

Nordic Built Active Roofs and Facades and Living in Light urban renewal in Valby, Copenhagen

Investigations by the Scientific Advising Board of the German government on “global environmental changes” has clearly documented that solar power will be the major energy source in the world with a very big expansion towards year 2100.

At the same time new building integrated PV (BIPV) solutions have been developed where PV is actually the climate shield in an architecturally optimized way, which in some cases means that the m² costs are becoming equal to the costs of normal façade and roofing materials, so economic prospects of local renewable energy production on our buildings have become much better. This has e.g. been documented in the Nordic Built Active Roofs and Facades project (see: http://cenergia2013.cypher.codelab.dk/en/news/?news_id=28).

In the ongoing ForskVE projects, BIPV Quality Cities and PV Active Roofs and Facades, Gate 21, Cenergia and other partners with Kuben Management, Technological Institute, Aalborg University, EnergiMidt, Solar City Denmark and FBBB / European Green Cities is working respectively with cities and housing associations to support the development of good BIPV solutions also with a view to use of international based Active House Labelling from the Active House Alliance (see: www.activehouse.info) together with a so-called “Solar Watch” system to secure principles for detailed monitoring, follow up and quality control. And a number of workshops are here organised with involved stake holders to support practical implementation work and full understanding of new PV rules in Denmark, and how you can realise cost effective PV projects if you base the design on more limited size projects where most of the PV electricity can be used in the hour it is produced in.

It is estimated, that there will be a very large market for “Active House” building technologies, but also that this is very dependent on securing an attractive cost level for the implementation.

During 2017 results will be obtained from ongoing implementation of active building elements in Nordic Built funded urban renewal in Valby and the Nordic Built Active Roofs and Facades project also dealing with the so-called Ellebo Garden Room renovation in Ballerup near Copenhagen.

In relation to this there is in some cases an aim in Denmark to obtain an energy quality equal to the Danish low energy class 2015 for urban renewal of old housing blocks and low energy class 2020 for renovation of multi-storey concrete housing blocks, and at the same time to aim at a zero energy solution, both for operation and costs on basis of the Active House Specifications for the involved demonstration projects.

In connection to this, it is important to realise, that there is in fact a unique situation in Denmark with respect to renovation in the social housing sector based on the organised savings for future maintenance and renovation, which is especially focusing at facade renovation.

In the ongoing Nordic Built Living in Light project, coordinated by Kuben Management, a new concept of urban renewal will be tested at Gl. Jernbanevej in Valby in Copenhagen. Here a 4 storey old housing block from around year 1900 will have new roof top apartments together with an approx. 2 m extension of the housing block towards the courtyard. The extension mainly consists of an innovative window structure from the Danish window company Velfac, and it increases the daylight quality of the apartments considerably without compromising comfort and energy use. At the same time building integrated PV solutions secures an overall CO₂ neutral design for the renovation project.



Glazed extension with 3 layer Velfac windows according to Active House standard

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Smart active house building

Peder Vejsig Pedersen from Cenergia Energy Consultants, looks at how integrated PV solutions can be used for smart house building...

At the same time as the cost of PV panels and related technologies remaining low every year, ongoing work is still taking place in Denmark to develop new low cost mounting and integration systems for both roofs and facades. Here with focus on ultimate solutions where PV panels can actually substitute normal building materials, so the use of nice architecturally integrated BIPV solutions in many cases can be realised, at very competitive costs even based on the new legislation for use of PV in Denmark.

In the ongoing ForskVE projects, BIPV Quality Cities and PV Active Roofs and Facades, Gate 21, Cenergia and other partners with Kuben Management, Technological Institute, AAU, EnergiMidt, Solar City Denmark and FBBB is working respectively with cities and housing associations to support the development of good BIPV solutions, with a view to use so-called "Solar Watch" systems to secure principles for detailed monitoring, follow up and quality control. A number of workshops are organised with the involved stakeholders to support practical implementation work and the full understanding of the new PV rules in Denmark. As well as, how you can still realise cost effective PV projects if you base the design on more limited size projects, where most of the PV electricity can be used in the hour it is produced in.

In connection to this, it has been clear that when you deal with new build and deep renovation projects of the future, quite small PV systems can actually play an important role not only in ensuring that the new low energy class 2020 can be met in practice, but even with a possibility to reach a zero energy or even plus energy building standard. It has now been possible to identify a number of housing associations and cities who are interested in being involved in a dedicated campaign concerning this together with agreements concerning



"Performance Documentation". It is possible to secure a good energy balance in practice, both with respect to the actual energy consumption/ solar PV production, and the total economy for the users. When the results are being disseminated through the national data base for sustainable and energy efficient buildings in Denmark, which is administrated by the Danish Association of Sustainable Cities and Buildings, [FBBB](#), then the proposed project can have a strong impact concerning integration of BIPV, which will actually benefit society.

A Danish Smart Active House demonstration project has been suggested for 50 new build housing units linked to an existing district heating network, here utilising the international [Active House standard](#).

Here, it has been suggested to combine a local low temperature microgrid distribution network for the houses, combined with a solar heated buffer tank and a local heat pump, which secures very low return temperature to the district heating system. As well as this, there is 0.5 kWp local building integrated PV for the houses combined with selected roofs near the common house, where the whole roofs are BIPV

The Active House Radar



The Active House specifications and labelling system is very useful to communicate the Active House quality of a building project, with respect to energy, comfort and sustainability, and it can at the same time be used as a dialogue and performance verification tool. (see also www.activehouse.info)

connected to a local battery system, which also charge the heat pump and local electrical cars. As part of the Active House, design is used as an integrated and web based local performance documentation system including comfort.

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As well as the ongoing Nordic Built Living in Light project, co-ordinated by Kuben Management, a new concept of urban renewal will be tested at Gammel Jernbanevej in Valby, Copenhagen. Here, a four-storey,

old housing block built around the 1900 will have new rooftop apartments and an extension measuring approximately two metres towards the courtyard. The extension mainly consists of an innovative window structure from Danish company Velfac. This considerably increases the daylight quality of the apartments without compromising comfort and energy use. At the same time, building integrated PV solutions secure an overall CO₂ neutral design for the renovation project. ■

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