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## RE-Commissioning of Complex Commercial Buildings

### Management Summary



|                            |  |
|----------------------------|--|
| <b>Project ID</b>          | II 3-F20-11-1-022 / SWD – 10.08.18.7-12.40   |
| <b>Funding Agency</b>      | Bundesrepublik Deutschland, represented by<br>Bundesamt für Bauwesen und Raumordnung (BBR)<br>represented by Bundesinstitut für Bau-, Stadt- und<br>Raumforschung (BBSR) |
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| <b>Building Partner</b>    | Technische Universität Braunschweig  |
| <b>Duration</b>            | 10/2012 - 9/2014   |
| <b>Date</b>                | 30.09.2014   |

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This Summary Report refers to the European project Re-Commissioning (Re-Co) and its German part “Re-Commissioning of complex Commercial Buildings”. It contains results from the German and the European project.



The Summary Report was funded by the Forschungsinitiative Zukunft Bau of Bundesinstitutes für Bau-, Stadt- und Raumforschung gefördert.

(Aktenzeichen: II 3-F20-11-1-022 / SWD – 10.08.18.7-12.40)

The authors have the responsibility for the content of the report.



Die project was funded by the European Union, represented by EACI and IEE, auf Basis von Grant agreement No. IEE/10/328/SI2.589423.



Co-funded by the Intelligent Energy Europe Programme of the European Union

The authors wish to thank all funding agencies, the Technische Universität Braunschweig and all European Partners for their support and cooperation.

## RE-COMMISSIONING OF COMPLEX COMMERCIAL BUILDINGS

### 1 STARTING POINT (450)

Research has shown that commercial buildings have saving potentials between 5 and 30 % in operation and that significant improvements can be accomplished through no- or low-investment measures with respect to operation & maintenance as well as to user behavior. A service for re-commissioning might help to ensure continuous performance near an optimum. The Re-Co projects objective was to develop a feasible service approach and to test it in pilot projects.

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### 2 RESEARCH PROGRAM



The objective of the European research project was the development and testing of a service concept for the reduction of energy cost of commercial buildings through no- or low-cost measures. The methodology was applied to a series of pilot projects targeting at total savings of 10% final energy. The project was carried out by 10 partners from 8 European countries, Germany, Austria, Czech Republic, Slovenia, Croatia, Norway, Finland and Belgium.

Buildings are complex systems. They are designed, engineered, constructed, operated and used for decades by a large number of different people. Therefore, to achieve and maintain a high level of performance is a tremendous challenge. Field research has shown that commercial buildings miss their energy efficiency potential in operation by 5 - 30 % and that these losses can be significantly reduced by improvements in use and operation.

In the course of the project a service concept for Re-Commissioning projects had been developed. It contains 10 milestones for the phases Design, Investigation, Implementation, Evaluation and Continuity.

The approach was applied by all partners analyzing and optimizing 15 buildings. Hospitals made up for the largest part of the buildings. In addition university buildings like libraries and labs and office buildings had been investigated. The work followed the predefined approach continuously enhancing it to a complete guidebook for Re-Commissioning with low- or no-cost measures.

energydesign braunschweig applied the Re-Co approach to the building stock of the Technische Universität Braunschweig co-funded by Forschungsinitiative Zukunft Bau and developed alternative approaches. 12 Measures have been implemented resulting into savings of 15% of final energy and 111,000 €/a in savings in 2013 compared to 2011 thereby even going slightly beyond the calculated savings of 105,000 €/a (14.5%).

The measures carried out by all European partners also proofed that the chosen Re-Co approach is a promising technical and economic approach to reduce energy consumption in buildings. The average savings of all projects reached 10% with a static amortization of 0.7 years and a profit rate of 73% calculated on the expected persistence of the measures.

The two projects in Germany showed that one of the key premises for success is to carry projects out as a team work of service providers and maintenance personnel in the building. Further success factors are the precise selection of high potential buildings and the teams focus on high effective, cost effective and feasible measures that can be implemented fast and easy even if this means not to make use of other existing saving potentials.

In addition to the general Re-Co concept two alternative approaches have been developed as consequence of our experiences. The first approach is to define a compact catalogue of measures for a specific project comprising measures that are likely to be implemented fast and with a save return on invest thereby reducing uncertainties among partners about objectives and responsibilities and allowing a strong focus within the buildings. The second approach is the implementation of energy budgets on a sub level within the costumers institution to transfer responsibility to users and to motivate energy efficient behavior.

When projects follow the Re-Co approach and take key aspects into account Re-Co services can be an attractive field of service for engineering offices and play a significant role within the energy transition in the German and European Building stock.

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### 3 CONCLUSION (700)

The European project as well as the project at the Technische Universität Braunschweig have been a success. The target of saving 10% of final energy in total was achieved and even surpassed in Braunschweig with savings of 15%. From the service providers view the project was also successful. Re-Commissioning services can be an attractive business for engineering service providers. Key factors are team work with maintenance personnel, a good selection of buildings and a focus on effective measures. When applying these findings Re-co services can be carried out successfully and be a cost effective part of the energy transition.

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### 4 KEY DATA

|                       |   |
|-----------------------|---|
| Title (short):        | Re-Co   |
| Research institution: | energydesign braunschweig GmbH<br>Dr.-Ing. Stefan Plesser |
| Total cost:           | 205 T€  |
| Federal funding:      | 53 T€   |
| Project duration:     | 10/2012 – 9/2014 (EU-Project: 09/2011-5/2014)             |