

Global challengers can be local incumbents: About the district heating system in Freiburg

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WS: „Incumbent-challenger dynamics in energy transitions:
Governmental challenges”

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Starting points: Incumbents are...

“incumbents” in transition studies:

- co-constitute the regime
(together with various other, e.g. material & institutional elements)
 - benefit from stability of the regime
 - can also engage in niche activities (hedge against instability risks)
- ⇒ incumbents (esp. large, multinational companies) often engage in contradictory strategies
- ⇒ hence they are not really in their entirety part of the regime

In energy: (currently discussed)

- municipal utilities often deviate in orientation from regime actors
 - e.g. being pro CHP/ RES/ distributed generation etc.
 - some even engage in ‘niche creation’
 - for example: Badenova
- Unique challenge to the notion of an “incumbent”: socialized EnBW

What an incumbent is - depends on...



the delineation and “scaling” of the regime :

Are we looking at the “energy regime”
or the “electricity regime”?

...at the *global* regime of centralized, fossil energy?
or *local*, place bound & independently stabilized energy regimes?

Particularly interesting here: District Heating Systems (DHS)

Just one example - from Freiburg

Energy policy

adopted in 1986

Priorities:

- Energy saving (consumption)
- Efficient energy generation (co-generation, CHP)
- Renewable energies

Abandon nuclear!





Two key strategies to achieve energy political ambitions:

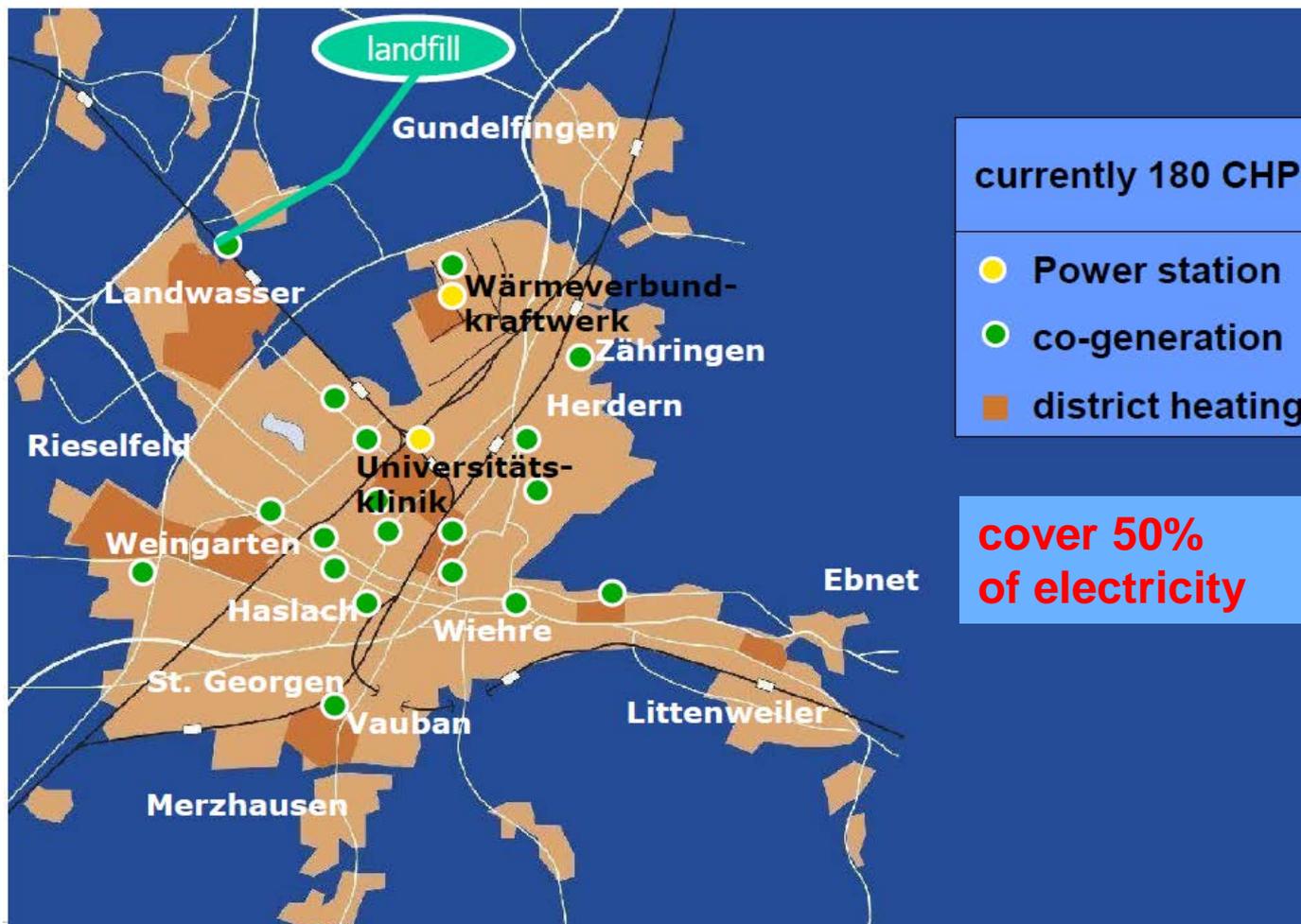
A) Develop CHP (Kraft-Wärme-Kopplung); best in DHS

- highest efficiency
- potential switch to renewable fuels
- => perceived as “the greenest” option

B) Pioneer in solar energy (“Solar City”)

- host emerging solar industry
- support demonstration projects of solar architecture (passive houses..)

Combined Heat & Power (CHP) in Freiburg



currently 180 CHPs

- Power station
- co-generation
- district heating

**cover 50%
of electricity**

Modified. © Freiburg environmental protection authority

Municipal building stock

Passivhäuser machen in Freiburg Schule

Wentzinger-Schulen und Feyel-Schule sind in der Stadt Vorreiter beim Energiesparen

VON UNSERER REDAKTORIN
HEIKE SPANNAGEL

Passivhäuser machen in Freiburg Schule: Neben der neuen Feyel-Schule in Ebnet wird derzeit am Seepark das erste Freiburger Schulgebäude in Passivbauweise errichtet. Im Neubau der Wentzinger-Schulen (Realschule und Gymnasium) sollen vom Frühjahr 2009 an rund 500 Schüler essen und betreut werden. Zwar muss die Stadt für den energiesparenden Bau 400 000 Euro mehr investieren, aber die

mehr geöffnet werden muss. Trotzdem lassen sich die hohen, dreifach verglasten Fenster öffnen. In der warmen Jahreszeit sei das kein Problem, sagt eine Architektin. Realschulleiter Heinz-Werner Brandes freut sich auf die gleichmäßige Temperatur in den neuen Räumen: „Im Sommer ist es in unseren Klassenzimmern manchmal heiß wie im Backofen.“

Im Juni 2007 hat der Freiburger Gemeinderat beschlossen, dass städtische Gebäude künftig ausschließlich nach Pas-

ser, Chef des städtischen Gebäudemanagements, im März 2009 abgeschlossen sein. 3,7 Millionen Euro kostet der Neubau. Klausen: „Das sind 400 000 Euro mehr als wir für die herkömmliche Bauweise gebraucht hätten.“ Kommandes Jahr soll die Herdermer Merian-Schule einen Neubau mit Passivhaus-Standard bekommen.

- 520 buildings (schools, administrative buildings, public amenities), total 630,000 m²
- All new constructions according to passive house standard
- Redevelopment according to Freiburg low energy standard



Planning for a new district: An opportunity for all?

Freiburger-Ludwigs-Universität Freiburg



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1993: opportunity to develop 40 ha of 1st class land
(conversion area) in growing Freiburg.

Citizens demand:

“Let’s create a
model district of sustainability”

Self-funded expertise in
mobility, energy, participation...



Pushing both strategies at district level?

Applying both strategies in the future “model district”:

- A) expanding efficient district heating (DHS)
- B) and solar architecture (passive houses, PH)

...makes them negatively interfering:

How many PHs can the DHS economically cope with?

(1st conflict)

Energiestandards bei der Bauweise im Stadtteil Vauban
Building Energy Standards in the Vauban District



2nd conflict: Obligation to connect PH to DHS?

Low energy demand of PH makes connection to DHS (mostly fixed costs) very expensive: (high connection costs/a on top of capex for **PH**)

Future owner/users of PH refuse to connect (“We invested in good insulation!”)

But: utility/municipality insists: demand of all is needed for DHS’s economic performance!

“Compromise”:

Only those fulfilling 3 conditions are exempted from the obligation (ST, proven PH, no el.).

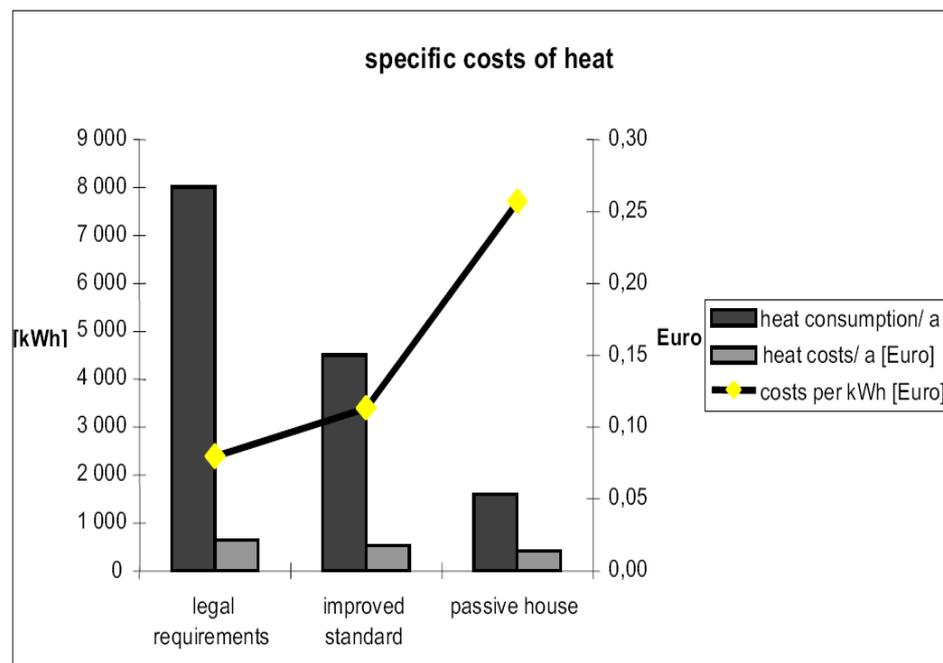


Figure 1. Specific costs of heat at different standards of consumption, Spaeth 2004.

Demand density makes DHS & PH strategies incompatible in one area.

This was voiced by a new group (“future PH-dwellers”)

in a newly opened arena (participatory planning, “model distr.”)

The outcome of the conflict (trial of force):

- solar architecture ambitions subordinated,
- tariff structure defended (city tariff, no linearization)
- very demanding “exit option” established,...

⇒ DHS expansion strategy has been made ‘immune’ to challenges

⇒ Utilities & city admin follow vested interests to strengthen the DHS
(linked via the municipal budget - bearing pot. losses in DHS)

⇒ A path dependency at city level;

⇒ Interesting interplay of local with trans-local dynamics/ lock-ins

[*Energy Policy* (78): Späth/ Rohracher 2015, cf. Gabillet 2015]

⇒ **These challengers are incumbents too...**

- DHS can be an instrument to challenge the global energy regime + at the same time create local path dependencies!
- (local) governments are not independent of any regime but either stabilize or challenge it. (co-evolution!)
- @ policy analysts: Little need to think more about good transformative policies. Study rather how/why they are avoided!

The effects - observed in Freiburg - are ubiquitous,

Some practical conclusions/ prescriptions:

- line bound, capital intensive infrastructures are set to produce inescapable lock-in, killing future incentives to invest in efficiency
- ⇒ establish/expand DHS only, where the demand of heat (& cooling) really allows for economic feasibility in the long term - despite all future efficiency gains (e.g. via refurbishments).

Thank You...

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....for your attention

and reflections!

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- Badenova (2014). "Ökologie und Nachhaltigkeitsbericht 2013". Freiburg, badenova
- Energieagentur Regio Freiburg/ Neumann, C. (2012). "Energiebilanz für die Region Freiburg. Verbrauch und Potenziale". Freiburg im Breisgau, FWTM Freiburg.
- Frey, W. (2011). "Freiburg Green City - Wege zu einer nachhaltigen Stadtentwicklung - Approaches to Sustainable Urban Development". Freiburg, Herder.
- Hellige, H. D. (2013). "Transformationen und Transformationsblockaden im deutschen Energiesystem ...". In: J. Radtke/ B. Hennig. Marburg, Metropolis.
- Hodson, M. & Marvin, S. (2011). "Can Cities Shape Socio-Technical Transitions and How Would We Know If They Were?". In: H. Bulkeley, V. Castán Broto, M. Hodson and S. Marvin. Cities and Low Carbon Transitions. London, Routledge: 54-70.
- Späth, P. & Rohracher, H. (2015). "Cities and socio-technical change - Dynamics at an urban junction of heat infrastructure and building standards." Energy Policy 78: 273-280.
- Späth, P. & Rohracher, H. (2014). "Beyond Localism: The Spatial Scale and Scaling in Energy Transitions". In: Padt, et al.: Scale-sensitive Governance of the Environment. Oxford, John Wiley & Sons, Ltd: 106-121.
- Späth, P. & Rohracher, H. (2012). "Local Demonstrations for Global Transitions— Dynamics across Governance Levels." European Planning Studies 20 (3): 461-479.