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The Relationship Between Energy and Socio-Economic Development in the Southern and Eastern Mediterranean

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List of Abbreviations

BBL	barrel (of crude oil)
CSP	concentrating solar power
EE&RE	energy efficiency and renewable energy
EDI	Energy Development Index
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
FEMIP	Facility for Euro-Mediterranean Investment and Partnership
GDP	gross domestic product
GHG	greenhouse gas
LPG	liquefied petroleum gas
IEA	International Energy Agency (OECD)
IFIs	International Financial Institutions
IT	information technology
MSP	Mediterranean Solar Plan
NIF	Neighbourhood Investment Facility
NGO	Non-governmental organization
MENA	Middle East and North Africa
MPC	Mediterranean Partner Countries
OECD	Organisation for Economic Co-operation and Development
OPT	Occupied Palestinian Territory
PPP	Purchasing power parity
UfM	Union for the Mediterranean
UNDP	United Nations Development Programme
RCREEE	Regional Centre for Renewable Energy and Energy Efficiency
SEMCs	southern and eastern Mediterranean countries[1]
SWH	Solar water heater
toe	ton of oil equivalent
VAT	Value-added tax

[1] Algeria, Morocco,Tunisia, Libya, Egypt, Israel, Jordan, Lebanon, OPT, Syria, Turkey.

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Abstract

This report aims to identify, explain and detail the links and interactions in southern and eastern Mediterranean countries (SEMCs) between energy supply and demand and socio-economic development, as well as the potential role of energy supply and demand policies on both. Another related aim is to identify and analyse, in a quantitative and qualitative way, the changing role of energy (both demand and supply) in southern Mediterranean economies, focusing on its positive and negative impact on socio-economic development.

This report investigates in particular:

- The most important channels through which resource wealth can contribute to or hamper economic and social development in the analysed region;
- Mechanisms and channels of relations between energy supply and demand policies and economic and social development.

The burdens of energy subsidies and 'oil syndrome' are of particular relevance for the region. An integrated socio-economic development and energy policy scenario approach showing the potential benefits and synergies within countries and the region is developed in the final part of the report.

Executive Summary

Despite relatively strong economic growth in recent years, the southern and eastern Mediterranean countries (SEMCs) face a range of pressing socio-economic challenges, such as poverty, large structural unemployment and rapid demographic growth. Energy is an essential commodity that enables socio-economic development. However, the current energy situation in the region is characterised by a rapid increase in energy demand, low energy efficiency and low domestic energy prices due to extensive universal consumption subsidy schemes. In short, the current energy policies do not appear to be sustainable and pose several risks to the prospects of socio-economic development of the region.

Patterns of energy supply and consumption in SEMCs strongly affect main macro-economic parameters, including fiscal balances and poverty trends. Volatility of global energy commodity prices and their relatively high levels in recent years constitute a burden on the finances of many net importing countries, both at the government level (via costs of running universal consumption subsidies) and the utility level. This also affects energy exporting countries. Furthermore, urbanisation, rapid population growth and economic growth all add to rising energy demand and put pressure on existing infrastructure, necessitating large new investments.

Excessive energy bills lead to energy poverty and harm living standards and socio-economic development. As for other commodities (e.g. food, water), SEMCs' governments use **universal energy consumption subsidies** to mitigate energy poverty. However, such price subsidy schemes appear to be quite inefficient at addressing poverty because on average only 20% of all energy subsidies (and 8% of fossil fuel subsidies) go to the poor, while most benefits profit the wealthy groups who consume more energy. Also, the subsidy schemes place heavy burdens on SEMCs state budgets, especially since the 2007-08 oil price surge that led to energy subsidies further increasing their share in total government expenditure. This growing pressure on state budgets appears to be unsustainable, in particular in Egypt, Lebanon and Syria (where subsidies account for more than 15% of total budgetary expenses). Furthermore, by distorting price signals, universal price subsidies act as a strong disincentive to a more rational and efficient use of energy and investment in the energy sector, including in renewable energy.

The energy sectors in SEMCs, especially in those exporting oil and gas, make up a large share of the economic activity and public finances. Nonetheless, certain market structure features and modes of energy sector operation lead to significant negative externalities, and can burden the whole economy. Large hydrocarbon revenues in two SEMCs (Algeria, Libya) account for a dominant share in their exports

and state budget revenues, determining their macroeconomic performance. However, without proper strategies and management, they generate structural domestic imbalances that paradoxically harm socio-economic development and lead to sub-development. Overall, rent-seeking strategies (with low labour intensity and added value) appear to be detrimental to economic growth and lock economies and public budgets into dependency on a single sector and one-commodity market, which, furthermore, is volatile. Without appropriate action this so-called 'paradox of plenty' (or *resource curse*, Dutch disease or 'oil syndrome'), can have ravaging and long-term socio-economic consequences.

Energy producers also receive public subsidies, generally for large capital-intensive projects but such subsidies can also harm economic efficiency as the economic viability of those investment plans is rarely properly assessed.

There are strong links and interactions between energy and other sectors in socio-economic development. Public policies addressing current challenges thus need to take a global, cross-sectoral view. They need to be well structured and systemic to overcome deep and accumulating socio-economic difficulties and negative vicious interactions between socio-economic processes and energy. In particular, this applies to the **costly universal energy subsidy schemes** and the penalising **oil syndrome**. Such **integrated socio-economic development and energy/climate policies** need to rely on three main pillars:

1. **Long-term socio-economic development strategy** based on a robust institutional set-up, a solid statistical system, enhanced public governance, including for oil revenue management, and a poverty reduction strategy with targeted support instead of universal consumption price subsidies.
2. **Integrated energy/climate policy articulated in** a national **energy strategy:** security and access, regulatory reforms towards full cost-reflective energy prices, energy sector restructuring **and energy efficiency and renewable energy** (EE and RE) action plans in synergy with climate change policies (carbon financing).
3. **Regional energy cooperation** (intra-Med and EU-MED) to focus on infrastructure (e.g. power and gas interconnections) and markets (e.g. EU/SEMC renewable electricity market), fostered by the Mediterranean Solar Plan (MSP) and integrated regional financing.

Introduction to the Energy and Socio-Economic Contexts

The complexity and interdependences between socio-economic sectors, countries and regions necessitate a multi-sectoral and integrated analysis in order to accurately assess their main features. An in-depth and multi-dimensional approach is also necessary to design, enforce, monitor and evaluate public policies, and enhance stakeholders' (investors, consumers, civil society) information and involvement in the development cycle of those public policies. Furthermore, they need to take into account the perspective of broad-based political reforms related to the Arab Spring.

Energy plays a crucial role as a global commodity and as a cornerstone of socio-economic development. In the 11 southern and eastern Mediterranean countries (SEMCs)[2], this role is even greater with the combined persistence of energy poverty and sizeable exporting energy sectors, with their potential curse and burden effects. Given the quantitative and qualitative importance of both energy consumption and energy sectors in the socio-economic development of the economies analysed, an in-depth understanding of their positive and negative impact is of the utmost importance for policy design. Thus, this paper focuses on:

- The interactions between energy consumption and supply and socio-economic development;
- The mechanisms and channels of relations between energy supply and demand policies and economic and social development;
- A scenario approach which integrates the national and regional energy policies in synergy with the socio-economic development of the region.

Methodological note: the chosen approach mostly relies on analytical and policy assessment based on various sources (MEDPRO technical reports, other reports, studies, publications, academic articles) and case studies (e.g. SEMC energy subsidies). Each listed topic's rationale (state of the art) is first reviewed and then described and specifically analysed for the SEMCs.

Most of energy data are provided by the International Energy Agency (IEA/OECD).

[2] Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Occupied Palestinian Territory, Syria, Tunisia and Turkey,

1. Global SEMC Features

1.1. Macroeconomics[3]

The population in SEMCs amounted to 281 million in 2009–(Table 1provides details).Average GDP by capita reached USD 7,400 (in PPP) with important disparities between the countries with high (Israel: USD 28,700), intermediate income (Turkey: USD 11,600 -PPP and Tunisia: USD 8,500) and low-income countries (Egypt: USD 4,200 and Syria: USD 3,500). The majority of the SEMCs experienced solid economic growth over the last decade, allowing a certain improvement in living standards (improvement in health and primary education services, reduction in illiteracy). The impact of the global crisis after 2008 was less severe than in other regions of the world that are more dependent on international trade. Nevertheless, the impacts of the crisis and the dramatic increase in food and energy prices accentuated financial, budgetary and social imbalances, in particular high unemployment among the urban population and youth including graduates. Even if the incidence of absolute poverty is in general relatively low, vulnerability is high because large and increasing shares of the population live on incomes close to the poverty line (population under the USD 2 (PPP) a day threshold: Algeria: 23.6%, Egypt: 18.5%, Jordan: 3.5%, Morocco: 14%, Tunisia: 13%, Turkey: 2% (World Bank, 2010; Arab Statistics, 2010).

1.2. Socio-Economic Development

Most SEMCs, while experiencing continuous socio-economic development, also face serious and structural imbalances, in particular poverty and unemployment.

Progress in addressing structural poverty in these countries has stagnated since the early 2000s. Taking a poverty line of USD 3 per day rather than USD 2 per day would double poverty in the region to 92 million (Pearce and Mohamadieh, 2009).

[3] Based on MEDPRO D5.1, Fiscal and macroeconomic database, Technical Report No. 10 "Determinants of Growth and Inflation in Southern Mediterranean Countries", (Coutinho, 2012), and a selection of international sources (IMF, WB, UNDP).

The Millennium Development Goals report outlines that since 1990poverty has decreased in all regions except for MENA (including Egypt, Lebanon, Syria, Jordan and Palestine) (United Nations, 2010).Actually, poverty has increased in the region with a high share of population close to the poverty threshold. Thus, even small income falls and/or small increases of basic goods prices can push them into poverty.

Along with poverty and unequal revenue distribution, SEMC suffer from structural unemployment (officially ranging from 9 to 13% but alternative estimations indicate 20 to 30%), especially affecting women (14%) and young people (22%), even with sustained economic growth. The main explanations include a rapid demographic increase associated with a young population, a relatively inefficient education system and the domination of economic sectors with limited job creation capacities and high volatility (e.g. retail trade, real estate and the financial sector). Since 2008, the global economic and financial crisis has increased unemployment, which is also combined with high informal employment (Pearce and Mohamadieh, 2009).

1.3. Energy Features and Policies

1.3.1. Energy Features

The energy situation of most SEMC is characterised by a rapid increase of energy demand (5-8% annually)[4], low efficiency in both supply and demand, artificially low domestic energy prices as the result of generalised and costly consumption subsidies combined with high non-payment rates. As a result of low-cost recovery for electricity, current customer electricity prices in most SEMC are well below the generating costs of renewable energy technologies (such as wind) and even below generation costs relying on fossil fuels[5] (see graph in Annex 1). Oil product prices are also distorted by high universal price consumption subsidies that are a heavy burden on public finances. According to the World Bank, "The region is lagging behind in implementing reforms in the electricity sector and lacks private sector

[4] With a 7% annual increase, capacity has to double every 10 years.

[5] In particular due to low prices (Egypt: 2 c€/kWh, ALG: 3.5c€/kWh, Morocco: 6.5c€/kWh, Tunisia: 9c€/kWh) and distribution losses (mostly-non-payment) (Algeria: 20-25%, Egypt: 20-25%, Lebanon: 40%); average inland wind generation cost is at around 6€c/kWh (without transport and distribution cost).

investment" (World Bank, 2010a). Thus, energy companies, which are mostly public monopolies, suffer from chronic deficit (the 'scissor effect' of insufficient revenues to cover increased investment and maintenance costs).

Infrastructure is generally outdated and saturated by rapid population and economic growth and urbanisation, leading to deteriorating security and quality of supply, especially for electricity (chronic blackouts in Algeria and Egypt at peak hours). Actually, under current trends (the 'Business as usual' scenario), total energy demand in SEMCs is expected to rise by as much as 70% by 2020, of which fossil fuels will cover 91%, leaving a tiny share for renewable energy (4% or the same level as in 2009%).[6] Given the large projected increase in demand, the total MENA region energy investment needs are estimated at over USD30 billion a year up to 2040, or about 3% of the region's total projected GDP. Such high projected energy investment needs is around three times above global average (World Bank, 2010a), and represents increased risks and negative socio-economic impacts.

Furthermore, the volatility of international oil prices aggravates economic, financial and social imbalances.[7] This persistent vicious circle appears unsustainable in the short to medium term. Finally, those imbalances, especially low energy tariffs and high consumption subsidies, are also major barriers to both energy efficiency (EE) and renewable energy (RE) deployment.

In energy supply terms, there are two distinct groups of countries among the in SEMCs: the net exporters of hydrocarbons (Algeria, Egypt, Libya and Syria) supplying 22% of the oil imports and 35% of the gas imports of the whole Mediterranean basin.[8] The other countries are importers with a very high dependency and costly commercial bills (in Jordan energy imports accounted for around 13% of its GDP in 2009, in Morocco the same share was 3.5%). On the whole, the SEMC region is a net exporter selling approximately a third (106 Mtoe) of their total energy consumption abroad, or more than the total supply of Turkey or Poland.

SEMC energy consumption at 1.1 ton of oil equivalent (toe) per capita and 1,770 kWh of electricity per capita remains far below levels seen in northern Mediterranean countries. Nonetheless, SEMC energy consumption has been rising fast, exacerbated by high energy intensity, underlining an important energy saving potential. However, it remains largely neglected in the region (with the exception of Tunisia, which has developed a proactive energy efficiency and renewable energy (EE&RE)

[6] For total energy primary supply – TPES (electricity consumption accounts for 15% of TPES in 2009 and 18% in 2020-OME, 2008; MEDPRO/WP 4b.

[7] In Morocco, the deficit of the "Caisse de compensation" reached around 4% of GDP in 2010 (2% in 2007); in Egypt: subsidies for energy account for 9.3% of GDP; in Lebanon: 17% of the 2007 public budget was allocated to general electricity price subsidies.

[8] Northern and southern rims.

policy since 1985).The transport sector has recorded the biggest increase of energy consumption over the last 30 years in the SEMC and accounts for approximately one-third of the total energy intake. Also, the industrial and residential sectors strongly increased their consumption, to account for 36% and 27% respectively of the total intake (2005).

Fossil fuels (oil, gas, coal) account for 80% of the energy supply of the SEMCs. The share of renewable energy, apart from hydropower and biomass, remains limited at less than 3% of primary energy supply. Thus, both energy and carbon intensities are relatively high (increasing environmental problems such as water and air pollution). Energy import bills are large in absolute and relative terms, underlining the high energy dependency of importing countries.

While most SEMCs have reached close to 100% of electrification coverage[9], groups of the population still lack effective access to electricity (e.g. 0.5 million in Egypt, 0.9 m in Morocco and 1.5 m Syria: 93%), especially in rural areas, and/or still rely on traditional biomass.

1.3.2. Energy Policies

Most SEMCs are at an early stage of energy policy development; currently it is fragmented as well as mostly:

- Supply-oriented (while demand and customer needs are largely neglected);
- Energy and export focused (while largely disconnected from other transversal public policies such as transport, urbanisation, regional development and environment);
- Insufficiently based on verifiable evidence(as there is a lack of reliable and accessible information and data in the context of powerful stakeholders: public energy monopolies, equipment manufacturers, banks);
- Short-term focused; neglecting long-term vision and synergies with other sectors and externalities;
- Relying on poor or inadequate policy cycles, in particular insufficient stakeholder and public consultation, inadequate design, low enforcement or weak monitoring and evaluation (feedback).

The above features result in weak energy administrations that are particularly problematic given the strength of dominant energy monopolies. These weaknesses

[9] Morocco: 97%, Syria: 93%; 2008.

reduce the capacity to design, enforce and evaluate effective energy policies. Nevertheless, it should be noted that countries such as Jordan and Tunisia, and more recently Morocco, have placed more emphasis on both energy policies and the institutional setting. Hydrocarbon exporting countries, such as Algeria and Egypt have established relatively strong administrations and companies.

2. The Role of Access to Energy And Energy Sector in Economic and Social Development

2.1. Access to Energy and Role in Socio-Economic Development

2.1.1. Energy as Crucial Socio-Economic Development input

Energy is an essential commodity for most human activities, directly (as fuel) or indirectly (to provide power, light, mobility).

In traditional societies, populations rely on their own physical strength for labour, then on the power of domesticated animals, such as horses and oxen, then on water and wind, steam engines, hydrocarbons (fuel motors for land, sea and air vehicles) and finally -electricity. Energy combined with technology multiplies human force (e.g. motor fuel for cars, electricity for household appliances), thereby playing a crucial role in pre- and post-industrial and then IT societies. For other essential needs such as space heating and cooking, the transition has been from local biomass (e.g. firewood, agriculture waste) to industrialised fuels (e.g. LPG, natural gas) and also electricity (Stern, 2011).

Poor access to reliable and affordable modern energy services therefore acts as a barrier to economic and social development.

This socio-economic contribution will be assessed in more detail at economic and social/human development as well as tax levels in the three following sections.

2.1.1.1 Economic Development

The mechanisms at play – an overview

Since the industrial revolution, energy has been a crucial ingredient of economic development. It is a direct (e.g. used in the industrial process and transport) and indirect input (the energy content of used goods, equipment and services) for most productive processes in primary sectors (mining, agriculture), industry and services, including transport and IT.

Industry absorbs 30% of the world energy consumption and uses it in all its transformation processes (e.g. heating, drying, and melting) and as a mechanical and driving force. Road, rail, sea and air transport mostly depends on oil products and increasingly on electricity, accounting for 27% of total consumption. These first two major sectors, industry and transport, which absorb almost 60% of global energy consumption, mostly rely on commercial energies. Service activities (e.g. education, trade, offices, tourism etc.) like the residential sector, abundantly use energy to meet their multiple needs (lighting, cooking, hot water, heating, air-conditioning, IT, telecommunication, refrigeration and other electric household appliances). With agriculture, which mostly uses mechanical force and energy-intensive inputs such as fertilizers, these sectors account for 33% of the total consumption of energy (Laponche, 2005).

The expanded provision and use of energy services is strongly associated with sustainable economic development and growth. The Johannesburg Summit on Sustainable Development (2002) explicitly recognised the privileged place of energy in the construction of a durable human development.

The combination of crossed energy and sectoral interdependences has reinforced the energy dependence of most economic sectors so that a disruption to electricity or oil supply would bring about a rapid stand still. Beyond the security of energy supply, its accessibility and affordability are also important factors to consider. The process of converting economic inputs (capital, labour, goods and various forms of energy such as oil, coal etc.) into economic outputs such as manufactured goods and services can be expressed using an equation called the production function.

In order to fulfil the objective of economic growth, which is the basis of economic and social development, it is necessary to have access, at affordable prices, to abundant and diverse energy forms, primarily commercial, which feed into the economic grid. A common policy objective is to make the required energy available to economic agents at best cost. As economies develop, energy consumption initially grows more or less in parallel to economic growth. An adequate, secure and affordable energy supply is thus needed to meet the needs of the business and domestic users, including the transport of people and goods.

However, it leaves open the question of how important energy is as a direct causal factor in economic development. In order to find out how influential energy input is on its effect output on an aggregate basis, the ratio between energy consumption and output (its associated value and thus GDP, one of the indicators of economic growth or in physical units) is the most frequently used indicator. This energy intensity at a product/service, production unit, company, region and country

level indicates the share of energy in output. While the primary and industrial sectors have a generally high energy intensity, service sectors are less intensive but qualitatively very dependent on energy, especially IT and transport.

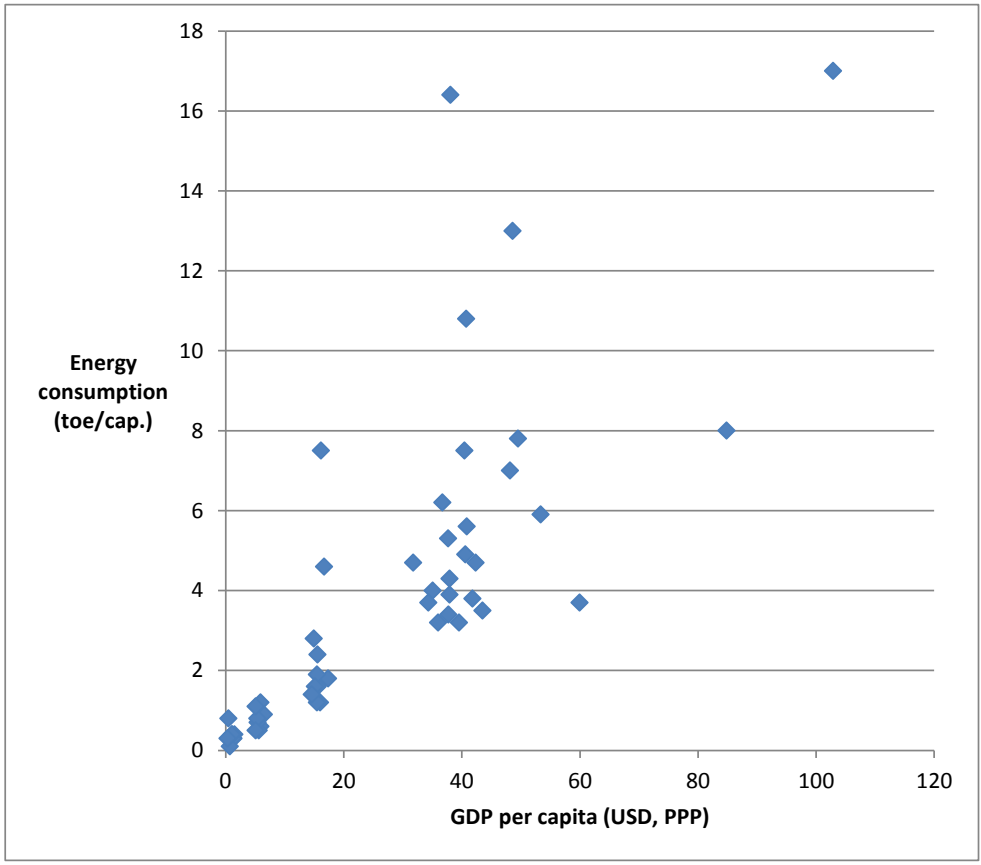
Advanced industrialised economies use less energy per unit of economic output (EU27: 0.14 toe/thousand USD PPP but more per capita (EU27: 3.3 toe) than traditional and poorer societies (Africa: 0.26 toe/thousand USD PPP and 0.67 toe/capita), especially those in pre-industrial stage (0.09 and 0.11 toe/thousand USD PPP and 0.18 and 0.35 toe/capita respectively for Bangladesh and Cambodia). The use of energy per unit of economic output significantly declines over time and in more advanced stages of industrialisation and post-industrialisation reflecting the adoption of more efficient technologies for production and use, combined with structural changes of the economy (trend to switch from primary to services activities) (Stern, 2003). Also, the heavy reliance on GDP data to calculate energy intensity can be misleading in comparing regions and countries, as GDP does not integrate informal and black economies. Also, the high level of GDP in industrialised economies and its decoupling from energy use has structurally reduced energy intensity while their energy consumption ratio per capita is high and overall energy dependency is pronounced.

Data analysis (Stern, 2003 and 2011) highlights a strong correlation between per capita energy consumption and development level (measured by GDP per capita) (see Figure 1). Furthermore, time series analyses confirm this correlation with the level of economic development.

Beyond the correlation between energy consumption and GDP, the IEA has developed the Energy Development Index (EDI) that mirrors the UNDP's Human Development Index and is composed of four indicators:

- Per capita commercial energy consumption: an indicator of the overall access to modern energy and somehow of the economic development of a country;
- Share of population with access to electricity;
- Per capita electricity consumption in the residential sector: an indicator of household access to electricity services and an indication of consumers' ability to pay for them (but not sufficient when bill payment problems exist);
- Share of modern fuels in total residential sector energy use, which serves as an indicator of the level of access to clean cooking facilities.

Figure 1. Energy consumption per capita and GDP per capita (2009)



Sources: IEA, 2010, IMF, 2010 (sample of 52 OECD, emerging and developing countries).

The increased availability of energy services might be a key to stimulate economic development along the different stages of the development process. The evidence underscores the importance of energy in economic development (Quoilin, 2005). Nevertheless, what is the causality and correlation between the two variables? Can one affirm that access to energy favours development? Or on the contrary that development supports energy consumption? Or perhaps a third variable exists inducing the two effects? The answer is probably at the intersection of these three proposals. One can in any case affirm that the development is concomitant with energy consumption. Also, the interactions among energy, other sectors, and economic activity significantly evolve along the various development stages. Clearly, more analytical work appears to be necessary to better understand the relationships between them and the role of energy in economic growth and development.

Global access to reliable energy services that could include renewable energy sources at tariffs (of connection and consumption) compatible with economic actors' incomes has a strong potential for positive socio-economic development in particular through the:

- Creation of new activities and employment;
- Generation of incomes for landowners;
- Reduction of rural migration;
- Use of local resources instead of imports;
- Knowledge acquired by the technicians and managers of installations.

On the contrary, when energy services are hardly available or insecure (no connections/access, shortages/cuts, energy poverty), this does create bottlenecks, structural barriers, and extra cost at micro and macro levels.

Situation in the southern and eastern Mediterranean countries

Table 1 presents key social and energy indicators of SEMCs.

Compared to low-income developing countries (mostly those of Sub-Saharan Africa), the SEMCs economic and energy specificities include:

- Smaller agriculture and rural share in the labour force and GDP;
- Larger and more diverse industrial sectors;
- Transport, water and energy infrastructures cover large to medium economic centres;
- Smaller grey and black sectors;
- Almost comprehensive access to commercial energy: electrification at almost 100%, fossil fuels such as LPG largely replaced biomass;
- The diversity of energy use is already well advanced (transport, industrial process, space cooling), especially for electricity and in rapid increase (with the multiplying effect of demographic and urban developments);
- Modern and intermediate energy technologies along integrated chains (production, transformation, distribution and use).

At the same time, SEMC, compared with their northern industrialised neighbours, differ notably by:

- Less developed and diversified service sectors and larger agriculture and handicraft sectors;
- Industry still focuses on primary processing with specialisation in labour-intensive sectors (textile, food processing);

- Commodity infrastructures are less developed and dense, especially for transport with a predominance of outdated road passenger and freight fleet;
- Informal sectors are more widespread;
- Energy poverty is higher and structural as combined with social inequalities despite increasing potential access to commercial energy;
- Use of appliances remains much more limited for most of the customers due to lack of resources and limited access to recent and diverse equipment.

Table 1. SEMC macro-economic and energy data and indicators(2009)

	Population, m	**GDP PPP, bn USD 2000**	**GDP PPP per capita, USD**	**Net energy imports, Mtoe**	**Primary energy consumption, Mtoe**	**Final electricity consumption, TWh**	**Primary energy consumption per capita, toe**	**Final electricity consumption per capita, kWh**	**Energy intensity (toe/ 1,000 USD PPP**	**CO_2 emissions, Mt**	**Carbon intensity, kg CO_2/ 1,000 USD PPP**
Algeria	34.9	226.3	6484	-111.7	39.8	33.9	1.14	971	0.18	92.5	0.41
Egypt	83.0	362.1	4363	-15.0	72.0	123.5	0.87	1488	0.20	175.4	0.48
Israel	7.4	192.2	25973	19.5	21.6	49.5	2.92	6689	0.11	64.6	0.34
Jordan	6.0	35.4	5900	7.2	7.5	12.5	1.25	2083	0.21	19.2	0.54
Lebanon	4.2	25.8	6143	6.7	6.6	13.1	1.57	3119	0.26	19.3	0.75
Libya	6.4	70.7	11047	-66.4	20.4	26.1	3.19	4078	0.29	50.0	0.71
Morocco	32.0	174.8	5463	14.9	15.1	23.9	0.47	747	0.09	41.3	0.24
OPT*	3.8	4.5	1184	1.1	1.1	4.3	0.29	1132	0.24	3.1	0.69
Syria	21.1	78.3	3711	-2.8	22.5	31.3	1.07	1483	0.29	59.8	0.76
Tunisia	10.4	90.4	8692	1.6	9.2	13.7	0.88	1317	0.10	20.8	0.23
Turkey	71.9	789	10974	70.3	97.7	165.1	1.36	2296	0.12	256.3	0.32
Total	281.1	2049.5	7291	-74.6	313.5	496.9	1.12	1768	0.15	802.3	0.39

Note. * 2008 data, statistical office of the Palestinian Authority (GDP at current prices).
Source: Key world Energy Statistics, IEA, 2011.

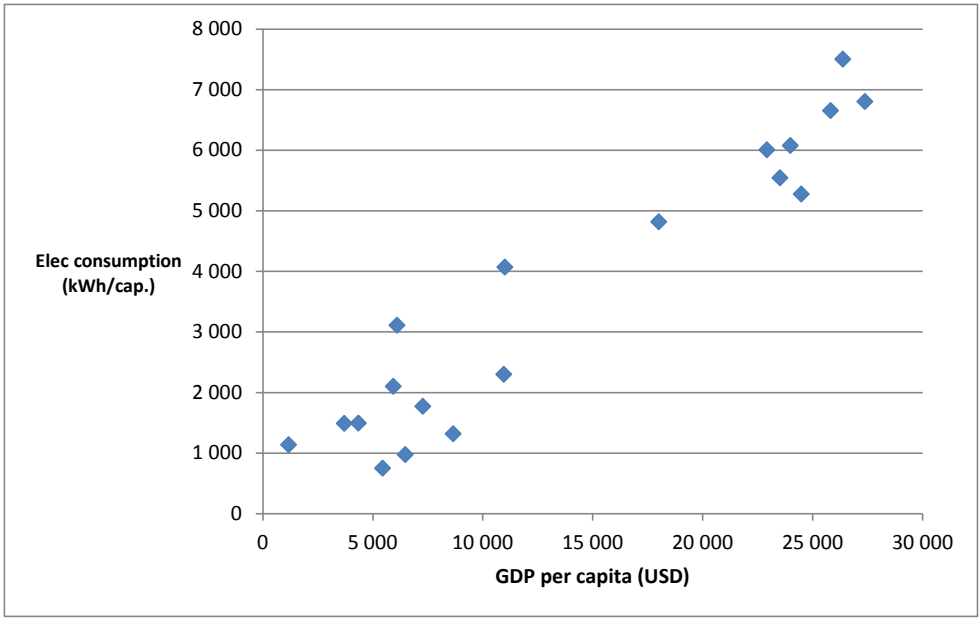
To sum up, SEMCs' interconnections between energy services and the economy as a whole represent the intermediate model between those of developing and industrialised countries. SEMCs show a strong correlation between energy intensity and GDP per capita. Nevertheless, their energy intensities appear lower than those

of developing countries but higher than in industrialised countries (which have largely decoupled energy use from GDP). Overall, energy consumption in SEMCs has major impacts on the main macro-economic parameters of the countries, their tax revenues and social development.

The above differences with both southern and northern neighbours can explain the interactions between energy and economic development in SEMCs, including:

- An extensive development of commercial energy (in particular LPG, natural gas and electricity), which has contributed to a first stage of an economic 'catching up' effect. Further contribution depends, however, on an effective and broader access of economic agents to energy (especially electricity) and availability of the adequate and energy-efficient equipment and appliances;
- Decoupling energy intensity from economic growth and development thanks to more rational and efficient energy use has not yet started (with the remarkable exception of Tunisia whose primary energy intensity dropped by 27% between 1990 and 2011).

Figure 2. Relation between GDP and electricity consumption for MED 11 and EU countries (2009)



Source: Key World Energy Statistics, IEA, 2011.

In the SEMCs, the access to modern energy (in particular LPG, natural gas and electricity) and energy services (commercialisation based on official services and

tariffs) has been key to the economic development of all sectors, in particular industry and commercial services and also as a condition to attract investment, in particular FDI. The electrification coverage reaches almost 100% of the population in most countries, illustrating spectacular progress.

Nevertheless, there are constraints and barriers in access to electricity and gas connection at an affordable price, especially in the case of small businesses and handicrafts (often semi-official or informal) in isolated rural areas or dense urban areas. Also, electricity black-outs primarily affect those areas compromising the operation and reliability of business activities. Thus, improving the effective access of local businesses to energy services appears to be a priority to enhance their viability.

Figure 2 illustrates the link between electricity consumption and GDP in SEMC.

2.1.1.2 Tax Revenues

In most countries, energy consumption is taxed, providing an important source of budget revenues, especially through VAT and excise taxes on oil products. Also, they contribute (or are supposed to) to compensate energy consumption externalities (roads, health).

Looking at the market price of a barrel of refined oil in OECD countries, energy taxes account, on average, for 68% of the price while 16% returns to the oil exporters and 16% are refining and distribution margins (OPEC source). This heavy taxation on energy in the region is illustrated in the box below concerning Morocco.

Box 1. Energy taxes in Morocco

The contribution of energy taxes to Moroccan public revenue is substantial. From 1980 to 1985, they accounted for 5 to 6% of the total tax revenues. Then from 1986 to 1994, the oil levy (imposed on the oil products on the basis of a fictitious price of 30 USD/barrel instead of 15-17 USD) increased this share to between 9% and 14%. Currently, the taxes on oil product consumption (excise tax and VAT) amount to almost 7% of the total tax revenues but are well below the government expenses for energy subsidies (5% of GDP). The annual oil import bill amounted before 2008 between 12 and 15 billion dirhams (12% of value of the total imports) and rocketed to 30-40 billion dirhams since 2008-09.

2.1.1.3 Social Development

The mechanisms at play – an overview

Energy is required to meet basic human needs. Thus, population access to modern forms of energy is essential for the provision of clean water, sanitation and

healthcare. Also, through the provision of reliable and efficient lighting, heating, cooking, mechanical power, transport and telecommunication services, energy, especially electricity, offer numerous social benefits, including:

- Job creation in agriculture and industry (especially food processing) in rural areas;
- Comprehensive primary education, thanks to lighting, which allows study after sunset in rural areas – something that attracts teachers;
- Reduced child and female mortality and enhanced gender equality: access to electricity and efficient fuels and cooking appliances reduce in-house pollution that causes disease; and partly frees up women from traditional domestic tasks.

Strong interactions exist between energy consumption and social conditions in general (IEA/OPEC/OECD/World Bank, 2010), particularly for the situation of women. The provision of modern, secure and affordable energy services and appliances (cooking, lighting, cooling) enhance a population's living standards and socio-economic perspectives. On the contrary, the lack of energy, and its inefficient use create obstacles to social development with stagnating and poor education, health care and transport and telecommunication systems. Actually what matters is not only access to energy but also quality, security, modern fuels, appliances and affordability.

The ratio of annual commercial energy consumption per capita indicates clear differences in social development:

- In countries below 1 toe of annual consumption per capita (and with low electrification and high use of traditional biomass), extensive portions of the population have an income below USD2 per day, with high illiteracy and fertility as well as infant mortality, and low life expectancy;
- Above the annual 1 toe consumption per capita, the social standards remain low but poverty is less widespread;
- For those in the annual range of 2-5 toe per capita, as in several recently industrialised countries, social conditions improve considerably;
- Above 5 toe per capita (i.e., the average annual energy consumption in OECD countries) living standards are generally high but inequality and energy poverty persists in some countries.

Electricity appears to play an even greater role in improving household welfare. Electricity is perceived by vulnerable populations as the most important service and is critical to increasing household income, before water and sanitation (see the World Bank study on Peru-World Bank, 1999). More recently, access to mobile telecommunications might also have become one of the key services with the largest

poverty-reducing potential. While the annual electricity consumption per capita in EU27 countries averages 6,000 kWh, it is only 560 kWh in Africa (120 kWh in Nigeria).

Situation in southern and eastern Mediterranean countries

Based on the IEA Energy Development Index,[10] six SEMCs ranked among the top 12, including Lebanon (0.850), Jordan (0.773), Algeria (0.706) and Egypt (0.668) owing to the share of the population with access to electricity and share of modern fuels in total residential sector energy use (reaching 98-100%). However, the effective access to those services looks more problematic (for example, energy poverty and electricity black-outs in Lebanon). Similarly as a strong correlation between energy services and economic development has been established in SEMC and other regions, a reliable and affordable access to energy in the residential sector benefits the population, in particular in terms of health, education, employment and mobility. For instance, the high access of the Jordanian and Tunisian households to energy services corresponds to relatively high welfare and lower poverty rates within the region.

2.1.2. Energy as a Burden

While being an asset for economic and human activities, energy may also have negative socio-economic impacts, such as excessive energy cost (bills). The usual policy response is to use subsidies and avoid including most externalities that, in turn, may generate socio-economic imbalances.

2.1.2.1 Energy Bills

From energy prices to socio-economic effects

Customer energy bills depend on two factors: the level of consumption and the unit price. For network energies (electricity, gas, district heating), a tariff system applies, taking into account the level of consumption and the fact of connection and use of the network. In some cases, a flat tariff (the bill amount is fixed, based on criteria such as size of flat or number of occupants for residential tariff) may apply.

[10] The indicator can be treated as a measure of energy poverty and is calculated for developing countries as an average of four indicators. Values close to 1 indicate a good performance. For detailed ranking of 2011 indicator (based on 2009 data) see (www.worldenergyoutlook.org/resources/energydevelopment/theenergydevelopmentindex).

An increase of energy prices may result from developments in the global market, higher taxation and/or specific national conditions (scarcity or complexity of access to energy resources and/or consumers). Higher energy consumption by consumers can be produced by higher economic activity, search for greater comfort (e.g. air conditioning), outdated equipment and/or low consumer awareness.

Excessively high energy bills compared to net revenues reduce customers' purchasing power and hit business competitiveness and household welfare. For the most vulnerable sectors of the population, high energy bills take up a disproportionately high share of the household budgets and/or reduce accessibility to basic services (lighting, food refrigeration);such a situation is known as energy poverty.[11] Structurally this increases non-payment rates to the detriment of energy infrastructure maintenance and investment.

Many field studies (World Bank, 1999; Barnes and Halpern, 2000) in transition and developing countries indicate that the poor are often keen to pay for standard energy services but face high access costs (full electricity connection fees of up to USD600 or deposit and advance payment for LPG bottles) or non-availability of services (rural areas: low population densities and urban areas: lack of infrastructure or non-suitable conditions, like in slums). Poor households lack cash reserves for such fees or lump sums but are generally able to afford the monthly energy service expenses if the service is reliable. In addition, replacing non-grid household electricity technologies by the grid prove cheaper[12] with much higher quality of services (e.g. light).

Energy price increases are passed onto most sectors of the economy and society. In particular, food prices, a major component of the household budget in developing countries, rapidly increase because of higher transport costs and higher prices of inputs to agriculture (e.g., fertilizers and diesel to operate tractors and irrigation pumps). For the poor who use transport services, higher transport costs also decrease their effective income. Third, as higher energy prices may reduce GDP growth, household income is reduced.

Situation in southern and eastern Mediterranean countries

Owing to the scissor effect of relatively low domestic incomes and growing energy dependency (in imports and exports) on volatile energy markets, especially of hydrocarbons, energy prices in SEMC have significantly increased. At first, fuel

[11] Various thresholds are used in EU countries, typically staying around 10% (EPEE, 2009b).
[12] Cost of useful electricity from various sources, in USD/kWh (excluding appliance costs): grid (0.08), dry cell batteries (0.53), car batteries (2.30), kerosene (5.87), candles (13.00) – Source: Foster, 2000.

prices, in particular LPG (used for cooking and heating) and diesel (local transport and agriculture) have rapidly increased over the period 2007-11 as a result of the international oil price surge (the first wave till mid-2008 and then between 2009 and 2011).[13] Also, electricity prices, which mostly rely on fossil fuels and thus follow international price variations, have also increased. Furthermore, like most developing regions, the Mediterranean region was also hit by the sudden surge in food prices that culminated in 2008-09.While domestic energy prices in SEMC are lower than in the EU, the level of household incomes is still much lower and poverty is widespread.

These rapid and steady price hikes, combined with relatively high energy inefficiency have increased the share of energy in customer expenditure and thus energy poverty and absolute poverty.[14] Energy expenses have accounted for a growing and significant share of SEMC household consumption baskets, especially for the most vulnerable who have to allocate an excessively high share of their incomes for basic fuels (LPG) and electricity, despite the universal consumption price subsidies (see below). Thus, access to modern energy services has been jeopardised for an increasing share of the poor who see their living standards reduced and/or have to come back to traditional biomass when available. This has a negative effect on their overall socio-economic development and perspectives.

High energy bills and energy burden at the customer level have negative macroeconomic consequences, both domestic (e.g. high share of energy subsidies in national budget, high energy intensity at the expense of competitiveness) and external (e.g. trade deficit). Along the SEMCs, Morocco, Israel, Jordan and Lebanon are the most energy-import dependent countries. Over the medium to long term, the trend of high, volatile and rising energy prices is expected to continue and thus increase the pressure and imbalances both at micro and macro levels in most SEMCs.

2.1.2.2 Energy Consumption Subsidies

The mechanisms at play – an overview

The usual way to address poverty and energy poverty is to provide subsidies. The OECD defines a subsidy as "any measure that keeps prices for consumers below

[13] Automotive diesel prices in Europe and North America increased by around 30% between 2009 and 2011 according to IEA data (www.iea.org/stats/surveys/prices_archives.asp).
[14] Unlike the EU, where the Survey on Income and Living Conditions (EU-SILC) regularly surveys EU households and includes energy poverty, a tool such as an individualised safety net hardly exist in SMC and thus energy poverty data are scarce.

market levels, or for producers above market levels or that reduces costs for consumers and producers". More specifically, the IEA defines an energy subsidy as "any government action that concerns primarily the energy sector that lowers the cost of energy production, raises the price received by energy producers or lowers the price paid by energy consumers".

An international report (IEA/OPEC/OECD/World Bank, 2010) outlined that "energy subsidies can thus help address market failures or respond to social and distributional objectives, especially where social welfare mechanisms for directly providing income support to the poor do not exist". Direct or indirect subsidies to customers are supposed to enhance the access of poor groups to modern energy services, especially electricity through affordable prices or a support system (e.g. vouchers). Further to overcoming market failures (e.g. when most efficient technologies cannot enter a market), well-designed and targeted subsidies can mitigate environmental problems such as encouraging alternatives to biomass in areas with serious deforestation or a switch to less polluting fuels (natural gas instead of coal or diesel in heating and transport).

The subsidy aims to reduce the difference between the effective (or market) price without government intervention and a socially optimal price. Most frequently, subsidies apply in respect to general energy tariffs (for electricity, gas, LPG, motor fuels) directly or indirectly (for example, cross-tariff subsidies between various categories of customers; usually business customer tariffs are higher than those for households).

Subsidies to the energy sector can take various forms (tax breaks, financial incentives, grants, R&D credits, etc.) and modalities with a direct or indirect effect on energy production costs and/or final prices (cf. Table 2 below and section below on producer subsidy).

Another form of subsidy includes an insufficient integration of externalities in the final price. Indeed, each segment of the energy chain impacts on its close vicinity and beyond notably by mobilising land, mineral resources, water and use of infrastructures, causing local pollution and contributing to global climate change and thus generating costs for other actors (e.g. cost remediation, health expenses). Thus, without internalisation of these costs, the fossil fuel industries and also the consumption benefit from an indirect subsidy that is provisionally left apart or partly covered by the taxpayer but sooner or later will need to be covered by those involved.

While the principle of subsidising energy appears coherent with socio-economic development (cf. the crucial role of energy above), ensuring that the benefits are effectively provided to the households most in need has proven problematic.

Table 2. Main types of energy subsidies

Government intervention	Example	How the subsidy usually works		
		Lowers cost of production	Raises price to producer	Lowers price to consumer
Direct financial transfer	Grants to producers	●		
	Grants to consumers			●
	Low-interest or preferential loans	●		
Preferential tax treatment	Rebates or exemptions on royalties, sales taxes, producer levies and tariffs	●		
	Tax credit	●		●
	Accelerated depreciation allowances on energy-supply equipment	●		
Trade restrictions	Quotas, technical restrictions and trade embargoes		●	
Energy-related services provided directly by government at less than full cost	Direct investment in energy infrastructure	●		
	Public research and development	●		
	Liability insurance and facility decommissioning costs	●		
Regulation of the energy sector	Demand guarantees and mandated deployment rates	●	●	
	Price controls		●	●
	Market-access restrictions		●	

Source: "Reforming Energy Subsidies, Opportunities to Contribute to the Climate Change Agenda", United Nations Environment Programme, 2008.

Overall, generalised or universal direct consumption price subsidies that benefit all customers appear rather inefficient as on average only 8% of fossil fuel subsidies go to the most vulnerable (IEA, 2010). In some cases, they may not even reach the poor at all (IEA/UNEP 2002).The main reasons for this low efficiency are as follows:

- The poorest households may be unable to afford to pay even for subsidised energy but above all for the high connection fees and appliance costs. Also, they may have no physical access to the energy system, for instance, in isolated rural areas or urban slums (no electricity grid connection) or when they are not considered as viable customers by energy companies;
- When poor households are able to purchase energy at subsidised prices, their consumption is generally modest and sometimes capped (e.g. electricity lifeline or block tariff, which can nevertheless provide a more effective support to poor and limit distortions towards richer customers). Thus, the share of the subsidy remains low in their revenues and does not significantly reduce poverty.

In addition, those who generally benefit most from the universal consumption price subsidies are the wealthiest customers, especially in urban areas, whose energy consumption is much higher. A subsidy scheme being indifferently addressed to all consumers, without taking into account income thresholds implies that, in fact, most of the subsidies benefit the less vulnerable households but paradoxically, poor households have also to contribute to the financing of subsidies (through indirect taxes such as VAT).

Low administrated prices with caps or ceilings often create physical shortages and thus lead to administrative rationing[15] that is generally circumvented by middle and high revenue households through favouritism and corruption at the expense of the poor.

Universal consumption price subsidies are also criticised because artificially low energy prices distort the price signals, in particular for medium and large customers and thus the supply/demand balance. They inflate demand at the expense of the energy sector (pushed to chronically increase investments to follow rapid demand increase but without sufficient resources), trade balance (either increasing imports or reducing exports) and the environment (local pollution).By distorting price signals, they become structural barriers and strong disincentives for more rational and efficient use of energy as well the deployment of renewable energy.

Also, by increasing demand price subsidies deteriorate the balance of payments and energy supply security by increasing a country's dependence on energy and imports. Finally, lower prices of fuels such as diesel or LPG favour their smuggling to neighbouring countries where the retail prices are higher. As universal consumption price subsidies create artificial prices, they undermine the energy sector economic capacities to adequately maintain and invest in infrastructure, including in more efficient technologies.

Also, the external costs (generally to address the consequences of health and environmental damages caused by energy production and use) are generally poorly estimated, especially in the medium- to long-term. This creates a collective but hidden and postponed burden to be covered in future.

Universal consumption price subsidies can place a heavy and barely controllable burden on state budgets as volumes of subsidised energy are large and international prices are volatile. Governments therefore prefer, for political reasons, to keep subsidies 'off-budget' with a universal (administrated) consumption price, especially with state-owned energy companies, to make them less visible and less subject to

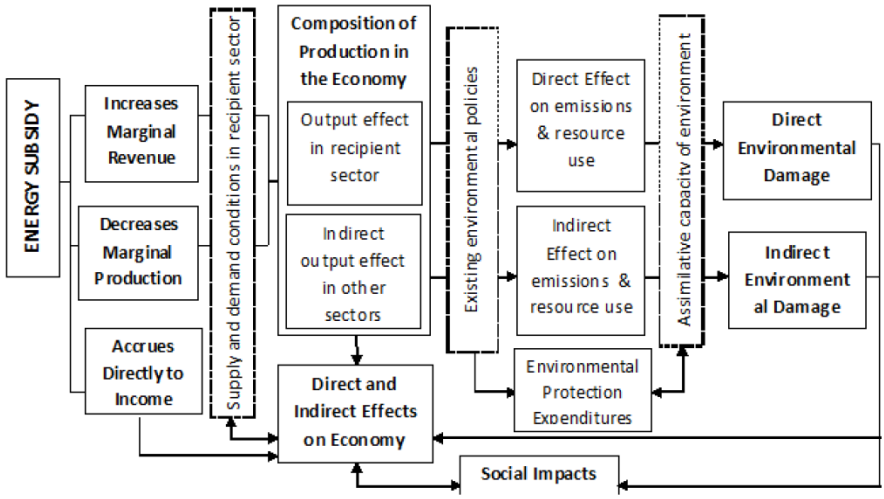
[15] In Egypt, the administration rations LPG cylinders, generating abuses and administrative costs while being largely inefficient.

scrutiny on the funds allocated and their effective efficiency. By contrast, 'on-budget' subsidies are more transparent and open to debate, notably by tax- payers.

Generally, the tax-payers (through the state of regional budgets) and/or productive sectors (through cross-tariff subsidies) finance such schemes. For the first, their income is affected and for the second, their energy bills increase at the expense of competiveness (see above). An indirect and significant cost is the lost fiscal revenue owing to the reduced price as well as the common illegal trading and trade of highly subsidised fuels. Also, transaction costs may be high and the impact evaluation difficult to conduct because of the lack of data and specific monitoring of energy consumption and poverty. Thus, what is at stake is the type of subsidy scheme and its effective enforcement.

The multiple impacts of energy subsidies on the energy supply chain and other sectors are illustrated in Figure 3.

Figure 3. Social, economic and environmental impacts of energy subsidies



Source: adapted from UNEP (2004)

Source: IEA/OPEC/OECD/World Bank, 2010 (from UNEP).

Energy subsidies are generally considered as a major component of the social safety net for the poor, guaranteeing the availability of affordable goods. However, the use of universal price subsidy scheme has proven highly expensive, as we argued above. In policy terms, the intent to address a social issue with only general energy price rebates is clearly misleading.

Box 2. IEA focus on energy consumption subsidies

Estimating the amount of subsidies can be difficult because of differences in definitions, methodologies and the transparency of fiscal systems; it is difficult to compare regional or individual country studies measuring the magnitude and impact of energy subsidies

Fossil-fuel consumption subsidies worldwide amounted to USD409 billion in 2010, with subsidies to oil products representing almost half of the total. Oil subsidies make up almost half the total fossil fuel consumption subsidies, with electricity making up 30%, natural gas 22% and coal less than 1%. Persistently high oil prices have made the cost of subsidies unsustainable in many countries and prompted some governments to try to reduce them. In a global survey covering 37 countries where subsidies exist, at least 15 have taken steps to phase them out since the start of 2010. Without further reform, the cost of fossil-fuel consumption subsidies is set to reach USD660 billion in 2020, or 0.7% of global GDP (at market exchange rates).

Fossil-fuel subsidies carry large costs. They encourage wasteful consumption, exacerbate energy-price volatility by blurring market signals, incentivise fuel adulteration and smuggling, and undermine the competitiveness of renewables and other low-emission energy technologies. For importing countries, they often impose a significant fiscal burden on state budgets, while for producers they quicken the depletion of resources and can reduce export earnings over the long term. Furthermore, they are inefficient means of assisting the poor: only 8% of fossil-fuel subsidies in 2010 were distributed to the poorest 20% of the population.

Note: The IEA (as other international organisations) subsidy estimates are based on the differential between domestic and international market prices. On its side, OPEC and others use the cost of production as benchmark.
Source: IEA/WEO 2010 (www.iea.org/weo/Files/ff_subsidies_slides.pdf, www.iea.org/files/energy_subsidies.pdf).

Situation in the southern and eastern Mediterranean countries

Energy subsidy schemes are widespread in SEMCs. They mostly consist of universal direct energy price reductions focused on LPG (used for cooking and heating), diesel (local transport and agriculture) and electricity (general and agriculture). Subsidies to fuels (LPG, diesel) account for the largest share, followed by electricity and natural gas. Subsidies have been covering an increasing share of the final energy cost as the gap between the international market and the social price is widening. Also, as subsidised universal prices benefit all customers in a context of rapid demographic growth, the nominal and real value of energy subsidies increased over the period 2002-2010 to become substantial in most countries, often accounting for the largest share of the government expenditures. In 2007, subsidies to fuels in SEMCs ranged from below 2% of the government expenditures in Israel, to more than 15% in Egypt. Also, Syria and Palestine spend more than 20% of their current expenditures on subsidies (fuel accounting for a large share). In 2009, energy subsidies accounted for a significant share of GDP in Egypt (6% and 11.9% in 2010)

(AfrDB, 2012)[16] and Syria (5%) but were lower in Jordan (2%)-see also Annex 2: Energy subsidies in SEMCs.

Furthermore, the 2007/2008 and 2009/2011 price increases confronted southern Mediterranean policy-makers with serious challenges, particularly in net-importer countries. As a result of the surge in fuel prices that culminated in 2008, fiscal expenditures on fuel subsidies increased much quicker than planned (the difference was over 2% of GDP in 2008-ECOFIN, 2011). Also, for most countries the size of fuel subsidies has been notably higher than those to food (300-600 USD/capita/year – see Table 3).

Table 3. Energy subsidies in SEMCs (2010 or most recent available data)

	Share of residential sector in final energy consumption (in %, 2009)	**Subsidy mechanism (universal energy price subsidy individual support)**	**Level of subsidy: total/ per fuel (in % of final price)**	**Main energy subsidies (in USD bn)**	**Total subsidies (% of GDP/ state budget)**	**Financing scheme**	**Overall efficiency to reduce poverty**
Algeria	33%	Universal consumption price subsidy	Total: 59.8%/ electricity: 35%	Fuels (8.5), natural gas (NA), electricity (2.1)	6.6/-	Indirect (state company deficit are covered by the state)	Limited
Morocco	22%	Universal consumption price subsidy	LPG: 250%, diesel: 66%, gasoline: 35%, fuel oil: 91%, electricity: NA	4.8 (2011)	5%/ 20%	Specific fund (CGC)	Limited (42% of subsidies benefit to rich household and enterprises)
Tunisia	31%	Universal consumption price subsidy	LPG: 144%, diesel: 37%, gasoline: 19%, fuel oil: 64%, natural gas: 86%, electricity: 44%	1.1 (2007), 2.2 (2010)	5%/ 15%	Specific fund	Limited

[16] Based on full economic cost (gap between the real price and the reference price).

	Share of residential sector in final energy consumption (in %, 2009)	**Subsidy mechanism (universal energy price subsidy individual support)**	**Level of subsidy: total/ per fuel (in % of final price)**	**Main energy subsidies (in USD bn)**	**Total subsidies (% of GDP/ state budget)**	**Financing scheme**	**Overall efficiency to reduce poverty**
Egypt	22%	Universal consumption price subsidy	Total: 55.6%/LPG/ 90%, diesel: 75%, natural gas: 80%, electricity: 10%	Fuels (14.1), natural gas (2.4), electricity (3.8)	11.9%/ 15% (2010)	State budget	Limited (only 13% of the subsidy go to 20% poorest)
Israel	23%	-	-		2% (est.)	-	
Jordan	21%	Individual support and universal consumption price subsidy	NA		2%	-	Improved*
Lebanon	36%	Universal consumption price subsidy	Electricity/ NA		4% GDP/ 17% budget (only electricity)	State budget	Limited
OPT	60%	Universal consumption price subsidy	NA		NA	State budget	Limited
Syria	16%	Universal consumption price subsidy	NA		NA	NA	

Notes: fuels mostly consist of LPG and diesel. Social tariffs (lifeline rate) for low purchasing power users are used in several SEMCs countries (Egypt, Jordan, Morocco, Tunisia).
* Jordan: a detailed evaluation of the new individual support scheme is not yet available but appears to be much more effective than the previous universal price subsidy (only 7% of the subsidy used to benefit the 25% poorest households) even if partially reintroduced in 2011.
Sources: IEA, IMF, World Bank, national statistics.

In absolute terms and worldwide, two SEMCs are listed among the top 25 countries for energy subsidies in 2010: Egypt (6th; total energy subsidies: USD 20billion

or 11.9% of GDP, 250USD/capita) and Algeria (12th; total energy subsidies: USD 10billion or 6.6% of GDP, 300USD/capita) (IEA, 2010).

The funding of these subsidies varies across countries. In the Maghreb, Morocco and Tunisia created "Caisses Générales de Compensation" (CGC) that are managed outside public budgets but funded by a state subsidy and/or parafiscal tax. CGCs make up the difference between the market price and the fixed price for a selection of energy products (LPG, diesel, electricity) to compensate distributors. In other countries, social ministries directly intervene through the state budget.

The impact of subsidies in the region is multiple as described above. In particular, universal energy subsidies encourage rent-seeking behaviour, energy waste and fuel smuggling,[17] and largely prevent supply diversification, in particular with renewable energy. As a result, SEMCs' economies are both energy and carbon intensive and, in contrast to other regions, the situation is deteriorating there. The rapidly growing energy demand can hardly be satisfied because of the structural underinvestment and lack of sufficient maintenance of domestic infrastructure. Finally, the subsidy schemes are largely inefficient to reduce energy poverty as they remain captured by higher income and interest groups.

The following Table 4 provides an assessment of the price subsidy mechanisms in place in SEM net-energy importing countries. The administrated price or universal subsidy scheme clearly dominates.

Table 4. Domestic fuel price subsidy mechanisms in net energy importing SEMC's

	Situation and reforms	Developments
Jordan	Increased fuel prices in 2005 and 2008, making most fuels reflect international prices. A committee of representatives from the Ministries of Finance, Energy, and Trade, and from the Jordanian Petroleum Refinery Company adjusts the prices of petroleum products monthly, based on a formula that follows the changes in the price of Brent crude oil during the previous 30 days.	In January 2011 Jordan temporarily suspended its automated adjustment mechanism, owing to increased social and political pressure, and reduced prices and taxes on fuel.
Lebanon	Fuel price subsidies were de facto eliminated in October 2008 with the reintroduction of fuel excise taxes; final fuel prices are issued weekly via ministerial decree basing the price on cost (including distribution costs and station margins) plus fuel excise taxes.	In early 2011, the Lebanese government reduced fuel excise taxes in response to high world market prices and increasing domestic political tensions.

[17] In particular in the Mashrek (between Jordan, Lebanon and Syria), between Egypt and the Palestinian territories, between Algeria and Morocco (as official borders are closed) and between Tunisia and Libya (in particular after the 2011 Libyan uprising).

	Situation and reforms	Developments
Morocco	After ad hoc fuel price rises in 1999 and 2005, Morocco increased domestic prices in 2006 for all products, except butane/LPG, to reflect import prices at the time, and introduced an automated, index-linked adjustment mechanism that would adjust prices in proportion to international price variations exceeding 2%.	Rising costs of newly built-up fuel subsidies in 2011 caused the country to contemplate a move from universal subsidies to targeted transfers in the future. In June 2012, the government increased the price of automotive fuels (gasoline +20% and diesel +14%) to intend to reduce the increase of fuel subsidies.
Tunisia	After ad hoc fuel price rises in 2005 and 2007, the government decided in January 2009 to cap the subsidies at the level they reached when oil cost USD52 per barrel. Whenever the international price of oil exceeded the reference price of USD52 per barrel by USD10 over a period of three consecutive months, prices of petroleum products increase by an a priori fixed amount. In early 2010 the reference price was raised to USD60 per barrel	In September 2012, the government increased the price of gasoline by 7.3% and diesel by 7.9%.

Source: Fattouh, 2012, author updates.

SEMC's and Iran country profiles on energy subsidies

Algeria

To guarantee prices accessible to all, the Algerian state subsidises a large number of food goods of first need but also electricity and fuels. Another objective is to attract FDI in energy intensive industries (e.g. petrochemical) and support domestic product competitiveness. The government budget does not officially include energy subsidies while the authorities provide energy price 'support' or 'implicit subsidies' by keeping administrated energy prices below the real costs. The Algerian energy customers, private individuals or businesses pay these products neither at market prices, nor at cost-recovery prices but at the administered prices. That led to the two-tier pricing system: lower prices for industrial sector and household consumption, and international prizes. The subsidy to the price of gas is primarily intended for industry, in particular petrochemical. For electricity, the subsidy amounts to 35%.

Energy subsidies apply to all consumers because there is no targeted income support to households. Thus, this system appears very unfair: large companies or multinationals profit from subsidised prices, whereas most of the poor population only partly profits from it. The subsequent losses of the state energy companies are either covered by other customers or by the state budget. The amount of energy subsidies is not known.

Morocco

The energy price subsidy in Morocco targets LPG (around 250% of final price) and diesel (66% compared to international prices) that are important for households. LPG is primarily used by households for cooking and to a lesser extent for heating but industry and agriculture (water pumping) have been using increasing volumes. For diesel, the public transport cost is targeted. The price difference is covered by the Moroccan "Caisse de compensation" (see above) whose deficit more than doubled to 32 billion dirhams[18] in 2011 to reach 5% of GDP (around 20% of state budget or two-thirds of total investment) following the rise of the price of crude oil and its consumption (4% in 2010 and 2% in 2007).

However, general price subsidies provide benefits to middle income high-income households (with several cars), SMEs and large industries and agriculture rather than households in energy poverty. Those customers account for 42% of total energy subsidies. The subsidies granted to LPG and diesel worsens consumption distortions by directing more consumers towards these energies and without encouraging a rational consumption. In June 2012, the government pressed by the continuous increase of fuel subsidies and the lack of financing, increased the administrated prices of gasoline by 20% and diesel by 14% and is considering possible targeted support.

Tunisia

General energy subsidy scheme in Tunisia supports administrated prices below costs. The subsidies (2010) are particularly high for:

- LPG: 144% (cost-recovery price at 18.3 dinars per bottle of 13kg against an administrated selling price of 7.5 Tunisian Dinars (TND)/bottle);
- Diesel: 21 % (cost-recovery price at 1.162 dinar/litre against an administrated selling price of 0.960 TND/litre);
- Fuel oil: 75% (cost-recovery price at 738 TND/t against an administrated selling price of 420 TND/t);

Thus, the subsidy for the oil products would reach 1.070 million TND in 2010 (on the basis of a Brent crude price at 80 USD/bbl and a parity dollar/dinar at 1.48.

In the same way, electricity and gas are very strongly subsidised:

- Domestic electricity tariff: subsidy of 44% (cost-recovery price: 180 millimes/kWh net of tax against an average administrated selling tariff of 125 millimes/kWh);
- Natural gas: 86% (cost-recovery price: 539 TND/toe against an average administrated selling tariff of 289 dinars/toe).

[18] 17 billion dirhams budgeted and extra 15 billion dirhams.

Also, the feed connection for gas is symbolic for the consumer, since s/he pays only 140 TND (in monthly instalments, at the rate of 3.5 TND/months) instead of 500 TND. Thus, the subsidy for electricity and gas in 2010 would be in the range of 1.050 million TND including 582 million TND as indirect subsidy and 468 million dinars for the direct subsidy.

Moreover, the adjustment of administrated prices has not followed inflation leading to a chronic deficit of the energy companies, in particular STEG, which has to receive grants from the state. Thus the total subsidy to the energy sector would reach 2.1 billion dinars (€1.1 billion) in 2010 or 11% of the state budget expenditure (5% of GDP). In September 2012, the government, pressed by the continuous increase of subsidies and the lack of financing, increased of the administrated prices gasoline by 20% and diesel by 14%) and is considering possible targeted support.

At the same time, a progressive reduction of the fuel price subsidy levels has been combined with an active and operational set of actions to reduce sustainably the fuel consumption (combining energy savings, efficiency and use of renewable energy, in particular solar water heaters through the PROSOL programme).

Egypt

Energy price subsidies in Egypt are large in relative and absolute terms. The subsidy rate amounts to above 75% for oil products and natural gas (almost 90% for LPG, 75% for diesel, 80% for natural gas) and 30% for electricity. This translates into a heavy annual fiscal burden of 83 billion Egyptian pound (EGP) or USD 5 billion in 2010, i.e. 67% of total subsidies, above 15% of the total state budget expenses, and 11.9 % of GDP[19]. Furthermore, they increased by 56% between 2007 and 2009 following the increase if international oil prices. They were estimated to reach a level of 100 billion EGP (USD 6 billion) in 2011 and can slightly decrease to 90 billion EGP in 2012 but accounting to almost 20% of total national budget expenses (OME, 2011) and to increase to 120 billion EGP in 2013 further above the 11.9% share in 2010 GDP (AfrDB, 2012). Subsidies allocated to oil products account for the largest share of expenses (40% for diesel and 22% for LPG) to be compared with the annual oil and gas exports revenue of USD 10 billion.

As for other countries, only a minor part (29%) of subsidies reaches the lowest income groups which account for at least 43% of the population. The 20% richest receive 39% of subsidies while the 20% poorest only 13% (cf. figure 4 below), i.e., the wealthiest receive almost three times more subsidies than the poor owing to their higher consumption of motor fuels, natural gas and electricity. Also energy-intensive heavy industries (including steel, cement, fertilizers, ceramics and glass) and administration (especially security forces) benefit from the price subsidies.

[19] AfDB, 2012.

Price distortions encourage excessive energy consumption, making Egypt's energy and carbon intensities 40% and 60% higher than the EU27 average and twice of MENA average (IEA, 2009). They also aggravate pollution and environmental damages and lower hydrocarbon export revenues.

Various reform plans of the costly and energy subsidy schemes have been undertaken since 2004. In 2007 the government decreased subsidies on domestic energy prices, including for energy intensive industries, and decided in 2008 to reduce domestic energy subsidies by 5% annually. However, non-energy intensive industries benefited from a six-month freeze in 2010 while inflation was above 10%. In late 2011, the interim Trade Minister, Mahmoud Eisa declared "the government would start the phase-out with energy-intensive industries, such as steel and cement, adding that many of these firms were exporting their products which meant that "they are exporting ... subsidized energy."

Jordan

Up to mid-2000s, fuel price subsidies to gasoline, diesel, fuel oil and kerosene accounted for up to 6 % of Jordanian budgetary expenditures. As in other countries, the generalised energy price subsidies were largely inefficient to target the most vulnerable households: the poorest 40% of the population received below 25% of the fuel subsidies and the 25% poorest households - less than 7%. On the contrary, the richest 20% of households captured over 40% of the subsidies. In particular this was the case of subsidy to gasoline as the poorest families did not own cars. Thus, an International Monetary Fund report qualified the fuel price subsidies scheme as "pro-rich" (IMF, 2010).

In 2005, the government initiated a gradual phasing out of fuel price subsidies. In early 2008 the oil product prices were fully liberalised and price subsidies eliminated for all fuels except LPG. It also set up an automatic fuel price adjustment mechanism. The combined increases of administered prices and specific taxes on fuel saved the state budget almost USD 200 million per year but increased inflation that was also caused by the oil price hikes of 2008. Between 2008 and 2010, the share of energy subsidies in the GDP dropped from 5% to 2% (of which fuels from 1.2% to 0.2%). It is also worth mentioning that the subsequent price signal has stimulated energy efficiency and the use of renewable energy.

In order to compensate for the impact on households - estimated at 4.4% of their income, the authorities put in place several accompanying measures or a social mitigation package. The National Aid Fund (NAF) set up an individual safety net that provides direct cash assistance in the winter for households earning less than USD 1,400/year to buy heating and cooking fuels. Also, the NAF put in place a social assistance (monthly aid of around JD 30 per family member with a maximum of JD 180 for a five-member family) targeting specific vulnerable groups including the

working poor, the unemployed and disabled and reinforced its food support programme. A lifeline (or 'block') electricity tariff for poor households was established.[20] In parallel, the government raised the public administration wages and pensions at the benefit of around 60% of the total population. This individualised cash transfer system targets low-income households. Also, the food support programme was reinforced towards the most vulnerable.

Overall, the annual cost of the individualised social mitigation package was estimated between one-third to half of annual energy subsidies and with much better targeting and effectiveness against energy poverty and poverty.

However, in the context of a price increase of basic goods and the potential political impact of the Arab Spring, in January 2011 the government decided to temporarily re-set administrated and subsidised prices for selected fuels (for an estimated annual cost of USD 230 million, including food prices) and thus suspending the automatic fuel price adjustment mechanism. Also the combined effect of soaring international fuel prices and the interruption of Egyptian gas supplies increased electricity supply costs to JD 0.19/kWh (27 USDc/kWh) well above the customer tariffs of 0.083 JD/kWh (11.7 USDc/kWh). This has resulted for NEPCO, the national power company, in a record deficit in 2011 of USD 2.5 billion or 15% of GDP. This deficit is expected to exceed USD 3.5 billion by the end of 2012.

Lebanon

Electricité du Liban (EdL), the national power company, relies heavily on government subsidies (USD 3.5-4 billion/year or around 3% of GDP in 2009). For the last few years the share of electricity subsidies in total primary expenditures fluctuated in the range 10-20%. They primarily target to cover the difference between actual costs of oil imports and administratively set theoretical and artificially low tariffs (3 to 6 USc/kWh for the first three tariff tranches in 2010) while the marginal generation cost is estimated at above 18 USc/kWh, and further up since then (WWF, 2011). This high tariff deficit combines with high debt arrears and very high distribution losses at around 40% at the result of poor bill and grid management. Thus, EDL has been in virtual bankruptcy (EDL's deficit in 2010 at USD 2.2 billion) and faces fierce social conflicts.

Despite this large subsidy, the electricity system has been plagued by daily blackouts, forcing customers to use individual and private block diesel generators that involve much higher costs compared to a situation if the grid was functioning properly. Also this causes serious local pollution and safety risks. This also makes EdL highly vulnerable to oil price increases. The generalised energy subsidies need

[20] Four consumption blocks: 1-160 KWh/month: 32 Fils/kWh; 161-300 KWh/month: 71 Fils/kWh, 301-500 kWh/month: 85 Fils/kWh, over 500 kWh/month: 113 Fils/kWh.

to be reformed to better target the most in need and support the power sector reform as well as reduce the strain on public finances.

Syria

Confronted with increasingly high expenses for fuel subsidies (amplified by significant oil smuggling to neighbouring countries) and lower oil export revenues, leading to drain foreign exchange reserves, Syria started to reform its fuel subsidy scheme in 2008, following similar patterns as Jordan (Fattouh, 2012). In 2008 and 2009, diesel price was tripled and those of fuel oil, kerosene and gasoline by more than a third. At the same time, salaries in the public sector increased and a rationing coupon system set up (up to 1,000 litres of diesel per year and household at a subsidised price and heating oil allowances for public sector employees and pensioners). In 2009, targeted cash transfers based on household income and energy expenses replaced the coupon system. They were estimated to benefit to around half of the population and to be managed by a National Welfare Fund (with individual registers). However its creation and the scheme were halted in spring 2011 by the outbreak of political protests and the civil war since then.

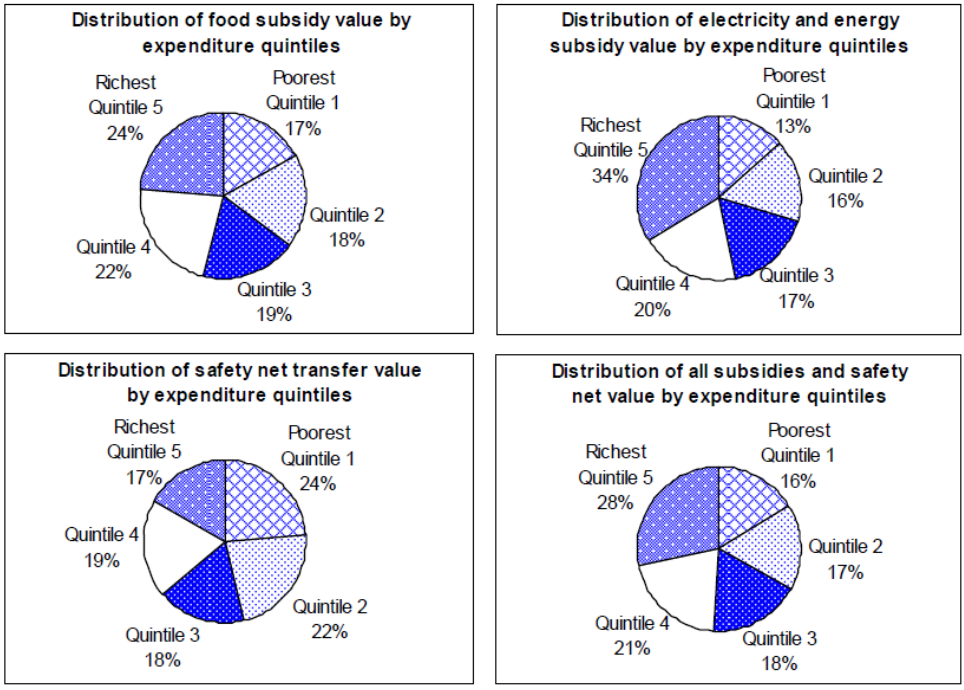
Iran

Until 2010, end-prices of fuels and natural gas in Iran were among the lowest in the world with diesel prices at a symbolic 3 USDc/l in 2009 (Egypt: 20 USDc/l, Tunisia: 84 USDc/l, Turkey: 163 USDc/l, Germany: 156 USDc/l) yet there was still a need to import (due to insufficient and inadequate oil refining capacities). This resulted in extremely heavy universal energy subsidies that reached USD 90 billion in 2010 or almost 30% of GDP. To ease this unbearable burden for the budget and adjust incentives the government decided to increase prices for petroleum products and compensate lower income earners with cash subsidies. In December 2010, energy prices were increased substantially: diesel by 1,000%, gasoline by 400%, natural gas by over 700% and electricity by over 300%. In one year this resulted in energy subsidies being halved to USD 60 billion (15% of GDP as of December 2011).

At the same time, the government introduced a general cash transfer scheme (including for children) that amounted to USD 30 billion. However, the devaluation that leads to accelerated inflation has reduced the purchasing power of this monthly cash amount: around USD 45 per person at the end of 2010 and only USD12 in September 2012 with the actual exchange rates. Also, industries and other customers received USD 10-15 billion notably to carry out energy-saving investments. Also, as a result of these changes inflation increased from 10% in 2010 to 14% in 2011 but below the previsions. Since then, international sanctions further increased inflation above 25% in 2012 as it resulted in uncertainty and supply disruptions through

the economy. However, the total cost of this mixed scheme (universal energy subsidies and cash transfer) appears to remain quite unchanged until the consumption pattern evolves to more rational levels.

Figure 4. Distribution of various subsidies by category of population revenues in Egypt (2004)



(Equal distribution of benefits provides 20 percent to each quintile)

Source: World Bank, 2005.

Comments: It appears that net importers SEMCs have fewer price distortions and better cost recovery for electricity. However, they face the challenge of how to keep financing subsidies when oil prices are high and investment is needed to respond to the rapidly growing demand for energy, particularly electricity.

Impacts: Although perceived as a major component of the SEMCs social safety nets for the poor (by enhancing access to commercial energy), universal energy price subsidies have proven largely inefficient at reducing energy poverty; they actually provide benefits to other private and public sector customers. In particular, universal subsidies to LPG, gasoline and diesel do not significantly help poor households but offer benefit to the largest and wealthiest consumers of those fuels. Subsidies impose a heavy burden on government finances (especially in Egypt and Leb-

anon) aggravated by the 2008/2011 oil price surge as well as by economic and demographic growth. They also create substantial distortions in the region's economies. This growing pressure on state budgets appears unsustainable, in particular in Egypt and Lebanon.

In SEMCs the fiscal burden of subsidies must be reduced to create more fiscal space for direct and targeted income support to the poor. Already, some governments, such as those in Jordan and Tunisia have progressively reduced the scope and level of price subsidies combined with EE&RE policies (e.g. Tunisian PROSOL: an effective solar water heater support scheme).

2.2. Energy Sector and Its Impact on Socio-Economic Development

While generally perceived as an important contribution to socio-economic development, the energy sector may also bring side effects and even generate a burden for the whole economy (curse effect).

2.2.1. Energy Sector's Socio-Economic Contributions

2.2.1.1 The Mechanisms at Play – an Overview

A first level of the economic impacts of the energy sector is to consider the various inputs and interactions with other sectors. The analysis based on input-output tables confirms that forward linkages of the energy sector (in particular electricity, and gas, bundled together with water supply) are particularly large in both OECD and non-OECD countries (Paczynski, 2012). A forward linkage can be interpreted as a measure of the extent to which a given sector supplies inputs used by other sectors down the value chain. The energy sector is also strongly interconnected –i.e. it is trading production inputs with many sectors, especially down the value chain. Energy-related investments can provide significant contribution to total investments. Employment effects of energy sector activity can be particularly significant through indirect channels - i.e. in other sectors cooperating or trading with the energy sector. Also, from a fiscal perspective, taxation of the energy sector is an important source of budget revenue.

Beyond those standard interactions, as the size of the energy sector is usually substantial, ranging from 2-3% to 10-15% of GDP[21] in large energy exporting economies and requiring advanced technology (e.g. efficient oil refining, electricity generation and transmission) its quantitative and qualitative spillovers are often significant. Thus, it may create a dependency and become a source of cyclicality (notably through energy investments).

The socio-economic impacts differ between sub-sectors and energy type. The centralised energy systems (e.g. oil and gas upstream and downstream, large-scale electricity generation) require sizeable up-front investment and highly qualified jobs in its design (R&D) and completion while then operation is less labour-intensive and does not require high skill level. The new and decentralised renewable energy systems (e.g. wind, PV, biomass and also energy efficiency) also require significant investment and R&D qualifications but more highly qualified jobs for the operation and maintenance. Various and converging studies have estimated that the EE&RE sectors create for each unit of energy supply between 5 to 7 more qualified jobs than the traditional energy sector and spread over the territories (EmployRES 2009; EREC and, 2009).

The combination of advanced technology and demand for skilled jobs stimulates development of the education and training systems. Also the R&D impacts on research are significant due to the size of budgets engaged and multiplicating effects. A side effect may be a 'brain drain' towards the energy sector, especially the exporting hydrocarbon sub-sector (that can afford higher salaries), at the expense of other sectors.

2.2.1.2 Situation in the southern and eastern Mediterranean countries

In the SEMCs region, the size and weight of the domestic energy sectors is generally significant as illustrated by Morocco and Algeria – see the box below. This substantial share of the sector is exacerbated by the high cost of equipment, mostly imported, the growing energy demand and the relatively low GDP per capita.

For instance, in **Morocco**, the energy sector (which mostly relies on energy imports) is the first industrial sector.[22] Its important weight in the nation's economy can be described by:

- Contribution to the GDP: 13%
- Tax revenues: 9% of total (2010)

[21] In the US, oil and natural gas supply 63% of domestic energy, for total sales in the range of USD 1 trillion, 4.4% of total added value and 6.6% of employment (PWC, 2008).
[22] 2007 and 2010 data.

- Investments: 9 billion dirhams (€ 0.8 billion)23
- Direct added-value (except induced activities): 27 billion dirhams of which electricity (57%) and refining (43%)
- Manpower employed: approximately 30,000/40,000 (3.5/4% of total)
- Main companies: ONE (electricity), AFRIQUIA(oil products) and TOTAL Maroc (oil products) that are ranked (based on total sales) as 4th, 6th and 8th largest country's companies, respectively
- Impact on transport and the port traffic: high (large imports of coal, oil and LPG)
- Impact on regional development: important (energy activities covering the whole national territory).

In Algeria, SONATRACH, the state-owned upstream oil and gas company, currently employs 120,000 staff (1.5% of total labour force), has an annual turnover of USD 57 billion (2010), invests annually USD16 billion, accounts for over 90% of country's exports and 76% of total tax revenues in 2006 (Bank of Algeria, 2008). In addition, it has a key impact on regional development. Its domination in Algeria's economy and exports makes the company a major player with great influence beyond the sector.

2.2.2. Energy Sector's Subsidies

2.2.2.1 The Mechanisms at Play – an Overview

As in the case of energy consumption subsidies, subsidies allocated to the energy sector intend to address market failures (support to development of nascent sectors/technologies such as natural gas and renewables), driven mainly by environmental and energy-security concerns. Energy producer subsidies generally aim to stimulate or support new investments within the energy chain (production to distribution) and thus alleviate the high up-front investment costs and associated risks. Subsidy schemes to energy producers can also aim to reduce barriers to market entry (high cost of modern power generation as gas combined cycle and RE). Subsidies to a particular energy source or technology aim to stimulate investment (also in R&D). Energy producer subsidies can also aim to protect employment when compensating economic losses. Subsidies can also combine various objectives simulta-

[23] Total increased significantly up to 2010 as only ONE annual investment amounted this year to 12.5 billion dirhams.

neously such as increase energy security, protect jobs and domestic energy industries, support regional development and reduce pollution. Energy producer subsidies support capacity and/or output according to the type of fuels or technologies.

'Take-off subsidy' to prepare working playing field for new technologies or energies appears necessary to attract initial investment and limit the associated risks, provided its conditions are fulfilled (including transparent scheme, cost effective with tax return, limited in time). Also, certain types of subsidies can effectively promote the development and use of less environmentally harmful technologies and fuels, such as energy efficiency and renewables (UNEP, 2008).

Globally, producer subsidies account for a smaller share of GDP than those to energy consumption, but their economic impacts can also be significant – either positively or negatively. In practice, subsidies to energy companies often go to large capital-intensive projects, such as hydropower dams, large-scale thermal power plants and oil refineries (UNEP, 2008). However, the combination of significant investment subsidies and high capital needs channelled for energy investments may generate internal and external unbalances. Primarily, this may divert long-term financial resources at the expense of other priority investment such as education and health. A World Bank report concluded that "subsidies to the large commercial businesses that dominate the energy sector or to industries that provide services mostly to better-off households" are not justified (Barnes and Halpern, 2000).

Subsidies to energy producers can harm economic efficiency in the following ways:

- Subsidies may isolate companies from competitive market pressures and thus reduce incentives to minimise costs and increase service quality, resulting in less investment in more efficient technology, insufficient maintenance and thus less energy- and economically-efficient systems;
- Direct subsidies (e.g. grants, tax exemptions, soft loans) without cap can drain public budgets, especially with high international prices, and generate windfall profits. This translates into lower tax collection and/or debt;
- Subsidies to specific energy technologies or fuels may affect the development and commercialisation of alternatives that might ultimately become more economically (as well as environmentally) attractive.

Subsidies (through soft loans, new transport networks) to some major facilities, such as hydropower dams usually displace communities at high social cost, although a greater access to electricity and water for irrigation can bring significant social benefits as well. Nevertheless, a global balance of costs and benefits is rarely undertaken during the feasibility and impact studies. Energy subsidies should encourage access to the modern energy sources, not to cover operating costs of companies and to capital intensive projects (World Resource Institute study, 2004).

2.2.2.2 Situation in the southern and eastern Mediterranean countries

The rapidly increasing energy consumption in SEMCs has clearly led governments to allocate growing resources to new supply capacities requested by energy companies. The administrated tariffs appear too low for companies to raise capital, turning to the state for subsidies and banks for concessional loans subsidised by the government and/or international donors. Also, the combined pressure of energy companies and equipment suppliers on relatively weak public administration prevents study of the economic viability of those investment plans and alternatives such as: i) demand-side measures which prove cheaper per unit of energy, more effective and durable; ii) local, small-scale labour-intensive energy facilities, such as biomass digesters, CHP and solar water heaters (SWH). IFIs have aggravated these distortions by providing loans to build new large and centralised facilities.

2.2.3. Energy Exports and Revenues: a Blessing or a Curse?

2.2.3.1 The Mechanisms at Play – an Overview

Commodity exports, in particular of hydrocarbons, can generate significant export revenues. Also, the oil market is global and liquid enough to enable oil exporters to find buyers and markets relatively easily (also depending on crude qualities). Crude oil and oil products make up around 14% of the world's commodity trade – much more than all other commodities. This high share is maintained despite the relatively low value added of oil, but is boosted by higher oil prices.[24]

For natural gas, initial exports by pipelines and long-term supply contracts restricted sales to selected markets. Since the 1990s, the spectacular development of LNG (using special tankers) and its growing share traded on the spot market (LNG tankers can supply a wide range of sea terminals) has brought it closer to a global market.

In absolute terms, the spectacular surge of revenues from oil and gas exports has further increased their share in trade balances and state budgets of oil and gas-rich countries. The oil and gas industries are considered as cornerstones of respective national economies as they ensure their export revenues, employment and technology development. Moreover, the prevailing views in the 1950s and 1960s, somehow

[24] In January 1999: around USD 10 a barrel, June 2008: a peak at USD 145, early 2012: above USD 100.

revived in the 1990s, is that increases of income per capita would lead to socio-economic improvements.

However, large hydrocarbon revenues have also proven to generate negative side effects in emerging economies that can hamper their growth. Oil and gas export revenues generate structural imbalances called as the resource curse, Dutch disease[25] or 'oil syndrome' (African Economic Research Consortium, 2007; Ross, 2010) including:

- *Revenues and debt:* the linear anticipation of future export revenues often creates the illusion of financial solidness and leads to the excessive use of sovereign debt (by government and state companies). High nominal oil revenues also create an illusion of wealth but the absence of macroeconomic framework and strategy and inter-sector interactions generally fails to generate a virtuous circle. This can lead to the political use of revenues for short-term and narrow objectives, e.g., increased employment in public administration, higher salaries in the public sector, the import of luxury goods and military hardware. At the same time, investments on infrastructure and structural development (e.g. education, health) lag behind the demand for them leading to various bottlenecks and distortions. Historical experience shows that increasing public spending without a strong development strategy does not lead per se to higher and sustained growth and effective socio-economic development, and thus to poverty reduction. On the other hand, fiscal expansion followed by reduction of oil revenues (as result of decline in oil prices) may lead to abrupt cyclicality that weakens poverty reduction policies.
- *Monetary imbalances:* the inflows of foreign currency revenues and subsequent appreciation of the national currency[26] harms the competitiveness of other exports (of low and intermediate technology levels). Also, excessive inflow of oil revenues pushes central banks to raise interest rates to curb inflation, but this discourages non-commodity sectors from investing. Large financial flows can also generate financial and real bubbles, in particular, real estate ones. Such financial imbalances are at the core of 'Dutch disease'.

[25] Following the Netherlands' large natural gas discoveries and exports in the early 1960's, wealth increased dramatically and raised the value of the Dutch currency by 30%. As a result, competitiveness, especially of the manufacturing sector dropped, inflation rose and unemployment shot up.

[26] Under a fixed exchange rate regime, the conversion of foreign currencies into local currency increases money supply and, consequently, leading to higher domestic prices and real appreciation of the national currency. Under the flexible exchange rate, real appreciation follows on from nominal appreciation.

- *Dependency and volatility:* the high share of hydrocarbons in total exports and fiscal revenues creates a structural dependency, which prevents diversification and creates structural imbalances that are aggravated by commodity price cycles.
- *Financial management and investment:* in a rent-seeking economy, the capacity to manage exploitation of resources in a timely manner and spend resource-related revenues in a productive way is a serious political challenge. High and potentially unsustainable revenue flows (as not linked to a domestic productive sector) need to be channelled, notably to avoid financial and real bubbles and the potential ravages of Dutch disease. Imported inflation and speculation on rare goods and services increase domestic prices and even create rationing that harm other business competitiveness and household revenues. A country may either accumulate more foreign reserves (often in the form of long-term 'oil funds'), or increase spending. If the decision is to spend, is it better in consumption or investment? Empirical evidence suggests that in most cases resource rents fail to reach domestic sectors and generate balanced and sustained growth. This is also due to limited sectoral synergies: oil rents do not easily spread to domestic manufacturing industries.
- *Trade imbalances:* a trade surplus hides a structural imbalance as hydrocarbon export countries sell low value-added raw materials but import advanced technology equipment, consuming goods and services. Thus, the terms of trade are clearly unfavourable and deteriorate over time. Domestically, the low oil and gas added value combines generally with low employment (skilled jobs being filled in by foreign expatriates) and limited technology transfers. Also, oil and gas prices are fixed on international markets under the influence of powerful integrated oil oligopolies the 'majors' or 'Seven Sisters' – that initially controlled most of world hydrocarbon supplies and subject to financial interests and speculation. Oil prices are therefore not transparent; they are also highly volatile, a situation exacerbated by the currency volatility (USD, EUR) prompted by hidden devaluations. Furthermore, most of the added value along the oil supply chain is realised downstream (cf. OPEC ratios on the oil value share). This also relates to frequent abuses of terms of exploitation of resources and sharing revenues and tax contributions by oil companies (e.g., using offshore tax heavens to reduce taxes in exporting and importing countries). This role of international oil companies may explain part of these imbalances. But, if the big companies were mainly to blame for the oil syndrome, then nationalisation should have cleared this issue. However, the 1970s nationalisation by various oil countries actually made the problems worse.

- *Governance:* another challenge is related to transparency in public governance and revenue management in the context of government secrecy in respect to oil revenues. The Revenue Management for Extractive Industries (EIR, World Bank led-initiative) (EIR, 2003) identifies 11 obstacles to adequate governance: "1) lack of participatory democracy; 2) corruption, lack of transparency and accountability; 3) excessive military and security expenditure; 4) lack of capacity for long-term planning and monitoring; 5) insensitivity to in-country context; 6) lack of good fiscal and macro framework, poor revenue management; 7) lack of community access to benefits; 8) foreign investment dominance and lack of local domestic enterprises; 9) weak legal system; 10) insufficient technical capability; and 11) poor communication capacity and resources". Almost all oil export countries share weak institutions and low governance indicators. For instance, African oil exporters are characterised by weak rule of law, malfunctioning bureaucracy and a democracy deficit, with a negative impact on the economy. Also, poor corporate governance in state-owned energy companies is detrimental to their performance. They often interfere in public policies and decisions, owing to their economic and political weight.

Overall, the combination of those negative economic, financial, governance, social and environmental effects has been experienced by almost all commodity exporters and led to a paradoxical reduction of the GDP per capita over time. Among 65 countries with large natural resources, only four (Botswana, Indonesia, Malaysia and Thailand) managed to reach both: (a) long-term investment exceeding 25% of GDP on average from 1970 to 1998 and (b) per capita GDP average annual growth above 4% over the same period. As an illustration, the Organization of Petroleum Exporting Countries (OPEC) as a whole experienced a negative rate of GDP per capita growth (Gylfason, 2001; Nili, 2003) over a similar period. Among its members, Venezuela ranked among the ten richest nations at the beginning of the 19thcentury and then as a wealthy country during the 1970s. However, despite its important oil exports, it is downgraded to the level of a middle-income country (GDP per capita: 65thout of 184, 2010). Similarly, Nigeria's GDP per capita of USD400 is far below the low-income countries' average, despite USD300 billion of oil revenues for over 25 years.

Furthermore, according to UNDP Human Development Index, the living standards in most oil and gas producers (Nigeria ranked 156th out of 187 and Venezuela ranked 73th) (UNDP, 2010) are similar or lower as the poorest countries of sub-Saharan Africa. These findings indicate that large oil revenues do not necessarily lead to economic growth and development but, on the contrary, to sub-development.

Overall, rent-seeking strategies appear detrimental to economic growth and lock economies and public budgets into dependency on a single sector and one commodity market (Ross, 2010). This is the so-called 'paradox of plenty' where natural resources fail to generate sustainable benefits and, on the contrary, lock economies into vicious circles and create various economic, financial, social and environmental distortions.

These structural and complex issues are generally imbricated and thus difficult to address separately without a global and sustained politically supported reform plan. They require ambitious policies for hydrocarbon export economies to create the conditions of sustained and balanced growth (see Part 3 below).

2.2.3.2 Situation in the southern and eastern Mediterranean countries

The SEMCs economies that rely extensively on hydrocarbon exports (Algeria, Libya and, to certain extent, Egypt) also face the oil curse effect. Their poverty is widespread and economic growth slow, despite an abundance of extractive resources. An illustrative case of the oil syndrome/paradox is **Algeria** (see box below).

Box 3.Oil paradox in Algeria

According to various studies (e.g. Benabdellah, 2010), the Algerian economy presents all the symptoms of oil syndrome and of the Dutch disease, but not its main mechanisms. It indeed presents a sectoral characteristic[27] of the oil syndrome:

- A vigorous growth of the hydrocarbon sector, which mobilised investments worth of USD 21 billion between 2000 and 2005 and then USD 32 billion between 2005 and 2009 (or 20% and 22% of the GDP, respectively) and accounts for 97% of total exports;
- A strong growth of the service sector, in particular public works (thanks to large public investment programmes) and commercial services (both with relatively low labour-intensity);
- A decline of the industrial manufacturing;
- A structural inflation and speculative bubbles;
- Hydrocarbons account for almost 50% of GDP and public spending represents above two-thirds of GDP.

The economy tends towards the oil syndrome, however, without the transmission channels of the Dutch disease. Indeed, the oil boom in Algeria that occurred since 1999 did not

[27] For more details and extensive analysis and data, see MEDPRO Technical Report No. 7 "Algeria's failed transitions to a sustainable polity: Coming to yet another crossroads", Hakim Darbouche, 2011.

overvalue the national currency. The real effective exchange rate (REER), the main transmission channel of the Dutch disease depreciated by approximately 20% since 2000.

This is because the Bank of Algeria sterilises part of international reserves by recycling them on the international financial markets[28]. Stabilisation of the REER constitutes a key objective of country's economic policy. As result, the Bank of Algeria has accumulated USD 170 billion of international reserves in 2011; an amount equal to the country's GDP. Depreciation of the dinar (with the market rate up to 40% lower than the official rate) is also a result of the relatively poor economic performance of Algeria, its economic and political uncertainties and high spontaneous dollarisation. Furthermore, Algeria suffers from capital flight, which was estimated by the Global Finances Integrity (GFI)[29] to be at least USD 26 billion over the period 1970-2008.

Actually, Algeria's macro-economic performance (GDP annual average growth of 3.7% and real GDP per head increase by 22% over 2000-2009, annual inflation at 4-5%) –, a spectacular reduction of the sovereign debt (repayment of USD 25 billion) and) is not reflected in the standard of living and the access of most of the population to basic services (education, health, housing and even energy, in particular electricity subjected to chronic cuts) and to employment (even if official unemployment rate decreased from around 30% in early 2000s to 10% but it is estimated to be at least 15% and is chronic for youth labour force (30%), in particular, young graduates (40%) with a high share of temporary and precarious jobs. In fact, approximately one Algerian in four lives below the poverty line and the rate of illiteracy exceeds 22%, whereas inequality of income has increased (20% of the population holds over 50% of the total wealth). Actually, Algeria ranks 94th in the UNDP Human Development Index (2010).

Furthermore, according to GFI (2011), Algeria faces various governance problems, including leaking of oil revenues to financial offshore centres, overspending in security and defence and lack of budgetary transparency and accountability. Using the hydrocarbon revenue, in 2001 the government launched a large public investment programme (2001-2009: USD 200 billion and 2010–14: over USD280 billion) focused on infrastructure and access to public services (housing, water, education, energy and health). Nevertheless, "while the transformative impact of these efforts on the economy has been palpable, their effect on the long-term prospects for growth and sustainability is less certain" (MEDPRO/Darbouche H., 2011). The public investment programmes appear not yet integrated in a long-term economic development strategy, in particular to diversify the economy and reduce its dependence and vulnerability on a single sector and commodity market. Therefore, "the risk of being thrown back into a severe socio-economic crisis is as real today as it was 25 years ago, when a prolonged period of depressed oil prices had dramatic consequences for Algeria" (MEDPRO /Darbouche, 2011).

[28] Algeria also established an oil fund, the Arab Oil Fund that was administered by the African Development Bank until its funds were fully disbursed.

[29] According to GFI (GFI, 2011), the capital flight from Africa amounted to USD 854 billion between 1970 and 2008, or four times the total amount of foreign debt of the continent In case of Egypt it amounted to USD 70.5 billion, in Libya - to USD 43 billion, in Morocco - to USD 25 billion, in Tunisia - 16 billion USD and in Syria - 23 billion USD.

3. Scenario and Policy Approach for Integrated Socio-Economic Development and Energy/ Climate Policies in SEMCs

Based on historical analysis, international experience and best practices, SEMCs need to take a global and cross-sectoral view. Their public policies must address current deep and accumulating socio-economic difficulties and negative vicious interactions between socio-economic processes and energy, and be well structured and systemic to overcome such challenges. An integrated approach to the SEMCs energy sector should rely on two main pillars: i) socio-economic reforms; ii) integrated energy policy.

3.1. Socio-Economic Reforms to Build the Fundamentals

To overcome existing problems and distortions such as an excessive energy burden, massive subsidies or the oil syndrome, SEMCs need to undertake **thorough and sustained socio-economic reforms, backed by solid strategies**. Those strategies would need to be supported and incorporated into laws, regulations, and contractual obligations to structure and articulate the reform process. Such reforms would first need to build a solid socio-economic framework that has proved essential in other regions (Central Europe and the Baltic States in the 1990s) and Tunisia and Jordan, which are among the most advanced countries in the southern Mediterranean region. The reform priorities should include:

1. Building strong institutional national capacities (in expertise and adequate staff numbers) within a robust set-up (national economic and social ministries and their agencies, including a statistical office). Coordination between SEMCs' national institutions, but also with regional and local institutions, is crucial.

2. Developing a solid socio-economic statistical system (including database and indicators) and economic tools (e.g. projections and forecast) in line with international standards (Eurostat and UN) to form a transversal and multi-sectoral information system (including 'dash board' indicators) to assist SEMCs policy design, evaluation and investment decisions.
3. Designing, implementing and monitoring multi-sectoral development strategy with medium to long-term vision. The strategy priorities (notably, poverty reduction and infrastructure development)should need to be based on a detailed diagnostic, allowing identifying global and sectoral priorities (in particular promising sectors as those related to the 'green' economy)[30], qualitative and quantitative objectives (with related indicators), timetable and clear responsibilities of implementation. The design and evaluation process would also include an open and true dialogue and consultation with key stakeholders and civil society (think tanks and NGOs) to ensure ownership and feedback on the strategy. Such national development strategy would serve as the reference for all socio-economic public policies. It would also need to be regularly monitored and evaluated.
4. Improved governance: Comprehensive national strategies backed by strong political will and capacity building can become powerful tools to enhance both SEMCs' public administration as well as corporate governance of state companies. For both entities, the objectives include ensuring accountability to political/public authorities and the public/clients. The adoption and introduction of clear standards and procedures would reinforce management capacities and social dialogue. Independent evaluations would regularly assess progress and fields for improvements. Also, the enforcement of the rule of law by an independent judiciary appears as a cornerstone reform in this process. Specific anti-bribery action plans can complement the approach on this key item.
5. Oil revenue management. The hydrocarbon exports generate substantial risks and imbalances that need to be managed and mitigated by SEMCs' governments. Besides, economic policies would need to ensure that their benefits contribute to the sustainable development of the human, social and physical capital.

[30] Jordan and Morocco already adopted green economy strategies: "Towards a Green Economy in Jordan", http://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=678&menu=35; "Mobilisation pour unecroissanceverte au Maroc", (www.mem.gov.ma/publucations/mobilisationourunecroissanceverte.pdf, www.unep.org/ greeneconomy/Portals/88/documents/advisory_services/countries/Morocco%20final.pdf).

The management of oil revenues would need to combine strict governance standards and macro-economic tools in line with multi-**sectoral socio-economic development strategy.** To improve the oil revenue management and enhance population welfare and quality of life the following actions are critical:

- Ensure transparency of oil revenues and their disposition; this includes lifting governmental secrecy on the revenues (possibly using the support of technical assistance and experience of other countries subscribing to the Extractive Industries Transparency Initiative-EITI). An independent oil fund has proven to be an effective tool to manage oil revenues and ensure that their allocation corresponds to the decisions that are open to public disclosure.
- Based on the economic development strategy, and in consultation with principal stakeholders, clear and flexible rules should guide allocation of oil revenues. The main short-term objective would aim to prevent the Dutch disease thanks to respective monetary and fiscal policies (following the experience of Algeria). In the medium- to long-term, oil revenues should support economic diversification, investments in public services (education, health), R&D, public infrastructure (telecom, transport, energy) and poverty reduction. Such investments should generate positive effects, in particular, increasing competitiveness of the entire economy.
- The challenge is both to reduce corruption and rent-seeking activities, to enable oil rents support economic growth and social development through productive investment. Also, it could help to progressively move away from a strong dependence on non-renewable, low-added value and volatile resources to a more diversified and competitive industrial model.

A good practice was developed by Chile, which has addressed the key challenge of managing large revenue inflows following commodity windfalls (copper prices in the late 1980s, early 1990s and since 2008). In particular, the government imposed a tax on 'hot' money inflows ('encaje' mechanism) while welcoming longer-term diversification of investment, promoted by a strong national economic development strategy.

6. Poverty reduction strategy- the reforms of commodity subsidies. Maintaining the current energy subsidy systems in the SEMCs seems fiscally and economically unsustainable, especially after the increase of international commodity prices in recent years. In addition, they appear largely inefficient at reducing

poverty. Thus, in oil exporting and importing countries, the effective reduction of poverty depends on adoption of comprehensive national poverty reduction strategies. Nonetheless, experiences in the region indicate that the social consequences of the subsidy reforms can have far-reaching political implications, for example, public unrest. Thus, policy-makers need to take into account both economic and social constraints (including transaction costs) and the potential political consequences.

Based on detailed data collection and qualitative poverty assessment on a broad range of items, specific tools such as social cost-benefit analysis (SCBA) can evaluate the impacts of various subsidies (and alternatives) on social welfare and their effectiveness. Such diagnostic serves to identify priorities and develop direct and individual poverty reduction schemes based on reliable database of poor households.

Direct support, in the form of direct income transfers and lifeline tariffs (special low rates for small and poor users) for water, electricity and gas (instead of individualised vouchers)[31] can individually support the neediest SEMCs customers for selected products (food, energy). The effectiveness of lifeline tariffs[32] depends on the targeted population being connected to the distribution networks and the possibility to collect data on each household's consumption.

As outlined by various studies and best practices, direct support has proved to be more effective at reducing the loss in real income due to higher commodity prices than universal price subsidies and cross-subsidies. Besides, such well-targeted direct safety nets are more cost-effective, thus reducing the burden on government finances (it also becomes possible to increase the level of support to poorer households while reducing the global envelope) and have more durable effects. Its monitoring and evaluation are also easier. They have also the advantage of involving in persona the households, enhancing the ownership and establishing a channel of information and advice on related topics (education, health). It means that social policy moves from primary reliance on in-kind subsidies to cash transfers, provided that governance is improved to avoid misuses.

[31] Vouchers provide insufficient price signal to customers and, thus reduce incentives (such as to save energy and use it more efficiently).

[32] The example of Cape Town (South Africa): below 450 kWh of electricity per month, the first 50 kWh are free of charge, a social tariff applies for the next100 kWhand above 150 and then 350 kWh the tariff successively increase by 32% (www.scenicsouth.co.za/2011/07/city-of-cape-town-electricity-tariff-structure-1-july-2011/).

Such safety nets require an extensive data collection notably to develop a reliable database of poor households and individual administrative follow-up that may be carried out by a specific public agency (Jordan National Aid Fund) and /or local recognised NGOs. For energy support, short-term support can also be complemented by structural measures such as basic energy efficiency (e.g. flat insulation, low consumption Class A appliances) that reduce at source the level of consumption (with rapid payback at market prices) and thus the cash subsidy. In parallel, a progressive and scheduled phasing out of the inefficient universal price subsidies and cross-subsidies complements the subsidy reform. It could have direct positive economic effects, particularly if it significantly reduces economic distortions with market price signals and budget deficits. A global IMF study backed by country experiences (e.g. Jordan) concluded that keeping energy prices liberalised is a robust approach to prevent a resurgence of universal subsidies (IMF, 2011).

Overall, balanced reformed subsidy schemes should be:

- Soundly based: direct subsidies should be justified by a thorough study of the associated costs and benefits. Also, they should not conflict with other instruments and goals;
- Well-targeted: direct support should be directed and limited to a clearly defined group within the most vulnerable on an individual basis;
- Practical: the overall amount of a subsidy should be affordable for the state budget and the administrative cost transparent and reasonable;
- Transparent: information on the total subsidy funds and target groups should be disclosed;
- Limited in time with regular evaluations to avoid consumers and producers becoming overly dependent on this support, to limit opportunist behaviours and avoid costs spiralling out of control.

Direct income support has proved to be more effective than universal price subsidies and cross-subsidies. Besides, well-targeted direct safety nets are less costly and easier to evaluate. The reform in Jordan proved it can be both feasible and effective. However, the current political turmoil in the region makes it politically and socially difficult to pursue such reforms. For example, the government of Jordan decided to return to the subsidisation of fuel prices in 2011.

3.2. Integrated Energy/Climate Policy

The integrated energy policy in SEMCs should include at least two components:

1. National energy strategy
    - Each SEMCs would benefit from a comprehensive and long-term national energy strategy remaining in synergy with other public policies (climate, transport, regional, social, etc.) and coherence with other countries' strategies.
    - The strategy may rely on at least three pillars(WWF, 2010; IEA, 2008):
        - Energy security and access: there is significant potential to diversify fuels, sources and suppliers; put in place emergency crisis management (combination of contingency plans and oil stocks); finalise rural electrification and promote sustainable biomass; increase access to energy services for the poor, notably through social tariffs for electricity and LPG (when relevant) for poor households combined with an incentive scheme for A or A+ class energy equipment and basic insulation of buildings.
        - Structural and regulatory reforms: within a clear, effective and stable legislative and regulatory energy framework, independent regulators should progressively set tariffs based on cost-recovery level, in parallel with the improvement in security and quality of supply. Anyhow, phasing out of universal price subsidies and cross-subsidies would need to be gradual with clear time horizons (e.g. annual 5% price adjustment over a 5-10 years period) and complemented by an individual support system combining lifeline/social tariffs and targeted subsidies to the poorest parts of the population. The pricing policy should aim to both enable the poor to access energy services (with eventual individual support) and have energy tariffs that reflect its real costs (including investment and maintenance, and progressively, externalities, for example, health and environmental expenses).
        - Energy sector restructuring: SEMCs' governments face the challenge of improving corporate governance in energy monopolies and their accountability to public authorities and clients, move natural monopoly functions to special state-owned entities (e.g. transmission system operator (TSO) owning and operating the

electric and gas grids) and lift technical barriers (e.g. national grid bottlenecks to connect planned RE capacity and interconnections).

- A crucial reform relates to separating the function of public policy from regulation and policy enforcement, and management of the public energy sector. This would limit conflicts of interest and political interference in energy sector operations.
- Developing a reliable statistical system on energy (in particular, energy balances, price database and indicators as developed within MEDSTAT) and economic tools (e.g. demand forecast, least-cost plan) in line with international standards and in synergy with a national data system.

Once those crucial reforms are in place, sustainable energy policies can develop, as in Tunisia since the mid-1980s. Indeed, with a more balanced regulatory framework and cost-recovery prices, energy efficiency and renewable energy can become more attractive for private and public investment.

2. Sustainable energy policy

Better energy efficiency (EE) in combination with an increased use of renewable energy (RE) sources can remove some of the structural barriers of the SEMCs' energy sectors and move away from excessive dependence on fossil fuels and diversify supply.

The first priority in the SEMCs is to enhance the **efficient use of energy,** which offers large and affordable potential (cf. MEDPRO paper MEDPRO/Blanc F., 2012). Along the energy chain, the efficiency of energy supply and use can be improved by about 30% as demonstrated by comprehensive studies carried out in Tunisia (ANME, 2006; Plan Bleu, 2007) and the average performance of industrialised countries. This can be achieved by using the most efficient technologies already available. They are less expensive per unit of energy than increasing energy supply, environmental impact notwithstanding. Energy efficiency is a cost-effective tool to reduce high energy intensities and waste, and thus consumer energy bills. It also helps to control energy demand; demand and supply of energy needs to be better integrated to better satisfy customer needs (not only supplier interests).

Furthermore, EE&RE generate more and higher skilled jobs than fossil and nuclear energy (EmployRES 2009; EREC and, 2009). Decentralisation of energy sources offers economic benefits and increases security of supply as well as reduces investment in large transmission capacities.

Based on disaggregated sectoral data on energy consumption, the strategy could identify energy saving potential by sector/sub-sector and rank them by priority (by cost and saving potential) and then propose concrete measures (behavioural changes and investments).

These measures and associated targets need to be packaged in detailed national sustainable energy (EE&RE) action plans. The smart design and effective implementation of these plans depends on the strength of public institutions (energy ministries and agencies) and their human capacity.

Improved energy end-use efficiency and increased use of renewable sources of energy can ease energy demand and supply tensions and contribute to economic and social development. To stimulate better use of energy and of renewable energy (in particular solar technologies) a key measure is to set a clear and stable regulatory framework, including transparent permits procedures, non-discriminatory and open grid access and effective RE support schemes.

Sustainable energy policy is naturally interlinked with the environmental policy, in particular with mitigation of air water and soil pollution and emissions of greenhouse gases (GHG). In addition, carbon financing (CDM) can play a role in the co-financing of EE&RE investment projects (generally up to 10% of total costs).

3.3. Regional Energy Cooperation: Initiatives and Challenges

While national reforms and integrated energy strategies are essential to overcome SEMCs' difficulties, they are not sufficient to tackle international and cross-border issues, e.g. bilateral and regional electricity and gas interconnections.

Thus, both intra-Med and EU-MED energy cooperation appears crucial to build regional/sub-regional infrastructure (e.g. power and gas interconnections within the Maghreb and with the EU) and market (e.g. Maghreb electricity market). Both joint infrastructure and regional markets can offer:

- Economies of scale on investment and serving a large regional market;
- Higher security of supply (through interconnections);

- Access to the least costly and most diversified supplies as well as export markets, in particular the potential to export renewable electricity to the EU (as per the EU Renewable Directive) [33]

Plans and ambitions of the MSP

The Mediterranean Solar Plan (MSP) launched in 2008 within the Union for the Mediterranean (UfM) has the objective to foster and catalyse both EU and SEM efforts. Indeed, the highly ambitious investment under the MSP initiative aims to introduce 20 GW generation capacity from renewable energy by 2020. It aims to act as a catalyst for reforms and joint EU and SEMCs' investment. It is backed by two other major pan-regional initiatives:

- Medgrid (ex-TRANSGREEN) made up of major TSOs and utilities[34] with ambitions to develop regional electric interconnection lines, in particular to export renewable electricity from the south to the north of the Mediterranean.
- DESERTEC, a strong private-led investment initiative, bringing together large multinational energy groups[35] and aiming to build a network of renewable electricity projects in MPCs (in the range of 20 GW for an estimated total investment of €30 billion, and up to 80billion with infrastructure costs)[36], mostly solar electricity projects for the EU electricity markets. DESERTEC already signed framework agreements with Tunisia[37] and Algeria.

In May 2012 in Rome (Italy), the Electricity Transmission System Operators of the northern and southern rims of the region established Med-TSO, a cooperation platform of Mediterranean transmission system operators. Med-TSO's main objectives are to "coordinating the development plans and the operation of the grids in MED-TSO countries, encouraging the integration of their electricity systems and

[33] The Directive 2009/18/EC (Art. 9) provides the possibility to import significant volumes of renewable electricity (REL) from third countries in the coming decade. It enables EU Member States (MS) to import renewable electricity from outside the EU and to incorporate it into their RE target for 2020, something that remains challenging for several MS).

[34]Abengoa, AFD, Alstom, Areva, AtosOrigin, CDC infrastructure, EDF, Nexans, Prysmian, RED Eléctrica de España, RTE, Siemens, Taqa Arabia-(*www.medgrid-psm.com).*

[35] Including Munich Re, Deutsche Bank, Siemens, ABB, E.ON, RWE, Abengoa Solar, Cevital, HSH Nordbank, M & W Zander Holding, MAN Solar Millennium, and Schott Solar (*www.desertec.org).*

[36] Other estimates at the 2050 horizon indicate € 400 billion- (http://en.wikipedia.org/wiki/Desertec#cite_note-epoch-10).

[37] Pre-feasibility studies for pilot projects worth 500 MW: 250 MW CSP plants, 125 MW photovoltaic and 125 MW wind.

the implementation of common criteria and harmonised, transparent and non-discriminatory rules of access to and usage of grids". [38]

Towards a more integrated and balanced MSP and EuroMed energy cooperation

The MSP, by putting high political priority on sustainable energy and setting ambitious targets to 2020, has already proved useful to generate broad policy discussions and new initiatives. Its focused and transversal approach, with political support, has the potential to further advance the reform agenda[39], something that is needed in most MPCs to make effective large EE&RE investment.

Nevertheless, the MSP's advancement has been slow up to now (as of October 2010 only 0.2 GW are effectively under implementation or 1%)[40], as investing in large RE electricity projects in this region remains complex and risky for investors. Even if its full, MSP contribution would be marginal (5% of total capacity and even less of electricity consumption, impelled by a rapid and hard-to control energy increase)[41]. This is also much less than the large planned coal and gas power plant projects (almost 20 GW after +64 GW for the period 2000-2005) that are expected to reach 240 GW by 2020 (multiplied by 3.5 over 2005 to 2020), or two-thirds of the total at this horizon.[42] Also, the MSP targets mostly electricity despite the large solar water heater and biomass (as biogas, agriculture waste) potential and does not fully include Turkey, despite its large wind and solar potential.

The projected interconnections by Medgrid between SEMCs and between the two shores of the Mediterranean should be designed and used to effectively exchange renewable electricity, *not* to import poorly-regulated fossil and nuclear power generation (e.g. coal and gas power plants in Tunisia and Morocco planned by some EU utilities to use future 'green' electric interconnections to export to Spain and Italy), furthermore outside the EU emissions trading scheme (ETS). Apart from destabilising partner energy systems, this will create unfair competition (even dumping) for EU renewable and fossil electricity producers. Also, it appears crucial

[38] See (http://setis.ec.europa.eu/newsroom-items-folder/european-commissions-launches-med-tso-to-boost-mediterranean-electricity-systems-2).

[39] "Heliosthana, a Mediterranean sustainable energy country"; WWF/HBF; May 2010; 'EuroMed Energy Cooperation & the Mediterranean Solar Plan: A unique opportunity for a fresh start in a new era?" Bergasse E.; CIDOB, Barcelona, July 2011.

[40] "Study on the Financing of Renewable Energy Investment in the Southern and Eastern Mediterranean Region", FEMIP/EIB; October 2010.

[41] In the context of weak or non-fully operational EE policies and institutions.

[42] OME, 2008 and MEDPRO WP 4b indicate a lower increase of total capacity at 200 GW by 2020 with a higher share of renewables (26%, of which 14% for hydropower and 12% for other renewables (wind accounting for almost 8%).

to ensure a fair playing field between investors and between SEMCs, minimum coordination between DESERTEC and Medgrid, and convergence within the MSP.

Thus, the forthcoming Master Plan of the MSP (to be adopted by early 2013), within the EuroMed energy cooperation (and its current and future regional action plan) would benefit from introducing various changes:

- Revising its quantitative objectives by:
  - Taking into account Turkey's EE&RE potential (estimated at 23 GW, only for wind);
  - Incorporating heat (solar thermal) and biomass (biogas, agriculture waste) into RE potential;
  - Revise the '20 GW' objective in terms of available renewable electricity (in GWh) which can be delivered to the grid;
  - Expressing the energy efficiency objective in negaWatts (in nGW) and saved electricity (in nGWh);
  - Setting post-2020 renewable energy and negaWatts targets.
- Amending the solar plans with clear and detailed implementation timetable backed by robust market reforms to progressively reach market fundamentals.
- Giving a priority to EE (in particular standards and labels) the most effective and cost-effective tool to control energy demand and satisfy needs with RE.
- Adding an action plan for rehabilitation and modernisation of national grids and interconnections (they are largely outdated and weak while RE requires strong grid capacity and reactivity).
- Better use of MPC expertise on EE&RE; propagate regional and national best practices.
- Reinforcing regional cooperation on energy statistics within MEDSTAT43 (the EuropeAid regional capacity building programme on statistics) especially on data collection, energy balances and indicators, according to Eurostat and IEA standards.
- Promoting regional partnership on related R&D, academic activity and manufacturing.

The forthcoming Master Plan of the MSP should be widely discussed with all stakeholders and endorsed by the EU and MPCs to become a cornerstone of the EuroMed energy cooperation within the EU energy external policy.[44] On the implementation and institutional side, the MSP should clearly articulate responsibilities,

[43] See (http://epp.eurostat.ec.europa.eu/portal/page/portal/medstat/introduction/).
[44] See (http://eeas.europa.eu/energy/index_en.htm).

in particular, between the UfM Secretariat, EC (headquarters and EU Delegations), ENPI projects, especially the *Paving the Way for the MSP* EuropeAid project, MPC governments and regional centres such as the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE[45]), the regional focal reference for EE&RE deployment as well as MEDENER, the Mediterranean network of EE&RE agencies (www.medener.net). In addition, interactions with industry/investors (DESERTEC, Medgrid) and civil society would help to enhance the regional ownership of the initiative.

The need for integrated regional financing

Undoubtedly, the implementation of the envisaged investment projects within the MSP, DESERTEC and Medgrid, once regulatory and market conditions are met, will also heavily depend on the **financing.**

- Up to now, the financing of RE investments in MPCs by private banks (EU and PC) has remained limited (e.g. Tunisia's solar water-heater PROSOL programme. [46] International Financial Institutions (IFIs) provide most of the financing. Since May 2011, the EBRD has extended its coverage to North Africa with high ambitions (a potential annual investment of €2.5 billion)[47].The World Bank with the Clean Technological Fund (CTF)is also engaged in the region mostly in financing of RE. However, the EU remains the largest contributor, through various channels[48]:
    - The European Investment Bank (EIB): its loans, which target large projects (minimum of €20/25 million), are provided through a specific tool of the Facility for Euro-Mediterranean Investment and Partnership (FEMIP)[49], credit lines to local banks and project investors (Special FEMIP Envelope). Out of a total of almost €10 billion of FEMIP loans

[45] The Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) gathers nine South Arab countries plus Libya and Yemen; (www.rcreee.org) and was established in 2008 in Cairo at the initiative of the Danish and German cooperation agencies, and then with EC support. Staffed by a joint EU and MED expert team, RCREEE has developed a broad and strategic set of activities on EE&RE policy deployment in coordination with ENPI South energy projects (MED-EMIP, MEDENEC and PWMSP).

[46] www.unep.org/climatechange/finance/LoanProgrammes/MEDREP/PROSOLinTunisia/tabid/29559/Default.aspx.

[47] As decided by the EBRD Annual Meeting in Kazakhstan on 20-21 May 2011: (www.ebrd.com/pages/news/press/2011/110527.shtml. Current EBRD investments in Eastern Europe and Central Asia stand at around €9billion per year).

[48] Also the GEEREF (Global Energy Efficiency and Renewable Energy Fund) focuses on equity investment in EE&RE projects but does not cover the Mediterranean region yet.

[49] See (www.eib.org/projects/regions/med/index.htm?lang=en).

for the period 2002-2009, the energy sector accounted for 37%, of which only €130million (1.3%) for renewable energy;

- InfraMed Infrastructure:[50] the first financing facility of the Union for the Mediterranean (UfM). The InfraMed Fund is dedicated to investments in infrastructure in the SEMCs with initial commitments of €385 million to be raised to €1 billion (energy is expected to be a priority sector);
- EU member states' bilateral financing: several national development agencies such as the German Development Bank (KfW) and the French Development Agency (AFD) provide grants and concessional loans to specific projects (e.g. German and Spanish loans to wind farms in Egypt);
- The Mediterranean Carbon Fund (MCF): CDC Climat, AFD, PROPARCO, the European Investment Bank (EIB), CDP and KfW plan to launch in 2011 the MCF, which will purchase carbon emission reduction credits with initial commitments of €200 million.

Overall, the EU's existing financing scheme for EE&RE in the region is diverse but it appears rather fragmented (e.g. between EIB's FEMIP and EC's NIF), not sufficiently energy-specific, and mostly designed for large projects (e.g. EIB: only over €20/25 million), thus excluding a vast potential of small and medium projects, notably developed by SMEs.

The EU plans to increase the total envelope of EIB loans for the region to €6 billion between 2011 and 2013 (2010: €2.6 billion). This scale of effort provides a real opportunity to establish a dedicated joint regional development bank (possibly named "EuroMed Bank", an EIB extension and following the EBRD model). It would need close coordination with other financial regional and bilateral initiatives such as the InfraMed Infrastructure. Also, a specific SEMCs' bank would need to design an integrated financing scheme, both for large and small sustainable projects (e.g. EE&RE revolving funds) based on overall costs-benefits analysis.

[50] Created in 2010 by Caisse des Dépôts (CDC-France), CassaDepositi e Prestiti (CDP-Italy), the European Investment Bank (EIB), Caisse de Dépôt et de Gestion (CDG-Morocco) and EFG Hermes (Egypt).

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Annex 1. SEMCs Household Electricity Prices (2008)

Figure A1. Average electricity tariffs for households in 2008

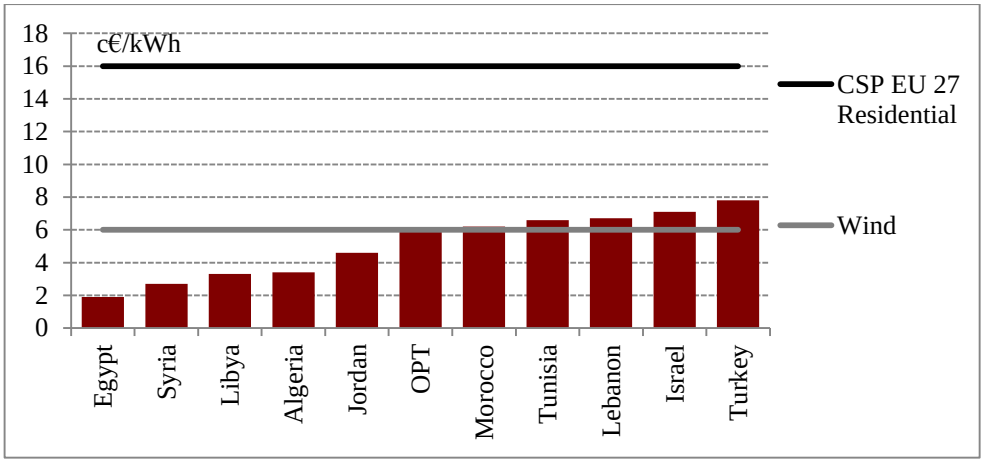
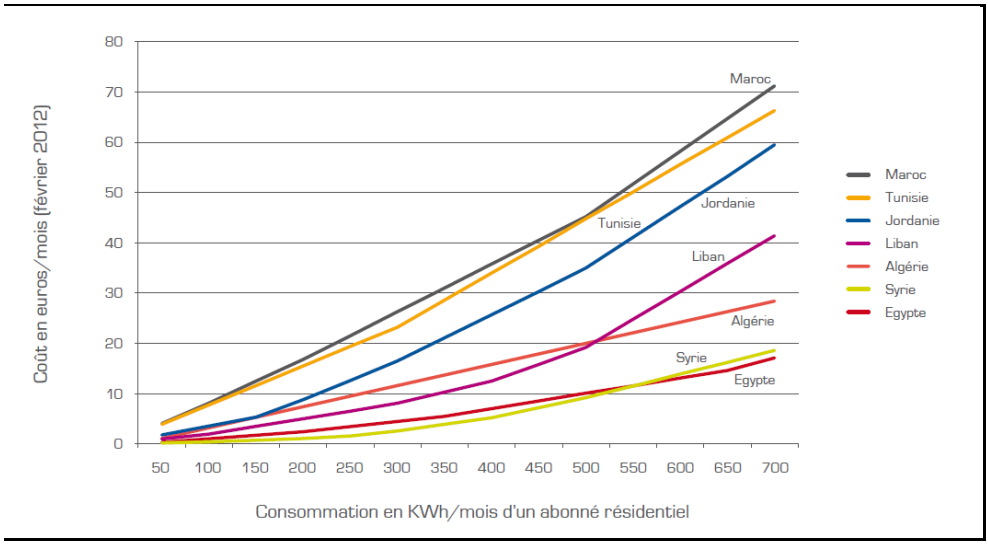
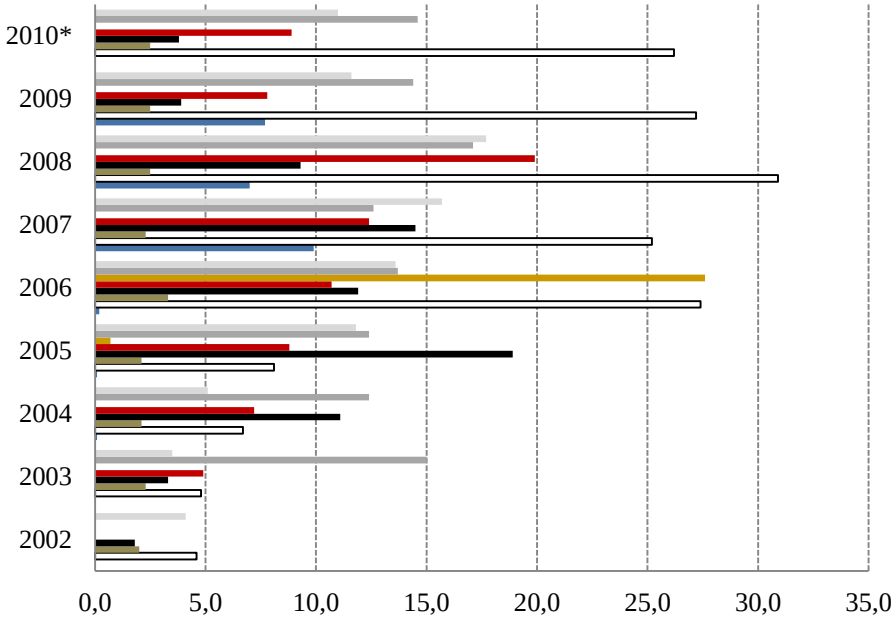


Figure A2. Average monthly electricity household bill (in kWh/month) (MEDENER/ADEME, 2012)



Annex 2. Energy Subsidies in southern and eastern Mediterranean countries (SEMCs)

Table A1. Food and fuel subsidies in SEMCs as a% of current government expenditure



	2002	2003	2004	2005	2006	2007	2008	2009	2010*
Tunisia	4,1	3,5	5,1	11,8	13,6	15,7	17,7	11,6	11,0
Syria		15,0	12,4	12,4	13,7	12,6	17,1	14,4	14,6
OPT				0,7	27,6				
Morocco		4,9	7,2	8,8	10,7	12,4	19,9	7,8	8,9
Jordan	1,8	3,3	11,1	18,9	11,9	14,5	9,3	3,9	3,8
Israel	2,0	2,3	2,1	2,1	3,3	2,3	2,5	2,5	2,5
Egypt	4,6	4,8	6,7	8,1	27,4	25,2	30,9	27,2	26,2
Algeria	0,0	0,0	0,1	0,1	0,2	9,9	7,0	7,7	

Note. * Projection.
Source: "Food and Energy Prices, Government Subsidies and Fiscal Balances in South Mediterranean Countries". ECOFIN paper (Ronald Albers and Marga Peeters; January 2011).

Table A2. IEA Estimates of Energy Subsidies in selected energy exporting Arab Countries, 2010

	Average rate of subsidization, %	Subsidy, US$ per person	Total subsidy, % of GDP	Subsidy by fuel, US$ bn			Total subsidy, US$ bn
				Oil	Gas	Electricity	
Algeria	59.8	298.4	6.6	8.5	0.0	2.13	10.59
Libya	71.0	665.0	5.7	3.2	0.3	0.78	4.21
Egypt	55.6	250.1	9.3	14.1	2.4	3.81	20.28
Saudi Arabia	75.8	1586.6	9.8	30.6	0.0	12.95	43.52
Iraq	56.7	357.3	13.8	8.9	0.3	2.16	11.31
Kuwait	85.5	2798.6	5.8	2.8	0.9	3.91	7.62
Qatar	75.3	2446.0	3.2	1.2	1.4	1.59	4.15
UAE	67.8	2489.6	6.0	2.7	10.0	5.51	18.15

Source: Fattouh B, 2012.