Emerging countries, cities and energy. Questioning transitions

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Introduction

This chapter presents the main conclusions of two comparative research programmes[1] exploring urban energy transformations, specifically energy for buildings and economic activities. Their starting point is rooted in a body of work dedicated to energy transition, a notion extensively employed in academic circles and, since the 1992 Rio Summit, increasingly associated with cities: "Cities, as entities within which an ever-larger share of energy is used, are seen as simultaneously constituting a key target of such an energy transition, as well as a key 'instrument' in delivering it" (Rutherford & Coutard 2014, p.2). The emphasis placed on the growing role of cities in the transformation of energy systems historically dominated by national players (Thorp & Marvin 1995; Bulkeley et al. 2010; Hodson & Marvin 2010) raises questions about the specificities of urban transition pathways and their geographical distribution (Bouzarovski, Introduction to this volume). The aim of the programmes was thus to explore the factors of change observable at urban scales and the main actors holding a "vision" or a strategy for energy in order to understand if and how transformations are framed, devised and implemented in relations with urban concerns and to assess the capacity for action of urban authorities. This capacity needs to be gauged in relation, on the one hand, to the traditional energy sector operators, often maintaining close links with central governments, and on the other hand, to the private players which have been strengthened by reforms in the sector (liberalisation, unbundling, privatisation or opening up to private investors). Globally, the question is about the emergence of a territorialisation of energy issues at metropolitan scales and, in this chapter, about the specificities of this process in the context of cities in emerging countries. As pointed in the introduction of the book, such metropolises must be placed in the agenda of future research. That is urban entities where development is taking place in conditions marked by a combination of high economic growth, strong integration into globalised markets and robust institutional know-how (Sgard 2008; Piveteau & Rougier 2010). Urban energy demand here is strong, driven both by high urban growth rates and by rising consumption among the urban middle classes.

The chapter offers a synthesis of in-depth empirical analyses exploring these questions in four big cities in emerging countries (Buenos Aires, Delhi, Istanbul, Cape Town) and a number

of secondary cities (Sfax in Tunisia, Turkish cities). These cases were chosen for contingent reasons, including the familiarity the researchers involved in the programmes had gained thanks to previous research. But as will be explained further, the research in these cities clearly shows that urban energy issues are subjects to very different framings strongly influenced by local and place-specific concerns. In view of this and considering the uneven capacity and effectiveness of local urban action in determining the scope and nature of the cities' commitment, the chapter argues against the hypothesis of a convergence of developments towards a model of "energy transition" as set out, for instance, in national sectorial policies (see the main characteristics of the case studies in Table 7.1). The analysis also critically reviews the assumption of a growing role for local authorities in energy governance (see also Rutherford & Jaglin 2015).[2] Although cities are not passive in response to the ongoing changes and to the tensions and contestation which materialise in urban spaces in relation with the politicisation of energy issues, the chapter suggests that energy transition is not the primary focus of urban governance in cities of emerging countries, which must address context-specific priorities pertaining to broader perspectives of urban development and social regulation.

The first section explains why the focus on urban energy issues challenges the idea of a convergent and stable energy transition and leads us to favour the notion of energy changes, which is less normative and restrictive. In the second section we stress the urbanisation of energy issues, understood as the rescaling of these issues at the urban level, and discuss why it does not result nor contribute to a greater autonomy of urban stakeholders vis-à-vis national authorities and sector firms. The third section is dedicated to the analysis of the very diverse politicisation processes that occur in the surveyed cities with respect to energy policy. We conclude by summarising the main implications of the cases findings for a research on the urban governance of energy transition sensitive to the variety of issues and contexts.

Energy transition, what transitions?

In recent literature, energy transition is often presented as an imperative imposed by climate change and growing pressure on fossil fuels. In a normative sense, it means a deliberate transformation of present sociotechnical energy systems necessary for the emergence of a more sustainable, less carbon-dependent energy model, more reliant on renewables and less energy intensive (Rojey 2008).

One of the questions for researchers therefore concerns the mechanisms and phases of sociotechnical change, as explored in transition studies addressing the transformation of large-scale socio-technical systems (Smith et al. 2005), and conceptualised as a result of the interaction between regimes, niches and landscape pressures by scholars who adopt a multilevel perspective (Geels 2002). Recent research has identified the urban level of governance as a central locus of such transition processes (Bulkeley et al. 2010), either because cities, and particularly global cities, are perceived as actors deploying coherent strategies (Hodson & Marvin 2010), or because they are places where negotiations and contestation also shape transition pathways (Späth & Rohracher 2015). Despite the emphasis placed on urban areas, there have been few systematic investigations of the specific urban approaches to energy issues and of the distinct dynamics of urban-level transition: focusing on aspatial innovation processes, most of the literature on energy transition underestimates the politics and challenges of national-local alignment while, more generally, inadequately recognizing the spatial and scale dimensions of the transition approaches (Raven et al. 2012).

Our findings, however, show that the assumption of a relatively stable preliminary consensus around broad objectives should not be taken for granted. Indeed, the question of energy transition,

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in the sense mentioned above, is far from omnipresent in the cases studied and therefore in fact constitutes only one of the instruments of contemporary energy change. In other words, energy systems evolve regardless of the overt rhetoric of energy transition and with varying degrees of coherence and coordination. At urban scales, these processes of change give rise to a politicisation of energy questions which, far from occurring through the simple transposition of national debates, incorporates factors and objectives specific to each place, as well as limitations on action associated with the resources and skills available. Energy issues are framed in close relation to local concerns and interests, embedded in territorial compromises constructed around disparate priorities and a multiplicity of arrangements that reflects diverging conceptions of the role of energy in urban policies and development. These urban "resistances" to normative discourses on the energy transition mirror the specificities of the sociotechnical systems of each city studied and the potential risks of destabilisation for local economic networks, labour markets, territorial organisation. They cast light on the origin and nature of the conflicts and resistances thus generated but also on the local conditions of any compromises reached to overcome them, the drivers and resources of a genuinely local trajectory of change.

A territorial perspective, focusing on the processes and their transversal dimensions, is of particular heuristic value here in investigating – beyond their strict sectorial dimension – energy changes that are unfinished, disputed and politically highly loaded, and which reflect different societal interests and preoccupations that cannot, *a priori*, be assumed to converge across spaces and scales. Thus, in many emerging countries, the failings of the electricity system are of a more immediate concern than the internationally publicised global factors of crisis (peak oil, climate change) and the politics of energy are typically related to dispute around reforms of the national electricity systems (privatisation and deregulation, cuts in energy sector subsidies), matters of development specific to societies in emerging countries (for instance the growth in energy demand, which inadequate and/or ageing production and distribution systems are stretched to meet), and advancement of urban environmental transition (Lee 2006) (through the replacement of inefficient and polluting traditional energy sources, like biomass and charcoal, by modern energy as electricity or gas). Taken together – and however significant they may be – these changes cannot immediately be classed as an energy transition, because methodological obstacles limit the evaluation of their long-term effects (Grubler 2012, p.11), and because the policies and measures observed are not always consistent and coordinated, and indeed are riddled with contradictions, thus obfuscating the coherence of any shared vision of energy transition.

Without prejudging whether or not such a vision exists, the changes considered affect existing sociotechnical energy systems. They are a combination of material factors (infrastructures, equipment), social actors (equipment manufacturers, producers and service suppliers, public decision-makers, consumers), regulatory frameworks, standards, and also values and repre-sentations internalised by the different actors. Whatever their content, the changes hold a strong political dimension. An indispensable component of wealth production, electricity is not reducible to the technical dimensions of generation and distribution activities. First, it encompasses all the value chains, in manufacturing and services, in terms of competitiveness and capital accumulation. Second, it is used as an instrument of political regulation and social redistribution, especially in cities. Necessary to the exercise of both economic and political power, its control – disputed – brings into play the balances of power between not only public and private, but also national and local actors. So beyond the "grid object", which has its own actors and dynamics, an analysis of electricity issues – including their urban dimensions – cannot ignore the sector's political economy, which incorporates social and political transformations correlated with the changes observed at all scales, as well as the way in which they transform or threaten to transform inherited power relations.

Table 7.1 Case studies in the dossier

Case study	Common features	National energy policy framework	Version and local specificity(ies) of energy policy	Forms of local politicisation of the energy issue
Buenos Aires (Prévôt-Schapira & Velut 2013)	Sustained demographic and spatial growth; sharp increase in energy consumption (industry, middle classes); big social contrasts and serios poverty in a significant section of the urban population	Security of supply Energy mix: gas (for thermal power centres and households), hydroelectricity, nuclear	Political management via consumer prices (more subsidised in BA than the rest of the country) and investments (quasi-regulated economy) Innovations reinforcing the status quo Energy transition: no	Opposition to plans increases in energy prices, stigmatisation of "big" consumers and "cheaters"
Delhi (Zérah & Kohler 2013)		Electricity sector reforms (privatisation, energy efficiency) to move from production deficit to production surplus Energy mix: coal, Electricity sector reforms hydroelectricity Model of low carbon intensity redistributive growth	Energy transition: nascent Sector of application: transport Proliferation of tools to support clean energy but little operational impact, wait-and-see and opportunistic approach in companies, distrust among users	Urban society interested in other priorities: transparency, continued low electricity prices, quality of living conditions Rising demand driven by a high consuming middle-class hostile to cost of living increases
Cape Town (Dubresson 2013; Jaglin & Subrémon 2015)		Security of supply in response to the crisis in the South African energy model based on massive use of cheap coal. National policy to promote renewable energy and energy savings.	Ambitious energy transition strategy, notably including the promotion of solar water heaters, but implementation at a standstill Conditions not in place for a shift to an autonomous local urban policy of energy transition	Construction of a green coalition and incorporation of energy transition into municipal policy. Very marked socio-economic contrasts and problems of municipal action in poor neighbourhoods.

continued . . .

Table 7.1 Continued

Case study	Common features	National energy policy framework	Version and local specificity(ies) of energy policy	Forms of local politicisation of the energy issue
Istanbul (Arik 2013)		Security of energy supply at an affordable price through privatisation of operators and the regulation of energy markets. Encouragement for the spread of gas, linked with the country's strategic position. Real but marginal development of renewables.	Policy of extending the natural gas network to replace household coal use (in order to reduce air pollution). No promotion of transition to renewable energy.	Energy clientelism encouraging the use of coal in working-class areas, the electoral bases of the ruling party. Universalisation countered by the diversity of uses and the social economic inequalities of households.
Secondary Turkish cities (Pérouse 2013)		National political priorities: energy independence and security (privatisations, private investments, state governance). Reality of prices for fossil fuels (petrol, electricity).	Local administrations confined to secondary roles. Development of public transport in several big cities (subway, BRT). Experimental climate plan in Gaziantep.	Opposition to energy prices and fraud prevention policies.

	Energy transition: development of urban gas network. Encouragement for renewable energy (solar, wind power) which remain marginal and are not a prerogative of the cities.		
Sfax (Bolzon et al. 2013)	Reduction in expenditure on fossil fuel imports. Cut in electricity price subsidies and substitution of less subsidised natural gas for other fossil fuels (LPG). Promotion of energy savings to the industrial, tertiary and residential sectors. Maintenance of public employment.	Public energy consumption control policies little territorialised and partially in competition. Promotion of natural gas impeded by urban morphology and poverty. Success of solar water heaters. Start of a policy to control energy consumption by the municipality.	Opposition to hikes in the price of electricity, gas and LPG.

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An urbanisation of energy questions under national control

In an increasingly urbanised world, cities and urban regions are not only places and players in fossil fuel dependence and the production of greenhouse gases; they are also powerful markets for renewable energy and new technologies, centres of political and economic powers and civil organisations, a focus for the emergence and spread of new consumption practices. They are therefore scales potentially appropriate for energy change, provided that there is commitment by the social actors. A growing number of experts therefore believe that big cities and urban regions will emerge as driving forces in the implementation of measures to bring about the necessary energy revolution. Back in 2002 in Johannesburg, Peter Droege, a member of the World Council for Renewable Energy, made the following claim: "Cities, towns and other urban communities are increasingly regarded as settings for coordinated policy implementation efforts aimed at global renewable energy technology introduction and carbon emissions reduction programs" (Droege 2002, p.2). This is also the starting point for the work of Hodson and Marvin (2010), for whom the ecological pressures imposed, for example, by climate change or peak oil on "global" cities are forcing them to develop metropolitan strategies designed both to ensure security of supply and to achieve greater autonomy in the control of their resources. Our case studies reflect a somewhat different reality.

To employ an analytical framework familiar to geographers, the question raised is therefore that of the urban rescaling of energy systems. These are "geographically embedded" (Bridge et al. 2013), in other words their infrastructures (and the spatial distribution of sunk costs) outline a specific geography of connections and interdependencies, their control and governance arrangements structure powers and interests at defined scales, the technologies implemented reflect local cultures of consumption, which in return they help to shape. Modifying and rescaling energy systems entails technical and sociotechnical changes that affect inherited power relations and transform the socio-geography of "energy landscapes".[3] Among the range of possible restructurings, the research thus explores the nature and scope of a process of urban territorialisation of energy systems, i.e. of the growing influence of the material infrastructure and urban issues on the decisions that govern them, the enhanced role of urban local authorities in their governance, a strategic reintegration (or a de-marginalisation) of the decentralised parts of the energy system in their political economy (small-scale local decentralised production, technology designed with a view to the ultimate supply and end uses, local determinants of urban demand).

If we stick to this definition, our case studies contain few examples of urban territorialisation. In energy systems that are everywhere expanding (extension of electricity and gas networks, increasing consumption), the security of urban energy supply is a major preoccupation for both central government and urban authorities, especially in capitals, as the example of Buenos Aires resoundingly demonstrates. From this point of view, there is little room for a divergence of interests and strategies: everywhere, the national and local political priorities are to meet growing demand at an affordable price, which tends somewhat to reinforce the dependency of cities first on large national infrastructures, and second on government actors and powerful new private actors, both national and international. Cape Town is dependent on the coal-powered Gauteng electricity complex, Turkish cities on Russian or Central Asian hydrocarbon suppliers. Everywhere, renewables are introduced into the energy mix to complement (rather than avoid) the increase in energy supply, whether from conventional sources (oil, gas, hydroelectric) or from nuclear power. Therefore, processes of decentralisation (development of local systems employing innovative technologies: photovoltaic, solar thermal, wind power, small-scale hydroelectric; mechanisms to increase energy efficiency in buildings or in household and industrial equipment) and of centralisation (continued construction of big fossil fuel dependent networks

based on electricity, natural gas or oil; revival of large hydroelectric and nuclear projects) ~~thus~~ work together, and at the same time, to reconfigure energy systems. This enables certain cities, for instance Cape Town and the Turkish cities, to encourage innovations and even to become the drivers of appropriate supplementary solutions, for example renewables, measures that nevertheless have ~~an impact on a still marginal sector~~ and, as in the case of Cape Town, come into competition with national measures (Jaglin 2017).

Nevertheless, another process may be observed, which we call the ***urbanisation of energy issues***. By this we mean, first, the growing inclusion of energy questions in urban policies, and also, the growing importance of rhetoric, initiatives and conflicts relating to energy issues, which are expressed in the cities and influence energy changes, even though these are controlled at other scales. Rather than growing autonomy for urban actors, and urban energy interests, what we are seeing therefore is these interests being increasingly taken into account in energy govern-ance at national level. This process has significant consequences: it positions cities, in particular the biggest cities, as possible interlocutors in a multilevel play of actors, it enhances their role in incubating or driving energy changes, but it also helps to import into energy systems demands, claims and resistances emanating from urban consumers.
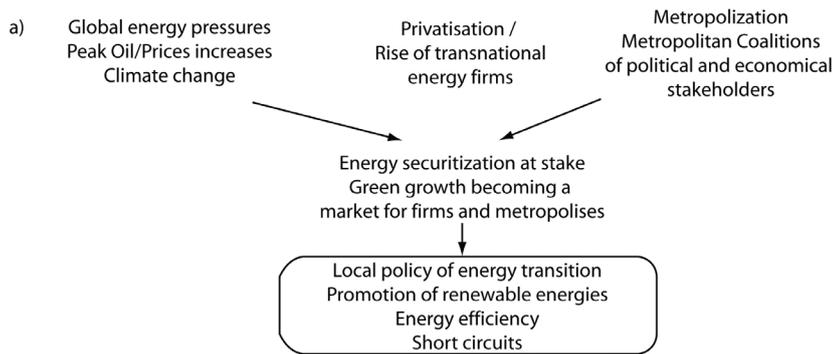

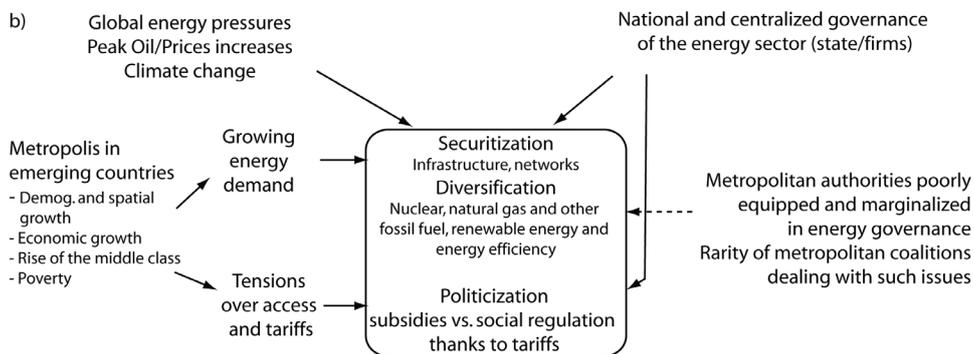*Figure 7.1a* Governance of the energy transition in world cities. Interpreted from Marvin & Hodson, 2010

Figure 7.1b Governance of energy changes in the metropolis of emerging countries. Synthetic modelling by Jaglin & Verdeil

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Energy questions through the local lens: partial and situated politicisation

While highlighting the emergence of the energy issue as a "public urban issue" (Verdeil 2014), the case studies help to identify three inherent characteristics of the politicisation at work (see Table 7.1). First, they stress the importance of national political and institutional frameworks, and the overwhelming role of strategic central government choices in recent sectorial changes: power company privatisations in India and Argentina, market liberalisation in Turkey, a macroeconomic strategy of public subsidy reduction in Tunisia, a readjustment of the energy mix in response to the crisis of the low-cost coal model in South Africa, the Argentinian government's energy populism. Second, they emphasize the multiple – not to say contradictory – aims of ~~these~~ decentralised approaches to tackling energy questions, together with their embeddedness in specific territorial configurations. Indeed, in taking hold of energy issues, urban authorities are less interested in meeting sectorial concerns (and, among them, the place-dependent energy mix whose variety our case studies illustrate) than in reinforcing across-the-board urban policies, of which those concerns constitute only one facet.

In consequence, there are frequent divergences between the way in which the object "energy" is constructed at the urban scale, on the basis of local priorities or controversies (gas in Istanbul, subway in Delhi, environment in Cape Town, etc.), and the way in which energy policies are established at national scales, where the concerns are more strategic and sectorial (Jaglin 2014). It is therefore difficult to pinpoint where and how the big cities can engage in order to debate and construct, between themselves and at national level, a shared vision of energy changes, their consequences and their joint management. Depending on local patterns, cities may be places of receptiveness, resistance or impetus, or any combination of the three, with no assurance of an alignment between their energy priorities and those promoted by national policies.

Against this background, three primary local preoccupations can be identified in the cities studied.

The first priority of urban authorities is to secure a high-quality and cheap energy supply, seen as essential to local economic development and urban competitiveness. In circumstances where the local energy supply will continue – for a long time – to depend on large infrastructures and their associated technologies, this security entails less a transition towards low carbon energy, which is very far from constituting a dominant or even stated objective, than the inclusion of decentralised energy production systems (e.g. solar water heaters), as a supplement to the large networks (Cape Town, Sfax, Turkish Cities). The current changes are therefore less about a desire for substitution, than about the organisation of long-term coexistence between different sociotechnical systems. This coexistence itself poses considerable challenges, both of technical and regulatory nature, that cities are ill-equipped to meet. In addition, by combining heterogeneous systems, whose dynamics of development/decline can vary from one place and time to another, it creates the possibility for a diversification – deliberate or accidental – of energy systems at local scales, with impacts on urban inequality and fragmentation that are still largely unknown. These also depend on the preferences of local political and economic actors, which greatly differ according to the context: while the failings of the national system fuel the enthusiasm of business circles for alternatives (e.g. gas instead of coal-based electricity) in Cape Town, in Delhi, the local players echo aggressive national rhetoric on the "right level" of energy efficiency (in view of the historical frugal development trajectory of India) to justify a certain continuity in energy choices and practices. The emphasis on coexistence, rather than on substitution, opens up a debate about the relevance of the concept of energy transition, as already stated by Fressoz:

> To extract oneself from the transitionist imaginary is not easy because it so much structures the common perception of the history of technics, punctuated by a few great innovations that define technical ages. This vision is not only linear, it is simply wrong: it does not account for the material history of our society that fundamentally is cumulative.
>
> (Fressoz 2013)[4]

Second, all the cities also take positions in favour of measures to facilitate access to electricity and/or gas, within the framework of programmes to fight poverty (everywhere), ill-health (linked with particles and smoke from the burning of coal and wood in Istanbul) and insecurity (fire accidents in informal settlements in Cape Town). The expansion of the electricity and gas networks (Istanbul, Sfax), and the universalisation of a still rationed supply, thus remain essential components of urban policy and are reflected in huge programmes of investment in and extension of physical infrastructures. In emerging economies that possess the capacity to absorb and even promote sociotechnical innovations, these can benefit from technological leaps forward (spread of individual photovoltaic panels and solar water heaters, as in Sfax or in Turkey, development of micro-wind power) and foster off-grid alternatives. However, modern policies to increase access to energy favour – and will long continue to do so – programmes of massive investment in the construction and expansion of integrated and centralised networks, the substitution of "clean" fossil energy (gas) for other, more polluting fossil fuels (coal or oil), as in Istanbul, being, at this stage, of a much greater urgency and relevance than decarbonising the energy model.

Beyond access to the infrastructure, the question of consumption and its cost is a major political issue. On the one hand, the emergence and consolidation of the urban middle classes is a structuring factor in changes to the energy sector: these new population categories enter a consumer society characterised by the personal acquisition of numerous energy-hungry goods and aspire to levels of comfort and mobility which, in the short term, are hardly compatible with new standards of frugality. Delhi and Sfax, like Buenos Aires, reflect the impact of these new middle-class practices (in particular air-conditioning) on the sustained growth of urban energy consumption, a fact equally true of the secondary Turkish cities.

On the other hand, however, the access of large swathes of these urban societies to efficient energy continues to be hindered by poverty and inadequate housing. In research on relations between energy and poverty, numerous economic studies look at the determinants of demand and the conditions of an "urban energy transition", in which household consumption patterns progress up a scale of fuel types, from the least to the most efficient, depending on income and degree of adjustment to city life (Leach 1992). Some of these works emphasise the impact of public policies in the modalities of this transition, but also the persistence of the use of mixed energy sources for economic and/or cultural reasons (Barnes et al. 2005). This is clearly confirmed by the example of Istanbul, where the policy of universal gas supply comes into conflict with both poverty and the "coal clientelism" of the local authorities, and of Sfax, where the spread of natural gas comes up against the additional costs of installation in low-density neighbourhoods as well as competition from other systems.

Third, the cities studied have all adopted energy efficiency policies and projects (at least in their own building stock), consumer education and awareness-raising programmes and measures to support the most vulnerable households by helping them to reduce their dependency on energy resources (by exchanging energy intensive household appliances, sometimes in return for the regularisation of illegal connections[5]). Some municipalities, such as Cape Town, run workshops and forums aimed at industrial users and occupants of commercial premises. While active on the energy efficiency front, urban authorities are, by contrast, more reserved in their

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criticism of existing production and consumption patterns, even when they possess the tools to influence these, such as urban planning, transport systems, building standards and planning rules, etc. In general, they are content to justify energy efficiency measures on the grounds of potential economic gains (lower bills), without discussing the question of consumer practices and habits (e.g. air conditioning). In fact, any such challenge tends to yield to another priority, the right to retain a recently acquired "quality of life" (Delhi, Cape Town, Tunisian and Turkish cities). Despite almost universal energy efficiency measures, and in the absence of a more profound transformation of urban economic organisation and ways of life, which are particularly heterogeneous in emerging countries, technical innovation and the spread of "modern" energy serve, for the moment, more to satisfy consumer demand than to achieve energy sobriety.

Altogether, these different aspects of energy policy rarely coincide with a clear and unequivocal position of urban authorities on energy and climate change, and are subordinate to the very nature of urban government. The tendency is thus for city authorities – multi-sectorial, territorialised and legitimised by a relatively short electoral cycle – to embed sectorial questions structurally within a transversal and multidimensional approach, justified by short-term outcomes. Cities are therefore the arena for the expression of energy concerns shaped by their territorial specificities: the nature of the economic base (dominated by heavy industry/services), the origin of primary energy resources (coal, nuclear, hydroelectric), the local potential of renewables (sunshine, wind), whether or not civil society is organised and motivated on energy issues, the impact of certain problems (poverty, industrial conversion or deindustrialisation, political crisis, regional energy geopolitics). The nature of the pressure groups is also crucial: while coal or nuclear lobbies can be particularly influential at national level, local businesses (as big energy consumers and major sources of taxes and/or jobs), environmental pressure groups or resident associations may also be key sources of local pressure. The example of Delhi thus shows the influence of middle-class consumer associations in setting priorities (transparency, living conditions, low electricity prices). Municipal energy agendas are also dependent on the need to join up with other facets of urban policy: cutting greenhouse gas emissions while transforming the city with a public transport system subject to recent restructuring (Delhi); developing renewable energy to sell the image of a "green" destination to investors (Cape Town); combating atmospheric pollution and a poor urban image (Istanbul). In cities, changing the energy system can mean altering spatial planning principles and ways of life as much as transforming the energy mix and the urban politicisation of energy issues is rarely about energy change *per se*. The capacity of local actors to create formal urban coalitions around shared objectives in this sphere – transcending real conflicts of interest between economic sectors whose primary concern is a reliable supply of cheap energy, others more preoccupied with the competitive advantages of a green economy, and yet others directly interested in the development of a renewable energies industry – is, for the moment, far from amply apparent in the cities studied. From this point of view, and subject to a more in-depth study, the participation of cities like Istanbul, Rio or Buenos Aires in a network like C40[6] seems more attributable to its organisers' wish to parade the participation of the cities of the South, than to any commitment by the representatives of those cities, who can nevertheless use it as a resource for their territorial marketing strategy.

Finally, the case studies emphasize that, whatever the ambition and the content of urban authorities' actions, it is primarily in relation to rationing and scarcity, on the one hand, and prices on the other, that energy becomes an urban political question. The price issue is particularly sensitive and linked to the impact of increases in production costs (use of gas-fired power stations to meet peak demand, new environmental standards, the impact of drought on hydroelectric production, rising oil prices, etc.), or to a gradual removal of subsidies previously

applicable to consumer prices before the liberalisation and privatisation policies implemented since the 1990s, as in Istanbul, Delhi or Sfax and, more partially and indecisively, in Buenos Aires. Ratcheting up the price of energy without giving consumers ways to reduce their dependency can lead to very serious social and economic consequences. For the moment, however, there has been very little close analysis of the socio-spatial distribution of the costs of potential changes in energy systems, nor systematic investigation of the consequences of these additional costs for different categories of urban energy users, as evidenced by the lack of data and analysis on the response of Cape Town's lower middle-classes to increases in electricity prices and to ill-conceived energy efficiency campaigns (Jaglin and Subrémon 2015). More generally, the shift from subsidised energy to less subsidised energy threatens the existing social balances, a threat exploited in different ways by movements of opposition to a less regulated electricity economy in Buenos Aires and of middle-class protest against discredited political and bureaucratic elites in Delhi. The tensions thus generated also limit the effectiveness of certain policies, such as universal gas supply in Istanbul and Sfax. While the question of access to energy is therefore far from settled in terms of network connections and consumer prices for what remains a large swathe of urban populations, very widespread shortages and power cuts affect users already connected to the grid. It is therefore scarcely surprising that, in many cities, supply failures coupled with price hikes generate urban unrest and constitute a "new public issue".

However, there is very little leeway to respond to this at municipal level, as is evidenced equally by secondary cities in Turkey and by a rich metropolis like Cape Town: the technical (choice of primary energy resources) and economic (energy industry structure, heavy infrastructures, spatial planning, etc.) paths of dependency have considerable influence on local capacity for action; the energy sector's institutional architectures still leave little room for the urban scale; the legal and normative frameworks governing the sector remain a national prerogative. While local governments have little control over changes, they suffer the instability linked with national transformations whose timeframes rarely correspond to their own aspirations: if too slow, they inhibit local initiatives; if too fast, they disrupt local economic environments without resources and skills being transferred or transformed.

In addition, these changes raise difficult questions. First, the question of funding: both renewable energies and certain energy efficiency measures are insufficiently profitable in the short term to be financed by the private sector, which may explain the hesitancies and delays in the quest for appropriate frameworks for action, which also affect local players, as in Cape Town. Second, the question of coordinating very heterogeneous measures: saving energy requires efforts in multiple spheres (consumption models, eco-design and retrofitting of buildings and machinery, urbanism and spatial planning, patterns of use, housing equipment). And finally, there is the question of anticipation and supporting urban societies in adapting to changes, notably in a way that protects the most vulnerable households whose consumption patterns are highly constrained (poor insulation, poor ventilation, poor lighting, energy intensive electrical appliances). These changes will not take place without social upheavals and require very early coordination of numerous public policies, for which cities often lack both the competence and the capacity.

Conclusion

While normative rhetoric in favour of energy transition is ubiquitous, this research failed to identify real green urban coalitions that unite economic actors and political elites, let alone organised civil society groups, to drive coherent policies in this sphere. Yet in all the cities

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studied, actors (elected officials and technicians in local or regional government, industrial groups, environmental lobbies, resident associations) seize on energy issues out of different motives: reduction or even elimination of the subsidies that drain public budgets, territorial marketing and competitiveness, access to available dedicated funding, energy savings, spending reduction, poverty alleviation. The justifications, motives and priorities for local interventions are very closely linked with urban conditions. Energy issues are therefore becoming partially urbanised around factors that have local resonance (security of supply in Buenos Aires, Cape Town, Istanbul), that intersect with other political concerns (green marketing of a service economy in Delhi and Cape Town; review of prices and sociopolitical motives everywhere) and that sometimes coincide with other interests (demand for transparency in local governance in Delhi).

All this confirms that energy issues are increasingly a matter of debate at local scale, that partial public policy responses are being developed (in particular in the sphere of energy efficiency and management); however, it does not demonstrate (at least for the moment) a general surge in municipal interest in the development and implementation of concerted and systematic strategies for energy transition. In this domain, it would seem, they have neither a clear mandate from their populations nor appropriate powers and resources, which remain national or have been conferred on private actors, for which cities are only one field of operation among others.

By showing that the conditions for convergence between local strategies, national policies and a "universal" model of energy transition are apparently not yet in place, the approach favoured in the research illustrates the advantages of complementarity between, on the one hand, sectorial and national analyses of transition and, on the other, analyses of the urban determinants of energy changes. The latter produce a more realistic understanding of the interdependencies between decentralised urban endpoints and the centralised strategic components of energy systems. The research also confirms the growing politicisation of the energy question in and on the part of cities, the emergence of a "public problem" inseparable from the dynamics of resistance, negotiation and opposition manifested by urban societies towards the contemporary forms of energy transition. At the same time, it cast lights on the way in which these crises and controversies can destabilise but also potentially contribute to changes in energy systems as a whole.

Beyond the cities of emerging countries examined in this chapter, this observation should prompt researchers to look again at the implementation of energy transition policies in other contexts, and to explore how, beyond a set of global conditions (resources, climate change, transformation of capitalism), the variety of issues and local trajectories affect the transformation of energy systems.

Notes

1 Energy trajectories in southern metropolitan regions, funded by the French National Agency for Research, scientific director: S. Jaglin, Latts/UPE and Urban energy governances, North and South, a multiannual project funded by Université Paris-Est, scientific directors: S. Jaglin and J. Rutherford, Latts/UPE.

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3 "Energy landscapes" are defined here as follows: "the constellation of activities and socio-technical linkages associated with energy capture, conversion, distribution and consumption" in which the "material landscapes . . . are the product of social processes and the outcomes of conflict and negotiation among different social groups" (Bridge *et al.* 2013, p. 335).

4 Our translation of "S'extraire de l'imaginaire transitionniste n'est pas aisé tant il structure la perception commune de l'histoire des techniques, scandée par les grandes innovations définissant les grands âges

techniques. . . Cette vision n'est pas seulement linéaire, elle est simplement fausse: elle ne rend pas compte de l'histoire matérielle de notre société qui est fondamentalement cumulative" p.174.

5   This is the case in some projects of urban regularisation of favelas in Rio of Janeiro (Pilo 2015).
6   C40 is a network of cities working to reduce greenhouse gas emissions (see: www.c40.org/).

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