Longterm Visions helping Short-Term Decisions
IMAGINE Seminar 2012

The 2000 Watt Society: Experiences in Zurich and Basel

Roland Stulz
Munich, 4th December 2012
Novatlantis as a Facilitator for Transdisciplinary Science

Steering Committee

Strategy
Quality Control

Pull:
Opportunities
• Needs
• Trends

Push:
• Innovation
• Expertise
• Products

Marketing:
• Analysis
• Seminars
• Networking
• Policy Making

Implementation:
• Communication
• Motivation
• PPP
• Landmarks

CCEM
CCES
other CC
ETHZ
EPFL
PSI
EMPA
EAWAG
WSL
Cities / Cantons
Energie Schweiz
Business
Universities

Sustainability at the ETH domain

Policy Funding

ETH Board
A Novatlantis Initiative:
The 2000 Watt Society
An ambitious way to go

Intermediated Goal:
50 % Reduction
of fossil Energy by 2050
We know what we have to do

**SUV**
10 litres/100km (Fossil Fuel)

**Existing Buildings**
10 litres oil/m²

**Fossil Energy**
(oil, gas, coal)

"Waste Society"
350 kg/year*person

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**Light Weight Mobility**
2 litres/100km

**Green Buildings**
2 litres oil/m²

**Renewable Energy**
sun fuels

**Closed Resource Cycles**

2005

2050
Starting with Pioneers: Partnerships for Sustainability

**Basel**
- 2000-Watt Novartis Campus
- Hy-Light H2 concept car
- CLEVER Low Emission Biogas car

**Geneva**
- Sustainable Neighbourhoods
- Health and Happiness

**Zurich**
- Sustainable ETH Science City
- Worlds cleanest Diesel Truck Engine
- Zero Carbon EAWAG Headquarter
- Zero Carbon Hospital

**Zurich:** Referendum November 2008: 2000-Watt-Society integrated in the Town Constitution
- 77% voted YES
2000 Watt Society becomes a National Program
Starting in Basel 2001: Transportation Laboratory

- Visionspartnerschaft / CEV an Autosalon Genf
- Fallstudie Mobilität Basel
- Stakeholder-Dialoge
- Akzeptanzstudien/ Zielgruppenanalys

- Rallye 21
- Gasfahrzeuge / Flottenbetreiber
- Hy-Light
- CEV

- HyMuve

- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
Hydrogen – Driven Municipal Vehicle
Basel: Landmark Building Projects

- 2000-Watt-Society in the „Politikplan“
- Transportation Laboratory
- Landmark New Buildings
- Incentive Programme Pilot and Demonstration Buildings
- Minergie-P Renovation Award
- Landmark Projects with „Wirtschaftsförderung beider Basel“
- Project „Klimaneutrale Verwaltung“
- New Energy Strategy for Administration
- Sustainable Neighbourhood Development
- Pilot Development Dreispitzareal

Novartis
Campus des Wissens
2000-Watt-Gesellschaft
New Methods for efficient Building Renovations (Retrofit)

Sustainable Renovation of Historical Buildings (SuRHiB)

New aerogel rendering with 3 times better insulation performance than other materials with optimal moisture diffusion ability.
“Pilot Region Basel”
Period 2013-2016

Module 1
Retrofit renovation

Module 2
Renovation of historical buildings

Module 3
Use of river water

Module 4
New colored PV

Module 5
Smart grid / micro grid

Module 6
Local storage of electricity

Module 7
Energy hub

Module 8
H2 small fleet

Module 9
Quick charging of EV

Module 10
Natural gas driven hybrid
Top Down Process: 2000 Watt Zurich

Taskforce 1
Energy/Resources Strategy
Sustainability TOR

Taskforce 2
Stakeholders Participation
Students, NNN, Staff

Taskforce 3
Design
Integrated Planning

Taskforce 4
HVAC

Taskforce 5
IT, Smart Grid

Taskforce 6
Facility Management

Mayor

Project Champion
Strategic Partner
Steering Committee

Communication

Project Management
Project Manager
General Contractor
Architects

Quality Control
Implementation of TOR
2000 Watt Activities in Zürich

- Strategy Paper 2000 Watt-Gesellschaft
  - Action Plans
    - Energy Efficiency
    - Renewable Energies
    - Efficient Electricity
  - Energy Coaching
- Landmark Buildings
- Public Procurement
- Lifestyle Scenarios
- Communication Handbook
- Züricher 2000-Watt-Days
- "Sportlich zum Sport"
- LIFEfair
- Eco-Kompass for SME
- Corporate Partnerships "Sustainable Zürich"
- Stand der Dinge: Building the 2000-Watt-Society

[1] Basis: econinvent-Datenbank 2.0
Energy Efficiency in Buildings: Factor 10

- **Average Building Stock Switzerland**: 226 kWh/m² per year
- **SIA 380 Building Code**: 166 kWh/m² per year
- **Canton Zurich Building Code**: 119 kWh/m² per year
- **Minergie**: 62 kWh/m² per year
- **Minergie P**: 34 kWh/m² per year

**Breakdown**:
- Electric Plug-in
- Hot Water
- Heating
Success Factor: Landmark Projects in PPP

- Neubau Forschungsanstalten
- Stadtspital Triemli, Zürich
- DB-Areal (Erlenmatt), Basel
- Eulachhof, Winterthur
- Novartis Campus des Wissens
- Science City, ETH Hönggerberg
With off the shelf technology:
EAWAG Chriesbach Research Headquarter

- Good insulation
- Passive solar heating
- Waste heat recovery
- Earth/air pre-cooling/-heating
- Free cooling (through openings)
- Optimized daylight use and shading (fins)
- Solar thermal collectors
- Photovoltaics
- Rainwater use
- NoMix toilets
- Waterless urinals
- Water-saving fittings
Renovation: From 0.8% to 2% per Year

CCEM Projekt:
- integrated building concept
- prefab modules
- general contracting
- quality control
- cost efficiency
- zero emission

Quelle: Karl Viriden / Mark Zimmermann / EMPA/CCEM, 2007
Integrated Neighbourhood Solutions

Verbraucher

Verteil-Netz

Gewinnung/Speicherung
Richtiareal Wallisellen: Certified 2000-Watt Neighbourhood

- 500 apartments for 1200 inhabitants
- over 3000 workplaces
- Ca. 127,000 sqft. shops
- green pedestrian parks
- public transportation
- certified 2000-Watt project
Plenty of Norms and Labels...

ESI (CCRS)
... No Lifestyle Scenarios: Rebound and Sufficiency

Pioneer Family, 2 Children,

Single, 28y

9000 Watt

3000 Watt
Trading off our personal energy balance

Reducing car travel and heating

Reducing car and air travel and heating
## Benchmarks for a step by step Reduction

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<th>2005</th>
<th>2020</th>
<th>2035</th>
<th>2050</th>
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<tbody>
<tr>
<td>Primary Energy (per capita)</td>
<td>6’300 Watts</td>
<td>5’350 Watts</td>
<td>4’400 Watts</td>
<td>3’500 Watts</td>
</tr>
<tr>
<td>Annual CO₂(eq)-Emissions (per capita)</td>
<td>8.7 Tons</td>
<td>6.5 Tons</td>
<td>4.2 Tons</td>
<td>2.0 Tons</td>
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A Network of Pioneers: International Sustainable Campus Network ISCN

- Enable a global dialogue between pioneers of campus sustainability
- Initiate a global experience exchange on sustainable campus initiatives
- Develop a knowledge management system that leverages the experiences gained by the network partners
Experience shows that Sustainable Development

- stimulates innovation
- offers market leadership opportunities for industry and service providers
- reduces dependency of imported resources

Thank you! www.novatlantis.ch
www.2000watt.ch