GBPN

Global Buildings Performance Network

Building Policies for a Better World

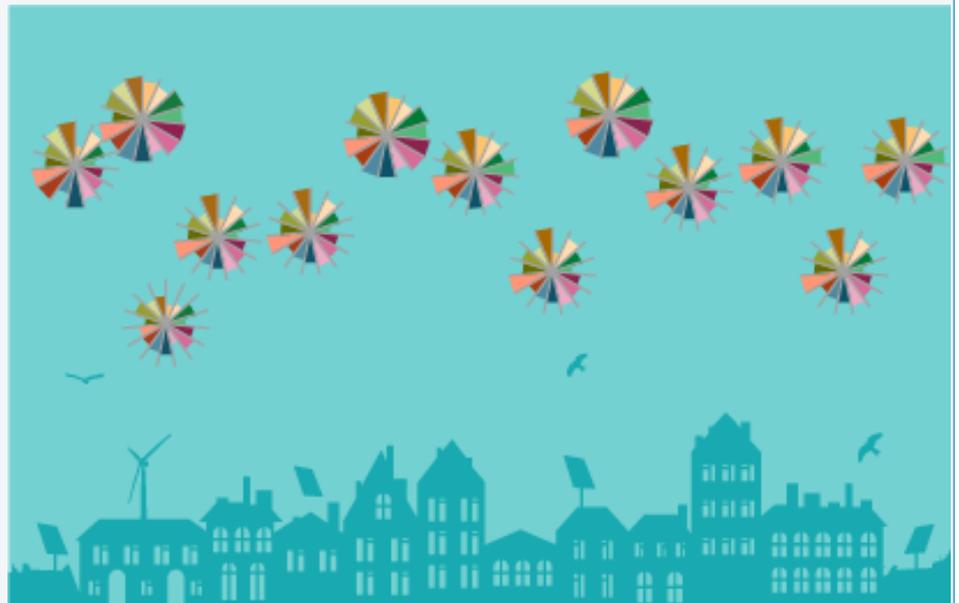# REDUCING ENERGY DEMAND IN EXISTING BUILDINGS: LEARNING FROM BEST PRACTICE RENOVATION POLICIES

July 2014

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ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

The GBPN's report "Buildings for Our Future" shows that if best practices[1] are up scaled globally by 2050, energy consumption in buildings can be reduced by 30% relative to today's levels. This is possible in spite of expected growth in population, floor space and comfort levels in developing regions. To achieve this, the 'deep' scenario requires that existing buildings will have to reduce consumption by 70% globally, which has been shown to be technically feasible by mainstreaming building technology with the support of aggressive policies.

To support the feasibility of the 'deep' scenario, the GBPN recognises the need for the development of a package of ambitious, complementary and sustainable energy renovation policies that can ensure significant energy savings in existing buildings. Consequently, the aim of this project was to identify elements that are critical when developing future energy renovation policies for *residential buildings*. Focus has been placed on this building typology following the outcome of the CEU's Scenario Analysis, whereby the residential building stock has been calculated to consume two thirds of overall building consumption, globally (Urge-Vorsatz et al., 2012). This documentation includes an assessment of best practice policies, incentives and programmes that support energy renovation of buildings, with strong emphasis on 'deep' renovation[2].

In light of this potential, the GBPN developed a project to support the up-scaling of deep renovation across the residential building stock, by defining a policy package for energy renovations and analysing current best practices in consideration of this definition. The results of this analysis are represented in an on-line interactive tool that can be accessed on the GBPN website. State of the art was defined by identifying the key elements/criteria that are necessary to ensure that all buildings are renovated towards zero energy. The methodology used to develop the criteria included a detailed desktop study of current literature on renovation policy as well as a peer review process. Six key themes were identified as intrinsic to the development of a state-of-the-art renovation policy package: regulatory normative measures, building assessment, financial instruments, economic instruments, capacity building and overall performance indicators. A set of sub-criteria was developed to further define state of the art under these six themes and to rigorously assess the performance of policy packages under the themes. The sixth theme acts as a performance indicator that analyses the performance of a country's or states policy package in terms of reduced energy consumption.

Current best practice policy packages for renovation in residential buildings were analysed in light of the criteria developed. Policy packages were selected for analysis where elements of best practice as defined in the fourteen criteria were present or where a reduction in residential energy consumption, between 2000 and 2012, using five indicators (relative, per capita, unit floor area, GDP and dwelling) was found. Best practice policy packages were selected from the European Union (E.U.) and the United States (U.S.) due to the large existing building stock, slow replacement rates and the more advanced experience in renovation policy in both regions. The policy packages selected for inclusion were those that met all or most of the requirements described above. The jurisdictions selected include in Europe include: Denmark, France, Germany, the Netherlands, Sweden and the United Kingdom. The chosen states in the U.S. include: California, Massachusetts, New Jersey, New York, Oregon and Vermont.

With the support of a panel of international experts (the Scoring Committee), each best practice policy package was scored against the criteria developed (and their sub-criteria). This analysis illustrates the current performance of each of the policy packages while also facilitating a comparative analysis between the 12 packages. Each criterion was allocated a maximum score of 10 points. In order to be awarded the maximum 10 points the jurisdiction's current policy measures must be

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[1] A **best practice** is a method or technique that is proven to be superior to others achieved with other means. Best practice can be used as a benchmark but it can also be improved over time. [Source: GBPN Glossary]
[2] Please find a full definition of a **"deep" renovation** in the GBPN Report "What is a Deep Renovation Definition?", http://www.gbpn.org/reports/what-deep-renovation-definition

progressive and target deep renovations. None of the jurisdictions were awarded the maximum score in any of the criteria as further improvements could be made in all areas.

The scores for each jurisdiction are illustrated in the Policy Tool for Renovation. The tool allows the user to develop their own analysis by selecting the criteria that are of interest to them. Policy packages can be compared using a single criterion or using multiple criteria. The tool allows the user to:

- Compare policy packages based on different criteria by selecting and deselecting criteria in the interactive tool area;
- Generate graphs based on time series data for energy performance in the respective countries/regions; and
- Access detailed information about each of the policy packages.

A number of key findings have emerged from the research:

1. Energy renovation policy is an emerging field and there is scope for further progress. The tool shows elements where positive steps have been taken and where countries and states can learn from these actions.

2. The countries and states that were successful in reducing all consumption indicators were found to have holistic policy packages in place that address key aspects of the renovation process.

3. There is no such thing as an overall "best" policy package and all countries and states can benefit from best practice sharing.

4. Financial mechanisms need to be locally adapted and linked to broader national renovation strategies. This is true for most of the criteria.

5. Among the current best practice renovation policies, there is a general absence of clear and ambitious targets for the renovation of the existing building stock.

Jurisdictions must go beyond current best practice in order to encourage the wide scale up take of deep renovations of the building stock. The GBPN supports a holistic approach; what makes a good renovation policy package is the proper combination of all the best practice elements. Each region can learn from others and use those lessons to find the right balance of elements adapted to their local context.

About GBPN   The Global Buildings Performance Network (GBPN) is a globally organised and regionally focused network whose mission is to advance best practice policies that can significantly reduce energy consumption and associated CO_2 emissions from buildings.