ECO-Life project in bird's eye perspective

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co-funded by the
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How did it start (from coffee break to project)

- Information meeting on Danish Support Schemes in 2007
  - Høje Taastrup and COWI connected in coffee brake
  - Collaboration for Vision Gammelsø with 2500 dwellings in Høje-Taastrup - Development dept & Climate secretary.
  - COWI prepared EUDP project for initial investigations

- Finance from EUDP (EFPII) project made it possible for COWI and HTK to
  - Preinvestigate energy supply options
  - Prepare EU application for support
    - (based on experience from previous performed Concerto project called ECO-City)
  - Project teams were formed for 3 Communities
    - in Denmark around Høje Taastrup
    - in Belgium were Goedkope Woning and COWI connected
    - in Lithuania through COWI Lithuania

- EU project won and the ECO-Life concerto project started in Dec 2009
  - EU grant of 12.2 million Euro (91 mill. DKK) for the 3 communities, the Danish share of the grant is about 50 mill. DKK

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What is the concept of CONCERTO

A CONCERTO concept project involves several players in a sustainable smart city development:

- activates all key stake holders in a community e.g. municipality, utilities, consultants, R&D organisation, industry, housing companies, ESCO's etc. to work together on a continuous basis in stead of sequential
- keeps stakeholders to the fire over a period of 5-7 years and creates lasting relations between partners and learning from feed back
- works as a catalyst for collaboration and development of new solutions and continued development
- gives access to economic support from EC: to construction work, metering equipment, follow-up and dissemination activities
- increases the project quality and the technical solutions are being optimised
- ends with a monitoring program and evaluation and documentation of results – for dissemination & learning
- profiles climate work and creates identity & proudness

ECO-Life project

- CO2 neutral town development combined with improvement of quality of life in communities of 3 countries involving 25 project partners:

46000 inhabitants

75.000 inhabitants

5.400 inhabitants

The following will concentrate mainly on Høje Taastrup

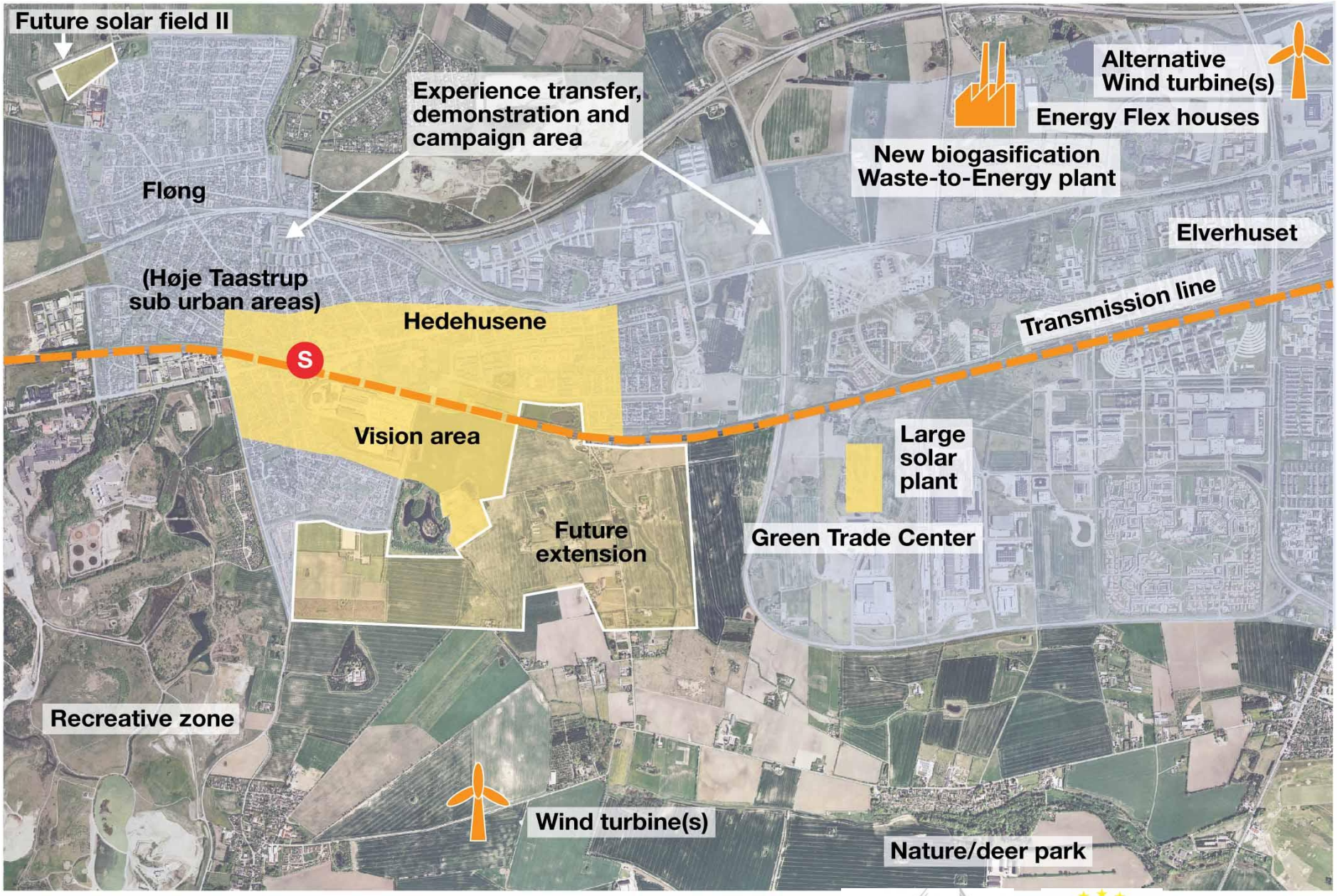
ECO-Life
Project participants in Høje Taastrup

1 (Coordinator)	COWI A/S
2	Høje-Taastrup Kommune
3	Høje-Taastrup Fjernvarme a.m.b.a.
4	VEKS I/S
5	Teknologisk Institut
6	Det Grønne Hus - Energitjenesten (SME+NGO)
7	11CityDesign (SME)
8	Rockwool A/S
9	AB APTUS Electronik

+ 3. parties

More than an Energy saving project

- Whole city approach
  - people, quality of life, end-user involvement
  - nature, environment
  - affordable cost
  - eco-buildings
  - renewable energy supply
  - transport
- All initiatives in the whole city area are addressed (not only a district)



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Birds Eye View – whole city approach

A kaleidoscope of ECO-Life demonstration projects

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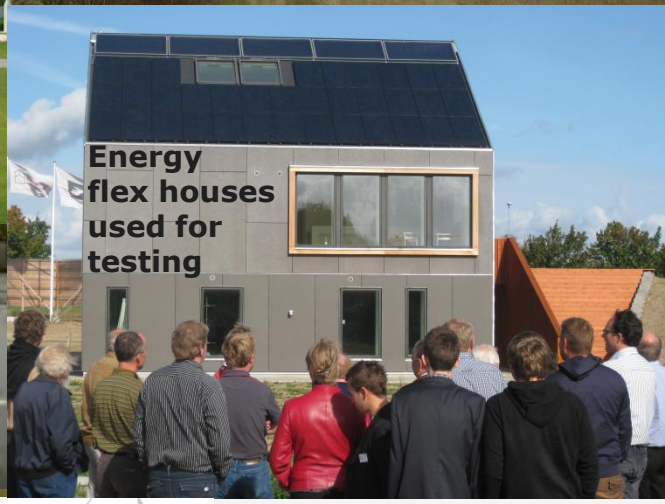
ECO-Life in Høje-Taastrup Denmark

- Elverhuset 901 m² passive house
- 34 m² PV, 4.5 kWp
- 12 m² solar collectors

PV & Smart grid charging station solutions

Demo wind turbine 850 kW near Ikea



Energy flex houses used for testing

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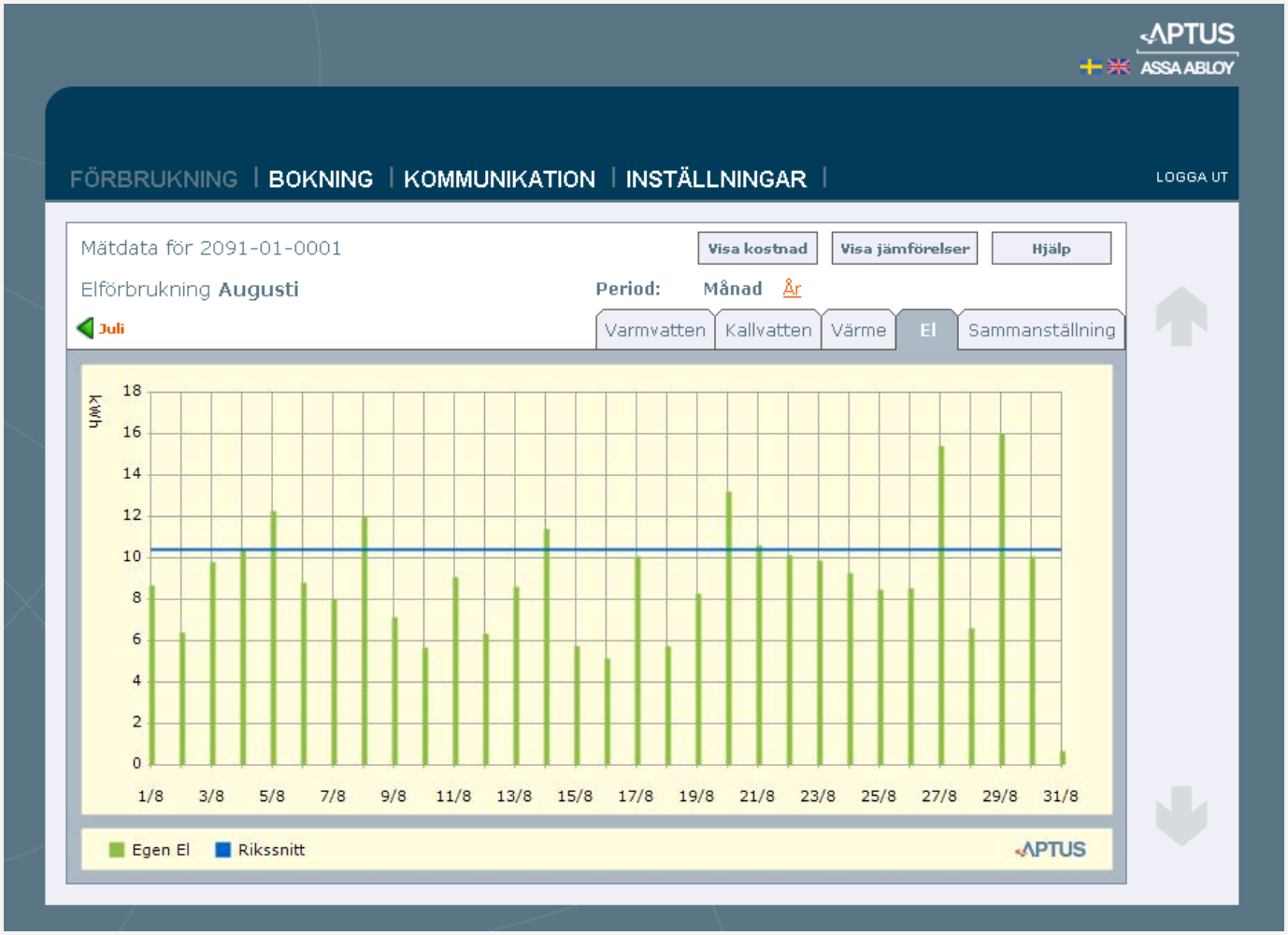
New low energy buildings (NZEB = class 2020)
Taastrup Station Centre, Boligforeningen 3B

2-way intelligent metering (money, energy, benchmark)



+
General
Switch

for ventilation
and main
switches

4 kWh/m² pa.
electricity
savings +
heat savings

23 kWh/m² y
electricity =>
very low

Low energy residential buildings

- Energy refurbishment in Høje Taastrup
  - 54 dwellings (4911 m^2) in multifamily house at Gadehavegård refurbishment of social buildings to passive house level (typical block)

Good feasibility

Net raise in rent 57 DKK/m² p.a.

(raise in rent from 785 to 972 DKK/m² i.e. a raise of 187 DKK/m² minus energy saving 30 DKK/m² O&M saving 100 DKK/m²)

7% raise in rent
for full modernisation and a glassed balcony

Before & After

Engvadgård (refurbished from outside)

- 71 dwellings (7782 m^2) semidetached housing
- Low temp district heating connected to a 3025 m^2 thermal solar field

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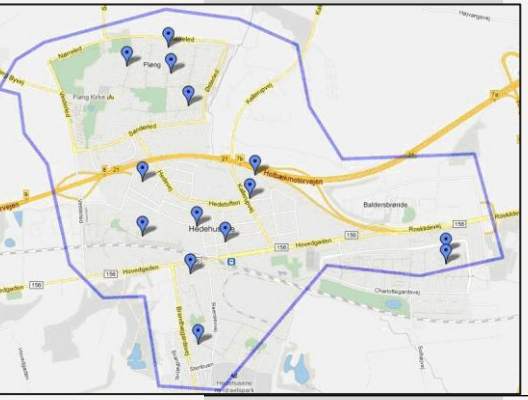
16 Single family homes refurbished 2298 m²

GoEnergi|HTK: Year 1

Home nr.	Investment, 1000DKK	Energy BF, DKK/y	Energy After, DKK/y	Savings, DKK/y
1	680	27.100	8.300	18.800
2	747	18.900	6.200	12.700
3	625	20.300	5.800	14.500
4	461	21.200	6.800	14.400
	334	27.500	10.700	16.800
	611	21.800	8.800	13.000
	699	29.200	6.300	22.900
	929	19.100	13.100	6.000
	1.066	34.800	17.600	17.200
	684	24.433		15.144
Avr. / home	90.000 EUR	3.280 EUR (100%)		2.030 EUR/y (60%)



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Low energy tertiary buildings

- Birkehøj plejecenter 5310 m² (elderly home with dwellings + common area)

- Deep refurbishment of institutions
  - Lindehaven 5
  - Lindehaven 1
  - Sankt Bendts Allé 6

- Rockwool Center 2 with innovative elements
  - Heat pump with vertical boreholes
  - Seasonal energy storage BTES
  - Solar PV and PVT plants
  - Thermo active slabs TABS
  - Window frames made of Rockwool

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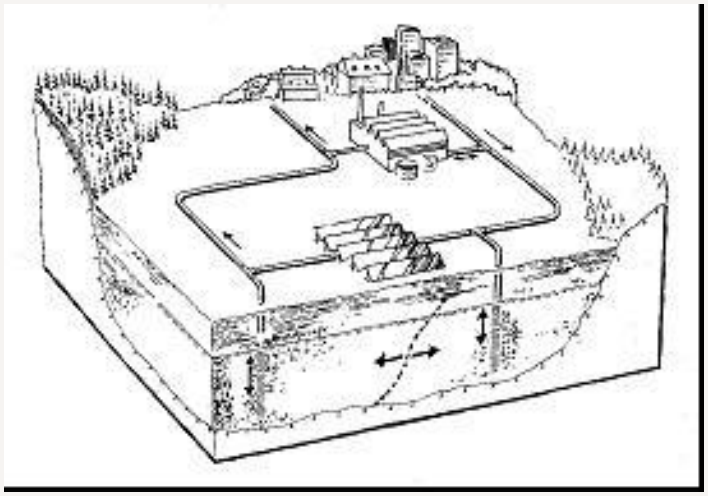
Rockwool building 3626 m^2 to be refurbished to Class 2015 / 2020

264 kWh/m^2 to 41 kWh/m^2 primary energy p.a. 84% savings at 9700 DKK/m^2



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Low temperature District Heating

- Sønderby area 75 houses
  - new twin pipes
  - re-use of district heating return water
  - new consumer units
  - => heat loss reduced from 41% to 14%
  - => return temperature reduced to below 40°C, but can be further reduced
  - => pay-back for extra cost of low temp district heating is 5 years

PV 795 m² and Electric Vehicle Chargers at Town Hall of Høje Taastrup

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Public information and training activities

250 hit per day on home page www.ecolife-project.eu

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Høje-Taastrup reached the targets

Planned

- Eco buildings 30.373 m²
- RES 3.352 kW

- New metering
- Electric car charging
- Seasonal storage
- Low energy street lighting

Realised

- ECO-buildings 26.892 + 2.625m²
- RES 4.509 kW

- New metering
- Electric car charging
- Seasonal storage
- Low energy street lighting

- ECO-Life project has led Høje-Taastrup to become on of the leading Green Municipalities in DK

CO_2 neutral ECO-Village in Kortrijk Belgium

- Social housing
- 276 Low energy dwellings
- Biomass DH and PV etc

- Whole city approach as for Høje-Taastrup
  - people, quality of life, end-user involvement
  - nature, environment, water
  - affordable cost
  - eco-buildings
  - renewable energy supply
  - transport

Kortrijk reached the targets

Planned

- Eco-buildings 20.842 m²
- RES 817 kW
- Metering & monitoring system

Realised

- Eco-buildings 29.136 m²
- RES (PV, heat pumps, solar thermal, biofuel CHP) 1475 kW
- Metering & monitoring system
- District heating on biomass new for Belgium
- MORE INFO IN NEXT PRESENTATION

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ECO-Life in Birstonas - Lithuania

- Typical housing blocks to be renovated.
- A school of art for eco- refurbishment
- 2 MW new bio-boilers planed
- Solar plant and CHP in minor scale

- Palanca city associated partner

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Birstonas

Planned

- Eco-buildings 28.059 m²
- RES (solar, biomass, PV) 1174 kW

- Metering & monitoring system
- Local gas based CHP

Realisation stopped

- Demonstration elements stopped as co-financing of EU FP7 and EU structural funds could not be combined
- National support scheme reduced
- Project grant transferred to Høje Taastrup and Kortrijk

- Today district heating on biomass

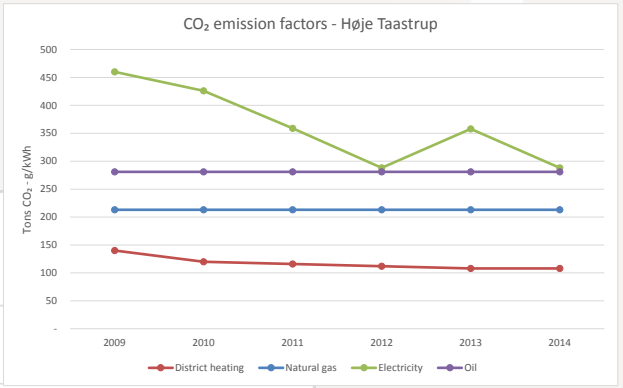
- All original intended parts analysed in feasibility studies => good basis for future refurbishment

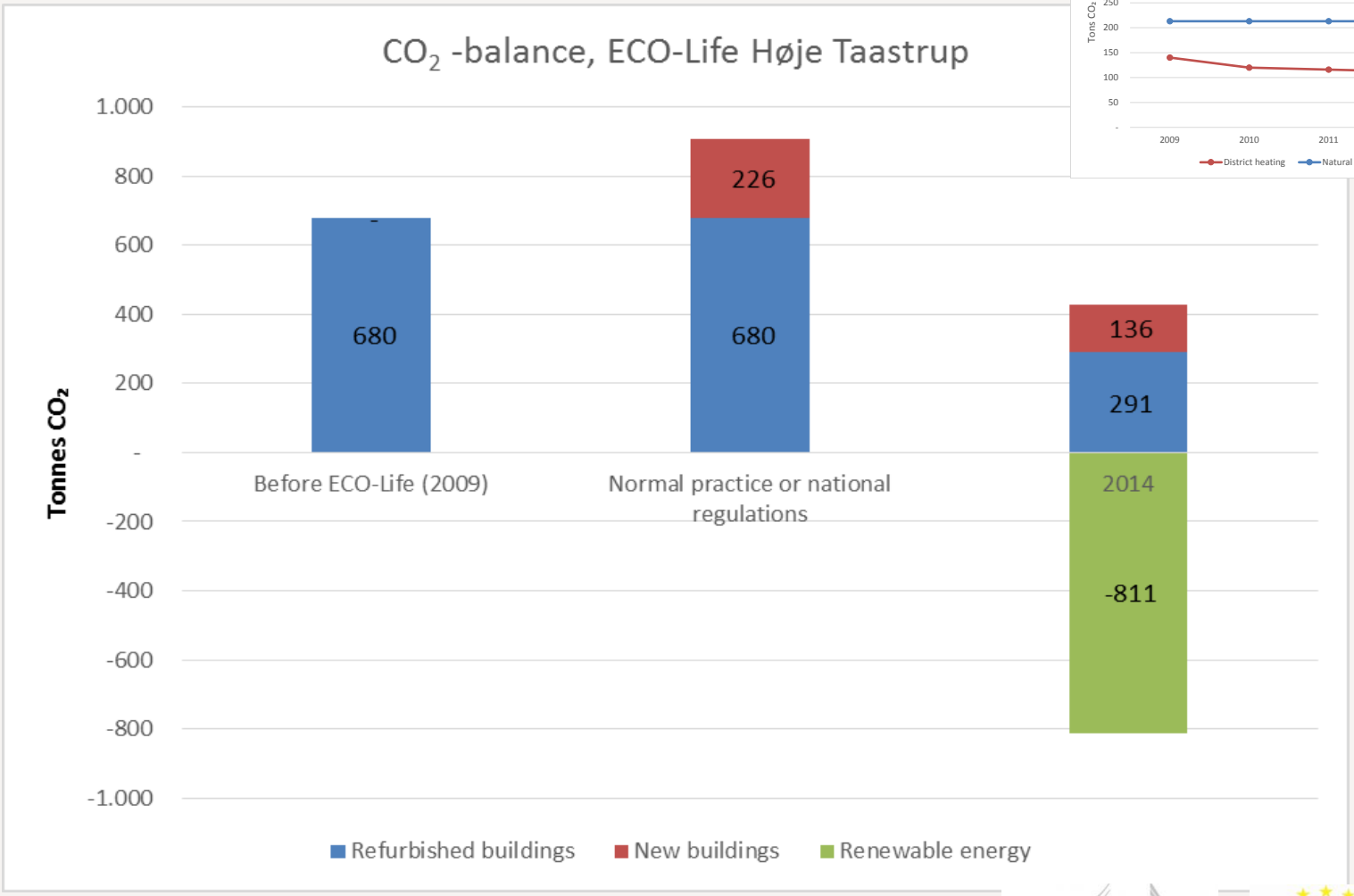
Monitoring tasks (77.5 person months)

- Energy flow monitoring
- Demografic data
- User interviews before and after
- End-user satisfaction and comfort evaluation

- CO_2-monitoring
  - Methodology for measuring CO_2-balance

Overall result on CO_2 reduction Høje Taastrup for ECO-Life project





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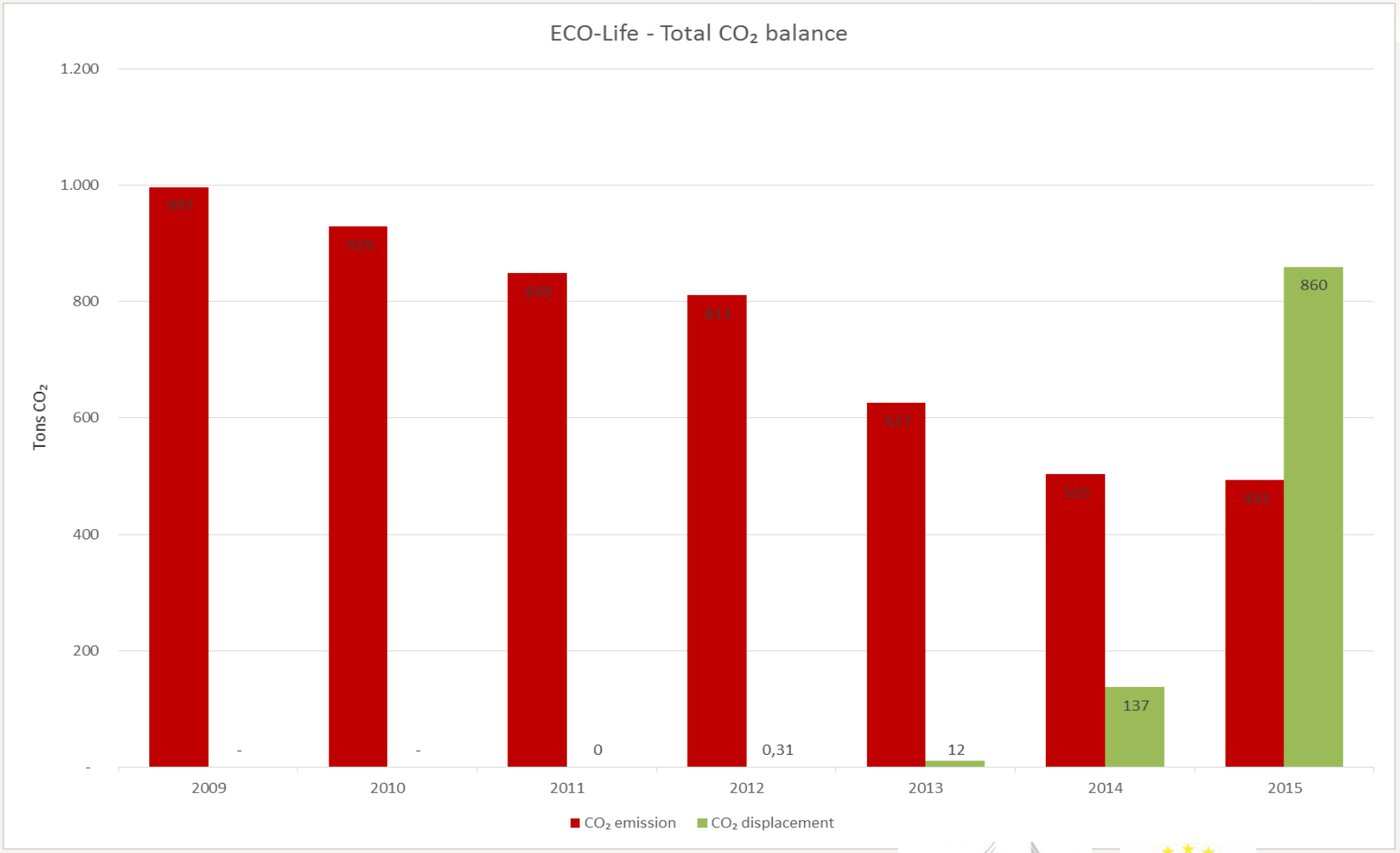
Overall ECO-Life project (Høje Taastrup + Kortrijk)



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Some learnings

- End user involvement is very important
- Location of wind turbines and solar plant in near urban area is difficult
- Cost of land must be reasonable low in case of land based solar
- New NZEB houses often have over temperature leading to window openings which have influence on energy consumption
- It is important with fiery souls, engaged leadership and continuity in the project team

A result of public private partnership

- Complementary competences and experience
  (strong alone, excellent together)
- Long period => lots of work => lasting relations => new and more initiatives

- Real life is dynamic and it is difficult to predict 5-7 years ahead…
  - e.g. financial crises
  - => Some flexibility have been necessary and EC has been helpful and accepted changes e.g. of project site (as long as ambitions and innovation level have been kept or improved).

Many thanks to our

EC project officer Mr Mario Dionisio

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And many thanks also to the engaged project participants

Continued development

Links to more info:

- **ECO-City project** (Helsingborg SE, Helsingør DK, Trondheim NO Tudela ES)
  - 2005-2013 (1st generation CONCERTO project, COWI coordinator)
  - www.ecocity-project.eu

- **SORCER project** (Apeldoorn NL and Hillerød DK)
  - 2006-2013 (2nd generation CONCERTO project, COWI loc. coordinator)
  - http://www.sorcer.eu

- **ECO-Life project** (Høje Taastrup DK, Kortrijk BE, Birstonas LT, Palanca LT)
  - 2010-2016 (3rd generation CONCERTO project, COWI coordinator)
  - www.ecolife-project.eu

- **READY** – Resource Efficient cities implementing advanced smart city solutions (Aarhus DK, Växjö SE and Kaunas LT)
  - 2014-2019 ("4rd generation" CONCERTO project, COWI coordinator)
  - www.smarcity-ready.eu

contact rmh@cowi.dk