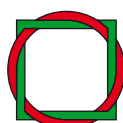




Energy Balance

Optimum System Solutions for Renewable Energy and Energy Efficiency



Wuppertal Institute
for Climate, Environment
and Energy

Energy Balance

Optimum System Solutions for Renewable Energy
and Energy Efficiency

Imprint

Energy Balance – Optimum System Solutions for
Renewable Energy and Energy Efficiency

Summary of Project Results

Dr. Martin Pehnt, Angelika Paar, Philipp Otter
ifeu-Institut für Energie- und Umweltforschung Heidelberg
Wilckensstraße 3, 69120 Heidelberg, Germany
Tel. +49 6221 4767-0, E-Mail: martin.pehnt@ifeu.de

In cooperation with: Markus Duscha, Hans Hertle, Regine Vogt

Frank Merten, Thomas Hanke, Dr. Wolfgang Irrek,
Dietmar Schüwer, Dr. Nikolaus Supersberger, Christoph Zeiss
Wuppertal Institute for Climate, Environment and Energy
Döppersberg 19, 42103 Wuppertal, Germany
Tel. +49 202 2492-0, E-Mail: frank.merten@wupperinst.org

In cooperation with: Daniel Bongardt, Christine Krüger,
Dr. Hans-Jochen Luhmann, Sascha Samadi

Subcontracts: Prof. Dr. Stefan Klinski (Berlin), Mike Voss and
Aloys Graw, (Planungsbüro Graw Osnabrück)

Project manager: Dr. Martin Pehnt

Translation: Christiane Lubisch

Layout and graphics: VisLab, Wuppertal Institute
Cover photo (balance): Ole Höpfner

Heidelberg, Wuppertal, May 2009

Funded by the Federal Ministry for the Environment,
Nature Conservation and Nuclear Safety, Reference 0327614

Final Report can be downloaded at
www.ifeu.de/energiebalance or www.wupperinst.org/en/projects/rg1

Contents

Introduction	5
Results and Findings of the Project	8
Energy balance in energy scenarios and concepts	12
From the bioenergy village to the 2000 Watt society: Energy policy target concepts	13
Example: Energy-autonomous town of Güssing	16
„Gut verzahnt geplant!“ competition — or “Well intertwined, well planned”	17
Energy balance in the building sector	20
Technologies for intertwining efficiency and renewables — the example of gas heat pumps	20
Intertwining technologies — supply of renewable energy to highly efficient buildings	22
Disentanglement or intertwining? The Energy Savings Decree (EnEV) and the Act on the Promotion of Renewable Energies in the Heat Sector (EEWärmeG)	24
Newly erected buildings	26
Refurbishment of existing buildings	27
Suggestions for further amendments to EnEV and EEWärmeG	29
The market efficiency programme (MAP) — introducing efficiency elements into promotional programmes for renewable energy	29
Energy balance in the electricity sector	32
Using renewable energy more efficiently — the example of the Renewable Energy Act (EEG)	32
Energy balance in the lifecycle by the example of biogas	34
Promoting efficiency under the EEG model: the Negawatt Feed Act (NEEG)	36
Energy balance in the traffic sector	38
Intertwining RE and EE in road traffic (passenger cars)	38
Intertwining RE and EE in rail-bound traffic	40
Electromobility	41
Recommendations	44

