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Reducing Energy Dependence at Urban Scale as an Aspect of Degrowth

INSTITUT FOR TECHNOLOGY ASSESSMENT AND SYSTEMS ANALYSIS (ITAS); Andrea Immendoerfer; Colette Waitz; Markus Winkelmann

Content

- Background
- What is CONCERTO?
- Technologies in CONCERTO
- Sustainable Energy neighbourhoods as degrowth
- Limitations
- Default solutions
- Efficiency and Sufficiency
- Sufficiency for everyone?

Background – rising Demand for Energy

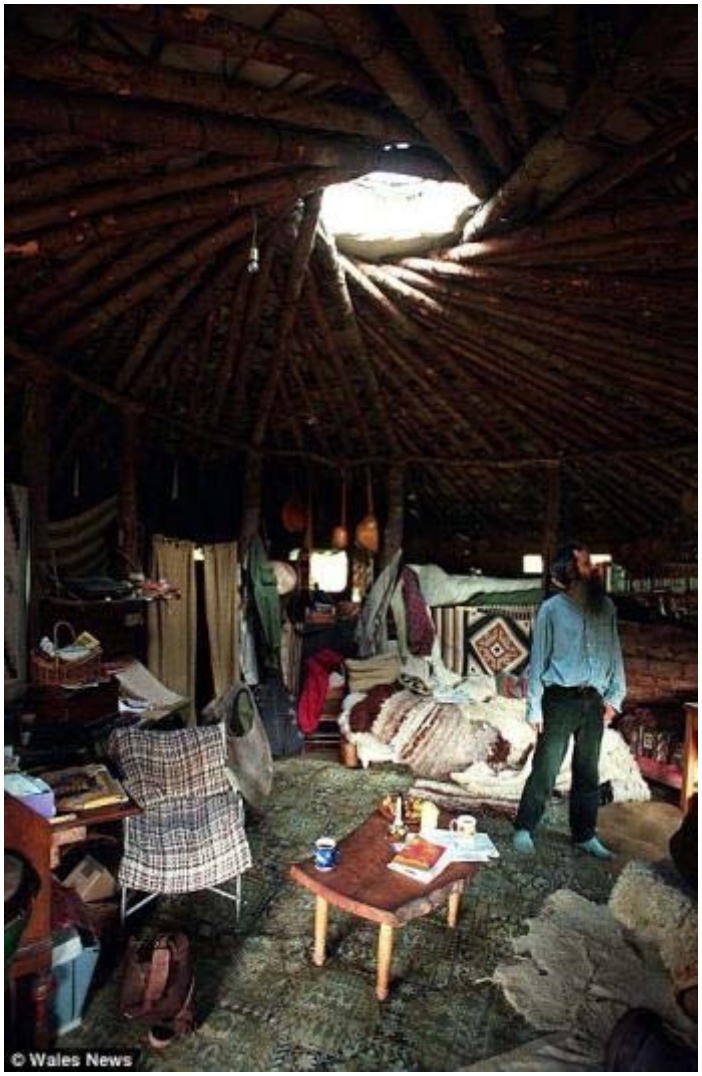
- Considerable rise in land use per person over recent decades (e.g. in Germany from 14 m² per person in 1950 to 45,1 m² in 2010
- More gadgets
- Higher comfort expectations
- rising energy bills,
- fuel poverty

Buildings, Energy and Degrowth

- imperative to reduce the consumption of all of these resources: Land, **energy and money**.
- image problem of degrowth
- associated with a reduction in comfort and convenience

- Is there degrowth that is acceptable to today‘s general public?

How much Degrowth/ how little Technology ?



The CONCERTO Initiative

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CONCERTO is co-financed by the European Union under the Research Framework Programme

CONCERTO - community

58 communities

23 countries

175 million EUR

started in 2005

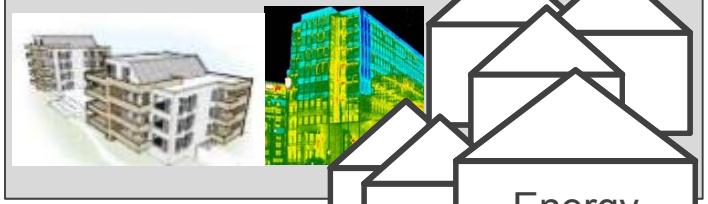
Why? -> to support EU-Targets

- 2020-Targets :
  - GHG to be reduced by 20%,
  - 20% of total energy consumption in the EU to be provided by renewables
  - 20% of efficiency savings to be made
- Furthermore, 80-95% of emissions are to be saved by 2050
- The Energy Performance of Buildings Directive (EPBD 2002)

- EPBD 2010 requires all new buildings to be “nearly zero energy” by 2020 and 2018 for public buildings

The CONCERTO Initiative

Energy supply



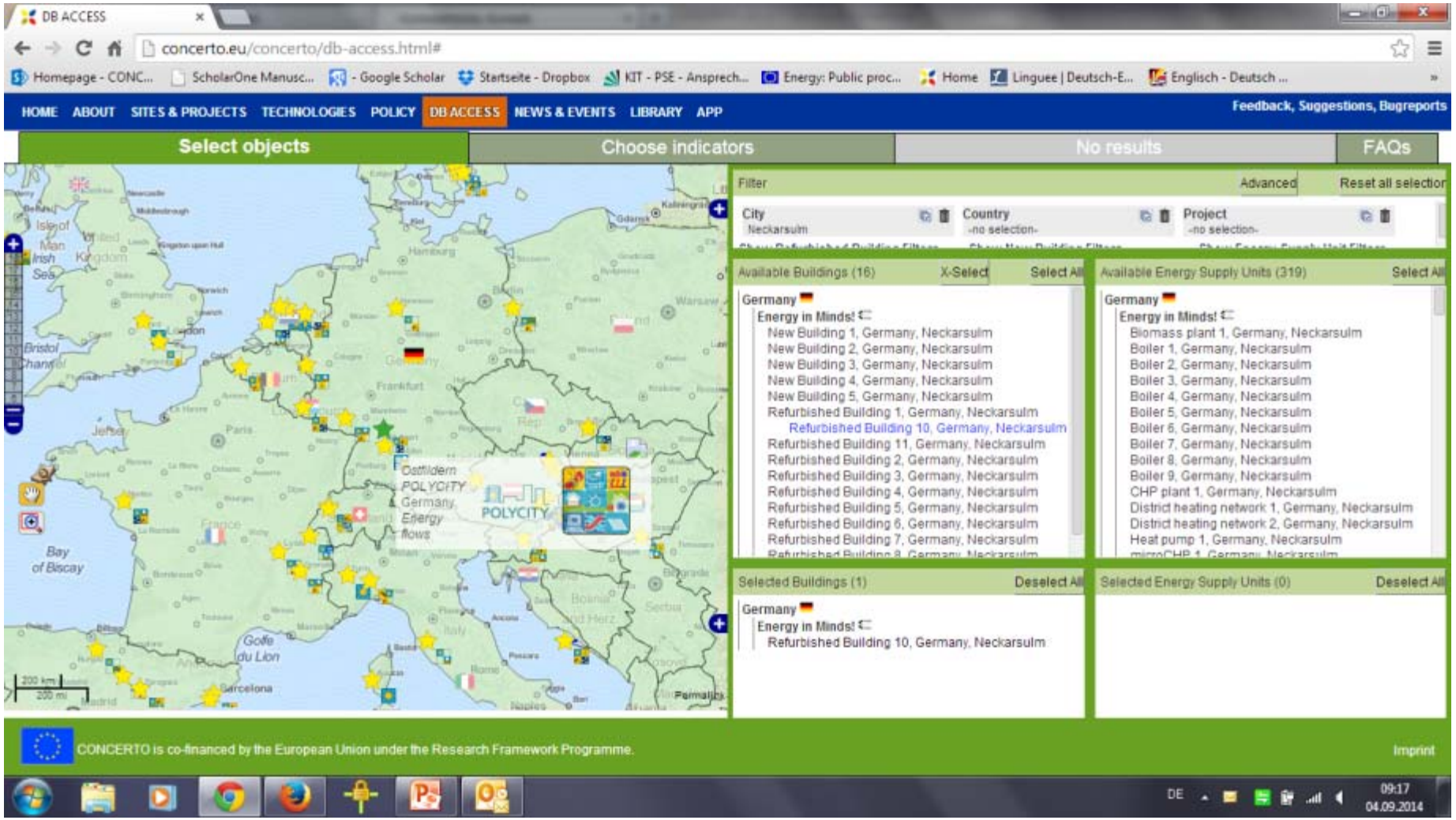
Energy demand

	Polygeneration	District Heating or Cooling	District Cooling	District Heating	Geothermal Plant	Heat Pump	Hydro Power Station	Information Technologies (IT)	Large Scale Storages	Air Pressure Storage	Batteries	Mechanical Ventilation & Heat	Natural Ventilation or Passive Cooling	New Mobility
Ajaccio, Corsica						X								
Alessandria	X		X	X										X
Almere	X			X		X						X		
Amsterdam Noord				X		X			X			X		
Amsterdam, New West	X			X										
Apeldoorn				X				X						
Birstonas				X		X								
Cerdanyola del Valles	X		X						X				X	
Cernier				X		X	X			X				
Delft				X		X						X		

Some Examples…

The CONCERTO Premium - KIT

www.concerto.eu



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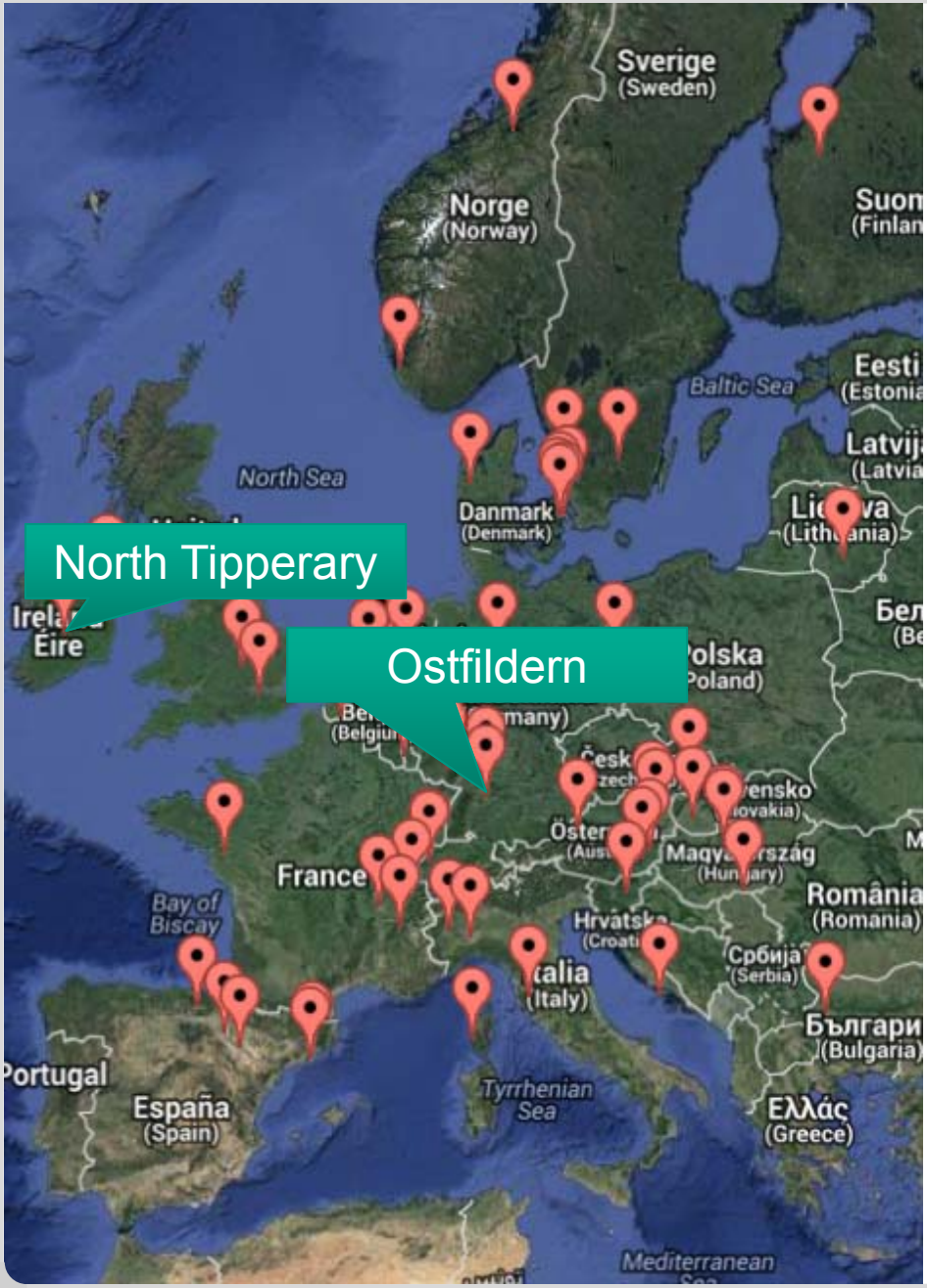
Samples of technology applications in three CONCERTO communities

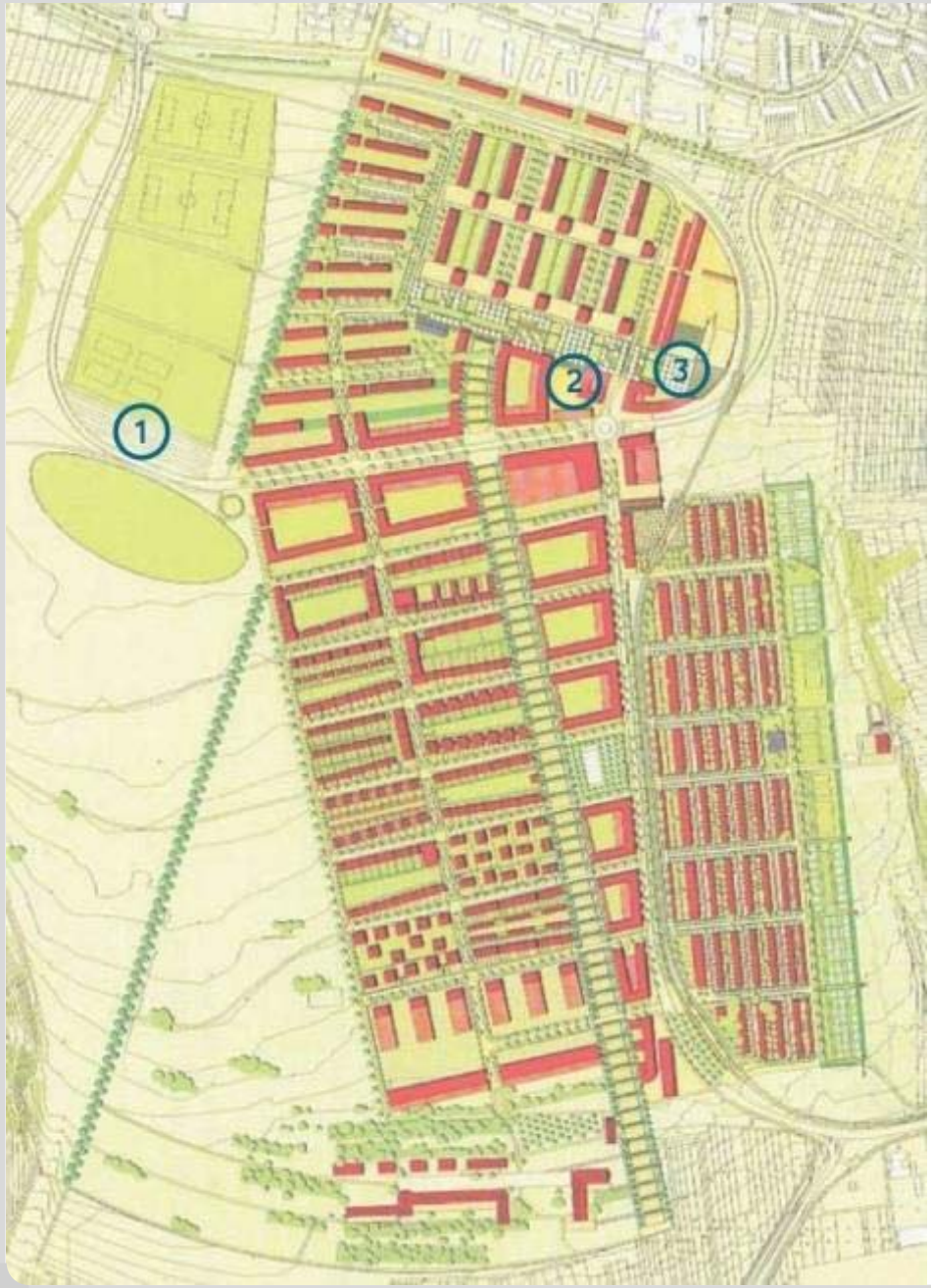
Energy supply and distribution
Information and communication technologies

KIT – University of the State of Baden-Wuerttemberg and
National Research Center of the Helmholtz Association



CONCERTO Examples

- Scharnhauser Park (new)
  - Ostfildern, Germany
- North Tipperary
  - Ireland



Scharnhauser Park - Ostfildern

- Former military area
- Development from scratch
- „Ecological model district“
- 9,000 inhabitants
- 2,500 work places

Scharnhauser Park - Ostfildern

- Biomass district heating
- Fed by new woodchip CHP

- Covers
  - 80% of heat demand
  - 50% of electricity demand

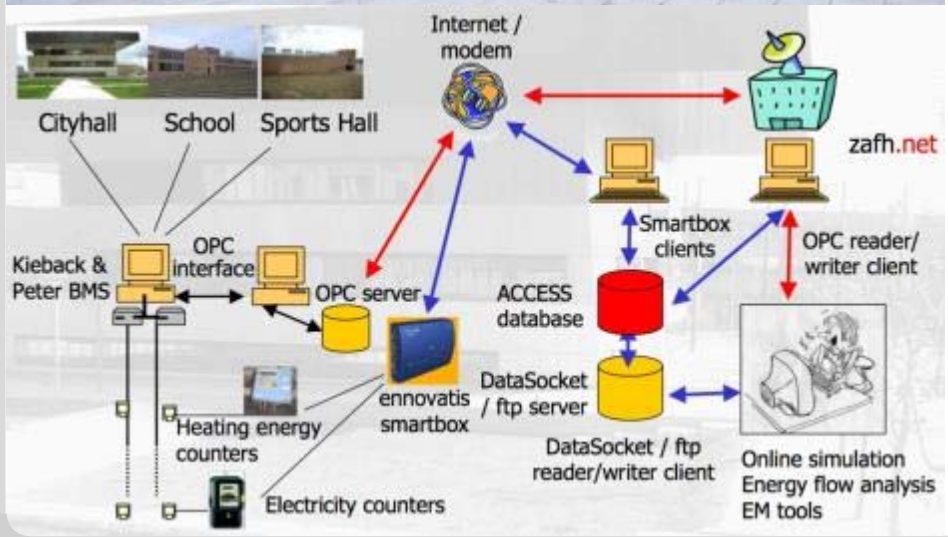
Scharnhauser Park - Ostfildern

- Hydropower on freshwater supply
- 238 MWh yield in 2010
- Equals to mitigation of 170t CO_2

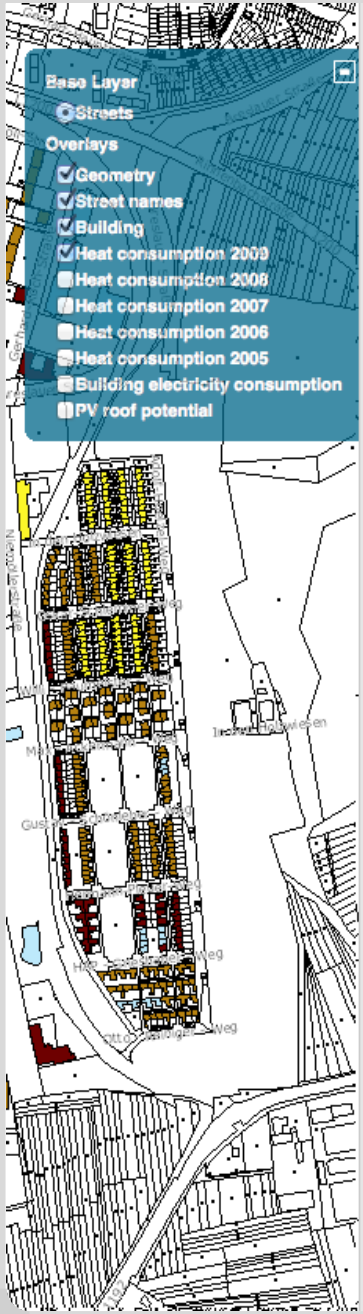
„Elektror“ building

- Office buildings
- Well insulated
- Automatic external shading and artifical lighting control
- Ventilation with heat recovery
- Concrete core activation
- District heat, Geothermal piles, absorption chiller

BMS



- Building management system
- Used
  - Control
  - monitoring



Gebaeude_Attribute

GebaeudeName	Reihenhaus "Grosses UG"
Gebaeudekategorie	1-/2-Familienwohnhäuser als Reihenhaeuser
Baugenehmigungsjahr	1998
Bauherrschaft	Hofkammer Projektentwicklung GmbH
Adresse	In den Holzwiesen
Hausnr	4
ID1	43

GIS

Gebaeudetyp_Waermeverbrauch_2009

Mittelwert_2009	56
Einheit	kWh/m²a
ID1	314

Gebaeudetyp_Waermeverbrauch_2008

Mittelwert_2008	53
Einheit	kWh/m²a
ID1	314

Gebaeudetyp_Waermeverbrauch_2007

Mittelwert_2007	52
Einheit	kWh/m²a

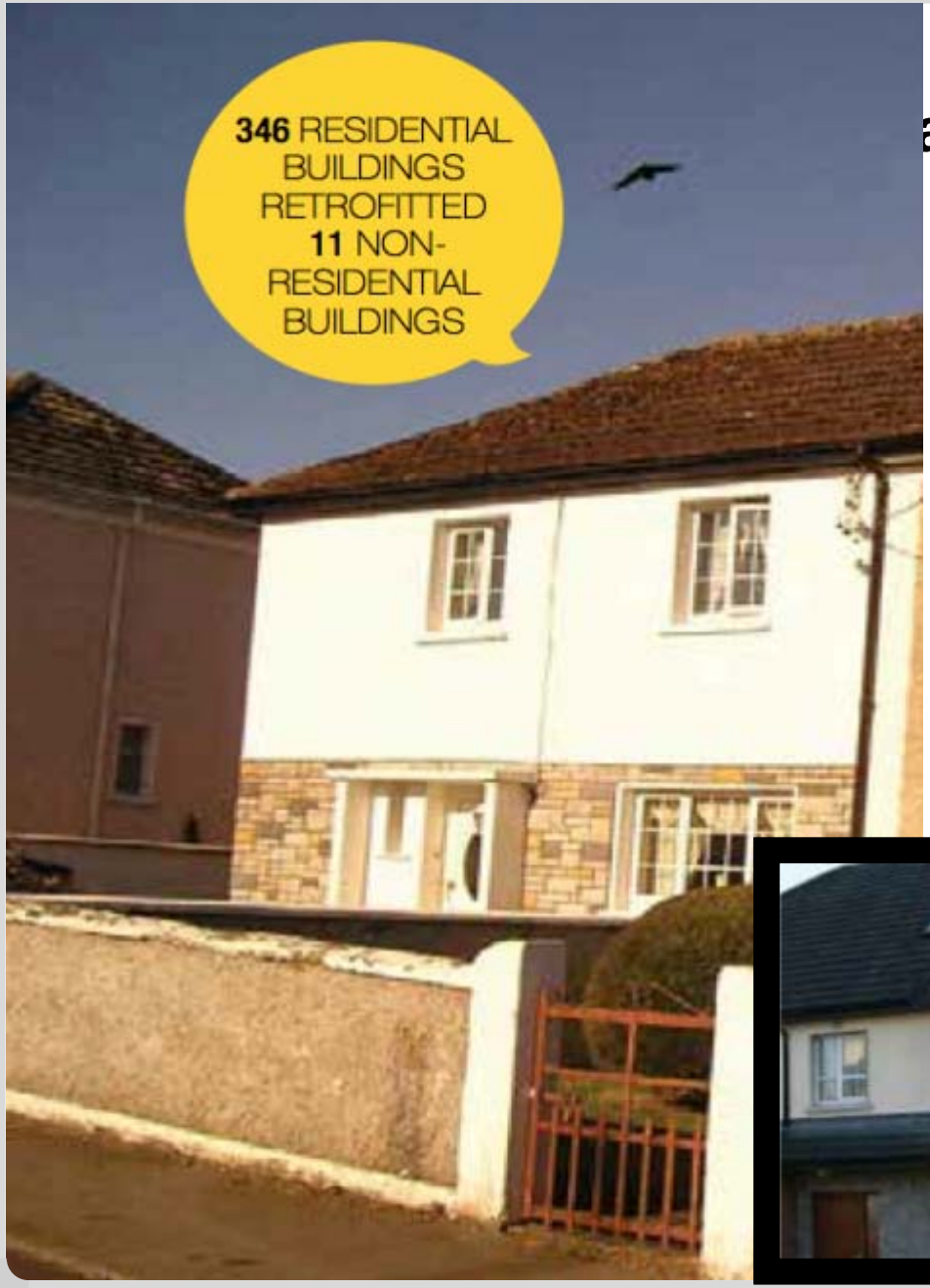
Legende *All facts in kWh per sqm and year*

- 0 to 20
- 20 to 40
- 40 to 60
- 60 to 80
- 80 to 100

> Referenced Values

- Map visualisation of results
  - Example: Monitoring data Ostfildern
- Potential analysis
  - Example: Energy catastre at Redange, Luxembourg
- Planning infrastructure
  - Example: Zlin, Czech Republic

North Tipperary



ary

- Large number of retrofits
- Retrofit of evident deficits
  - Envelope insulation
  - Upgrade heating control
  - Adding renewable heating source
- Large impact

It ain‘t no Rocket Science…

The Achievements

376 000 tonnes of CO_2 per year saved, compared to BAU

New Buildings: 30% better than national standard
Refurbishments: to new-build standard

So if you leave the heating on….

- You are still automatically greener
- **By default !**

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Degrowing energy by default

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Defaults are important !

Der innere
Schweinehund
(the inner pig-dog)

BedZED (South London) designed for „Eco-Slobs“


KIT
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ecodrive
127

One Planet Living

Source: Bioregional

So is this the solution ?

- There are limits to the “default”
- Rebound effects and prebound effects
- 80-95% target for 2025
- NZEBs, Zero Energy, Energy-Plus
- Efficiency-focussed approach is insufficient for degrowth

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Efficiency and Sufficiency and CONCERTO

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Solution 1: Awareness – 1-2-1

- Very intensive engagement with inhabitants by an energy agency
  - one-to-one
  - North Tipperary: „a cup of tea“
  - in other projects often also thro‘ schools

Solution 2: Making the invisible visible….

- All CONCERTO projects hat to monitor for 2 years (= funding condition)
- Real-time energy monitoring and internet-based visualisations
- Monitoring is absolutely crucial – North Tipperary / CONCERTO has potential to supply an evidence bases

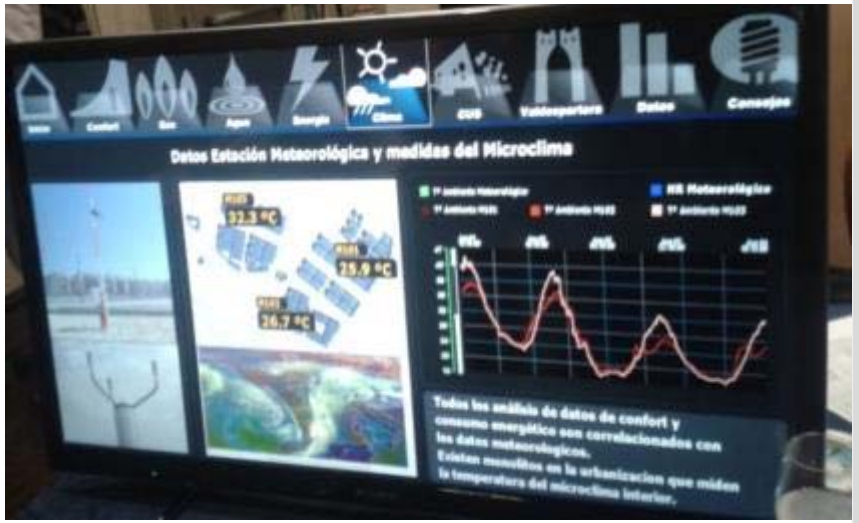
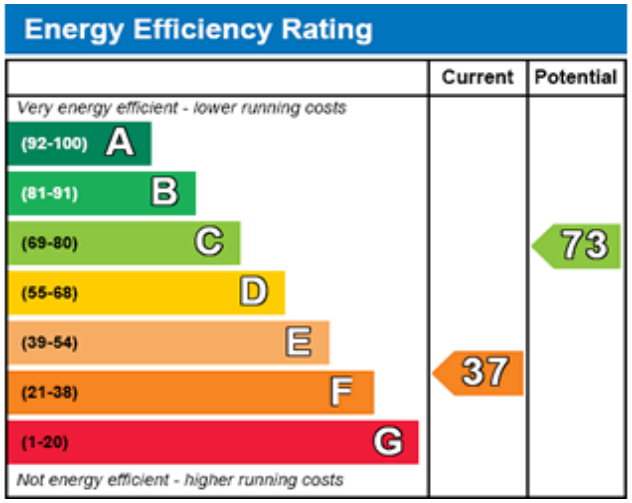


Image from Zaragoza, ES

Solution 3: EPCs

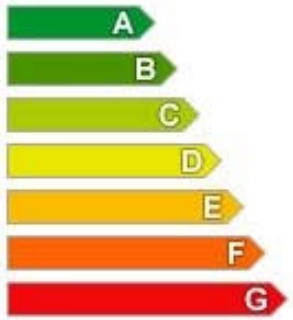
- One of the most visible and tangible outcomes of EU
- Has potential to be far more powerful
- Powerful awareness tool

…would have liked to see more



The new Version of the EU Energy Label

Original scale



New scale

1992
Energy Labeling Directive for domestic appliances

1998
EU wide Application of the Energy Label

2010
Revision of the Label and extention to further appliances

since 2011
Application of the revised directive

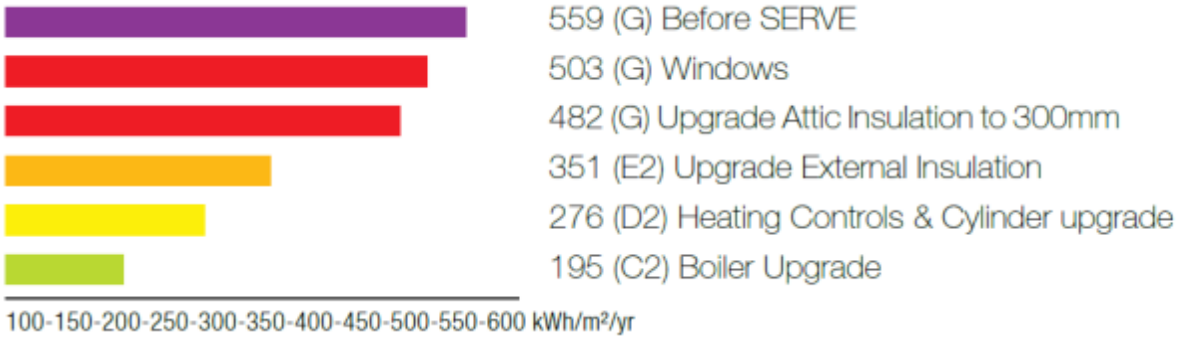
Further appliances
Ligth bulbs
Cars
Ovens
…

Air conditioner (coming soon)

Understanding Retrofitting with EPCS

Semi-detached house
From **559 kWh/m²/year** to **195 kWh/m²/year**
Investment of **18,383€**
Payback 13.7 years/After grant the payback is 9.73 years

ENERGY SAVING
AFTER SERVE
65%

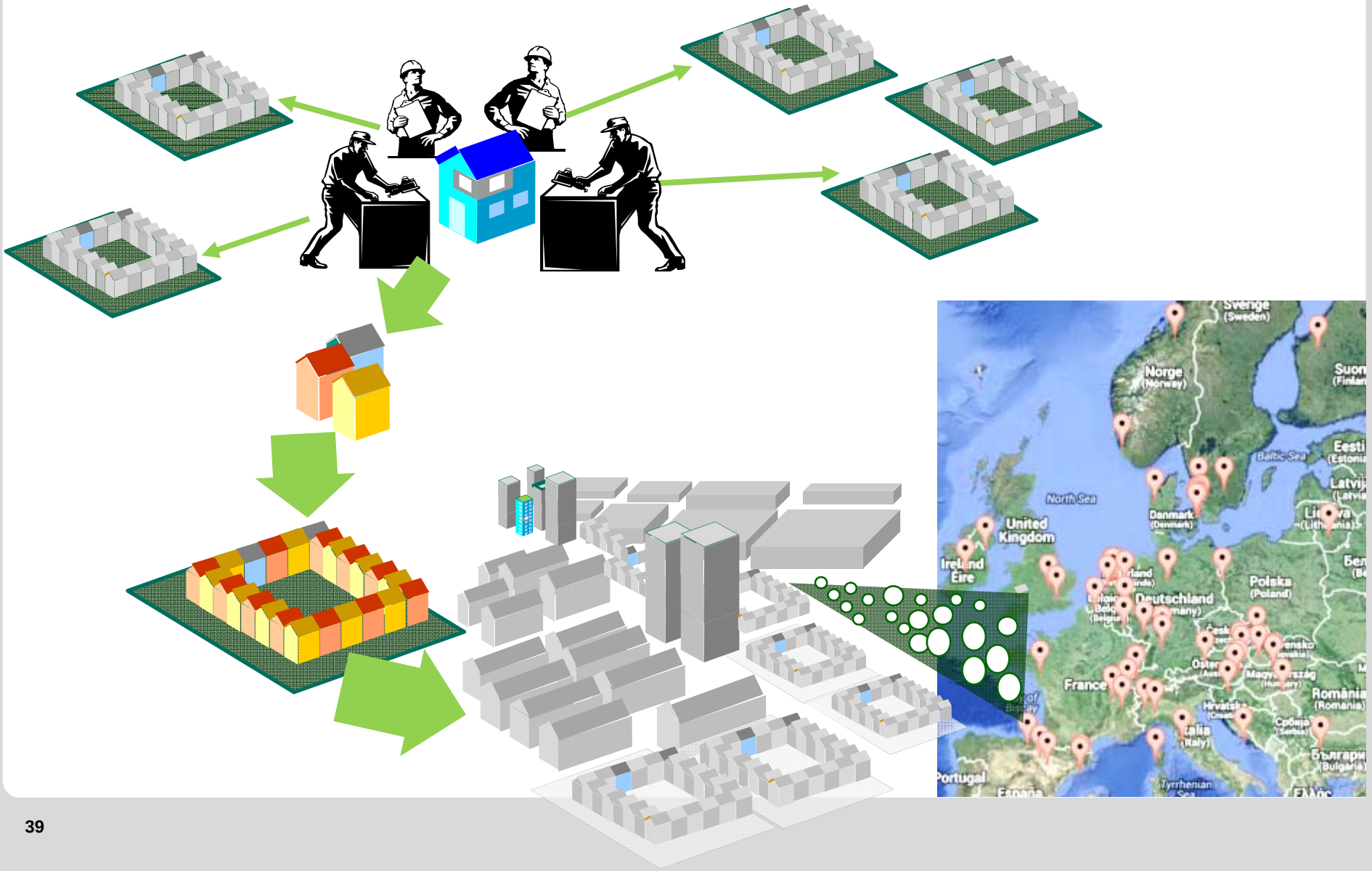


CASE N.3/
SEMI-DETACHED HOUSE

Sufficiency for everone? – rolling it out…

- Remember those targets…
- Legacies and successes
  - Policy developments (local, national)
  - Dissemination and diffusion
  - Replication
  - Partial diffusion: knowledge, structures, training
  - „diverted“ diffusion
- Pilot projects: the power of evidence that it can be done…per pressure

Rolling it out



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Lessons & Discussion

Lessons and points for discussion

- Need for large scale – whole communities
  - Demand and supply have to be matched
  - No standard approach – every situation is different
- Technologies in every field exist – reasonable implementation is needed

- Communities leave legacies/ diffusion happens
  - Pilot projects provide visible, tangible evidence -> crucial !
- Defaults are possible – to a degree!
- We need to think beyond energy
- **Efficiency + Sufficiency!**
  - Visibility

If you want to read more…

www.concerto.eu

If you dont want to read ….watch !

Thank You !!