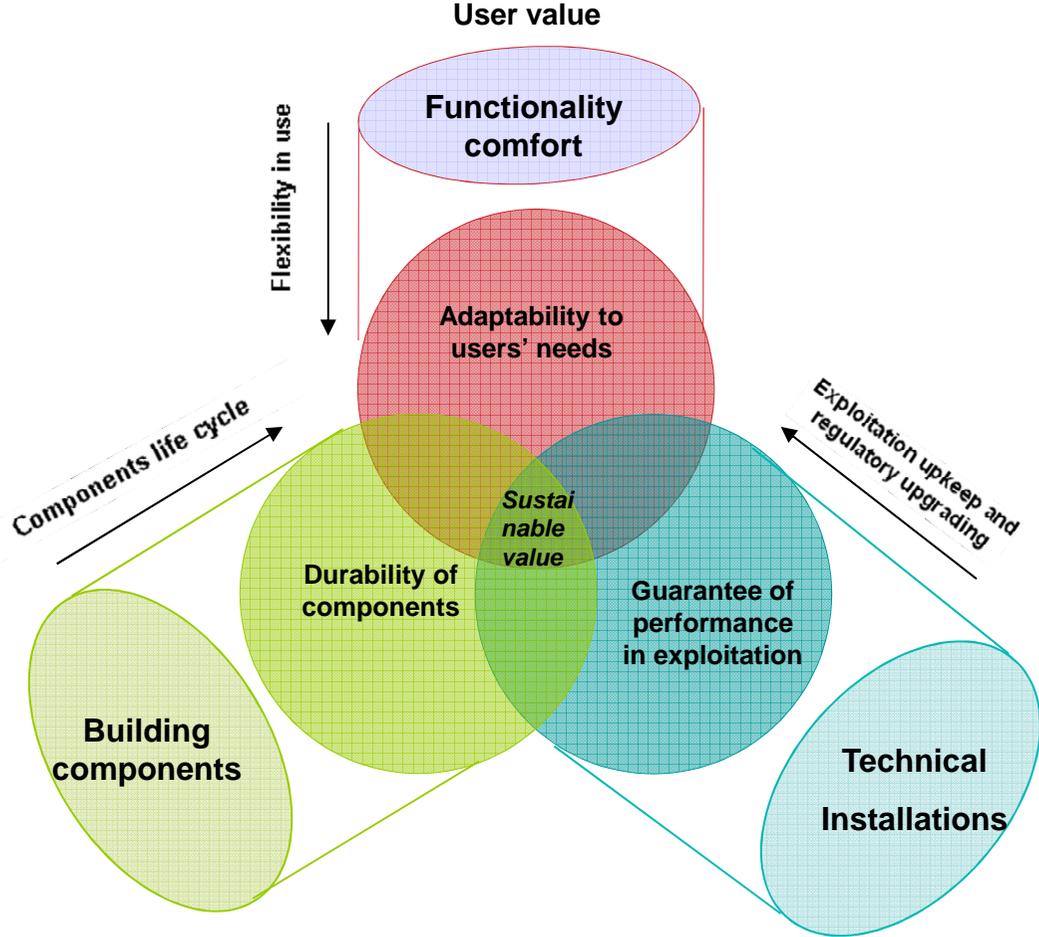
From a static vision



Intrinsic value

Operating value

To a dynamic vision of value



Intrinsic value

Operating value

Green value : holistic approach

References	Certifications	Market value	Rental value	Occupation rate
Fuerst and McAllister (2008)	LEED, Energy Star (USA)	31-35%	6%	
Wiley et al. (2008)	LEED (USA)		15-17%	16%-18%
	Energy Star (USA)		7%-9%	10%-11%
Miller et al. (2008)	LEED (USA)	10%		
	Energy Star (USA)	6%		
Kok (2008)	LEED, Energy Star (USA)	16%	6%	
Pivo and Fisher (2009)	Energy Star (USA) zones under redevelopment	6.7%-10.6%	4.8%-5.2%	0.2-1.3%
Fuerst and McAllister (2010)	LEED (USA)			8%
	Energy Star (USA)			3%
Eichholtz al. (2010)	LEED (USA)	11%	6%	
	Energy Star (USA)	13%	7%	
Chegut et al.(2011)	BREEAM (Londres, GB)	26%	21%	
Kok, Newell and MacFarlane (2011)	NABERS 5 stars (Australia)	9%	3%	
	Green Star (Australia)	12%	5%	
Fuerst and McAllister (2011)	Energy Star, LEED (USA)	25%-26%	4%-5%	



An example of green value evaluation

		Traditional Building	Low energy building (-25%)	Sustainable Building
Rent	€/m ² ,a	300	300	305
Maintenance	€/m ² ,a	10	10	12
Energy	€/m ² ,a	20	15	15
Net rent income	€/m ² ,a	270	275	278
Renting process	rental months	6	6	5
Free rent period	rental months	3	3	2.5
Churn	rental months	3	3	2.5
Total months	rental months	12	12	10
Rental period	years	6	6	7
Net operating income	€/m ² ,a	220	225	242
Capitalization rate	%	6.25	6.25	6.15
Value	€/m ²	3520	3600	3935
Change	%		+ 2,3 %	+11.8 %

Conclusion:

Policy

- **Change land regulation and taxes for investment in “service infrastructure” instead of energy production**

Finance

- **Change to long term assessment**

investors

- **Valuation of building quality (service & lifespan)**

Designers

- **Change to flexibility and dynamic strategic vision based on citizens life and expectations**

Construction

- **Change to quality efficiency instead of cost competition**

users

- **Change occupier behaviour**