Shrinking Networks, Growing Solidarities? How to Design a New Social and Territorial Contract

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Utilities operators in a number of European cities, faced with significant reductions in consumption levels across the networked infrastructures they run, are at the forefront of urban shrinkage management. Unlike numerous works describing a neoliberal process of territorial dislocation, Daniel Florentin demonstrates, through the case study of Magdeburg in Germany, that these dynamics of shrinking water and energy consumption can also foster new solidarities in the management of large technical systems.

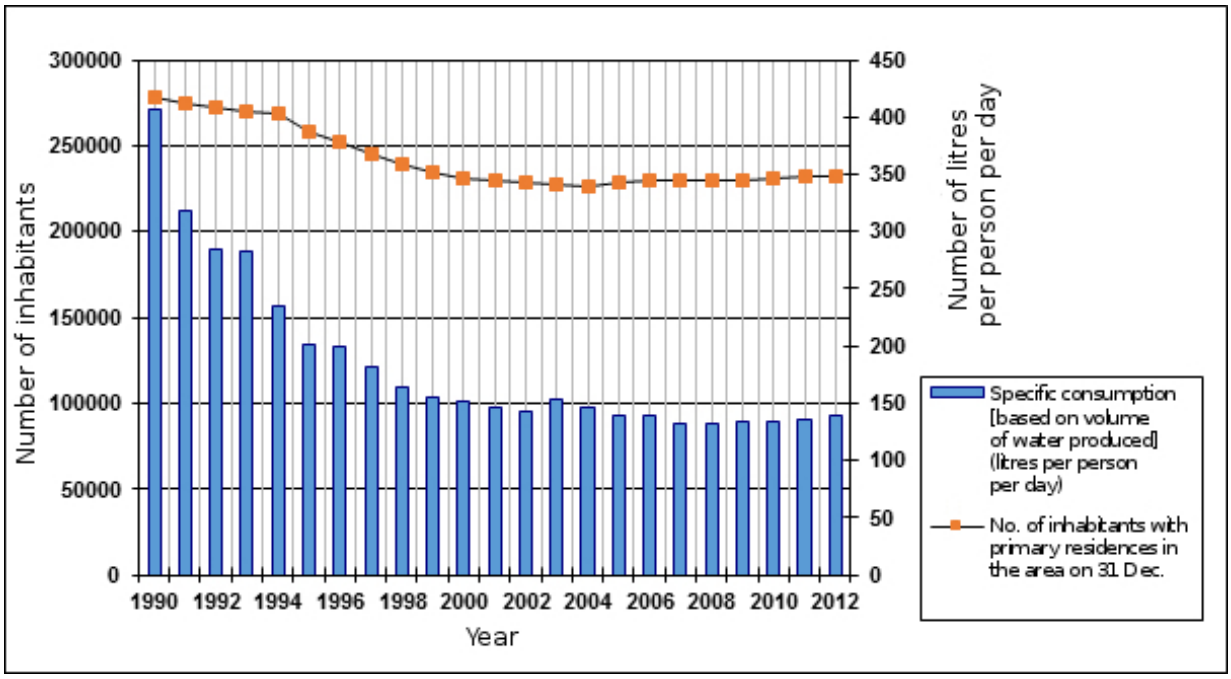
Decision-makers and researchers alike have long paid attention primarily to the most visible aspects of urban shrinkage: population decline, attrition of the industrial sector, blooming of brownfields or housing vacancy. However, these analyses have often neglected a crucial – though largely invisible – component of this phenomenon: the shrinkage of urban technical networks[1] that are crucial for the smooth functioning of a city and which, as such, represent an "urban dowry" (Kaika and Swyngedouw 2000). As Fanny Lopez reminds us, "urban planners are better at handling and designing streets than pipes" (Lopez 2014, p. 42). This becomes all the more critical bearing in mind that these pipes are increasingly operating in a way that is contrary to its historical design, based upon a model of continuous growth in demand and extension of the network.

We might imagine that such a situation is limited to a few shrinking cities whose industrial activities have collapsed. This is not, however, the case: the phenomenon in question affects a wide range of European cities, with variations in intensity[2]. This transformation has been documented for a couple of decades in the water sector and in district heating systems, and more recently has been affecting the energy sector. In some cases, the reductions in demand have been quite spectacular: water consumption levels have dropped by more than 20% in Paris since the 1990s, by over 40% in Seville over the same period, and by 50% to 70% in most of the shrinking cities of the former East Germany (Moss 2008) (see figures 1 and 2 with regard to Magdeburg, whose dynamics are representative of a large number of shrinking cities).

[1] The expression "shrinking networks" proceeds from the same ambiguity as "shrinking city", as the latter does not mechanically translate into spatial tightening. The changing regime of demand that involves closing of parts of networks, downsizing and resizing certain pipes, and creating smaller new interconnections is here to be considered congruent with the idea of "shrinking networks".

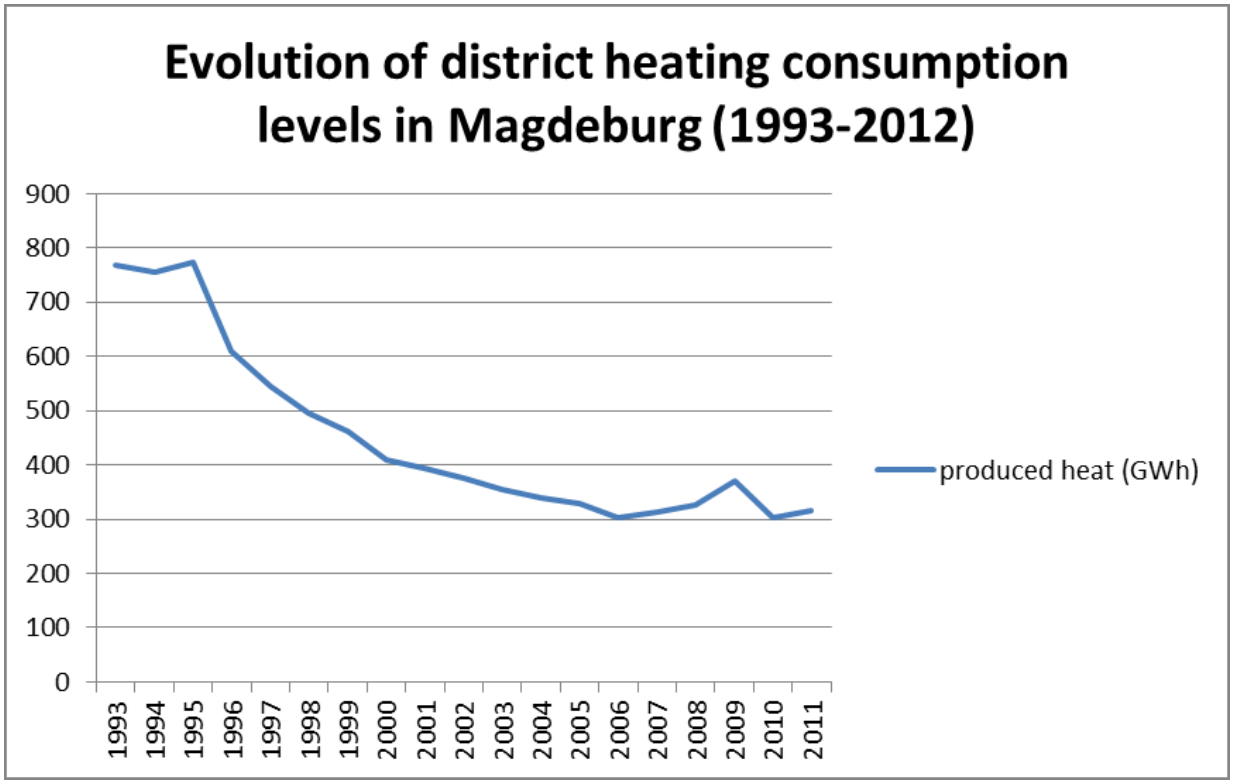
[2] Factors accounting for decreasing consumption levels may vary according to individual city profiles; however, the impacts of deindustrialization, the technological transformations that make home appliances less water- or energy-intensive, and growing economic pressures due to tariff increases are always of the utmost importance in all cities.

Figure 1. Shrinking water consumption in Magdeburg (1990–2012)



Source: data from the local utility, Städtische Werke Magdeburg (SWM).

Figure 2. Shrinking use of district heating in Magdeburg (1993–2012)



Source: SWM data.

What are the sociopolitical and urban effects of these shrinking networks?

Such decreases in consumption may at first glance appear opportune, as they reduce pressure on natural resources and could thus be considered to contribute to the preservation of the environment. This is only partly true, however. These processes of changing demand patterns encompass complex dynamics in which a number of problems are intertwined (Florentin 2015). Lower consumption levels may, for instance, result in sanitary problems, such as stagnant water in pipes that could become sites of bacteriological contamination. They may also lead to unpleasant urban atmospheres as a result of odours emanating from underused sewers, as well as environmental issues linked to large energy losses and urban inequalities whereby certain areas suffer from lower-quality services. Managing these various technical problems translates into additional costs for utilities if they wish to maintain the same level of service. These diminished consumption levels also raise socio-economic issues: as fixed costs are extremely high for these types of infrastructures (between 50% and 85%) and as the network management costs are covered solely by volume-indexed utilities bills, a reduction in these volumes leads to a significant loss of revenue for the utility. Changing demand patterns consequently result in a scissor effect: rising costs and diminishing income for the network operator.

These processes of network shrinkage threaten both the technical and economic rationales of urban technical networks, which explains why it has become a growing subject of concern for utilities. Consequently, shrinking networks represent both an emerging research topic and an operational issue of the utmost importance. As one engineer employed by a German water company put it: “when we saw this phenomenon of shrinking consumption, we understood that we had to stop building [new infrastructure] and instead pay more attention to managing what was already there, to avoid it collapsing too” (interview with an engineer at Trinkwasser Magdeburg – TWM – the regional water company for the Magdeburg area, January 2013). Stopping extension to avoid implosion: this has become the new credo of engineers facing significant shrinkage of consumption levels. These processes in fact illustrate the emergence of a new relationship between technical networks and their territories, whose various mechanisms are still not fully stabilized. Accordingly, the traditional capacity of urban technical networks to unite territories, by offering the same service at the same price across the whole area served, and by pooling production costs, is called into question (Dupuy 2011), along with a number of urban equilibriums. The major issue here is understanding how these networks and the utiliries operating them can adapt their infrastructures and organizations to this new context.

A fairly conventional response could lie in the adjustment of tariffs: the unitary cost could be increased to make up for lost volume, so as to deal with the additional costs of maintenance and management. However, this is not what can be observed in the field, as such price increases are socially and politically loaded and represent a short-term solution that cannot realistically be repeated very often, and which furthermore is an inadequate response to the long-term process of shrinking consumption.

Shrinking networks, an opportunity for new territorial solidarities?

This alteration of large technical systems has urban effects that contribute to a reconfiguration of powers within the city. Such a reconfiguration can lead to greater spatial fragmentation between areas with high-quality networks and areas with a declining level of service. This is the thesis of splintering urbanism described by Graham and Marvin, whose works gave largely inspired research on networks over the last 15 years (Graham and Marvin 2001). Yet this framework does not account for all configurations. Several actors, and notably some utilities, with the support of local authorities, have opted for another industrial and urban trajectory, based on territorial solidarity (Barbier 2011; Coing 2013). Such a strategy is based on the idea of re-creating the economies of

scale that have disappeared as a result of shrinking demand. This essentially translates into mechanisms of tariff solidarity.

This is what can be observed in and around Magdeburg, in the *Land* (federal state) of Saxony-Anhalt, to the south-west of Berlin. The city of Magdeburg, in spite of its status as state capital, has lost over 25% of its population and most of its 80,000 industrial jobs since 1990. The changes observed in the city echo those experienced in the rest of Saxony-Anhalt, the *Land* most affected by processes of urban shrinkage in eastern Germany and which often has some of the most dramatic indicators of socio-economic precarity at national level. Magdeburg's technical networks, which are mainly run by a local multi-utility operator (Städtische Werke Magdeburg, or SWM, a mixed-capital company), have been deeply affected by this cumulative crisis. Water and energy consumption levels have dropped by 50% to 80%, depending on the network in question, since the fall of the Berlin Wall. This situation is quite extreme but at the same time relatively common in this eastern part of Germany. This has forced the utility to radically change its practices and adapt to this new and unplanned context, which has made Magdeburg a form of laboratory for the exploration of shrinking networks management.

The changes that have been carried out are complex and multifaceted. One key aspect has been a spatial strategy based on mechanisms of spatial redistribution and solidarity.

On the one hand, SWM has tried to enlarge its area of operation to compensate for lost economies of scale. This has taken the form in particular of mergers with other networks and taking on the management of networks in adjacent territories. Shrinking consumption levels has thus resulted in the growth of the areas supplied by SWM, which has tried to pool infrastructures at a larger scale for water, sanitation and electricity.

On the other hand, new mechanisms for tariff solidarity and shared governance have been put in place on an infraregional scale, in close collaboration with other actors directly and financially linked to SWM. A similar arrangement has enabled the infraregional water company, Trinkwasser Magdeburg (TWM), to optimize its tariff system since the 1990s.

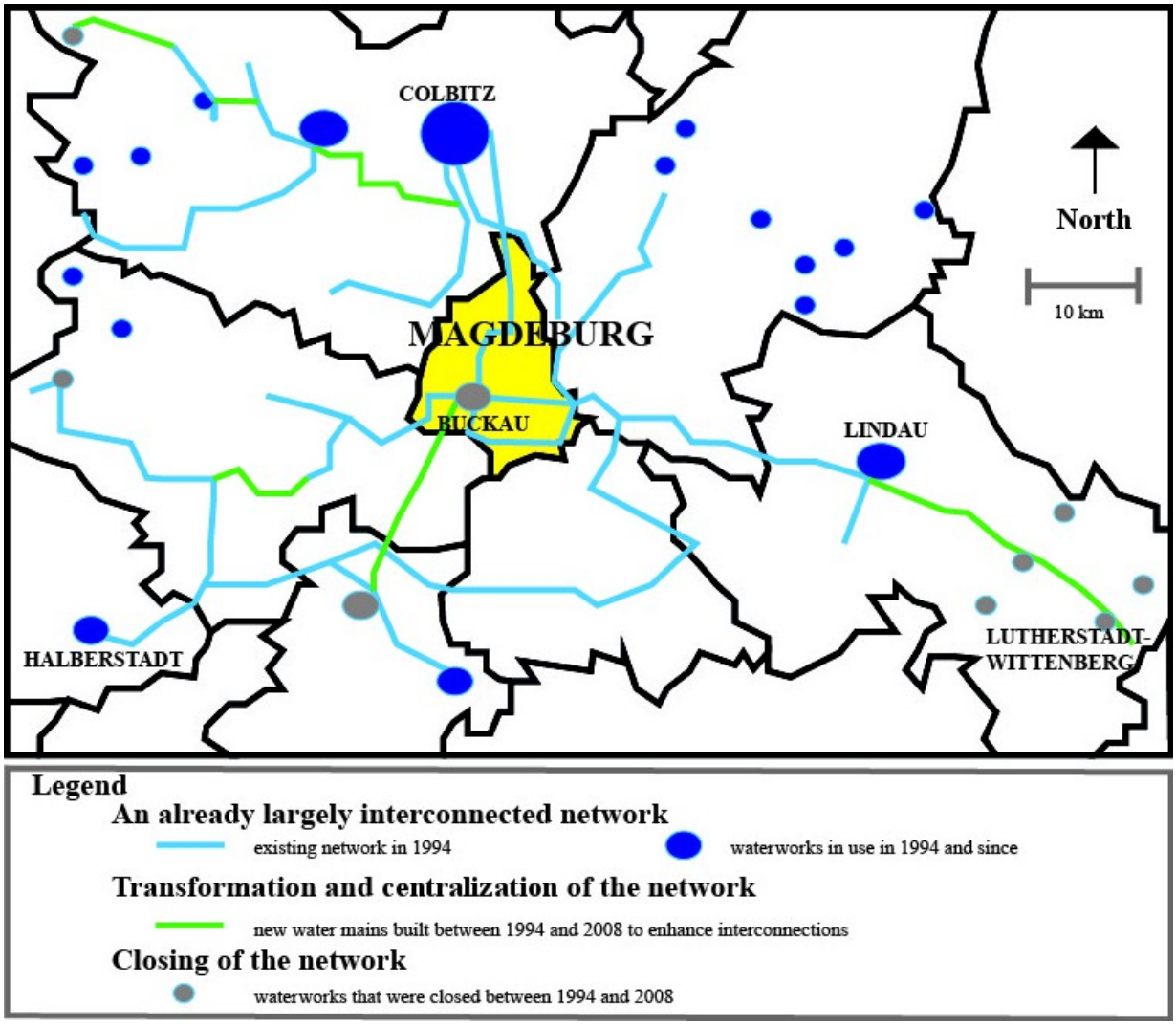
TWM supplies 19 local utilities (including SWM, the largest) that in turn supply water to 338 communities, covering a population of 770,000 inhabitants (Kluge *et al.* 2010). These local utilities are also the shareholders of the company and are represented on its management board in proportion to the populations supplied. In addition to this structure, a mechanism guarantees that SWM, as the largest shareholder, cannot force any decision alone and, conversely, cannot be constrained by a coalition of the other shareholders. This favours dynamics of negotiation and consensus. To deal with the huge drop in consumption levels and in order to stabilize – demographically and economically – the poor, ageing, low-density and depopulated communities on the outskirts of Magdeburg, TWM has implemented a new tariff system explicitly called "Solidarity Tariff" ("*Solidarpreis*"), based on principles of redistribution. What this means in concrete terms is that Magdeburg's utility (and therefore Magdeburg's inhabitants, as the end users whose bills cover the water management costs) contributes a little more than it otherwise would if it were to pay only for the city's infrastructure, while the 18 other utilities in the adjacent areas – and consequently their inhabitants – pay less than they would otherwise have to if they were solely responsible for funding their areas' rising infrastructure costs.[3]

TWM has anticipated some of the changes that have occurred the region and tried to maintain a similar quality of service at the infraregional level. In doing so, this utility has produced a new form of "waterscape" and a form of interterritorial solidarity that has stood the test of time: Magdeburg still pays for the stability of the surrounding region, which has been so dramatically affected by the different economic and social crises that have occurred over the last 25 years. Although this kind of system generates important overheads, it is nevertheless of benefit to the local utility and the city

[3] Every year, this system costs Magdeburg's utility between €1 million and €2 million. Without such a redistribution system, some communities in the region would have to pay eight to ten times more for their water than the city of Magdeburg.

authorities: for instance, the infraregional network has been extended to another city (Wittenberg) in order to deal with the underuse of both their networks, which has also helped reduce the risk of stagnation and water contamination within Magdeburg, thus making the city less vulnerable to some of the risks associated with changing patterns of demand.

Figure 3. The transformation of the TWM network: towards an intermeshed network



Source: TWM data; map produced by the author.

These new forms of spatial redistribution do not coincide with the widespread dynamics of competition. They embody a form of spatial redistribution that seeks, on the contrary, territorial equalization. Here, however, the process of redistribution is not designed and advocated by an elected institution or an administration but by a utility (though partly linked to local authorities). This demonstrates the eminently political character of these actors and their potential role in the stabilization of territories that have experienced both urban shrinkage and the emergence of new territorial solidarities.

Bibliography

Barbier, R. 2011. “La sécurisation de l’approvisionnement en eau potable : un tour d’horizon des enjeux et des leviers d’action”, in G. Bouleau and L. Guérin-Schneider. (eds.), *Des tuyaux et des hommes*, Versailles: Éditions Quæ, “Indisciplines” series, pp. 123–134.

Coing, H. 2013. “Gestion urbaine de l’eau : nouveaux défis, nouvelle donne”, in B. Pecqueur and A. Brochet (eds.), *Le Service public d’eau potable et la fabrique des territoires*, Paris: L’Harmattan, pp. 427–432.

Dupuy, G. 2011. “Fracture et dépendance : l’enfer des réseaux”, *Flux*, no. 83, pp. 6–23.

Florentin, D. 2015. *Shrinking networks ? Les nouveaux modèles économiques et territoriaux des firmes locales d’infrastructure face à la diminution de la consommation*, PhD thesis in territorial development and urban planning, Université Paris-Est, 387 pp. Available online at the following URL: https://tel.archives-ouvertes.fr/tel-01298487.

Graham, S. and Marvin, S. 2001. *Splintering Urbanism*. *Networked Infrastructures, Technological Mobilities and the Urban Condition*, London: Routledge.

Kaika, M. and Swyngedouw, E. 2000. “Fetishizing the modern city: the phantasmagoria of urban technological networks”, *International Journal of Urban and Regional Research*, vol. 24, no. 1, pp. 124–138.

Kluge, T., Felmeden, J., Michel, B. and Rüthrich, W. 2010. *Analyse und Bewertung der teilräumischen Entwicklung und Strukturierung teilräumlicher Lösungsansätze für das Gebiet des TWM – Strukturkonzept TWM 2050*, internal report, Magdeburg: Trinkwasser Magdeburg (TWM).

Lopez, F. 2014. *Le Rêve d’une déconnexion. De la maison autonome à la cité auto-énergétique*, Paris: Éditions de la Villette.

Moss, T. 2008. “‘Cold spots’ of urban infrastructure: shrinking processes in Eastern Germany and the Modern Infrastructural Ideal”, *International Journal of Urban and Regional Research*, pp. 436–451.

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