Germany
Researching Sustainability

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Three case studies:

1. *Baukultur*: The Culture of Building
   Explores the process of decision making in the planning and building practice, for example in developing new methods of cooperative planning between government offices, investors, and citizens.

2. Planning for Climate Change
   Develops regional models and explores necessary changes in both urban structures and buildings, especially in materials and the building envelope.

3. Houses as Power Plants
   Explores how a new generation of buildings can produce more energy than they use. Since buildings, and especially housing, account for 50% of our energy use, the research focus has been on the single-family home. Research results have been presented to the public with a strong marketing focus.
1. *Baukultur*: the Culture of Building

Loosely translated: culture and building practices, both with regards to housing and urban design.

From 2002-3 the ExWoSt (*Experimenteller Wohnungs- und Städtebau* = Experimental Housing and Urban Design) program “3stadt2” sponsored five model projects to link community groups with public-private partnerships.

Five middle-sized cities of regional importance were chosen for the study:
1. Bielefeld wanted to restructure and expand a district at the city’s edge;
2. Beuel sought a new focus after the German capital moved from neighbouring Bonn to Berlin;
3. Gelsenkirchen-Buer, wanted to counter unemployment and an eroding retail base;
4. Lübeck wanted to design a new quarter as a backdrop for its university;
5. Osnabrück sought to expand its concept of “area recycling” to renew a quarter without expanding the city’s built-up surface.

In 2004, the term *Baukultur* was made part of the federal building code, with *Baukultur* becoming a mandatory point of consideration when developing any sort of master plan.
“3stadt2” process meetings in Bielefeld (left), analysis of the Osnabrück experience (right)
Both planning processes brought together municipal planners, investors, and the public.

(Source: BMVBS)
2. Planning for Climate Change

Effects of anticipated climate change in Europe

(Source: BMVBS)
MORO project “Raumentwicklungsstrategien zum Klimawandel” (spatial strategies for climate change), a two-phase planning study that took place from 2009-2013, in which climate-change adaptation strategies were developed and tested in eight regions encompassing different climate types. (Source: BMVBS)
Example of a detailed analysis of the region Oberes Elbtal/Osterzgebirge. The graph assesses what percentage of communities have planned for various climate-change factors. (Source: BMVBS)
“Results of Climate Change: Buildings and Construction Practices in Germany”

This publication has set a road map for future research on building components, materials, and construction practices.
Example: Analysis of the effects of strong rainfall. Affected building components and need for adaptation are noted in columns three and four. Detailed problem descriptions followed for affected building components, including roof systems, facades, openings, base of the building, and basement.
3. Houses as Power Plants

Solar Decathlon winners 2007 (left) and 2009 (right) Plus-Energy Houses developed at the TU Darmstadt and exhibited at the international Solar Decathlon competition in Washington, D.C.

(Source: BMVBS and Solar Decathlon)
Development of energy-saving building and construction:
Blue line = Technically possible
Red Line = Typical building practice in any given year (industry standard)
Stepped Line = Legislated minimum standards

The graph shows that there is generally a 10-20 year lag between levels of “technically possible” and “legislated minimum”.  
(Source: BMVBS)
Prefabricated house by the HUF company, based in Germany. HUF is one of several German prefab companies that have developed commercially available “plus-energy” homes. This model, first developed in the late 1970s, is now offered as a “plus-energy” version. Testing on energy efficiency has been supervised through the Fraunhofer Institute. HUF exports to many countries in the world.

(Source: BMVBS)
“Effizienzhaus Plus mit Elektromobilität” 2011
Winner of a competition sponsored by the BMVBS. Sixteen teams of university institutes and architecture offices took part. A “test family” is living in the house for 15 months.

(Source: BMVBS)
The BMVBS house. Publicity and “marketing” through: website, printed brochures, “opening events”, test-family blog, Facebook page, twitter feed, and YouTube videos.
Thank you