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Energy transition in Jordanian and Lebanese Cities : the case of electricity

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The management of the energy transition¹ as it currently displayed in many institutional and academic publications stresses both the need and the assumed potential of the move towards new small scale and renewable sources of energy, mandatory for reducing the greenhouse gas emissions, and the promotion of local initiatives by citizens or local authorities, credited with a decisive role in such a transition. In the field of electricity, which we specifically focus on in that paper, it could encompass decentralized technologies like solar energy and the valorization of local energy resources (biogas, hydroelectric plant). Local authorities could play an active role, be it as owner of local utilities or through promoting pilot experiences and monitoring and reducing the energy consumption patterns of their assets. Exemplar stories of this kind as well as more balanced appraisals of the difficulties that such moves imply are largely discussed in the growing academic literature on city and energy transition (*Annales de la recherche urbaine*, 2007, for instance). But they mostly deal with Western case studies and the case of lower income countries and cities is less analyzed. When we turn to such places, one has to take into consideration a range of specific issues, among which the following.

- The process of electrification of the day-to-day life has not been achieved as is the case in western cities. Part of the urban dwellers do not have access to the electricity or only on a part time basis. But, given high growth rates of the population and the policies of electrification expansion, the rise of the demand creates a strong need for new electricity resources which the renewable electricity production means can not satisfy quickly and at affordable prices. The lack of local know how is also at stake. The energy transition therefore does not mean turning to the renewable energy sources but also increasing the generation from classical generation sources.
- The role of the local authorities is often problematic. Firstly because their involvement in the transition process as highlighted by the above mentioned set of prescriptions is contradicted by their administrative status. Limitations and lack of decentralization policies do not allow the local authorities to take part in the regulation of the electricity supply. It can even be that the institutional and financial reforms of the utilities sector according to market-oriented

¹ We do accept in this paper the broad definition of energy transition the convenors of the seminar have proposed : a process of potentially radical change in the resources and technologies involved in energy generation as well as in patterns of energy consumption (and we add : of distribution).

criteria lead to a reduced role for local authorities. Their involvement can also be hindered, de facto, by the limitation of their budgetary means or the qualification of their manpower. But besides these facts, others forms of involvement of local actors can be highlighted, though they sometimes occur through informal means. The existing literature reviewing the energy transition related experiments in the Middle east simply overlooks any possible involvement of local authorities (Energy Research Group, 2005).

The proposed paper intends to tackle these issues through the examination of two Middle Eastern cases: Jordan and Lebanon. Both countries lack national energy sources and are highly dependent upon imported oil and gas power plants, even if some attempts at renewable electricity plants are discussed. Both countries also have very high rates of urban population and their economy and domestic life intensively and increasingly rely on electricity.

The paper intends to concentrate on the recent transformations in the electricity sector at the national and the local level to examine the degree of involvement of local or city authorities and actors in the regulation of the electricity sector where State agencies and, in the Jordanian case, new coming national or multinational corporate investors remain the dominant stakeholders. The purpose is to acknowledge the specific factor of their situation and their combination with more general trends.

The investigation is based on fieldworks carried out in Lebanon from 2005 until 2008 and in Jordan in 2008-2009². It encompasses gathering available statistics, meeting with the utilities managers as well with State agencies and administration involved in the sector (operation and regulation), meeting with local authority representatives as well as compiling of existing literature.

The social and geopolitical parameters of the energy transition

Before going into the issue of energy governance, this section provides a brief presentation of the energy and electricity consumption issue in both countries. It will highlight that they stand at a turning point. The high level of consumption and the reliance on imported resources led them to minimize their dependency and therefore to diversify the sources of electricity generation.

The rise of the electricity consumption

Lebanon and Jordan are two small countries with respectively about 4 and 6 millions inhabitants, mostly urban. They belong to the lower-middle income category regarding the GDP/Capita with respectively 5612 and 2461 \$ per inhabitant. According to official records, between 96 and 100% of the population is connected to the public network of electricity. Even if these records seem to overlook some categories of urban dwellers who do not have access to electricity in informal settlements in Lebanon, the fact is that the use of electricity is widespread. In Lebanon in 2004, 95% of the households have a TV, 93% a fridge, 91% an iron. In 1998, electric heating for space and water

² The research in Jordan is sponsored by Tanmia, a project led by IFPO, on behalf of the French National Funding Agency.

heater represented out of the total residential electricity consumption³. In Jordan, 96% of the households have a TV, 93% a fridge and 95% a washing machine. But the main heating sources are gas and diesel, and electricity account for none in this respect. The development of solar water heating systems is at a relatively high level but don't increase very much. It was at 10.5% of households in 1996 and at 13.7% in 2006.⁴ These changes are relatively new when compared to western societies. 30 years ago, the rate of electrical lightning in Jordan was only 71,5% (78% in cities): the cycle of electrifying the society, with the rise of home appliances use, is at its beginning. The use of electricity also change in nature, as evidenced in the summer peak, associated with the use of air conditioned at home or at work and in public or commercial places.

The rise of the population, very strong in Jordan and more limited in Lebanon, as well as the increase of the GDP, associated with these new practices, is inducing a strong growth of the electricity demand, which amounts to about 3,5 to 10% yearly in Jordan (2001-2008) and is estimated at 2% in Lebanon⁵. Such a growth makes compulsory for both countries to increase their production by adding new power plants and/or to rely on higher imports.

Energy transition under geopolitical constraints

Since both countries have almost no or at least very limited national energy resources that can be exploited in the state of the economy or of technology, they are highly dependent upon imported fuels. And yet, these prices have jumped in recent years because of the global surge of oil prices or, in the case of Jordan, because of the end of the special agreements that guaranteed the supply of oil to the country from Iraq after 2003. This has led to new energy strategies.

In Jordan, until 2003, trade agreements with Iraq... used to guarantee the supply of cheap oil. But the regime change in Iraq has ended that agreement (to be developed). Since the end of that agreement, the Hashemite Kingdom has deeply revised its energy strategy and has switched most of its power plants to natural gas instead of fuel oil. (80% of generation from gas). The Kingdom has sealed an agreement with Egypt for the supply of natural gas until 2015 at a fixed price. But the electricity demand growth prospects make compulsory to increase the production. Since the Egyptian government is reluctant to increase the supply and to build a new gazoduc unless a new agreement with revised price and quantity is reached, the Jordanian government has been forced to devise a new strategy. It has decided to end the subsidies to the energy sector which was weighting very heavy on its budget and it is seeking to diversify the energy sources. It has therefore designed an ambitious policy aiming to develop renewable energy power plants and prospects for a nuclear plant are also onwards. The purpose of that Royal Energy Strategy is to reach a 5% share of electricity from renewable energy power plants share in 2015 and 10% in 2020⁶. At the same time, the launching of the regional grids' interconnection with Egypt, Libya, Syria, Lebanon provides an opportunity for electricity exchanges. But such a mechanism has a limited potential because of the limited capacity

³ Central Administration for Statistics, *The National Survey on Households Living Conditions 2004* (www.cas.gov.lb) and ERG 2005.

⁴ Living conditions of households in Jordan, 1996; The Hashemite Kingdom of Jordan Statistical yearbook, 2006.

⁵ But in a context of electricity shortage as we will analyze in the next section.

⁶ Updated Master Strategy of Energy Sector in Jordan for the period (2007-2020). Summary, December 2007.

of the interconnections and the fact that none of these countries has any noticeable surpluses – in the contrary, the local demand is hardly met everywhere.

In Lebanon, the situation is much worse than in Jordan. The country has never fully recovered from the damages the electricity network had experienced during the civil war. Though massive investments in the electric network and in new power plants during the 1990's, the shortages have never been overcome. No new power plant has been built since 1997 and the older units don't work properly and need frequent revision periods. The recent Israeli war in 2006 has damaged some units and affected the network. The demand, currently (2008) at 2300GW, exceeds the national production which stands at 1600 GW. Importations from Syria and, recently, from Egypt, do not compensate that discrepancy and the supply is rationed. Oil products accounts for 93% of the electric generation, the rest being produced thanks to hydroelectricity. Two new plants built in the 1990's were supposed to be powered by natural gas, intended to be imported from Syria. But due to their own national growing needs and to changes in their political relationships with Lebanon, Syria has never supplied the gas once the pipeline has been finished in 2003. The design of gas turbines was intended to save money because gas is cheaper than fuel oil. Large amounts of money invested in order to build the power plants have been wasted, while these power plants have to work on fuel oil, which is very expensive and less efficient than gas. The national electric utility called Electricité du Liban has accumulated a huge debt, amounting yearly to one billion dollars in the three last years, and totalizing, with the interests, about 13 billion dollars in the period 1992-2006. It is one of the main sources of the national public debt (44 billion dollars in 2008). The Lebanese government has only recently acknowledged that the gas solution was over. It has to devise a new strategy which is arousing a heated debate among the political class. The minister of Energy has proposed to build new coal power plants and, temporarily, thermal generators. They are awaiting for the results of the next parliamentary elections before decision is taken. Any strategy towards developing renewable energy power plants is deemed inadequate and not affordable by the government, though some experiments have been done, mostly funded by foreign aid. Evidences from the ground suggest that the use of solar water heaters is developing quickly, reflecting individual strategies of energy cost-savings, far from reaching the level of Jordan.

Jordan and Lebanon are facing common energy and electricity transition challenges (the increasing demand in electricity) but they deal with it very distinctly. Both are highly dependent upon expensive importations of oil and (for Jordan) gas. The dependency is also geopolitical. For Lebanon because natural gas and electricity imports are under the control of Syria. For Jordan because the American invasion of Iraq has changed a special partnership with Iraq with resulted in low prices of energy. The move towards new energy resources or fuel has to be understood in that framework of dependency.

The new Jordanian strategy consists in securing gas supply at negotiated prices and to develop nuclear as well as renewable energy power plants (solar, wind farms). This is supposed to be done thanks to foreign investments and strategic partnerships with foreign firms and is linked to the privatization strategy of the electricity sector (see next section). The Lebanese are facing no lesser challenges than Jordan but have not until yet designed a clear national strategy for the electricity sector. It is nevertheless obvious that Lebanese government is not prioritizing the development of renewable energy sources but favors classical technical solutions like oil powered or coal powered thermal plants.

The notion of energy transition, usually understood in a normative way, as a change in the energy mix including more renewable, encompasses in our case studies other meanings: the geopolitical constraint – rather than the ecological one – is a strong rationale for changing the energy mix while the harsh growth of the energy demand, resulting from the spreading of new social practices (the new widespread electrification of the daily life) requires the use of big power plants rather than small disseminated units. The transition is a change in the energy mix but not necessarily towards more renewable resources. These points are key parameters to understand the specificity of the transition and how the public authorities at various levels (nation, city) as well as the people are going to engage and to negotiate such a change. We will now examine the two case studies in a row before summing up the main lessons they have bore.

The Jordan case: privatization of the electricity sector under state control

A brief history of the electric sector in Jordan: from private and local to State involvement

Two main features should be highlighted about the history of the electricity sector in Jordan: the leading role that private initiative, at the level of the city and with the involvement of the local authorities, played in its beginning. But such an early trend was reversed by the rising role of the State.

As in many cases all over the world, the beginning of electricity in Jordan took place in the main city of the country, Amman, and was the result of a private initiative of the brothers Budeir, entrepreneurs of Syrian origin, in 1938. Their firm was granted a license renewed every year until 1962. Then, JEPCO as it was now called was granted a concession contract for 50 years, which will be open for contest in 2012. The concession area was later adjusted in order to encompass the successive broadened perimeters of the city and the main urban settlements around. It must be noted that the municipality of Amman holds 2,5% of the shares of the firm⁷.

A similar organization of the electricity sector has worked for years in the northern region. IDECO (Irbid District Electricity Company) supplies electricity to Irbid, the second main Jordanian city (about 600.000 inhabitants in 2004) and to others secondary towns of the North, according to a license agreement that has been granted in 1962. IDECO started as a joint municipal and private initiative (with investments by Irbid families) in 1957. Therefore, the company is felt as a local firm and the people of the city a strong sense of belonging with the utility. The area was extended in 1962 and a license concession for 50 years was then granted⁸.

During the 1960's, the government launched a strategic reflection on a strategy in order to develop electricity networks all over the country, but it faced numerous oppositions from the private companies (Kingston, 1999). After 1967 and the occupation of the West Bank, the new political situation led to the implementation of this development strategy as a way to strengthen the State.

⁷ Interview with Mr Marwan Bushnaq, Director of JEPCO, May 2008 and October 2008.

⁸ IDECO website : www.idoco.com.jo and interviews with the director and the deputy director (may and October 2008). The history of the company has to be confirmed and refined.

International grants (notably by the IBRD) helped fund the required investment. The Jordan Electricity Authority created in 1967 enforced that policy. It reclaimed the generation units belonging to the private existing companies in Amman and Irbid, entered the capital of IDECO (of which it owned 55,4% of the shares, against 25% for the municipalities, the rest belonging to private investors, mostly local families) in order to extend its perimeter of operation. It began to build a national power transportation grid, and began the extension of the network in the others places of the country (Jordan Valley and the South).

As a result of the State involvement, the level of electricity supply improved in dramatic proportion. In 1961, only 17% of the households had electric lightning at home and 39.2 of the urban households. In 1979, the figure had risen to respectively 71.5% and 78%. As figures show above, it is now 99.7%. The development of electricity networks is part of a larger State effort to provide public services. The State aimed to legitimize its regime that the 1967 defeat and its aftermath, the Black September⁹, harshly challenged. The Kingdom benefited therefore from foreign funding from the international lenders and the United States that sought to protect and stabilize a country whose geopolitical role was crucial for the peace in the Middle East. The mounting role for the State in the electricity sector has marginalized the early local and private initiatives, because of the geopolitical context and the correlated need for the State to establish itself as a strong a reliable service provider.

The privatization process: an alliance of foreign investors with the State

In 1990, with the second Gulf war, the brutal end of the remittances from the Gulf and the return of numerous expatriates to Jordan, coupled with the (temporary) decrease of the international aid put the national budget under pressure. Therefore the Jordanian government engaged with a privatization process in several sectors. In 1997, the JEA was corporatized and in 1998, three subsidiaries established under the name of NEPCO (National Electricity Power Company), in charge of buying, selling and transmitting electricity, CEGCO (Central Electricity Generation Company) running the main power plants, EDDO (Electricity Distribution Company) in charge of the distribution outside the JEPSCO and IDECO perimeters. The next step was the creation of the Electricity Regulatory Committee (ERC) in 2002, in charge of designing and supervising the privatization process.

After one unsuccessful tender in 2005, Energy Arabia announced in 2007 the purchase of 51% of Central Electricity Generating Company (CEGCO). Energy Arabia (Enara), a company established by Jordan Dubai Energy, the energy investment arm of Jordan Dubai Capital, in association with Malakoff (a Malaysian company) and CCC, an Athens-based firm controlled by Jordanian-Palestinian businessmen. In February 2008, Kingdom Electricity Company bought the State's shares in IDECO (55,4%) and 100% of EDCO. Kingdom Electricity Company is a subsidiary of Jordan Dubai Electricity, itself owned by Jordan Dubai Capital. Jordan Dubai Capital is owned by Dubai Holding, a giant financial firm. This reorganization resulted from tenders where the competition was very limited, if there was even any¹⁰. We can notice the fact that Jordan Dubai Capital appears to be involved in all the firms of the electricity sector. On one hand, this could be understood as the entry of the Emirati firms in the Jordanian economy, at a time where Emirati investors, benefiting the wealth of oil and

⁹ In September 1970, harsh fights between the PLO and the Jordanian Army occurred, resulting in the expelling of the PLO and in heavy damages in the Palestinian camps.

¹⁰ There was only one offer for the sale of IDECO and EDCO. Interview, ERC, October 2008.

more generally of the UAE boom, are investing all over the world. Selling Jordanian assets to Emiratis is doubtless a central point but it must also be seen as a strategic and stable alliance for the regime. The General Manager of JD Capital is Mr. Samir al Rifa'i, the grand-son of a former Jordanian Prime minister, the son of a former Head of the Jordanian Senate, and a close collaborator of the Diwan (the Royal Administration) then a Minister himself¹¹. He is, among other commitments, a member of the board of CEGCO. The professional and political record of Mr Al Rifa'i can be understood as a sign of the control the Diwan wants to keep on the electricity sector, by appointing to key positions people owing their careers to the King. Conversely, the careers of Mr Al Rifa'i can be read as an illustration the privatization process in Jordan opened to the king's advisors.

It seems that the Jordanian authorities managed to keep control on the privatization process. One has to look if the new system allows for the very needed investments in generation units that the Royal Energy Strategy called for (Kabarity 2005). It might be too early to analyze its results but let's at least stress that several tenders have remained without offers or they were deemed unsuccessful. This is particularly the case for the wind farms. The solar strategy remains until now in its design phase. The privatization of the thermal unit of al Hussein and the BOT tender for building a new one also stalled. The firms interested for investing in Jordan expect very high rewards and limited risk. Recently, the financial crisis and the difficulty to raise money from the banks hampered the projects. The nuclear project is in its early phase. Agreements have been signed with 6 countries in order to explore the potential of Jordan Uranium mines as well as to identify a place for a nuclear plant. The site of Aqaba seems the most appropriate and feasibility studies are underway. Until now, the burden of investment in new electricity units remains on the shoulders of the Jordanian government.

Moving to privatization was strongly correlated with the end of subsidies to electricity. The goal is that the money collected from the customers pays for the whole spending in the electricity generation, transmission and generation. Therefore, the Electricity regulatory committee has increased the prices in 2004 and 2008. In 2008, in an apparent bid to ease the social impact of these hikes, the lower "social" block of the tariff have risen by only 3% while the upper ones recorded more than 25% increase and other non residential tariff up to 51% (agriculture) and categories of customers enjoying until then free tariff are now to pay. Despite these cautious moves, the rise took place in a time of high inflation, with concomitant end of subsidies resulting in hikes. In 2008, the inflation rate in Jordan amounted +14%, after 4.7% in 2007 and 6.25% in 2006. Rising prices in a context of widespread poverty is creating a climate of social tension. For instance, the electricity companies have recorded unusual "theft" practices (hook-ups, cheating the meters) and higher non-payment.

The privatization process in the electricity sector has social differentiated effects. On the one hand, it favors a new class of entrepreneurs with strong links with foreign capital and backed by the regime. The improved efficiency of that policy has not (yet?) produced the expected benefits in terms of improving the power generation. On the other hand, the social effects of the liberalization are felt hard in a context of rising poverty and strong inflation. Despite this situation, the link between energy policy and poverty alleviation is not done.

¹¹ According to unconfirmed information, he is married with the daughter of the main owner of JD Capital ? – to be confirmed.

Poverty alleviation, local governance and renewable energy

Since about 10 years, the strengthening of local governance is a central issue of development policies in Jordan (Malkawi, 2001). Decentralization has been seen as a tool to improve the delivery of public services and, more recently, is emphasized as an efficient mean, and a necessary step, to alleviate poverty. In 2001, a law has amalgamated the municipalities of the country, whose number has dropped from 315 to 99, in order to rationalize the public expenditure and make it more efficient (Taamneh 2007). Several initiatives have been funded by foreign donors in order to strengthen the capacities of the municipalities, like the currently running program by the World Bank and AFD called "Local Governance and Development in Jordan". The government officially stressed the role of the municipalities in such a strategy¹².

Academics and consultants in the field of electricity stress that developing renewable energy project is a mean to contribute to the alleviation of poverty, most notably in rural places. But despite that emphasis, these reports never mention the municipalities as potential actors in the development of renewable energy technology they call for and their targeted actions do not involve anyhow (RE Group, 2005; Kabarity, 2005).

Despite such voluntary discourses, the institutional situation of the Jordanian municipalities is constraining and allow for few initiatives on their own (Taamneh, 2007). The law of 2001 reducing the number of municipalities has been interpreted as a way to more tightly exert political control over the municipalities (Malkawi, 2001). Though elections have taken place twice since 2001, the State has at some occasion proceeded to the nomination of unelected personalities as mayor, like in Irbid (2005-2007). In 2007, elections have taken place but local commentators stated that the State intervened in order to have his favorite candidate elected¹³. Despite official discourses favoring decentralization, and sponsoring of new initiatives by the World Bank and other lenders, their budget is tightly controlled by the State (the governor) and hardly suffices for their commitments, though their field of competency is limited. Therefore, one can understand that they are marginalized in the energy policy.

The Jordanian local authorities marginalized and under pressure

The privatization process implies new relationships at the local level regarding the management of the electricity sector. The local authorities are marginalized but in the same time, they are under pressure because of the rising prices of electricity. This could be a lever towards adopting local energy policies. We will focus on the case of Irbid, the second biggest in Jordan, with about 600.000 inhabitants.

As we stated above, the electricity utility of Irbid, IDECO, was created as the result of a local initiative and the municipality was involved in the board. The mayors of Irbid, Ramtha and Jerash have a seat in the board. Since IDECO pay yearly fixed mandatory dividend to its shareholders, it means that the municipalities' budgets benefited from those incomes, even if they are limited sums. Further, IDECO is the main job provider in Irbid and political recommendations could help in obtaining and securing

¹² "Municipalities can do more to fight poverty", *The Jordan Times*, October 31st, 2008;

¹³ Irbid election results and the cheating charge, What's up in Jordan, August, 2nd, 2007, <http://ajloun.blogspot.com/2007/08/irbid-election-results-and-cheating.html>

job in the company. Yet, the private management of the company did not allow easy recruitment, but the mayors thanks to their access, could interfere in job recruitments or in protecting IDECO employees. Other local political leaders (members of Parliament, governors) could also do so.

Until 2003, the financial results of IDECO were quite bad and in certain years, losses had to be compensated by the State so that the company could pay the mandatory dividend to the shareholders. Of course, those results were not caused only by the job policy but we can put that local authorities used the utility, at various degrees and in various forms, as a resource for power and wealth redistribution.

The privatization means the end of these practices or at least, has been the pretense invoked to end them. In 2003, a new general manager has been appointed with the task of improving the financial results. He drastically changed the management methods. On his desk, the visitor can see a small engraved sign that reads “wasta¹⁴ is no honest acting and it’s the best way to corruption”. His action resulted in the resignation of more than 400 people deemed inefficient. A small number of new employees have been recruited on their knowledge and skills, following manpower management methods. The modernization of the enterprise also improved the technical operations with investment in new technologies, as well as incentives for billing teams and anti-theft-teams, which resulted in very good records. As a result, the utility has posted higher profits and the price of the share has decupled.

It also seems that the relationships between the municipalities and the utilities are changing in the day-to-day life, for instance regarding the coordination of road works and digging for electrical networks, that have aroused some conflicts¹⁵. The use of poles belonging to IDECO for advertising and the sharing of revenues they generate is also a cause of dispute¹⁶. Conversely, the municipality is requesting the utility pays for the lands they use for substations and even poles. Court suits have been filed against IDECO in order to obtain the removal of poles in private lands. We have to document further these petty conflicts which seem to evidence the change from a close and mutually trusty relationship to a more distant one.

The file of the rises in the electricity tariff also prompts the municipality to worry for its electricity bills. The most worrying is the street lightning, which has recorded a growth of consumption of +6.5 % yearly (2004-2007). Street lightning seems to be a major claim by city dwellers, as a symbol of access to modern urban life. For instance, street lightning appears among the most popular demands in surveys undertaken by the funded by the World Bank¹⁷. During an interview with Irbid’s mayor¹⁸, he stressed the will of his municipality to extend street lightning. As much as the rising prices, expending street lightning network is responsible for the increasing electricity bills.

¹⁴ String pulling.

¹⁵ An interview with Reem Hamdane, operations manager at EDCO, confirmed that such conflicts also exist in other places (October 2008).

¹⁶ These data have been gathered during a two days visit to IDECO and to the municipality to Irbid in October 2008.

¹⁷ Ministry of Municipal Affairs, Regional Planning Department, Preliminary Follow up Chart of Sub-Projects of All Beneficiaries Municipalities from RDLP

¹⁸ Interview with Abderrauf Tell, November, 3rd 2008, Irbid.

Street lightning used to be a massively subsidized sector, with the consumption up to the index of 1988 being free and the above consumption being billed at only 25% of the cost (World Bank, 2005). The rise of electricity bills has led the municipalities to call for the ministry of local administration to intervene. They complain they are facing huge increases of their electricity bills and they claim the works undertaken for the street lightning (new lines, maintaining of poles) by electricity companies should be done for free. During several meetings in October 2008, they asked the Ministry of Energy and the ERC to take an official decision.

The context of financial pressure on the municipalities has led to pilot experiments of new technologies aiming to reduce the power consumption, like installing new lamps or solar equipped poles for street lightning. International organizations, like the French development agency, has launch a pilot project for electricity demand management, oriented to energy saving. But the lenders tend to prefer partnerships with the electricity utilities (like JEPSCO in Amman) rather than the municipalities. These are felt less interested and all the more, less relevant before of their lack of knowhow and of expertise in the field. These projects remain in their early stage, with a strong technological component and no legal and organizational initiative in order to broaden the scope of the experiment is to be found. We can hardly identify any local actors stepping in such a process.

These elements highlight that the local authorities in Jordan do not display any sign of particular involvement in electric governance, and in designing local energy policies. They are more marginalized and under pressure actors. Conversely, the State has applied a voluntary policy of privatizing its main assets while keeping control on the main evolutions.

The Lebanese case: evidences of local struggles for governing electricity

In contrast to Jordan, Lebanon is less advanced in the institutional process of reforming the electricity sector and the State utility EDL still remains the main actor. Nevertheless, the Lebanese case is intriguing because, in a context a national shortage, it reveals spatially differentiated patterns of energy governance, in the sense that several actors, including local one, which sometimes are informal, are negotiating the energy (electricity) policies. We draw here on several previous analysis of the Lebanese case (Verdeil 2008, Verdeil 2009, Verdeil Féré Scherrer 2009).

The spatially differentiated regulation of energy distribution

We have analyzed above the main feature of the situation of the Lebanese electricity sector, which is the power shortage. After the civil war, the national delivery of electricity was about 6 hours a day. In 2006, before the Summer War, the delivery of electricity was about 22 h a day. Then, the damages inflicted by Israel to some power plants and to the networks, combined with the bad state of repair of some old generation units, caused the shortage to increase. The shortage is spatially very unequally distributed (Table 1). The capital city, Beirut, enjoys nowadays about 3 hours power cut a day and was fully supplied before the 2006 war. But the other places suffer very severe power cuts, and sometimes do not get more than 10 hours electricity a day. The official stance is that the strategic and economical infrastructures of the country have to be best served. But it is also the place where the most affluent people of the country are leaving. In summertime, the summer resorts where foreign tourists as well affluent Beirutis are migrating also enjoy the same level of delivery

than the capital. The power delivery timetable is clearly benefiting the wealthiest class in Lebanon. Such an unequal repartition was challenged by the current Minister of Water and Energy, Alain Tabourian, from the Free Patriotic Movement. But in September 2008, his proposal to supply all the country equally was rebuked by the Council of Ministers.

In response to the shaky delivery of electricity, fraud and non-payment have developed over the war years and have never been eradicated during the reconstruction years. The few indicators available reveal regional and geographical gaps, highlighting the informal political management of fraud. Data on "theft" are available only at the national scale, but not at the city level. The data show that fraudulent practices reach their maximum in regions far from Beirut (Verdeil, 2009).

Table 1 : Power "theft" (Percentage of non billed consumption and non paid bills on total electricity production). Districts according to EDL geographical organization

Beirut	Mount Lebanon North	Biqaa South	Mount Lebanon South	South Lebanon	North Lebanon	North Biqaa	Middle Biqaa
12,1 %	40,1 %	45,6 %	49,6 %	56 %	60,7 %	67,2 %	69,1 %

Source : EDL, August 2003, quoted in EL MUFTI, 2005.

According to interviews with EDL engineers, some areas like Dahiyeh (the mostly Shia populated southern Beirut suburbs) are also subject to strong level of fraud but mostly by small customers, whereas in Beirut and in the northern suburbs, fraud has been evidenced for big costumers like industries, shops or leisure centres, as well as for personalities. These engineers tend to minimize the social and confessional dimension of fraud: the poor and the Shias would not necessarily be the biggest cheating population, contrary to widely circulated assumptions.

The fact is corroborated by data on bill payment. Here again, the non-payment is very high in rural and mountainous areas, while Mount Lebanon reaches a relatively low level (but of course, these regions concentrate the bigger part of the customers). In the suburbs, the collection rate has fairly improved over the recent years (see below).

EDL is managing only 90% of the electricity customers, the remaining part living in places where ancient concessions granted to local firms are still in operation (and are approaching their term). In these places, the rate of losses and of non-payment is also very limited compared to the national picture. In Zahleh, the manager of the company is proud to display his results and he recognized easily that it was reached with the help of the Syrian army then being stationed near the city (and which was known for not paying the electricity of EDL).

The geography of theft and non-payment seems very closely linked with the de facto local powers which are prevailing in the post-Taif Lebanon, and depends upon local political arrangements. Even if the situation has improved over the reconstruction years, the relationships of patronage are preventing in most remote areas that sanctions are taken against cheating persons or non-payers (see Verdeil 2009 for a closer examination of data). Those facts highlight that a de facto multi-actors

governance of energy exists. Such a point must be taken into consideration when examining the changes the sector is now undergoing.

The attempts at privatizing the distribution of electricity

The continuous poor performance of the Lebanese utilities in service delivery is a matter of public debate since the early 1990's. But the issue surfaced at the top of the agenda in the late 1990's when the problem of the public debt forced the successive governments to tackle it. The accumulated debt of EDL during 1993-2006 amounts 11,6 billions US\$ (including the interests generated) (Ministry of Finance, 2008). In 2008, the Lebanese public debt amounts 42 billion US\$. We can conclude that the various utilities represent about one third of it. Regarding the electricity, the main reason of the rising debt is the surge of the oil price, while the tariff was not adjusted, but many other flaws in the management also come in line: delay in substituting the old oil processed plants by new gas units, corruption in the subcontracting works, technical losses, fraud and non-payment, etc.

All this led the Hariri government to set up a program for privatization in 2000. In the electricity sector, a law in 2002 planned the privatisation of the sector. Later steps in the reform process¹⁹ foresaw that the utility should be unbundled in three units for the generation, the transportation and the distribution subsectors. Generation and distribution are to be sold to or operated by the private sector. These legal and industrial evolutions have been strongly praised by international financial bodies, like the IMF or the World Bank, who helped drafting the new laws, as well as by national aid institutions like the French AFD or the USAid. The financial aid given to the Lebanese government at the Paris II (2002) and Paris III (2007) conferences was conditioned to the implementation of such reforms.

Compared to the transformations experienced in other similar countries, one can wonder why the discourse of privatisation as a solution for these sectors had not been advocated previously. Indeed, several other sectors had experienced PPP in the 1990's, like the garbage collection and treatment, awarded to Sukleen, the mobile phone awarded to Cellis and Libancell in 1994, or Liban Post (1997). Not to mention other private sector operations in the real estate sector (Solidere, Joseph Khoury, etc...). One of the reasons probably is that water and electricity were felt being more sovereign and strategic sectors, where public investment had to be implemented first in order to reform them before privatizing them. Another reason is the resistance of some of the political elites to that privatisation process, at least until a certain stage. In the recent years, Hezbollah – in the person of Mohamed Fneish, then (2005-2006) Minister of Energy and Hydraulic Affairs- didn't oppose the principle of the privatisation of parts of the electricity sector but still remains wary (Verdeil 2009). Indeed, those previous experiments have, in most cases, illustrated the tendency of the post-Taif Lebanese State to allot shares and markets under impenetrable conditions and according to political cronyism (Leenders 2004).

The process of privatising the power sector only stands at its very beginning. The Saniura government commissioned several auditing firms and consultants in order to lay down the way to the corporatisation of the utility, which implies a cost accounting and the census of its assets. Then, it's

¹⁹ Every minister drafted his plan: Sehnaoui (2004), Fneish (2006), Tabourian (2009). We cannot examine in details their analogies and differences but let's say that the option of introducing PPP remains a central item.

planned to unbundle it into several functional units (generation, transportation and distribution), of which the first and the last would be sold or whose operation would be managed by private firms. Before reaching this stage, it is possible for a management contract to be established in order to upgrade the utility's results. Some critical reforms must be carried out, like the setting up of a new tariff reflecting the rise in the generation cost resulting from the oil price surge. The tariff has not been updated since 1994.

In 2007, the Lebanese government has awarded two projects of power generation plants but they seem to be shelved. No project has been drafted for the distribution sector yet, though PPP are frequently said to be the solution²⁰. Nevertheless, between 2002 and 2005, an interesting experience took place, whose results I will analyze now. The government assigned private firms the task of reading the meters, of distributing the bills and collecting the fees, as well as of detecting the fraud and fixing it. In Beirut suburbs (*da'ira* of Antelias and Chiyah), the French firm EDF was commissioned. For the other *da'ira*-s throughout the country, local firms were selected after a tender. Most of the selected ones were without experience in the field and, as I was told, in many cases their owners were known for their closeness to the local *zu'ama*-s. The experience stopped in July 2005 when the contract of EDF was ended without explanations, probably because of the change in the balance of power after the legislative elections and the arrival of a new minister. Later on, the contracts of the private local firms in the *da'iras* were also interrupted or not renewed.

This limited experience of subcontracting private firms for reading the meters and fighting the fraud resulted in strongly contrasted results. At one end, EDF scored very impressive results in its period of operation. The amount of billed electricity rose (+50%), the rate of non-payment fell down at less than 4%, EDF made a hike in detected fraud (more than 100.000 thefts detected and fined in 2002-2003)²¹. These achievements were obtained through 'commando methods', according to one manager: it means an intensive monitoring on the field, bimonthly fraud eradication operations, etc. The EDF teams faced strong opposition from fraudulent electricity users, sometimes turning to local riots (March 2004 in Jnah). According to the manager, the operations were successfully implemented with the help of the Interior Security Forces (ISF) and when necessary, thanks to coordination with those labelled "villages chiefs" by the manager. In Dahiyeh, he also mentioned close cooperation with Hezbollah. EDF targeted not only 'small fry' but also personalities, major enterprises, in the southern suburbs as well as in the northern suburbs. Their methods and results were so successful that EDL authorities invited EDF teams for one-day commando operations in Saida, Jounieh and Tripoli. The EDF enrolment was dedicated to impulse new methods and a new spirit to the employees of EDL regarding the distribution. The contract apparently didn't provide for a link between EDF's income and its results. It is possible that EDF was seeking to be granted a broader contract on the Lebanese market but its presence was part of a wider strategic help and technical program for the rehabilitation of EDL. In 2005, the collaboration in the distribution ended, probably because EDF worked on the field with associated firms that were linked to Syrian interests.

²⁰ For instance, *Le Commerce du Levant*, September 2008 ; or Dana Halawi , 'Diversity key to managing fuel price swings', *The Daily Star*, March 26, 2009.

²¹ S. Risk, « Énergie - Une récapitulation de ce qui ne tourne pas rond depuis des années. L'électricité, un secteur gangrené de toutes parts », *L'Orient-Le Jour*, 28/12/2004.

In most Lebanese provinces, the private local firms in charge of reading the meter and collecting the fees didn't reach the same results. No figures were available from EDL, one reason being that EDL experienced many difficulties in monitoring the results these private firms achieved. According to non official sources embedded in the operations in the North and in the Biqaa, the results have been very disappointing both in terms of fees collecting and of fraud detection²². Among the many reasons of the deceiving operation, we can name the lack of professionalism of those firms, the flaws in the mechanism of linking their earnings with their results, the protection that the cheating or non-paying customers enjoyed from their *zu'ama*, as well as the lack of coordination with the ISF.

The experience of subcontracted private firms in order to read the meters, to collect the fees and to fight the theft delivers no black or white results. It shows that the private sector isn't in itself the criterion of a successful reform: it depends very much on the political regulations on the field and the keenness of local forces to comply with the enforcement of new practices. In the period until 2006, it seems that Hezbollah favoured reform even at the expense of most of its clientele in Dahiyeh. Conversely, in other areas (Biqaa, North Lebanon, South), local forces have been reluctant to the reform of the distribution sector. Therefore, we can conclude that those experiments have aggravated the territorial fragmentation, since the implementation of that new management methods results being particularly felt by the inhabitants of the Greater Beirut. In that area, the better fees collections and the reducing of theft has led to an increase in spending, relatively more difficult to bear for the poorest households.

After 2006, the poorer delivery of electricity and therefore, the need to compensate with more expensive generators expenditures aggravated the situation. In November 2007-January 2008, an array of social mobilizations against the poor delivery of electricity took place in Dahiyeh and ended with a bloody riot where several people fell dead, probably by army shots. This was part of the escalation and sectarian process that culminated in May 2008 with deadly fighting in Beirut between Hezbollah and their opponents. But the social roots of that event, to be found in the unequal supply of electricity and, on a more general level, the unbalanced service by the State, should not be overlooked. This is highlighting the strong resonance at the local level, of the on-going moves in the tentative reforms of the electricity sector. The unclear and controversial management of electricity is a factor of political instability.

The local governance of informal electricity supply

The continuous and aggravating shortage of electricity led to the consolidation of the informal sector of generators that had developed during the civil war and had never stopped. Given the official monopoly of EDL in the production and distribution of electricity, these suppliers are working unofficially but the State can not prevent them to work since they provide an alternative for its failed duty. According to various sources, between 38 and 58 % of the Lebanese households use diesel-run generators (ACS 2004; Corail-ICEA-IPSOS, 2004). Being run by private owners, the sector offers differentiated services and fee and the customers usually are not in a position of strength for negotiating since the territorial organization tends to the establishment of de facto local monopoly. In the context of increasing diesel prices and of the poor performance of the public utility, polemics are arisen and various actors, from grassroots NGO's to members of Parliament, have publicly called

²² A sounder analyze is available in Verdeil 2009.

for a public regulation (Gabillet, 2008). Gabillet's work has nevertheless evidenced that the municipalities are more and more involved in the management of that sector.

She has documented a range of local situations with differentiated configurations. In Borj Hammoud, a densely Armenian town near Beirut, she has identified a coalition of actors, from Tachnag, the hegemonic Armenian Party and the municipality which it controls to the gendarmerie, officially a State apparatus. All of them are collaborating in order to enforce a regulation on the generators owners, from granting the right to settle and operate in a strictly delimited area, to the setting up of the price which they advise the population every month thanks to the local TV network. In Jbeil, another organization has recently emerged. The mayor elected in 2004 had focused on regulating the informal electricity sector during his campaign. In Jbeil, the distribution of electricity is not EDL but an ancient concession dating back the French Mandate years. That firm owns the poles that the owners of private generators usually use for installing their parallel network. The mayor has encouraged Electricité de Jbeil not to tolerate the use of its poles, for esthetic reasons and to produce and sell itself electricity in time of power cut. In Zahleh where another private utility operate according to a concession, the private actors even plan to develop their own generating units soon. In 2007, the ministry accepted a project of thermal plant proposed by the firm but, as we said, it has been shelved for the moment. A few other configurations are to be found (Gabillet, forthcoming). They all reveal different local patterns of electricity governance in a semi-informality, since the sector of generators is officially prohibited.

Beyond the details and variety of local arrangements, those examples show that electricity is subject to a local governance, i.e. of local negotiations involving the State utility, the local utilities when they exist, the owners of generators as well as the local authorities, municipality and police apparatus. In a sector, electricity, where the State has long tolerated the involvement of local actors, mainly de facto powers rather than administrative authorities, it's not so amazing that an energy governance emerges. That process is producing innovative arrangements if not from a technological point of view, at least in terms of policy. We can think it as part of a transition process.

Discussion

The preliminary review of those two case studies was carried out with an insistence on understanding energy transition not only at the macro and national level of countries and national administrations and policies, but in taking into consideration the involvement of cities, ie local societies and, mostly (at this stage of the survey) local authorities and companies. We have tried to understand how the cities are affected by and are managing the energy transition. In this concluding section, we want to see to what extent the Jordanian and Lebanese situations reveal specificities or even contradict the trends and/or the most usually agreed recommendations concerning local energy policies.

Lebanon and Jordan are two lower-middle income countries, with almost no national energy resource (at least that they could exploit in the contemporary state of the technology). Their energy consumption profiles show that they are in a time of strong increase of energy and particularly of electricity, and they are now shifting to an electricity-based energy system. New practices and new uses are spreading that consume more electricity. But there is little awareness of the global climate change and little inclination to adopt therefore energy-saving technologies. The only incentive in this

respect is the price of energy that is leading more customers to use solar heater (about 14% of the households in Jordan, less in Lebanon). We have seen that the Jordanian municipalities suffer because of the burden of their electricity bills but until now, this is not going to challenge their mood to extend street lighting, which is seen as a sign of modernity and development.

The growth of the demand is prompting the national authorities to discuss the best energy mix. In Jordan, the ecological rationale has led to the formulation of a Royal Strategy stressing the need to foster renewable technologies. But no real change with respect for such objectives has begun. The effective changes that have been implemented in energy generation is the switch from fuel-oil to natural gas. It was not driven by an ecological rationale but rather by financial and geopolitical constraints. In Lebanon as well, the discussion turns around the way to escape the expensive fuel-oil thermal turbines. The unreliability of natural gas prompts the authorities to draw plans on imported coal. In both case, geopolitics and finance are macro-factors of energy transition, rather than climate change oriented arguments. The energy transition is, in those examples, a real crisis of energy generation, urging States to design policies which are not always or even not at all climate change oriented because of price, technology availability. In designing those policies, States are left at risk of the shortage, which means that their legitimacy is challenged, which the Lebanese case illustrates dramatically.

The energy transition challenge encompasses not only shifts in the energy mix but also an array of institutional reforms, involving new relationship between public and private actors, as well as broadened governance including local actors. Jordan and Lebanon differ strongly from the point of view of institutional reforms and the local governance of energy. Jordan appears as the good pupil in the class of reforming countries. Its electricity sector, which had never been fully public and was overtime characterized by an alliance of private and State (Tomeira 2008), has been largely privatized since the beginning of the new millennium. The former State utility has been split into subsidiaries, and the majority of the State's shares have been sold to private investors. The regulation of the sector has also been change, the Minister of Energy officially leaving that mission to an independent authority. But behind those shifts, we have shown that the State has retained some levers of control, be it through special relationship with the private investors or through not allowing full independency to the independent regulation authority²³. In Lebanon, conversely, the discourse of privatization has not been translated in fact due to an array of impediments which do not appear to be changed soon.

One of the interesting things with such a point is that we can somehow correlate it to the local governance of energy, ie with the way local authorities and other local actors (sometimes informal) are involved in the management of the energy transition. In Jordan, the reaffirmed alliance of the State and the private sector is obtained at the expenses of the local authorities. Though the State holds discourses of strengthening of local authorities with decentralization policies, the municipalities of Jordan have small powers and little capacities to act as policy makers. This is particularly evidenced in the field of electricity, which do not belong to their legal field of competence. But they used to have, at least in the Irbid and in the Amman regions, special relationships with the electricity utilities. These relationships are now changed and the municipalities

²³ We have not dealt with that issue in the paper but several interviewees have stressed that point.

seem to be marginalized through the privatization process. It is possible that the pressure due to the rising electricity bills will push them to devise new energy strategies. But despite the interests of international lenders in helping energy saving policies, they are targeting the municipalities and prefer to deal with the electricity utilities.

Though the situation of the electricity sector in Lebanon has officially remained much more integrated at the national level, there are many evidences of strongly differentiated local governance patterns. The legacy of the civil war and of a sectarian society where groups have established specific relationships with the State on a regional and sectarian basis explains such a situation. The shortage of electricity and, hence, the issue of emerging alternatives to the public supply of electricity are other contexts favoring the emergence of such local governance patterns of the energy.

The academic literature on energy transition in the Middle East and, probably, in other low income countries barely includes the issue of local governance and concentrates on national issues. In this paper, we have shown that local governance is an interesting entry point, even if we show at last that the local actors are not key actors in the policy making process and if we have to understand energy transition not only as a normative move towards renewable energy and ecologically friendly practices but as a much more complex situation of struggle for energy. The first explorations of the Lebanese and the Jordanian situations also show that the relevant actors of the energy local governance are not only institutions. Local movements and forces, like in the Lebanese case, are to be taken into consideration as well. These first results need further elaboration and are waiting for discussion.

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Annex

Table 1: Total primary energy supply (2006, source : IEA)

	Total primary energy (ktoe)	Oil	Gas	Hydroelectricity	Geothermal, other renewable
Jordan	7168	70,5%	28,1%	0,1%	1,3%
Lebanon	4758	93,0%	-	1,3%	5,6%

Table 2: Electricity generation and consumption breakdown (2006, source : IEA)

	Generation 2006				Consumption 2006	
	Oil	Gas	Hydro& Renewable	Imports	Total	Per capita
Jordan	3371	8135	51	472	10.54	1904
Lebanon	8592		685	929	8.68	2148

