Title: Sustainable Transitions in Urban Water Management

Abstract: Urban water management structures are increasingly challenged by climate change, strained public finances and rapid urbanization processes around the globe. Despite the remarkable success story of conventional urban water management systems over the past century, doubts about their longer term sustainability have recently been raised. New technologies enabling high quality onsite water treatment and the increasing possibilities to decentralize intelligence, (including new sensors and control technologies), open up radically new and potentially more sustainable alternatives to provide water services to households and industries. However, implementation of these alternatives has remained marginal, so far. The project analyzed industrial activities for onsite technology development in different countries identifying resources and deficits of emerging industry formation in the field of onsite water treatment technologies. Emerging industry formation was analyzed using the conceptual framework of technological innovation systems. According to this literature, early industry formation often not only suffers from market failures but also from system failures (i.e. capability, coordination or institutional deficits). Based on this framework, an integrated assessment of the industry’s development potential was carried out for successfully developing and marketing onsite solutions. Empirically the research drew on evidence from Germany, China, Australia and the USA, as well as innovation activities from transnational companies.

Identification of the problem you address:
Radical system change in the urban water management sector leading to a substantially higher performance in terms of sustainability

Key question asked about the problem:
Preconditions for industry formation to address the key innovation challenges of this technology: cost-effectiveness, reliability and acceptance.

The methods by which you answered that question:
Conceptually: Innovation System Analysis; Methodologically: mixed methods approach with a strong reliance on expert interviews in industry, professional associations and academia. But also, co-authorship and patent analysis (social network analysis) and analysis of secondary sources.
Principle literature upon which the research drew:
Innovation Studies as a confluence between evolutionary economics, science and technology studies, industrial dynamics and the innovation management literature.

Empirical data acquisition description:
In each country 20-50 expert interviews (for a full scale analysis). Co-authorship analysis with about 1000 publications on membrane bioreactor technology.

Geographical region studied:
Germany, China, Australia (full scale analysis), USA (overview analysis), transnational companies (analysis more strongly focused on secondary sources)

Recommendations that might be relevant for your problem:
A major implication of this research is that it seems unlikely that onsite systems will take off unless the system deficits are addressed explicitly. This calls for an active role of academic research and a tight interaction with practice through pilot and demonstration projects. Therefore the problem represents an ideal type case for a sustainability science approach.

A description of the final product(s) you have/are aiming to produce:

Coenen, L., Truffer, B. (guest editors) Places and spaces of sustainability transitions: geographical contributions to an emerging research and policy field’. Forthcoming Special Issue in European Planning Studies. (Publication date: end of 2011)

*Dewald, U. Truffer, B. (accepted) Emerging innovation systems – diffusion of photovoltaic applications in Germany. Accepted for European Planning Studies. (Publication date: end of 2011)


Truffer, B., Binz, C., Gebauer, H., Li, L., and Lu, Y. Assessing an emergent global industry for onsite water treatment systems. Paper to be submitted to Technological Forecasting and Social Change. (To be submitted by the end of 2011)


Description of major other intellectual or professional advancement activity(ies) over the past academic year:
- Nomination as an adjunct professor at the institute of Geography at the University of Bern
- Invitation to hold the Regional Studies Annual Lecture 2011 of the international Regional Studies Association
Citations for reports, papers, publications and presentations that built on your fellowship research:
See above

**Principal collaborators outside Harvard:**
Prof. Yonglong Lu, Chinese Academy of Sciences (RCEES) Beijing
Prof. Anton Eberhard, University of Cape Town, South Africa
Prof. Rebekah Brown, Monash University, Melbourne
Prof. Lars Coenen, Circle, Lund University, Sweden
Prof. Rob Raven, Eindhoven Technical University, the Netherlands
Prof. David Sedlak, UC Berkeley (CA)
Profs. Jim Murphy and Halina Brown, Clark University, Worcester (MA)
Several at the Swiss Federal Institute of Aquatic Science and Technology, Switzerland