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ENERGY AND NATIONAL FINANCES IN AFRICA

A BACKGROUND PAPER

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African Union Finance Ministers Meeting

**Energy and National Finances in Africa
A Background Document**

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1. Why Energy is Important to Growth and Public Finance

Finance Ministries have the double responsibility for respecting macro-economic constraints, and for assuring the effective use of public resources. This document presents ideas on how:

- **Energy can make positive contributions to both economic growth and to public finances;**
- **Finance Ministries can help create the conditions for improving and expanding energy services.**

This document addresses the role of public policy and public expenditures in ensuring an efficient and equitable energy sector, contributing both to national development objectives and to macro-economic equilibria.

Energy is important to economic growth and public finances

- Energy accounts for a major share of **public revenues, and expenditures**, and may be a significant cause of public budget deficits in many countries.
- Energy weighs heavily in the **balance of payments**. For countries exporting oil or hydropower, energy revenues are a major part of foreign exchange receipts. On the other hand, for oil importers, the energy bill is often the biggest single import item: for HIPCs, added costs for energy due to rising prices have exceeded debt relief and offset additional ODA.
- Rising energy prices contribute to **inflation**.
- **Disruption of energy service**, for instance power outages and fuel shortages, disrupt the most productive parts of the economy and lead to **lost public revenues**.
- **Energy production, supply and use involves high capital expenditure**. The entire stock of national infrastructure - including roads, vehicles, office buildings, factories, water supply, hospitals, factories, household appliances, etc. – adds to energy demand. Energy supply infrastructure – dams, power plants, power lines, refineries – is often the single largest component of the national capital stock, with annual investment estimated at 2 to 4% of GDP in African countries. Increasing access from the current 24% to 47% by 2030 for SSA as a whole would require an estimated doubling of financing, from US\$2 billion per annum currently to approximately US\$4 billion¹.
- Energy investments often require a public role in **risk management**. Because energy infrastructure has long pay back times, low liquidity, and low or unknown rates of return, Finance Ministries must often guarantee risk or take an equity stake in order to allow the building of energy infrastructure.

Public Finance tools for meeting the energy/development challenge

National energy objectives generally include: security and reliability of supplies; economic impacts (contribution to growth, access to energy, balance of payments); the management of natural resources. Finance Ministries possess a set of powerful tools to aid in achieving these objectives:

- **Taxes and import duties**
- **Public spending on energy**, including public infrastructure investment and use of energy by public services
- **Borrowing** for energy infrastructure investment
- **Regulation of the energy sector**
- **Investment environment**

¹ Data contributed by the Africa Infrastructure Country Diagnostic (AICD).

Furthermore, Finance Ministries have a role of oversight in energy related planning, both by the Energy Ministry, and by Sectoral Authorities responsible for energy using sectors (agriculture, health, education, ...).

Organisation of this document.

The "Challenges" section takes an energy point of view, showing how the main energy challenges impact on public finances and budgets. The "Opportunities for Action" section takes the reverse view, exposing how Finance Ministries can act on the energy sector using the tools at their disposal to improve public finances, and at the same time improve the reliability, availability and affordability of energy services.

2. Energy Sector Financing and Budgeting Challenges

Recent developments - high and volatile oil prices, power shortages in several countries – have moved energy high up the agenda for African governments. These developments have reinforced a three part post Johannesburg consensus on energy:

1. Reliable and affordable energy services are essential for economic growth and social development.
2. Under current conditions in Africa, many essential energy needs will not be met by the private sector alone.
3. Public authorities must act to assure reliability of, and access to, essential energy services.

Governments must take responsibility for regulation, for redistribution and for correction of market failures by internalising external costs. Public action must aim to ensure access to energy (a public good). In the African context, where provision of energy services to large parts of the population is not an attractive activity for the private sector, public action must make optimal use of scarce financial resources to attract and leverage private capital and private payment for services.

2.1. Assuring reliable energy services

Currently, as many as 25 African countries are faced with power and/or fuel shortages, causing severe economic disruption. Government action is essential to secure reliable supplies and services without adversely impacting on public finances.

The Investment Climate Assessments (based on a survey of manufacturing firms in 22 Sub-Saharan African countries) show that 40% of firms identify unreliable power supply as a major constraint to doing business. On average they experience 36 days of power outages per year and suffer losses of more than 6% of sales revenue as a result of lost production and damaged equipment. Firms running their own generators pay on average around US\$0.40 per kilowatt-hour for electricity, or about four times as much as they would typically pay for electricity from the public grid².

Power sector

The electricity supply problems being experienced by many African countries have multiple causes. The combination of high input fuel prices, high losses and inadequate electricity tariffs cause power companies to lose money on each kWh produced. Under these conditions, it is in their interest to limit production. Furthermore, changing weather patterns have adversely affected hydro-electric facilities. Economic growth coupled with long term

² idem AICD.

under investment and inadequate maintenance of existing plant, have led to inadequate generation capacity. These structural problems are worsened by waste and loss of power.

The following actions can contribute to alleviating the power crisis, and ensuring reliable electricity.

- **Reduce loss and theft** of electricity. Well run systems receive payment for 90% of power produced. Some African power systems receive payment for only 60% of power. Consumers who steal electricity, or simply do not pay for it, are often wasteful users. Performance based regulatory action (see para. 3.5) can incite utilities to reduce technical losses within their systems, and to fight against theft of electricity. Note that non-payment, and consequent excessive and wasteful consumption, by public authorities is often part of this problem (see para. 3.2).
- **Encourage efficient use** of electricity. Regulatory action, optimal tariffs and specific public aid to energy efficiency measures can reduce electricity consumption. Examples of actions are: free or low cost distribution of efficient CFL light bulbs; encouraging or obliging users to turn off unused lights, air conditioning and other equipment; financing public programmes to replace or improve inefficient domestic refrigerators; public support for technical programmes to improve energy efficiency among large users (hotels, cement plants, canneries, etc.).
- **Optimising tariffs.** Average electricity tariffs should reflect long term marginal generation, transmission and distribution costs. Adequate tariffs can encourage proper maintenance, and investment in expanded capacity. Tariffs are also essential to encouraging efficient use of energy.
- **Encourage load shifting.** In many cases, the power crisis is worsened by high consumption during daily "peak" hours. Shifting some of this consumption to off peak hours can help utilities to make better use of existing generation capacity. Finance Ministries can act by creating peak tariffs for large users, and by supporting technical measures for load shifting (see 3.2).
- **Encourage decentralised power production and private sector participation.** For large scale users, installing "inside the fence" energy systems is often an attractive option. This is particularly the case for facilities that use both electricity and heat (saw mills, food processing plants, hospitals), or electricity and refrigeration (hotels, food storage) where cogeneration is optimal. Distributed production can increase overall system efficiency and reliability. Finance Ministries can encourage decentralised production by a variety of mechanisms (see paras. 3.3 and 3.5): regulation; taxes; tariffs; import duties on power equipment.
- **Install additional power generation capacity.** In crisis conditions, small and medium size diesel generator sets are the only short term solution³. This solution has the double disadvantage of high cost power generation, and increased dependence on high cost oil. Thus this solution should be avoided unless the measures to reduce and shift load are inadequate to meet short term demand.

In the long term, in addition to demand side measures to optimise consumption, Finance Ministries must work with power utilities to plan and carry out investments in additional generation and transmission capacity, both at the national level (see planning and investment para. 3.1) and through the regional power pools (see 3.4). Attracting investors requires building adequate institutions and creating an enabling legal framework: independent regulator, transparent rule based tariff setting procedures, establishment of local capital markets; rules for energy trade; as well as general frameworks for public private partnerships, local and foreign investment (see 3.5).

³ Combined cycle gas turbines can also be installed rapidly. While they are much more efficient, they require natural gas, currently unavailable in most African countries.

Fuel sector

Public action in the fuel sector should aim at guaranteeing adequate supplies for essential uses, and at optimising public revenues from the sector.

For oil exporting countries, the double challenge is to assure just and secure payments for the resources extracted, and to manage these revenues so as to maximise their contribution to national development goals (see para. 3.6).

For oil importing countries, volatile and rising prices have made the challenge of the fuel sector more difficult, since their economies must absorb the increased cost of energy. Improved efficiency of energy use (see para. 3.2), as well as diversification of energy sources can both aid in meeting the challenge (see 3.6). As in the electricity sector, pricing is an essential tool. National prices that reflect rising world prices:

- avoid imposing a huge burden on national budgets;
- encourage users to use fuels efficiently;
- avoid shortages;
- avoid smuggling and illicit use of subsidised petroleum products (for example, subsidised kerosene is often redirected to the transport sector).

2.2. Improving access to energy: poverty alleviation, growth, basic public services

Access to modern energy services (electricity, mechanical power, domestic and commercial fuels) is a key input to fuel growth locally and increase rural people's cash intake. However, access to modern energy services is not a goal in itself: it is rather what can be done with it that is the key.

From a public finance point of view, it is essential to direct financial resources to projects and programmes that focus on productive uses of energy, and on essential public services. The World Bank estimates that in order to achieve a rate of 35% of households with electricity service in Sub-Saharan Africa, connection in urban and peri-urban areas would cost about \$500. Costs would of course be higher for more remote and lower density areas: \$800 per connection to increase the electrification rate from 35% to 50%; up to \$1500 per connection to reach 75% of households. Given the low or negative rates of return on electrification in rural areas, it is essential to concentrate public resources on the investments that will have the greatest impact on development.

Thus, in rural sparsely populated areas, providing electricity to each household might not be cost effective in the short term. Rather, by providing key public services such as health and education facilities, the benefits of access to modern energy services can extend to the surrounding community (see para. 3.1). Electrified classroom buildings can provide evening classes, an evening study area for homework and a scene for community gatherings in the evenings. Health facilities that are electrified can provide night time service, and assure the cold chain for vaccines. In areas too far from the grid, access programmes may focus on aggregate demand and high impact locations, in order to create incentives for the establishment of local energy service providers. Such providers, can use a base load of institutional demand as a "springboard" to keep presence in the area and increase the opportunities to sell and provide for the private market.

Modern energy services are essential for revenue generating activities, for instance in increasing the value of agricultural production: pumping for irrigation; food milling and processing; cold storage or drying for perishable products.

By providing water and modern/improved domestic fuels, rural energy service programmes allow families to engage in productive activities rather than spending time on collecting traditional fuels and carrying water. Modern energy services can increase working hours for small businesses, increase productivity in the handicraft and agro-processing sectors and create new businesses in the service sector (entertainment, communication, etc.). With increased access to communication services (internet, radio, TV), the population will be able to take a more active part in the democratic system.

Since energy programmes in poor rural areas of Africa are not profitable without some kind of public financial aid, Finance Ministries must act to evaluate the impact of energy access programmes (see para. 3.1 and 3.2).

3. Financing and Budgeting: Opportunities for Action

High and sustained growth is required for Africa to have a realistic chance of reaching the MDGs. The NEPAD Action programme concludes that the infrastructure backlog in Africa, in comparison with the rest of the world, is a serious constraint for economic growth and poverty reduction. NEPAD prioritises improved access to basic infrastructure services, and emphasises regional cooperation, trade and cross-border interventions, and a well developed institutional framework to attract private capital, and capacity development.

The following paragraphs outline how Finance Ministries can use the tools available to them to achieve the double goal of improving public finances and meeting the energy challenge.

3.1. Policy and Planning

Adequate public policy and planning for the energy sector is a precondition to efficient public action in the sector. Planning for energy must be integrated into an overall planning process, taking into account the needs of all sectors. Finance Ministries can carry out the following actions.

Intersectoral needs/resources energy planning

Since energy is used in all sectors, adequate planning for the energy sector requires input from major energy using sectors. Many countries have established multi-sector energy committees to examine current and future energy needs. These groups can include both public authorities and private actors. Proper functioning of the groups requires active participation and leadership from Finance Ministries.

Capacity for planning, budgeting and reporting

Public budgets should provide sufficient resources – to Energy Ministries and to public authorities responsible for the energy sector – to adequately plan and budget future investments in energy infrastructure. These investment plans should be based on priority energy needs, as established for instance through inter-sectoral consultations. The plans should take into account existing infrastructure, national energy resources, and planned regional infrastructure.

Finance Ministries should, in return for these resources, require adequate planning for the energy sector that takes into account both long term needs and the availability of national energy resources. Sectoral energy related budgets should be based on agreed objectives, and should make reference to monitoring, evaluation and reporting mechanisms.

Finance Ministries must also act to obtain reliable and accurate information on the energy sector. Reporting, both from public authorities and from regulated private energy actors, should permit Finance Ministries to periodically evaluate the efficiency and effectiveness of public expenditures in the energy sector. Proper reporting, notably through the financial statements of energy enterprises, constitutes an essential tool to guarantee accountability and transparency in the use of public funds. Finance Ministries may wish to commission performance audits, notably on publicly controlled enterprises.

The Paris Declaration: harmonization and alignment of ODA

By signing the Paris Declaration on harmonization and alignment of Official Development Assistance, aid donors have committed themselves to align their contributions to objectives defined by beneficiary countries. Finance Ministries have the responsibility for imposing their national priorities in ODA financed programmes, using a sector wide approach based on national priorities that have been identified in democratic/participatory processes.

3.2. Quality and effectiveness of energy related public expenditures

Public investment in energy infrastructure

Under current conditions in Africa, investment in energy infrastructure (with the exception of extractive industries) suffers from low profitability, high risk and poor liquidity. As a consequence, public intervention in infrastructure will generally be necessary. As a condition for investing public resources, Finance Ministries should require that projects and programmes are optimal, according to the following criteria:

- **contribution to economic growth.** Does the programme respond to the nation's energy needs, as defined by public policy and by the results of inter-sectoral consultations? Will the programme lead to new economic activities? Does the business model provide for long term sustainable payment of operating costs?
- **public finance.** Will the programme generate new public revenues, permitting repayment of part of the public resources used? Does the investment plan use an optimal mix of equity, debt, subsidy, guarantee, so as to minimise the use of public funds? Does the programme provide leverage on public funds through public-private partnerships?
- **technology, risk.** Is the technology to be used optimal? Does it take into account different elements of risk, notably with respect to price and availability of the energy resource used (oil price variations, variation of rainfall, ...).
- **social impact.** Will the programme permit the expansion of basic public services?
- **equity.** Does the programme assure equity between regions and social groups within the nation?
- **management of natural resources.** Does the programme make optimal use of national energy resources (for instance renewable energy resources)? Are environmental impacts (deforestation, pollution, climate, ...) adequately taken into account?

Energy efficiency programmes

Public expenditures on energy efficiency can often provide rapid positive economic effects. In some cases, by stabilising energy systems and resolving crises, they may allow increased public revenues that more than pay for the expenditure.

Optimising the energy consumption of public administrations.

Public administrations are often large, and very wasteful, users of energy (and water): lights and air conditions left on overnight; old and inefficient equipment; leaky water pipes and faucets; poorly maintained vehicles; etc. Furthermore, public energy use is often not paid for

in full, contributing to the frail finances of power utilities. Finance Ministries can use the budgeting process to encourage more efficient energy use by administrations. For large energy users, self-production is an option to be considered.

When and what to subsidise. Financing basic energy services for the poor.

When electricity is sold for less than the marginal generation cost, or fuel for less than world market prices, this constitutes a gift from the nation to the user. For any country, this gift, or subsidy, uses resources that will not be available for other priorities. In the same way, when a product is taxed less than other products, this constitutes a subsidy. While there may be many grounds to subsidise energy use - provide vital services to poor populations; stimulate economic growth; dampen the shock of rising oil prices; etc. - universal energy subsidies are typically very costly. Much of the benefit of universal power or fuel subsidies benefit the higher income households who are connected to the grid and account for most of the energy/fuel consumed. Subsidies encourage more energy-intensive growth rather than more growth and, in so far as they contribute to inefficient use of resources and unsustainable budget deficits, can actually harm growth.

Subsidising the energy use of poor consumers poses a specific problem for African States. "Life line" rates are used in many countries to provide a minimum level of basic services. Nevertheless, in African countries that have very low connection rates, electricity subsidies often benefit well to do urban users, who could afford to pay higher tariffs.

Finance Ministries should apply a performance-based approach to capital/recurrent subsidies. Is the performance and pertinence of the subsidy evaluated according to some of the following questions?

- What is the purpose of the subsidy? To what public policy objective does the subsidy contribute?
- Is there a more focused, efficient, way to achieve the same policy objective?
- Does the beneficiary need the subsidy? What would be the negative impact, if any, to the user or to the nation of removing the subsidy?
- Are there any plans to reduce or eliminate the subsidy in the future?

One option for effective use of public resources for rural electrification is to establish Rural Electrification Agencies that allocate limited capital subsidies from a Rural Electrification Fund against objective and output-based criteria.

Should energy prices be lower in oil exporting countries?

Selling fuel below world prices constitutes a subsidy to users, whether the raw material is imported or produced locally. Such subsidies may be politically necessary: citizens may not accept paying higher prices for fuel, when they know that the fuel is produced locally for export. A small subsidy, by providing a local market for refined petroleum products, may contribute to making a national refinery profitable. Nevertheless, such subsidies represent lost revenues for the nation, that could be used for other priorities. Furthermore, subsidised fuel can create other problems, notably smuggling to neighbouring countries, or wasteful use of fuel.

3.3. Potential avenues for tax reform

Taxes, royalties and import duties on energy constitute an important part of public revenues. At the same time, fiscal tools can be powerful instruments to orient market actors towards optimal decisions on energy production and consumption. The challenge for Finance

Ministries is to adjust the fiscal structure so as to maximise both government revenues and positive impact on the economy. While in some cases these are conflicting objectives, some actions can be "win-win".

- **Tax energy use.** Taxes on energy incite users to economise energy. Energy taxes can be made deductible for productive enterprises, for instance by a VAT mechanism.
- **De-tax investment in energy efficiency, renewable energy or decentralised energy production.** Investment in renewable energy and energy savings devices can be de-taxed, either at the time of importation (through adjustment of import duties), or at the time of installation (through the system of taxes on enterprises, for instance by allowing accelerated depreciation or partial deduction from profits).
- **Tax high energy use equipment.** These taxes could cover, for instance, vehicles with high fuel consumption, or inefficient air-conditioning equipment. Import duties or annual vehicle taxes could be used.
- **Use taxes to favour sustainable forestry management.** Taxes levied on wood and charcoal brought into cities can be used to fund rural wood markets and village based participative forestry schemes⁴.
- **Use taxes to favour use of local energy resources.** Taxes on imported energy resources should be higher than taxes on local energy resources.

3.4. Regional cooperation

Given the uneven distribution of resources in Africa, increased regional cooperation and trade offers a potential for securing low-cost power supply to existing consumers and buying down the unit costs of connecting new customers. Regional cooperation allows for the benefits of economies of scale and risk sharing, and is a key element to increased energy security among African nations. The cost of additional transmission capacity is outweighed by the benefits: electricity trade could save up to USD 1.2 billion in annual costs in a scenario of large scale electrification in Africa.

Development of a system of interconnections between the national networks and the creation of a market for electricity exchanges is essential to making use of the hydropower potential in Africa. Public authorities must prioritise the establishment of gas and oil pipelines as well as allocate funds for the development of trans-border rural electrification systems.

African countries have established several regional power pools, in different stages of advancement (WAPP in West Africa, COMELEC in North Africa, SAPP in Southern Africa Power Pool, EAPP in East Africa, CAPP in Central Africa). In addition, there are emerging examples of cross-border oil and gas pipeline projects: South Africa-Mozambique, Chad-Cameroon, the West African Gas Pipeline. However, given the complexity and high cost of cross border infrastructure, development of regional cooperation requires an enabling environment for regional energy trade: clarification and development of regional protocols; establishment of regional regulatory bodies with sufficient means, and clear mandates; clear division of responsibilities; increase in funding and technical support for project preparation activities; acceptance of cost reflective and market based energy prices; mechanisms to deal with non convertible currencies⁵⁶.

⁴ Elements of this system have been used in several countries: Senegal, Mali, Niger, ...

⁵ Interview with Mr Fanile Mathangwane, former Deputy Director of the Department of Energy in Botswana, currently Energy Policy and Research Coordinator at the SADC Secretariat Directorate of Infrastructure and Service.

⁶ ESI Africa, "Industry Insight – Energy Trade: Defining the roles of the ESI players in the SADC region", Issue 1 2006

Similarly, stimulating large scale intra-African trade in oil would require institutional mechanisms such as⁷: harmonization of technical specifications of oil products; coordination and harmonization of taxes and prices; structured financing for improved risk management.

Finance Ministries can promote regional cooperation by:

- encouraging market pricing of energy;
- promoting bi and multi lateral agreements on energy trade;
- promoting regional organizations and power pools;
- integrating consideration of energy security into the general budget process.

3.5. Regulatory reform, investment climate

The primary motive of economic regulation of the energy sector is to promote economic efficiency and, in doing so, protect consumers' interests. There are several regulatory goals that should ideally be accomplished:

- There must be a balance between protecting consumers' and investors' interests. While monopoly abuses must be protected against, it is also necessary to create conditions conducive to investment.
- Regulation should give appropriate incentives for efficiency.
- Regulation should give incentives to ensuring that an appropriate trade-off between cost and quality is reached.
- Regulation should encourage energy efficiency investment decisions.

Electricity sector regulation

There is no generic model for energy regulation but rather, each country needs to assess the current situation and adapt regulatory instruments appropriate for the setting. Depending on the market structure, different regulatory set-ups apply.

Many countries still have a vertically integrated power utility (i.e. for generation, transmission and distribution of electricity) that requires substantial government subsidies to maintain existing levels of service. In addition, such subsidies generally favour well off urban users. Restructuring of vertically integrated companies is usually considered a part of power sector reform. In countries where the power market is sufficiently large, increased competition can lead to both enhanced efficiency and lower prices to consumers. If the power market is too small, the corporate restructuring/privatisation may not lead to the desired benefits.

Separating the responsibility between the Ministry of Energy and an independent Electricity Regulator is a necessary (but not a sufficient step) to reduce risk for investors. Solid and transparent contractual arrangements for private investors must also be in place. The Ministry of Finance can take an active role in providing support for the development of such contracting system.

Prices and tariffs that reflect costs

The pricing of electricity and the electricity tariffs are the most important determinants of investor interest and sector viability. In order to promote efficiency and equity, tariffs need to send the "correct" market signals to actors and this can only be achieved if tariffs reflect costs. If, for instance, it costs 24c/kWh to generate electricity using e.g. diesel and the tariffs are less than 24 c/kWh, the utility has no incentive to connect more customers nor to to

⁷ L. Rutten, Senior Advisor at the World Bank, "African high-level regional meeting on energy and sustainable development"; Nairobi; 2001, and "Using new financial instruments for improving oil trade across Africa: opportunities and limits"; 2001

invest in infrastructure, since these costs cannot be recovered. Furthermore, tariffs below costs imply using public funds to subsidise utilities, instead of using these funds in potentially more productive applications. The Ministry of Finance has an important role to play in promoting cost reflective tariffs for a viable sector and for increased investments and to be able to use the public funds more productively for national development. It is to be noted that uniform national tariffs are in contradiction with regulatory systems aimed at attracting private investors to rural electrification.

An independent regulator that assesses and publishes tariffs is highly important if the private sector is to be motivated to invest in electrification projects. For rural electrification projects, funds can be built up and allocated on a competitive basis to private developers for rural electrification projects through a dedicated institution, for example a Rural Electrification Agency that controls the disbursement of a Rural Electrification Fund.

3.6. Managing energy resources

Oil and gas revenues

In any country, managing revenues from extractive industries poses a challenge. Meeting this challenges and reaping the potential benefits of oil revenues requires transparency in management of resource-induced cash flows. The recommendations of the global Extractive Industries Transparency Initiative (EITI) can guide Finance Ministries in the management of oil revenues.

When the flow of oil revenues is distributed to the population, it gives rise to real exchange rate appreciation, resulting in lowered competitiveness and inflation⁸. To avoid this, the revenues can be invested in physical and human capital, thus contributing to economic development and to the long term competitiveness of the economy. Alternatively, excess revenues can be invested over seas, so as to permit future generations to benefit from the investment when oil revenues decline. Many countries have addressed the issue of increased oil revenues by establishing a fund that stabilizes financial flows and smooths out fluctuations in government expenditure and in GDP. Such a fund requires good governance and transparency to be able to work efficiently and fulfil its purpose⁹.

Electricity exports

Several African countries sell electricity to their neighbours. The development of Africa's regional power pools will accelerate cross border electricity sales, and will aid in developing Africa's largely untapped hydro potential. This will provide revenues to exporting countries, decrease the cost of electricity, and generally contribute to regional integration.

Finance Ministries should support the creation or strengthening of regional mechanisms to regulate the sale of electricity, since they contribute to conditions of sale mutually beneficial to buyers and sellers.

Biomass resources

Rising oil prices have brought increased attention to Africa's potential for production of biomass energy, for transport fuels, for power production and for domestic use. Bio-ethanol

⁸ This phenomenon was named "Dutch Disease" by economists, due to the negative impact of natural gas sales on the economy of the Netherlands.

⁹ UNCTAD, 2006, "*Meeting trade and development challenges in an era of high and volatile energy prices: oil and gas in LDCs and African countries*"

and biodiesel production are being studied in several countries. The production of energy from biomass can have several benefits, notably:

- increased revenues for rural populations;
- contribution to secure national energy supplies;
- potential for export earnings;
- contribution to protection of natural resources, on the condition that production is carried out in a sustainable way.

Nevertheless production of biomass energy can have negative impacts, by diverting limited land or water resources from other agricultural activities (notably food production) or by leading to the destruction of forests for plantation of energy crops.

Finance Ministries can often have an impact on production of biomass energy, through regulatory or fiscal action. Their action should aim at maximising the value of agricultural and forestry activities, both for the national economy and for local populations, and at guaranteeing the long term sustainability of these activities.

Traditional biomass

Traditional biomass, wood and charcoal, represent 90% of rural energy consumption in Africa. The traditional cooking fuel value chain¹⁰

forestry → (charcoal conversion →) transport → family cook stoves

provides a vital service to both rural and urban populations. It is also one of the largest private economic activities¹¹, representing added value comparable to food production. Two parallel and complementary approaches exist to assure supply of cooking fuel:

- Modernise and improve traditional biomass, so as to extract the maximum value from forest resources, while guaranteeing the long term sustainability. This includes actions at every link of the value chain: sustainable management of forests (for example through participative forestry management or through the establishment of rural wood markets, as in several West African countries); improved charcoal conversion techniques; rationalisation of transport; improved stoves.
- Introduce alternative fuels such as LPG¹². This is essential when action to make traditional biomass cannot meet demand for fuels without endangering forests. It is also a natural development, as urban families choose modern fuels.

Finance Ministries need to act on both options:

- Budget support for public programmes to improve the traditional biomass chain. Experience has shown that the rather limited budgets have a very high rate of return (as much as 25 to 1)¹³ in terms of health, resource and economic impacts. The cost per household, for training of stove producers and awareness campaigns, is about 2 to 3 US\$¹⁴. Sustainable forestry management programmes cost from 15 to 50 US\$ per household served¹⁵.

¹⁰ Note that conversion to charcoal is a means to reduce the weight of transported fuel. It is common in the wood fuel value chain, and is sometimes used for other biomass fuels.

¹¹ Turnover on the traditional wood fuel market is estimated at 20 millions euros per year for N'Djaména in Chad, and 30 to 40 million per year for Mali.

¹² While the most common alternative fuel is LPG (Liquefied Petroleum Gas), experiments are under way with modern biomass cooking fuels, based on agricultural wastes, ethanol or on plant oils.

¹³ GTZ, Economic evaluation of the improved household cooking stove dissemination programme in Uganda, Eschborn, February 2007.

¹⁴ Data from GTZ programme in Uganda.

¹⁵ CEIF progress report, p. 65

- Finance LPG programmes when necessary. All successful LPG programmes have used subsidies to "kick start" commercial operations. Nevertheless, it is not yet clear whether these operations are viable in the long term, under current market conditions, without continued public support. Long term LPG subsidies are costly: \$202 per tonne for LPG in 6 kg containers, in the Senegalese programme.