6. Social Aspects of Grid Interconnection

6.1. Introduction

Power grid interconnections have the potential to affect the societies in the interconnected countries in a number of ways. These impacts on societies can be positive or, particularly in instances where the costs and benefits of interconnection are not fairly distributed, negative. As a result, power grid interconnections can contribute to sustainable development, can damage prospects for sustainable development, or, because grid interconnection infrastructure may cover thousands of kilometers, have both types of impacts in separate places and among separate peoples. This Chapter describes some of the potential social benefits of international grid interconnections, and of the electrical power and income such interconnections can provide. Also described are the potential social costs and liabilities of grid interconnection, as well as approaches to enhance the social benefits, and reduce the social costs, of grid interconnections.

6.2. Potential Social Benefits of Grid Interconnection

The potential social benefits of international electric grid interconnection can be divided into those benefits derived from improved access to affordable electricity, benefits related to the economic gains associated with electricity sales, and benefits related to cooperation between the interconnected societies. The "E7" Group of utilities describes some of the social benefits of grid interconnections as follows[99]:

> "Optimized electric power systems should improve reliability and quality of service, while allowing lower tariffs. Lower electricity rates, achieved through regional electricity cooperation and integration, will foster increased regional growth. The interconnection of isolated electric power networks throughout a region will enhance rural electrification programs. Local needs of individuals, families, communities and businesses will be better met through the increased availability of electricity.

In order to assure that of grid interconnection results in sustainable development in the region, capacity building may often be necessary to assure that benefits (and costs) of interconnection are properly accounted for, and to assure that the interconnection is operated in such as way as to contribute to sustainable development.

6.2.1. Potential social impacts of grid integration related to improved electricity supply

Many of the clearest societal impacts of international grid interconnections are related to either the effects of improved electricity supply in parts or all of the interconnected nations, or effects of lower costs of electricity supply in countries receiving power and/or receiving avoided generation capacity benefits.

99 The "E7" Group of representatives of large utilities from the G7 group of industrialized nations (2000), *Regional Electricity Cooperation and Integration (RECI)* compilation. Subtitle of overall set of documents, "E7 Guidelines for the pooling of resources and the interconnection of electric power systems". These documents are available from *http://www.e7.org*. The quote provided is from the Guidelines volume.

Improved electricity supply may take the form of more reliable electricity service in areas that are already served by the national grid or grids, or greater availability of electricity service made possible by the grid interconnection—such as extension of grid electricity into previously non-electrified areas. Improved, and especially new, power supplies offer the potential to contribute to sustainable development through creation of employment opportunities[100], thus assisting with poverty alleviation. Better electricity supplies for agricultural uses, such as water pumping and crop processing, can yield to higher crop yields and better harvesting processes, potentially improving both farm incomes and food availability. Electricity for pumping of water for household needs may yield much-improved water quality and quantity (with their attendant health and welfare benefits), as well as freeing householders (often women and children) from what is often many hours spent transporting water from remote supplies. More hours of electricity (or new supplies) can yield improved educational opportunities, through enhanced availability of high quality light for studying or evening classes. Provision of electric light in the evening also enhances opportunities for home businesses, as well as improving the availability of information via radio, television, and possibly phone and computer. Where electricity supplies are sufficient for use for cooking (and electric cooking appliances are affordable), use of (sometimes scarce, and usually polluting) biomass and wood fuels can be avoided, with an attendant reduction in the amount of time householders, especially women and children, are obliged to spend collecting fuel. Where both better lighting and information are combined with more time to use them—through reduction in the time needed for tasks such bringing in drinking water or wood, washing clothes, or purchasing lamp oil—the social benefits of electricity provision can be compounded.

Better electricity supplies help to make the storage of medicines and vaccines that must be refrigerated possible in rural areas, contributing to better health care. Improved lighting and access to electricity of better quality also allows the operation of electrical health care devices, and allows medical practitioners a better view of their patients. Where electric on-grid lighting replaces costly energy sources such as kerosene and diesel oil used in lamps, or small disposable electric batteries, significant savings in the household energy budget can occur, freeing income for use in education, health care, or home business investment. Reduced use of non-electric fuels for lighting may also result in significant improvements in indoor air quality, with related health benefits[101].

Note, however, that the social benefits described above imply that grid integration allows rural on-grid electrification and/or improves grid reliability. While both of these outcomes may be stated goals of an interconnection project, these outcomes may not necessarily come to pass unless care is taken in designing and implementing plans for the distribution of the benefits of the project to different stakeholder groups.

100 Some employment opportunities may arise as a direct result of the interconnection, including both short-term employment in constructing interconnection-related facilities, and longer-term employment related to maintaining the interconnection infrastructure and distributing electricity from the interconnection. These longer-term

101 Itai Madamombe (2005; "Energy Key To Africa's Prosperity: Challenges in West Africa's Quest for Electricity", *Africa Renewal*, Vol.18 #4, January 2005, available as *http://www.un.org/ecosocdev/geninfo/afrec/vol18no4/184electric.htm)* describes additional potential benefits from the use of electricity in the place of other household fuels.

6.2.2. Potential social benefits of electricity-related income and savings

For a country that is primarily a seller of electricity in a grid interconnection project, one of the key motivations of participation is to be able to export, in the form of electricity, energy resources, in exchange for (typically) hard currency income. This income from energy resource exports has the potential to be a "lever" to provide societal benefits from the interconnection to the people of the exporting nation. For example, income from electricity exports, in addition to paying for the net costs of increasing electricity production (including capacity expansions and fuel extraction, if any), can be partially devoted to social concerns, such as developing local businesses and industries, building/improving schools and health care facilities, or subsidizing electricity provision to low-income residents (including assisting with the development of renewable local electricity sources), each of which can help to contribute toward sustainable development. In distributing these types of social benefits, care should be taken that benefits are provided in particular to those groups and areas likely to be most affected by the interconnection, such as groups in areas hosting new transmission lines or generation facilities. If the entity selling electricity through the interconnection is a state-run company, these sorts of income transfers for social purposes would be internal to the government, and thus (theoretically) relatively straightforward. If the entity selling electricity is a private company, some sort of export tax or license fee may be necessary to collect funds to be used to provide social benefits in electricity exporting countries.

These types of social impacts derived from additional electricity sales can also apply when overall cost savings result from the interconnection project. Public and private monies that would otherwise (in the absence of the interconnection) need to have been spent on electricity generation and transmission capacity may be devoted instead to addressing social needs like those described above. Further, to the extent that an interconnection avoids the need to construct and operate new power plants, the potential social impacts of those plants—including the social and health impacts of pollution from the plants, changes in land use, and arguments among groups over power plant siting (the "not in my back yard" phenomenon)—may be avoided. The avoided social impacts of a project are, of course, extremely site-specific.

6.2.3. Ancillary social benefits of construction of interconnections and related infrastructure

The construction of grid interconnections, and of new power plants to feed interconnections with power, may open up economic and social opportunities for residents in nearby areas. For example, roads or railroads built to serve a power line may provide access for isolated communities to markets for local goods, to income from tourism, and for improved access to education and medical care. Similarly, the opening up of routes used by new transmission infrastructure can provide opportunities for the installation of other infrastructure, such as telecommunications and internet cables and access (which themselves may provide a spur economic development)[102].

102 Briony Hale (2002), "Africa's Grand Power Exporting Plan", BBC, October, 2002, accessed from the Global Policy Forum website at: *http://www.globalpolicy.org/socecon/develop/africa/2002/1017power.htm*, The impact of telecommunications expansion—particularly the expansion of mobile phone networks—on economic development is treated in the article "Calling Across the Divide" in *The Economist*, March 12th-18th, 2005, p. 74.

6.2.4. Fostering cooperation between the interconnected societies

As noted in earlier Chapters of this Report, the planning, design, construction, and operation of a grid interconnection between two (or more) nations requires cooperation of many different types. High-level political cooperation between countries is certainly necessary, but a potential benefit of grid interconnection is also that the project can serve as a spur to cooperation at the societal level as well. If the grid interconnection serves to provide (or enhance) a political bridge between nations, the bridge can be used to foster social exchanges in sports, education, and culture, for example, promoting understanding between societies. Similarly, enhanced trade in other commodities between countries could follow from the experience in trading electricity, bringing citizens from the interconnected societies into additional contact in the process. In addition, grid interconnection activities, such as power line construction and maintenance, or construction of new power stations, may, depending on how the contracting crews are selected, bring workers from the interconnected countries together. Working together on projects of clear mutual benefit, and working in ways that provide person-to-person contract between people of different nationalities, is an excellent method of building trust and understanding between peoples from different societies.

6.2.5. Building social capacity to participate in grid interconnection decisions

A key to making sure that the potential social benefits of international electricity grid interconnections are fully realized is to assure that the various stakeholder groups that should benefit from the interconnection have the capacity to fully participate in the project decision process. As a consequence, there will in most projects be a need for capacity-building to allow groups within societies to evaluate the costs and benefits of grid interconnection from their own perspectives. This may, as noted in Chapter 5, take the form of direct training of members of the groups in the types of analysis needed, and/or may involve making available funds for hiring assistance. For example, representatives of local groups will need training in the economic analysis of energy projects so that they can read and comment on project design reports, training in environmental analysis so that they can review environmental assessments to determine how interconnection infrastructure will affect their groups (and the areas the group uses), and training in law sufficient to allow them to review legal agreements to determine what the impact of those agreements will be on their group. If human capacity is built to the extent that all social groups with stakes in how the interconnection is configured, and in how the interconnections costs and benefits are distributed, are able to meaningfully participate and have an adequate voice in the decision process, that social capacity building in and of itself can be considered a major benefit of the interconnection process.

6.2.6. Building capacity for socially-beneficial management of grid interconnections

As with participation in the interconnection decision process, one interconnection infrastructure is built, interconnection operators—and those who will oversee them—will require training in order to allow management of grid interconnections in a manner that contributes to sustainable social development. This will mean, for example, that grid operators must be aware of commitments made to different social groups, and make sure that the way in which the interconnection is operated is consistent with those commitments. This includes (for example) commitments such as availability and reliability of electricity supply in rural areas, the distribution of income from electricity sales via the interconnection to meet social needs, and coordination with local groups to avoid conflict when maintenance of interconnection facilities in areas used by those groups is required. The types of human capacity building required here may be largely the development and implementation of guidelines for the operation of interconnection, training of interconnection/grid operators in the implementation of those guidelines, and management training to make sure that the guidelines are periodically reviewed and continuously enforced to assure that social benefits are as promised (or as much so as possible).

6.3. Potential Social Costs/Liabilities of Grid Integration

A well-designed, well-managed, grid interconnection can bring significant social benefits to the nations that it serves. Similarly, if configured or operated in a way that ignores significant social needs or potential impacts, a grid interconnection may have significant social costs or liabilities for one or more stakeholder group. Examples of such costs include the impact of a power line on access to resources used by a group, potential "upstream" (in the fuel chain) impacts of a grid interconnection, and the potential for a grid interconnection to increase reliance on outside resources.

6.3.1. Potential isolation of local residents from key resources

The infrastructure that must (in many cases) be constructed to complete an international electricity grid interconnection may have the potential to significantly affect local communities. New large power lines, for example, may cut across traditional hunting, gathering, or agricultural areas. The need to keep vegetation low for safety reasons may result in loss of habitat for the plants or animals on which local communities depend, thereby putting social (and economic) stress on those communities. The need to secure the power line may result in the denial or restriction of the right of local peoples to travel from one side of a power line to another, thereby restricting the resources the communities can use for their livelihood, as well as their social access to communities on the other side of the power line. Further, if a power line or other interconnection infrastructure are located in areas inhabited by indigenous peoples with little contact with the outside world, power line operation is likely, unless handled with extreme care, to expose local societies to unwanted and potentially destructive outside influences, with social conflict between locals and others entering the area for work related to the interconnection a distinct possibility.

6.3.2. Potential construction-related social impacts of grid interconnection

Power line interconnections often are designed to connect remote resources with large centers of electricity demand. As such, construction of interconnection infrastructure can, like interconnection operations, affect societies in the remote areas they transit by exposing those societies to unwanted outside influences. An increase, among those local populations, in social problems such as drug and alcohol addiction, prostitution, disease, and other social problems may result from encounters of construction personnel (and, for example, in-migrants providing services to construction teams) with locals.

6.3.3. Potential "upstream" impacts of grid interconnection

For countries entering into grid interconnection agreements mainly to export power, the social impacts associated with energy sector changes needed to provide power for export—that is, changes "upstream" in the fuel chain—have the potential to be costly in social terms. One type of social cost here is the displacement of communities due to the impacts of new power plant construction and operation. Although fossil-fueled power plants (particularly those using coal or other solid fuels) may require considerable land area, the classic example of displace of communities results in cases where hydroelectric facilities are built to provide power for exports over an interconnection. Here the hydroelectric dam, and the reservoir that forms behind the dams, may easily displace many thousands of people—whole towns and even cities—with loss of communities, agricultural resources, and even cultural resources such as antiquities sometimes the outcome. An example of the social and other impacts of population displacement due to construction of a hydroelectric plant (providing power for both domestic use and exports) in Ghana was summarized as follows by E.A.K. Kalitsi as follows[103]:

> "In Ghana, significant environmental and social issues were faced with the development of the Akosombo Lake on the Volta River for hydropower generation and other multi-purpose uses. The creation of the Lake and the regulation of the floodwaters of the Volta River brought in its wake numerous negative impacts on the lives of the communities living upstream and downstream. The major impact was socio-economic arising from the dislocation and resettlement of about 80,000 people from about 740 villages. Different ethnic groups with a wide linguistic diversity lived within the flood basin. This tremendously compounded the problems of resettlement. The resettlement effort also represented a formidable and physically challenging task due to the nature of the basin that was inundated. The basin was not only large; it was isolated, difficult to access and had minimal infrastructure. The basin was also unhealthy with insect-borne diseases like malaria, river blindness, and sleeping sickness and water borne diseases like bilharzia. Incidence of some of the water borne diseases like bilharzia and hookworm increased."

Historically, hydro dam construction has sometimes led to substantial social and political conflict between predominantly urban groups who benefit from the electricity and groups in the reservoir area who suffer from displacement and economic disruption, or between relocated populations and existing populations in the areas to which the displaced populations are relocated. In addition, hydroelectric facilities affect the availability of water resources both in the area of the dam and downstream—potentially even across borders. The International Rivers Network, in a short summary of the effects of several existing hydroelectric dams in the Mekong region of Southeast Asia (where efforts to build interconnections are underway), cite social impacts such as population displacement, loss of food sources and income through effects on agriculture, irrigation, and fisheries, changes in the availability of drinking water, increases in the incidence of water-borne diseases, and other impacts[104]. Other types of "up-the-fuel-chain" impacts on

103 E.A.K. Kalitsi (2003), *Problems And Prospects for Hydropower Development in Africa*. Prepared for the Workshop for African Energy Experts on Operationalizing the NGPAD Energy Initiative 2 – 4 June 2003 Novotel, Dakar, Senegal, and available as *http://www.un.org/esa/sustdev/sdissues/energy/op/nepadkalitsi.pdf*. Quote is from page 13.

104 International Rivers Network (2003) *Trading Away the Future: the Mekong Power Grid*. International Rivers Network, Berkeley, CA, USA, June, 2003. Available as *http://www.irn.org/programs/mekong/030620.powergrid-bp.pdf*.

societies may accrue, for example, when fossil fuels deposits in remote areas are exploited to fuel an export-oriented power plant or plants. Particularly for solid fuels, but also for petroleum or natural gas fuel extraction as well, the development of mines and gas and oil fields can bring with them loss of local resources and environmental impacts that yield a social impacts. These extraction operations also result in more exposure of local populations to "outsiders", increasing (in many cases) the potential for unwanted changes in society and for social conflict.

Another classic type of negative social impact associated with the construction of energy facilities of many types—and which may occur in energy facilities needed to "feed" electricity exports—is the "boomtown" phenomenon. Here, as populations—often thousands or tens of thousands—of workers are imported to a remote are to work on a large project such as a hydroelectric dam, major power plant complex, or oil-field, a "town" forms, populated by immigrants to the area as well as more local residents, to provide for the needs of the workers. Often, in the past, the planning of such towns is poor (or non-existent), and as a result social, health, safety, and other services have been lacking. Some of the problems associated with Coari, an energy-facility-related "boomtown" (in this case, an oil and gas transport terminal) in the Brazilian Amazon have been described as follows[105]:

> "…Coari itself has suffered the typical problems of a boom town: rapid population growth (from 50,000 to 60,000 within a period of 12 to 18 months, the majority men from other parts of Brazil seeking employment), prostitution also of children (2% of babies born in Coari have 11- to 14-year old mothers), drugs (Coari is the so-called regional capital of drugs), increased crime, a high prevalence of venereal diseases and AIDS (the medical staff at the Coari hospital are alarmed as they feel they have absolutely no control), and high rates of unemployment due to immigration (the terminal has 700 workers, most of whom are not from Coari)."

As construction on the energy facility is completed, workers begin to leave, and those that have made their living serving the workers lose their sources of livelihood. Those that cannot return to rural areas for one reason or another (including, for example, that their towns have been displaced by the energy facilities), may be obliged to migrate to the margins of large cities in their search for employment, adding to social problems (including unemployment, poverty, and crime) there[106].

6.3.4. Potential for grid interconnection to increase dependence on outside resources

For countries importing power, and even for countries implementing a grid interconnection in order to be able to share generation resources and reduce the costs of developing new generation, the use of imported power will in most cases increase social dependence on outside resources. One impact of this dependence may be reduced incentives for development of possibly promising local resources. Reduced development of local resources may be a net positive social impact if development of those resources would

105 Amazonia (1997), *Urucu hydrocarbon project*. Available as *http://www.amazonia.net/Articles/116.htm*.

106 The "boomtown" phenomenon and other issues related to development of energy resources is described briefly in Sustainable Development International (2005), *Impact Assessments: Preventing slow burn issues from bursting into flames*, available as *http://www.sustdev.org/index.php?option=com_content&task=view&id=424&Itemid=49*.

yield net negative social impacts, but in some cases development of local resources may provide higher social benefits and lower social costs—in the form of additional local jobs, and reduced exposure to outside influences, for example. Also, reliance on electricity from an interconnection, rather than on local sources of energy, may put the communities served by electricity from the interconnection, and the country importing power, at risk of political, economic, and social events beyond local or even national control. If the cessation of power flows from a relied-upon interconnection is rapid and permanent, the social impacts of suddenly short supplies of electricity may be significant, and the costs and other arrangements (over-cutting of fuel-wood, or massive new investments in power plants, for example) needed to supply needs for energy services in the short run to make up for lost supplies may be unsustainable and cause irreversible environmental, economic, and social damages.

In a paper from the Workshop on Regional Power Trade (held in Kathmandu, Nepal, in March 2001), the following point is made about the possible security risks of relying upon power supplies from another country[107]:

> "Power interconnections have been shown to enhance the security and reliability of a country's electricity supply through the access of support during times of emergencies and the sharing of the provision of operating reserves. However, attendant with the development of power interconnections is the counter-balancing concern over the dependence on imported power and possible electricity shortages as the result of others actions. In a regionally operated system, where all the power-generating facilities are responding to the demands of that regional system, each of the individual areas within that region loses a certain amount of autonomy and self-determination."

6.4. Approaches to Reduce Social Costs of Grid Interconnection

Though the potential social benefits and costs of gird interconnections are likely to be highly case-specific, there are several generic approaches that can help to reduce the social costs of grid interconnection, reduce the risk of social damage from grid interconnection arrangements, and/or increase the social benefits derived from interconnections. These approaches include:

- Locating **power lines in existing transmission or transport corridors**. To the extent possible while maintaining safety and reliability standards, power lines used for international grid interconnections should be placed in existing transmission corridors—or, if that is not possible, in existing transport (road or rail, for example) corridors—whenever possible. Placing new power lines in existing rights-of-way minimizes additional disturbance to the ways of life of local remote communities, and tends to minimize additional environmental disturbance (and the attendant social costs of environmental problems) related to power line construction and operation. Placing new transmission lines in existing corridors is also less likely to stimulate social conflict over the interconnection project, as the power line will not traverse as much virgin territory[108].

107 Workshop on Regional Power Trade (2001), *Regional Electricity Trading: Issues and Challenges*. Paper from the Workshop on Regional Power Trade, Kathmandu, Nepal, March 2001. Available as *http://64.224.32.197/Publications/shean.pdf; quote is from page 6.*

108 There are also likely to be cost savings when locating a transmission line in an existing right-of-way, including lower costs for clearing of the route and providing access to the line. These costs may be offset, of course, by higher costs caused by the use of a routing that is less direct.

- Make sure that **benefits and costs of power projects are shared equitably**. As stressed earlier in this Chapter and in Chapter 5 of this Report, a key to reducing the political and social difficulties involved in reaching agreement on grid interconnections is to make sure that both the costs and benefits of a project are equitably shared by the various stakeholder groups. This means assuring that communities hosting a power line or other infrastructure related to grid interconnection are compensated for doing so, that investors and contractors are adequately but not excessively paid for their financial services and work, that benefits can clearly be shown to be flowing to the societies sponsoring the power line, and that within the societies receiving benefits, specific individuals and groups do not end up taking more than their share of benefits. By sharing project costs and benefits equitably among project stakeholders in a transparent manner, social conflicts related to the project should be minimized.
- **Integrate** planning **of grid interconnections** with overall **long-term power planning**. Benefits and costs of any project must be calculated relative to reference and alternative sets of conditions—that is, relative to what would have happened, or could have happened, in the absence of the project. This means, for example, demonstrating an interconnection project's viability relative to other ways of providing importing countries with the same power supplies using internal (or other imported) resources, or demonstrating that the project has net benefits relative to some other means of providing stability and sufficient generation capacity to the national grid. Providing a thorough, long-term analysis of the interconnection project in the context of what would have happened without the interconnection, or would have happened had other major options for providing electricity services were pursued (for example, emphasizing decentralized local generation and energy efficiency options), is a key way of allowing the different social stakeholder groups to clearly evaluate whether the interconnection option is in their best interest, and to be assured that other options with possibly greater social benefits have not been overlooked. Planning should also be undertaken jointly, or collaboratively, by the countries potentially involved in the interconnection, to assure that all relevant project costs and benefits are taken into account to the extent possible[109]. In fact, planning of grid interconnections should be integrated not only with long-term power planning, but with long-term planning for the provision of energy services (not just fuels) and of social development in general. This point was stressed in a 2004 UN-DESA Report on sustainable energy consumption in Africa, prepared by Stephen Karekezi, Jennifer Wangeci, and Ezekiel Manyara, and is illustrated in the following quote[110]:

> "The key challenge facing Africa is not to increase energy consumption per se, but to ensure access to cleaner energy services, preferably through energy efficiency

109 The costs and benefits of "joint planning" are described in the "Module 4: Integrated Operational Planning: Optimal Conditions" volume of *Regional Electricity Cooperation and Integration (RECI), E7 Guidelines for the pooling of resources and the interconnection of electric power systems*, prepared by the E7 Network of Expertise for the Global Environment, dated approximately 2000, and available from *http://www.e7.org.*

110 Stephen Karekezi, Jennifer Wangeci, and Ezekiel Manyara (2004), *Sustainable Energy Consumption in Africa*. Prepared for the African Energy Policy Research Network (AFREPREN/FWD) for UN DESA. UN DESA Final Report, May 2004. Quote is from page i (Executive Summary). Report available as *http://www.un.org/esa/sustdev/sdissues/consumption/Marrakech/EnergyConsumption.pdf.*

> and renewable energy thus promoting sustainable consumption. Unlike most industrialized countries which progressed from traditional energy to unsustainable conventional energy consumption patterns and which are now struggling to move to a sustainable energy path, Africa could, in a number of sectors, leapfrog directly from current traditional energy consumption patterns to sustainable energy options. Consequently, the careful examination of energy consumption patterns and trends in Africa should be of interest to the sustainable development community."

Note that long-term planning here does NOT (and practically, cannot) mean specifying every element of the future development of an electricity system, but rather means a process, requiring frequent updating and iteration, through which overall directions for a power system (or energy sector, or society) are chosen. The actual implementation of these directions may be up to government agencies, the private sector, or a combination of the two, guided by overall policies[111].

- **Plan interconnection construction and operation** so as to **maximize social benefits and avoid social costs**. Social issues should be included explicitly as considerations when planning how grid interconnections, and the power plants that will feed them, are to be constructed and operated. For example, where temporary work camps to provide lodging for workers on construction projects, the camps should be planned, preferably with input from local residents, so as to minimize their negative impact on nearby communities and on the resources those communities depend upon. The operation of hydroelectric plants should take into account the seasonal needs of downstream communities for water to support agriculture and fisheries so as to minimize social and environmental impacts on locals. If local communities are promised benefits from the interconnection in return for hosting electrical facilities, those benefits should be supplied promptly so as to build trust and minimize the potential for social conflict. In the context of the construction of hydropower plants, E.A.K. Kalitsi expressed the need for continuous monitoring and assessment of social situations as follows[112]:

> "There is a need for detailed and extensive studies during the planning phase long before implementation time. These studies will have to be intensified during implementation and the results used to modify the plans. With environmental data gathered before and during construction and filling stage, it was possible to

111 Examples of procedures for the demand- and supply- (resource evaluation) side elements of long-term planning incorporating consideration of interconnections can be found in the "Module 2: Market Analysis" and "Module 3: Resource Development" volumes of *Regional Electricity Cooperation and Integration (RECI), E7 Guidelines for the pooling of resources and the interconnection of electric power systems*, prepared by the E7 Network of Expertise for the Global Environment, dated approximately 2000, and available from *http://www.e7.org*.

112 E.A.K. Kalitsi (2003), *Problems And Prospects for Hydropower Development in Africa*. Prepared for the Workshop for African Energy Experts on Operationalizing the NGPAD Energy Initiative 2 – 4 June 2003 Novotel, Dakar, Senegal, and available as *http://www.un.org/esa/sustdev/sdissues/energy/op/nepadkalitsi.pdf.* Quote is from page 13 and 14. This reference also provides a useful summary of the need for other types of ongoing planning, studies, and mitigation activities related to the social and environmental impacts of large hydroelectric facilities, with the experience in Ghana as background.

> plan mitigation and eradication measures, to monitor and assess changes in the ecosystem. Such planning should not be static but be adjusted as new conditions arise. In spite of initial and environmental and social studies before start of construction when it came to actual implementation the information available was found to be inadequate. This is how VRA [the Volta River Authority] found itself compelled to provide its dislocated people with uniform core houses not related to the value of their properties affected; or failing to clear from the reservoir areas tree stumps scattered all over the lake creating serious hazards to navigation or failure to provide for settlers and riparian communities to share in the benefits of electricity. The lesson here is that there is need for continuous planning and evaluation in order to implement a satisfactory program to mitigate any negative effect of hydropower developments."

Full consideration of both upstream and downstream riparian rights and water-sharing issues should be a part of any interconnection project that will involve changes in hydroelectric capacity or operation.

- Assure that **all affected parties are brought into** and can **participate meaningfully** in the decision process. Social groups with a demonstrable voice in a decision on an interconnection project are arguably less likely to come into conflict with authorities or each other over the project later. In order to promote the participation of all potentially affected social stakeholders in an interconnection project, it is necessary to create a forum, starting early in the project formulation process, where stakeholder groups can learn about the project and participate in decisions. Moreover, representatives of stakeholder groups must be provided with the resources (education, expertise, and the wherewithal to attend meetings, for example) that they need to fully participate in the project planning process. Finally, post-project (including post-relocation) monitoring of the social situation of peoples affected by the project is needed in order to anticipate and minimize any ongoing or developing problems.

Many of the suggestions above, and many other techniques germane to the development of grid interconnections in such as way that social problems created are minimized, are described in the document *Conflict-Sensitive Business Practice: Guidance for Extractive Industries*, published by International Alert[113].

6.5. Summary and Conclusion

International grid interconnection projects may yield significant social benefits to some or many groups in the nations participating in the projects. Among these benefits are:

- The social benefits derived from **enhanced supplies of electricity**. An international interconnection may help to provide better power quality, more reliable power, and more widespread availability of electricity to communities. Greater availability of affordable electricity can provide more opportunities for education, improvements in health care, development of employment opportunities, and reduction of difficult and labor-intensive tasks, all of which can contribute to sustainable development.

113 Jessica Banfield, Adam Barbolet, Rachel Goldwyn, and Nick Killick (2005), *Conflict-Sensitive Business Practice: Guidance for Extractive Industries*. Prepared for International Alert, dated March, 2005, and available as ***http://www.international-alert.org/pdf/pubbus/conflict_sensitive_business_practice_all.pdf.***

- The social benefits derived from **national and/or local income related to electricity sales**. If carefully and equitably distributed, and particularly when spent toward meeting social development goals such as improved education, health care, and housing, agricultural improvement, and creation of employment opportunities, the income to power exporting countries from an interconnection agreement may have many positive social impacts.
- A spur toward additional **cooperative activities between the interconnected societies**. Successful operation of a grid interconnection may provide the experience and incentive for interconnected countries to embark on additional cooperative activities, including cultural exchanges and trade in other commodities, that can help improve social (as well as political) relations between the countries.

Among the potential social costs and/or liabilities of grid interconnection are:

- The **isolation of local residents from resources**. The presence of a power line or other types of infrastructure used in grid interconnections may partially or totally physically separate local groups from the water, land, forest, agricultural, social and economic (local towns and markets), and other resources that they use regularly.
- The process of **construction of interconnection infrastructure** may bring in **unwanted outside influences**, causing social problems in formerly isolated local populations ranging from alcoholism to violence.
- Other **fuel cycle impacts** on social groups. For electricity exporting countries, the construction and operation of power plants built to feed an interconnection, and of the fuel supply infrastructure that feeds the power plants, may have significant social impacts. Displacement of populations by new facilities (particularly hydro facilities) can be considerable, and can lead to social problems such as out-migration from rural areas to the margins of cities, under-employment, and dislocation from ancestral lands.
- Increased **dependence on outside resources**. For electricity importing countries, use of electricity provided via an interconnection from a neighboring country can reduce the incentive to use local resources, can increase the vulnerability of communities to cuts in power supply that are outside of the control of the community and the nation, and can reduce the preparedness of the community to deal with electricity shortages.

Some of the general approaches to making sure that social benefits of interconnections are maximized, and social costs are minimized, include, as noted above:

- Locating new power lines **in existing transmission or transport corridors** as much as possible.
- Making sure that the social **benefits and costs are fully considered** as part of any project impact or feasibility study, and make sure **that social and economic benefits and costs** of the project are equitably distributed.
- **Integrating** consideration of grid interconnections as a part of overall **long-term electricity** sector (and general energy sector) **planning**.
- **Plan the construction and operation** of grid interconnections so as to **minimize social costs** and assure that **social benefits are delivered as promised**. Continue planning and assessment studies even after the grid integration project is completed and avoid “developer’s fatigue”, in which “the

enthusiasm which characterized the initial socio-economic activity waned when this should have been the time for such activities to have been accelerated"[114].

- Implement **capacity building to allow different social stakeholder** groups to meaningfully participate in **investigating and deciding upon grid interconnection options**, and in **planning** for grid interconnection construction and operation.

6.6. Selected resources for further analysis

Stephen Karekezi, Jennifer Wangeci, and Ezekiel Manyara (2004), *Sustainable Energy Consumption in Africa*. Prepared for the African Energy Policy Research Network (AFREPREN/FWD) for UN DESA. UN DESA Final Report, May 2004. Quote is from page i (Executive Summary). Report available as *http://www.un.org/esa/sustdev/sdissues/consumption/Marrakech/EnergyConsumption.pdf*

E.A.K. Kalitsi (2003), *Problems And Prospects for Hydropower Development in Africa*. Prepared for the Workshop for African Energy Experts on Operationalizing the NGPAD Energy Initiative 2 – 4 June 2003 Novotel, Dakar, Senegal, and available as *http://www.un.org/esa/sustdev/sdissues/energy/op/nepad-kalitsi.pdf.*

Itai Madamombe (2005) "Energy Key To Africa's Prosperity: Challenges in West Africa's Quest for Electricity". *Africa Renewal*, Vol.18 #4, January 2005, available as *http://www.un.org/ecosocdev/geninfo/afrec/vol18no4/184electric.htm.*

The UN Global Compact (*http://www.unglobalcompact.org*) includes a number of references, case studies and tools in areas relevant to assessing the social benefits and costs of business ventures (such as interconnections and other large energy ventures) and their impacts on sustainable development. Issues such as transparency and multi-stakeholder processes are covered in documents (including the Banfield et al document referenced below) available on the UN Global Compact site.

Jessica Banfield, Adam Barbolet, Rachel Goldwyn, and Nick Killick (2005), *Conflict-Sensitive Business Practice: Guidance for Extractive Industries*. Prepared for International Alert, dated March, 2005, and available as *http://www.international-alert.org/pdf/pubbus/conflict_sensitive_business_practice_all.pdf.*

114 E.A.K. Kalitsi (2003), *Problems And Prospects for Hydropower Development in Africa*. Prepared for the Workshop for African Energy Experts on Operationalizing the NGPAD Energy Initiative 2 – 4 June 2003 Novotel, Dakar, Senegal, and available as *http://www.un.org/esa/sustdev/sdissues/energy/op/nepadkalitsi.pdf.* Quote is from page 15, and is based on experience with large hydroelectric projects in Ghana.