



# Infrastructure for Whom?

A CRITIQUE OF THE INFRASTRUCTURE STRATEGIES  
OF THE GROUP OF 20 AND THE WORLD BANK

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## A Critique of the Infrastructure Strategies of the Group of 20 and the World Bank

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### About International Rivers

International Rivers protects rivers and defends the rights of communities that depend on them. With offices in four continents, International Rivers work to stop destructive dams, improve decision-making processes in the water and energy sectors, and promote water and energy solutions for a just and sustainable world.

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# Acronyms

<b>ASEAN</b>	Association of Southeast Asian Nations	<b>MDGs</b>	Millennium Development Goals
<b>DRC</b>	Democratic Republic of Congo	<b>OECD</b>	Organization for Economic Co-operation and Development
<b>G20</b>	Group of 20	<b>PPPs</b>	Private Public Partnerships
<b>GCF</b>	Green Climate Fund	<b>TI</b>	Transparency International
<b>HLP</b>	High Level Panel on Infrastructure	<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>IEA</b>	International Energy Agency	<b>WCD</b>	World Commission on Dams
<b>IUCN</b>	International Union for Conservation of Nature		
<b>MDBs</b>	Multilateral Development Banks		

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# Executive Summary

There can be no prosperity without infrastructure, but infrastructure projects don't necessarily benefit the poor. Past energy, water and transport strategies have neglected the poorest population groups, and taken a heavy toll on affected people and the environment. Will the new infrastructure strategies of the World Bank and the Group of 20 address the needs of the poor, or will they entrench the power of privileged groups?

The Grand Inga Dam on the Congo River is an icon of centralized infrastructure development, and has been heralded as Africa's dream. With a capacity of 40,000 megawatts and a price tag of \$80 billion it will be the world's biggest hydropower project if it ever gets built. Project proponents claim that the dam could meet the energy needs of 500 million African households – more than twice the number of families who actually live on the continent.

Sub-Saharan Africa and other poor regions of the world have huge needs for infrastructure services. More than 1 billion people have no access to clean water, electricity, and improved sanitation. They have been left high and dry by the infrastructure development strategies of past decades. Traditional and new financiers are now increasing their funding for infrastructure projects, and have a chance to address the opportunities that were missed in the past.

In November 2011, the Group of 20, the World Bank and other multilateral development banks prepared new strategies for infrastructure development. They propose to focus public support on strategic regional infrastructure projects such as large dams and transport corridors, and to make them attractive for private investment through public guarantees and other incentives. They argue that centralized infrastructure projects with private participation will lower the costs of services such as electricity, and have identified the Inga scheme as an example of their proposed approach.

This report examines the track record of the proposed approach to infrastructure development. Like the G20 and the development banks, it focuses on Sub-Saharan Africa and the power sector. The report finds that large dams – and particularly the complex multipurpose schemes once again being promoted by the World Bank – have a history of big cost overruns and questionable economics. They have typically been built without public participation, and have increased societies' vulnerability to corruption

and climate change. Centralized projects have often had massive social impacts on local communities, but their benefits have largely bypassed the rural poor. In spite of the billions of dollars that have been poured into dams at the Inga site over the past five decades, 94% of the population of the Democratic Republic of Congo still has no access to electricity.

Most rural poor in Africa and other parts of the world live closer to a river and other sources of renewable energy than to the electric grid. While centralized grid electrification is not an economic proposition for large parts of Africa, the cost of wind and solar power has rapidly decreased (and continues to do so). Decentralized, diversified solutions are more affordable than electricity from the central grid, and can support the creation of rural jobs in agriculture, agro-processing industries and tourism. They strengthen the institutional capacities and climate resilience of poor societies.

The International Energy Agency estimates that at a cost of \$41 billion per year, 395 million people could be provided with access to electricity and 1 billion people with improved cooking stoves by 2015. This would pay for all the energy investment needed to achieve the Millennium Development Goals. Such bottom-up solutions offer a better way to address the basic needs of the rural poor than the large regional projects proposed by the G20 and the development banks.

In 2012, infrastructure development is at a crossroads. Infrastructure strategies will be discussed by the G20 Summit in Mexico in June and throughout the Rio+20 process. Jim Yong Kim will take office as the World Bank's new President in July and may want to redefine the Bank's role, including in the infrastructure sector. This report offers concrete recommendations that will allow governments, the G20, the World Bank and other actors to draw lessons from past experience with large, centralized infrastructure projects and to address the needs of the poor in an effective and resilient way.



# Part I: Background

## 1. INFRASTRUCTURE AND DEVELOPMENT

Infrastructure hardwires our societies. It allows us to light our streets, heat our homes, get water from the tap, and flush our toilets. It allows us to travel, make phone calls, and cool perishable goods. Without infrastructure there can be no prosperity.

Yet like development or sustainability, infrastructure is a plastic word that covers many different concepts. It includes bullet trains and access roads for poor farmers, water pipes in the *favelas* and canals that irrigate biofuel plantations. Infrastructure includes rural mini-grids and the Fukushima power plant, the Golden Gate Bridge and Alaska's bridge to nowhere. While there can be no prosperity without infrastructure, infrastructure does not necessarily bring broad-based economic growth and social development.

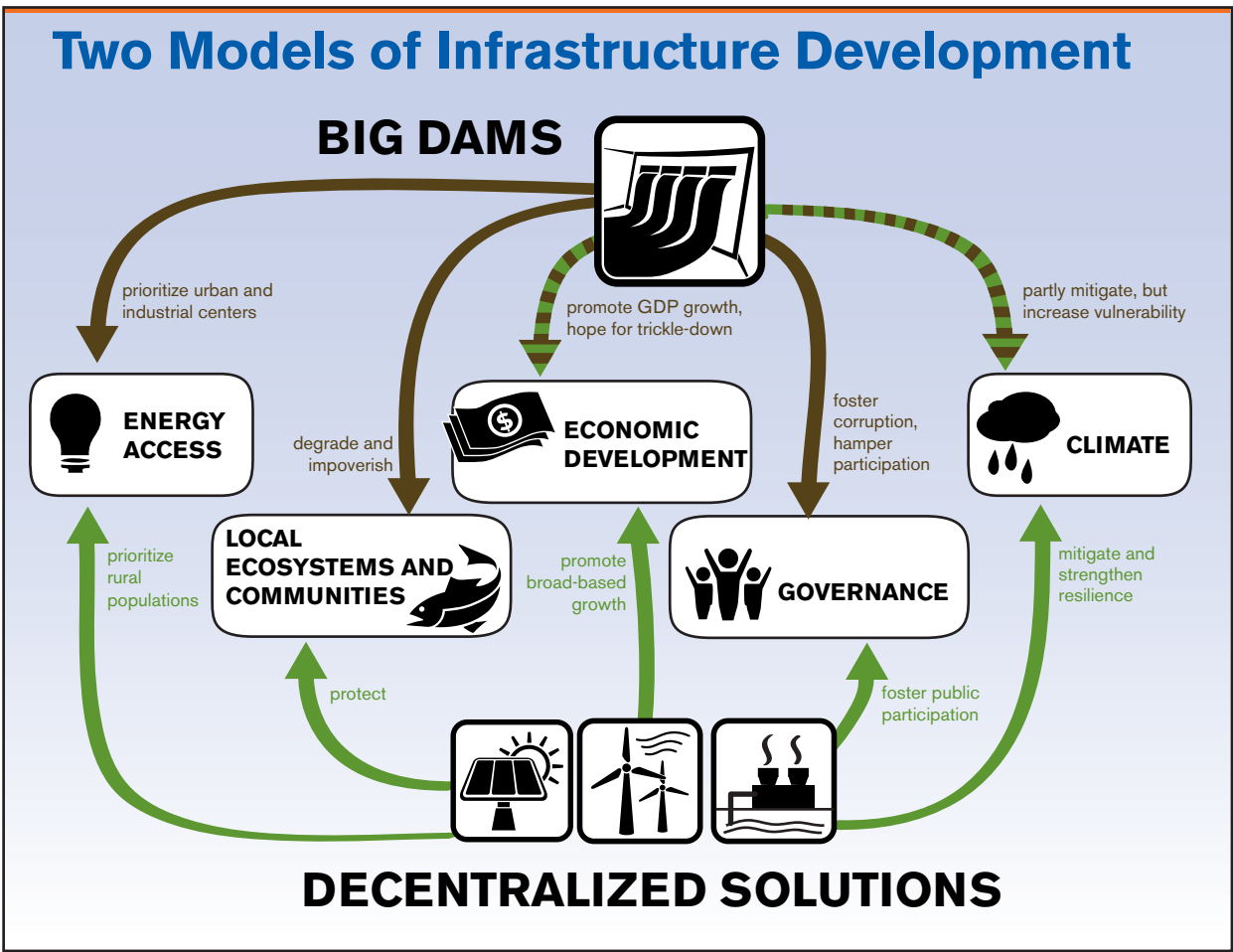
After hundreds of billions of dollars have been invested in the infrastructure sectors of poor countries, at least one billion people remain cut off from the basic services that would allow them to lead healthy, productive lives. About 13% of the world population has no access to clean water, 19% has no access to electricity, and 39%

has no access to improved sanitation.<sup>1</sup> Infrastructure projects have impoverished millions of people who lived in their paths, and contributed to climate change and the degradation of ecosystems on which present and future generations depend for their livelihoods.

Since the turn of the century, new and traditional financiers have massively increased their funding for infrastructure projects. Infrastructure has become a buzzword of the current development debate. The Group of 20 has taken on a coordinating role in this debate. It has tasked a Panel of Experts to prepare a report on future infrastructure strategies, and asked the World Bank and other multilateral development banks to do the same. Infrastructure strategies play a significant role in the debate about Green Growth within this year's Rio+20 process and in other fora.

The G20, the World Bank and the other MDBs promote a specific agenda of infrastructure development. They favor large, centralized, regional projects such as

1 A Safe and Just Space for Humanity, p. 10



big multipurpose dams and transport corridors that are made attractive for private investors. They have identified the Inga scheme on the Congo River – the world’s largest hydropower project – as an illustrative example of their approach.

The G20 and the development banks all have endorsed the Millennium Development Goals, yet they are not explicit about how exactly their infrastructure strategies will reduce poverty and achieve other development objectives. A rising tide of infrastructure investment, we are asked to assume, will lift all boats.

This report disaggregates the debate about infrastructure. It analyzes the recommendations of the G20, the World Bank and other development banks, and examines the track record of the approach they propose. It analyzes how centralized, regional projects have contributed to economic growth, how successful they have been in expanding access to energy and other basic services, what their social and environmental impacts have been, how they have helped to mitigate and adapt to climate change, and how compatible they are with efforts to strengthen public participation and fight corruption. The report concludes with a series of recommendations for governments, the G20, the World Bank and other development banks.

## 2. INFRASTRUCTURE DEVELOPMENT GOALS

There is general agreement that a strong link exists between infrastructure investment, economic development and poverty reduction, yet official documents are largely silent on how this link works. The Millennium Development Goals and other principles of social development do not address the role of infrastructure in any detail. Documents on economic development on the other hand typically do not elaborate how exactly infrastructure investment is supposed to reduce poverty.

The Millennium Development Goals, which have been endorsed by 193 governments and more than 20 international organizations, aim to eradicate extreme poverty and improve human wellbeing by 2015. One of the eight MDGs is to ensure environmental sustainability. Remarkably, the eight goals, and the UN Millennium Declaration on which they are based, do not explicitly address infrastructure development.

The Group of 20 was created in 1999, and gained importance when its member governments began meeting regularly to deal with the global financial crisis in 2008. The G20 created a Development Working Group and adopted a development agenda in the form of the Seoul Development Consensus for Shared Growth in 2010. The major themes of the Development Working Group are currently green growth, infrastructure, and food security.

**“Infrastructure includes rural mini-grids and the Fukushima power plant, the Golden Gate Bridge and Alaska’s bridge to nowhere. While there can be no prosperity without infrastructure, infrastructure does not necessarily bring broad-based economic growth and social development.”**

The Developing Working Group has called infrastructure the “jewel on the crown of the G20 development agenda.”<sup>2</sup> The six core principles of the Seoul Consensus include “focus on economic growth” and “private sector participation,” and the nine “key pillars” which are supposed to attain these principles include infrastructure, private investment and job creation. Neither the core principles nor the key pillars of the G20 Development Consensus explicitly address poverty reduction and environmental sustainability.

At the Seoul summit in November 2010, the G20 created a High Level Panel on Infrastructure (HLP) with prominent representatives of governments and the private sector. The panel’s mandate was to prepare recommendations within one year “to scale up and diversify financing for infrastructure needs, including from public, semi-public and private sector sources, and identify, with multilateral development banks, a list of concrete regional initiatives.”<sup>3</sup>

The HLP report states at the very outset: “The Development agenda is at the core of the G20 priorities, as an essential part of the global economic agenda, promoting a shared and inclusive economic growth, conducive to sustainable development, and reducing poverty, inequality and unemployment.”<sup>4</sup> Yet the report is silent about the specific goals which an increase in infrastructure financing is supposed to attain.

Mexico holds the presidency of the G20 in 2012. The Mexican government defined five priorities for its presidency. In addition to global financial and economic stabilization, they include “promoting sustainable development, green growth and the fight against climate change.”<sup>5</sup> The seven dimensions of the Mexican green growth agenda include infrastructure, climate change, energy, and food security.

## 3. THE G20 INFRASTRUCTURE REPORT

The HLP on Infrastructure submitted its final report to the G20 in October 2011, a few days before the Group’s summit in Cannes. The panel’s recommendations are grouped along the themes of “Ensuring a strong and

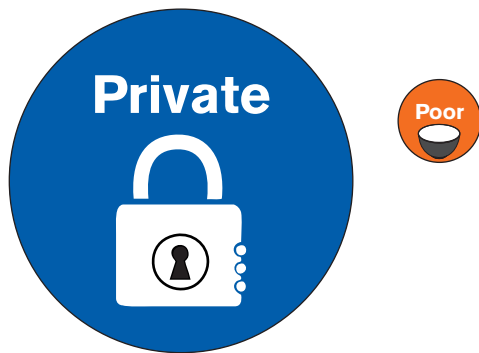
2 Infrastructure, A G20 agenda

3 High Level Panel on Infrastructure, p. 1

4 Ibid., p. i

5 See G2012 Mexico

## Bias in the G20 Infrastructure Report



The infrastructure report prepared for the G20 in 2011 mentions *private* (or *PPP*, for Public-Private Partnership) 184 times. It mentions *poor* (or *poverty*) seven times.

sustainable supply of bankable projects,” “Contributing to building an enabling environment,” and “Making funding available under appropriate terms.” Its specific recommendations include

- developing “gold standard” policies for public-private partnership (PPP) projects;<sup>6</sup>
- insisting less on competitive bidding requirements “in order to accommodate PPPs more easily;”<sup>7</sup> and
- moving “from a lending culture to an enabling culture by ‘crowding in’ more private capital through the use of guarantees and other risk mitigation products.”<sup>8</sup>

The recurrent theme of the HLP report is its support for private infrastructure projects through public funding, guarantees, and other incentives. The report only briefly justifies its strong support for PPPs as follows: “Comparative analysis reveals that the PPPs contribute to saving time and thus increasing major social benefits, and reduce cost over-runs relative to public projects and thereby enhance the relative efficiency of investment, for example in PPP road projects.”<sup>9</sup> The report does not make an explicit case for how exactly PPPs contribute to poverty reduction.

In the conclusion of the report, the HLP states that “regional infrastructure projects have been considered increasingly important to capture the benefits from economic integration.” Together with the MDBs, the HLP identified a set of criteria to help MDBs and governments “to determine whether a specific infrastructure project could be considered as exemplary, in order to facilitate prioritization.”<sup>10</sup> These criteria are:

- the extent to which the project brings about regional integration, considering the number of direct and indirect beneficiary countries;
- the extent of political support available to the project, considering both concerned countries and regional organizations;
- the potential transformational impact of the project on sub-regions’ growth considering its economic area of influence;
- the maturity of the project, considering how advanced project preparation is;
- the institutional capacity, considering technical capacity of the implementing institutions;
- the potential attractiveness for the private sector, considering it in terms of funding and creditworthiness.<sup>11</sup>

Remarkably, the HLP and MDB criteria do not mention poverty reduction, the mitigation of climate change or environmental sustainability more generally. The report only states that the third criterion (on promoting growth) “implies sustainable development dimension [sic] and is particularly met in green growth related projects.”<sup>12</sup>

The HLP invited the MDB Working Group on Infrastructure, which includes the World Bank Group and five other development banks, to identify a number of regional projects that exemplify the new criteria. The Working Group came up with the following 11 projects, which are listed in the appendix of the HLP report:

- **Energy sector:** Inga hydropower project in the DRC; regional power pools based on hydropower projects in East and West Africa; solar energy for export to Europe in North Africa and the Middle East; biomass energy in the Greater Mekong Subregion; a gas pipeline from Turkmenistan to South Asia.
- **Transport sector:** railway projects in East Africa and the Middle East; transport corridors in Southern Africa and Mesoamerica.
- **Others:** ASEAN Infrastructure Fund.

In conclusion, the HLP proposed increased public support for private infrastructure projects and projects that facilitate regional economic integration in particular. The panel did not address social and environmental concerns explicitly, and did not make an effort to explain how its recommendations are expected to reduce poverty and bring about sustainable development more generally. It may be telling that the HLP report contains 184 mentions of the words “private” and “PPP”, but only seven references to “poor” or “poverty.”

6 High Level Panel on Infrastructure, pp. 3ff.

7 Ibid., pp. 6ff.

8 Ibid., pp. 10ff.

9 Ibid., p. 8

10 Ibid., p. 13

11 Ibid., pp. 13f.

12 Ibid., p. 13

#### 4. THE ROLE OF THE WORLD BANK AND OTHER MDBS

The infrastructure report which the Group of 20 commissioned is part of a broader trend. After a lull in the 1990s, the World Bank committed to increasing support for infrastructure projects in its Infrastructure Action Plan in 2003. For the Bank, increased infrastructure lending is part of an effort to remain relevant for middle-income countries.

At the Seoul summit of 2010, the G20 asked the World Bank and the MDB Working Group to report back on their respective infrastructure strategies. The G20 HLP and the MDBs worked hand in glove when they prepared their reports. The HLP relied on staff from the World Bank – not from G20 member countries – in the preparation of its report. The panel also cooperated with the development banks in preparing the criteria for the selection of regional priority projects, and lent legitimacy to the banks' list of priority projects by presenting them in its report.

The HLP, MDB and World Bank reports were all finalized in October 2011. It is no surprise that their recommendations are very similar and reinforce each other.

The Infrastructure Action Plan of the MDB Working Group presents a series of proposed measures, including facilitating projects with technical assistance and targeted financial support, developing catalytic regional projects, increasing incentives for MDB staff to engage in PPP and

regional projects, and adapting procurement guidelines to ease collaboration with the private sector.

The MDB Action Plan argues that regional projects have “the potential to be transformational in helping to provide the access to markets and essential services critical for promoting inclusive and sustainable growth.”<sup>13</sup> It proposes that such regional projects be supported through more MDB staff and financial resources. It even suggests that “this may include making funds directly available to the private sector under certain circumstances.”<sup>14</sup>

The World Bank's updated infrastructure strategy for 2012-15 concedes that its past lending has been “biased towards infrastructure investments that promote growth, with expected ‘trickle-down effects’.” Learning from experience, the Group will do more to enhance the delivery of infrastructure services to the poor.”<sup>15</sup> Yet the updated strategy points in a different direction. Like the HLP report, the strategy update focuses on support for large, private regional infrastructure projects. The Bank aims to double the number of PPP projects and advisory services from 2010-15. And it admits that because of its own budget constraints, it is “consolidating resources into fewer, but larger, projects.”<sup>16</sup>

In 2010, the World Bank already called for “a new generation of large power generation projects” in a report

13 MDB Working Group on Infrastructure, p. 4

14 Ibid., p. 5

15 Transformation Through Infrastructure, p. 18

16 Ibid., pp. 31, 10

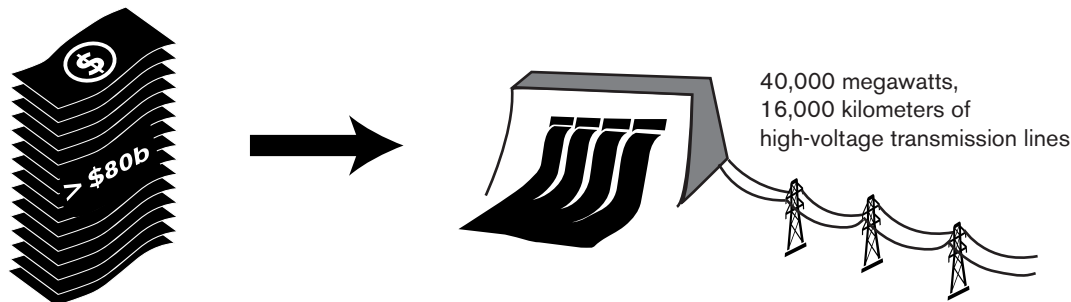


*There can be no prosperity without development. Yet past infrastructure strategies have neglected the poorest population groups. (IRIN)*



## What Would \$80 Billion Buy?

**Cost of Grand Inga Dam on the Congo River and associated transmission lines: at least \$80 billion**



**Cost of improving energy access to hundreds of millions of people: \$41 billion**



Sources: World Energy Council, International Energy Agency

on Africa's infrastructure sector. The report claimed that regional hydropower projects and fully integrated regional power pools could reduce the cost of electricity in Africa by \$2 billion per year.<sup>17</sup> The Bank's 2010 report and the updated infrastructure strategy call for a revival of multipurpose dams, which are supposed to address electricity, irrigation and flood protection needs at the same time. The 2010 report argued that Africa needed to invest no less than \$9 billion a year into such multipurpose projects.<sup>18</sup>

Like the MDB Working Group, the World Bank Group aims to facilitate "transformational" infrastructure projects. While the Working Group defines transformation in terms of access to markets and services, the Bank states that such projects have "the goal of accelerating growth and even shifting clients towards more sustainable development trajectories."<sup>19</sup>

This focus on transformation is not coincidental. Governments are currently setting up the Green Climate Fund (GCF), whose mandate will be to fund transformational change. The MDBs and the World Bank in particular are positioning themselves as future recipients of GCF support. Yet while the UNFCCC secretariat

interprets the transformation which the Climate Fund is supposed to facilitate as shifting "towards a low-carbon, climate-resilient future," the banks define transformation as economic growth and market access.<sup>20, 21</sup>

The future of the G20 HLP has not yet been clarified. The multilateral development banks have meanwhile started implementing their infrastructure strategy and action plan. The G20 Development Working Group has asked the MDBs to report back on the implementation of their action plan and on the recommendations of the HLP report.

### 5. THE INGA DAMS – AN AFRICAN DREAM?

Hydropower projects play an important role among the exemplary regional projects that the multilateral development banks identified for the G20 HLP. The World Bank's updated infrastructure strategy states: "A hydropower project will be [sic] transformational project in a given country to the extent that: (i) access to electricity, and power generation represents a bottleneck (the point of leverage) in a country, and (ii) it is chosen among a range of technically feasible options over a more

<sup>17</sup> Africa's Infrastructure: A Time for Transformation, pp. 199, 187

<sup>18</sup> Ibid., p. 7

<sup>19</sup> Transformation Through Infrastructure, p. 4.

<sup>20</sup> UNFCCC

<sup>21</sup> After the publication of the World Bank strategy update, the mandate of the GCF was clarified as promoting a "paradigm shift" (rather than transformation) towards low-emission and climate-resilient development pathways.

polluting form of energy with a view of maximizing green benefits (green project).”<sup>22</sup> In other words, the World Bank considers a hydropower project to be transformational if a country needs more electricity and the hydropower project is not the most polluting option.

The MDBs’ list of exemplary regional projects includes regional power pools in East and West Africa that rely on large hydropower projects, and the Inga scheme on the Congo River. The World Bank calls the Inga hydropower project a “pre-eminent example” of the potential to unlock broader development benefits. Its infrastructure strategy asserts that Africa “has a strong pipeline of hydro-power projects – with schemes identified in Benin, Burundi, Cameroon, Ethiopia, Guinea, Liberia, Niger, Sierra Leone, Tanzania – that will help put these countries and their surrounding neighbors on a greener development path.”<sup>23</sup>

With its perennial flow and a water discharge that is only surpassed by the Amazon, the Congo River has a huge hydropower potential. Much of this potential is concentrated in the Inga rapids downstream of Kinshasa in the Democratic Republic of Congo (DRC). In the 1970s and early 1980s, the Mobutu government built the Inga 1 and 2 dams at this site. The dams have a combined installed capacity of 1,775 megawatts. Most of this capacity is supposed to power the mining province of Katanga through a 1,700 kilometer transmission line.

The Inga dams and transmission line suffered big delays and cost overruns. Due to neglect and mismanagement, the power plants now operate at only 40% of their capacity. The dams, hydropower plant and transmission line are currently being rehabilitated. Meanwhile, only 6% of the DRC population has access to electricity.

The Inga rapids have an untapped hydropower potential of more than 40,000 megawatts. This potential could be exploited by the Inga 3 Project (with a theoretical capacity of 4,500 megawatts) and the Grand Inga scheme, which would divert the Congo River through a series of dams at the Inga rapids. With an estimated capacity of

40,000 megawatts, Grand Inga would be the world’s largest hydropower project. With a hubris that is typical for large infrastructure projects, the current secretary-general of the International Commission on Large Dams called Grand Inga “the African dream” and claimed that it could supply electricity to about 500 million African households.<sup>24</sup> (Africa has no more than 200 million households.)

The Inga 3 Project could be implemented without damming and diverting the mainstream of the mighty Congo River. In 2004, the DRC formed the Westcor consortium with four Southern African governments to develop the project for the benefit of the regional electricity market. In 2006, the DRC government scuppered this deal and signed a contract with BHP Billiton instead. The mining company agreed to buy Inga 3’s electricity output to power a new aluminum smelter with a capacity of 800,000 tons per year. In 2011, the DRC government invited bids to develop the hydropower plant as a PPP project. Yet in February 2012, BHP Billiton abandoned the project “following a review of its economics” according to a company spokesperson quoted by *Reuters*. Neither the Westcor nor the BHP project would have expanded electricity access for the DRC’s poor population.

In 2011, the African Development Bank commissioned two Canadian and French engineering firms to prepare plans for the optimal development of the Grand Inga Project. The consultants proposed a staged development in which the full potential of the Inga site could be exploited with a series of dams and power houses. The complete scheme would have a capacity of 42,000 megawatts and export electricity through 16,000 kilometers of “power highways” to South Africa, Egypt, Nigeria and other countries.<sup>25</sup>

The cost of the Grand Inga Project has been estimated at up to \$80 billion. In November 2011, the governments of South Africa and the DRC signed an agreement to develop the project. Even just the cost of preparing the feasibility studies for the project has been estimated at more than US\$100 million.<sup>26</sup>

22 Transformation Through Infrastructure, p. 15

23 Ibid., p. 37

24 Hydropower & Dams, p. 61

25 Ibid., pp. 62ff.

26 High Level Panel on Infrastructure, Appendix 6



*The Grand Inga Dam on the Congo River has been called Africa’s dream. Yet the existing dams at the site have had massive cost overruns without delivering on their promises. (International Rivers)*

# Part II: Critique

## 6. ECONOMIC DEVELOPMENT

Hydropower dams are quintessential large infrastructure projects. They count among the biggest infrastructure investments in many countries, and have often been used as symbols of national pride. Hydropower projects and the transmission lines that support them make up a significant part of the regional priority projects that have been identified by multilateral development banks for the G20. The MDBs are using the Inga scheme – the world’s largest hydropower project – as an illustrative example for their proposed strategy.

What is the development impact of large, regional hydropower projects? The independent World Commission on Dams (WCD), which was convened by the World Bank and IUCN, carried out the most thorough evaluation of the development impacts of dams in 1998–2000. It came to the following, carefully calibrated conclusion:

- Dams have made an important and significant contribution to human development, and the benefits derived from them have been considerable.

- In too many cases, an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment.
- Lack of equity in the distribution of benefits has called into question the value of many dams in meeting water and energy development needs when compared with the alternatives.<sup>27</sup>

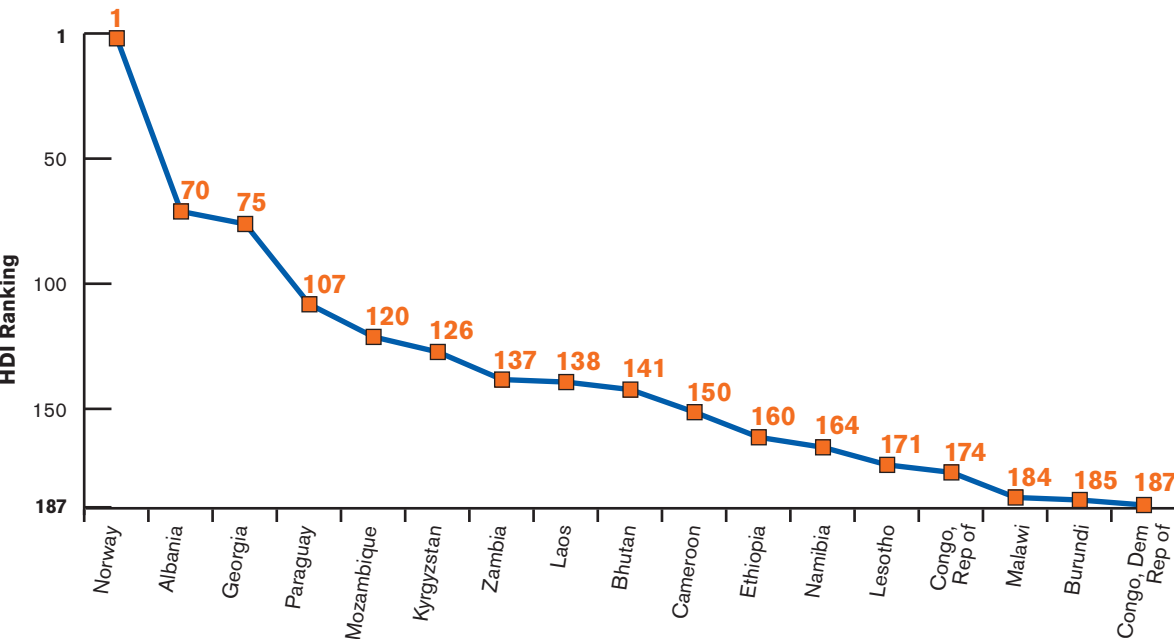
“Overall, the [World Bank Group’s] business has been biased towards infrastructure investments that promote growth, with expected ‘trickle-down effects’. In reality, the results of any trickles have been slow.”

World Bank Group, November 2011

27 Dams and Development, p. xxviii

## Hydro-Dependency – a Recipe for Poverty?

The countries which depend on hydropower for more than 90 percent of their electricity supply occupy the following positions on the Human Development Index (187 countries listed):



Sources: International Journal on Hydropower and Dams 2011 World Atlas & Industry Guide, UNDP 2011 Human Development Report

**“Dams have made an important and significant contribution to human development, and the benefits derived from them have been considerable. In too many cases, an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment.”**

**World Commission on Dams, 2000**

The WCD found that the technical, financial and economic performance of dams was marked “by a high degree of variability.”<sup>28</sup> It noted that few ex-post evaluations of dam economics have been carried out. On average, hydropower projects performed better than irrigation dams, and the multipurpose dams which the World Bank is proposing in its draft Energy Strategy performed worst among all types of projects. The eight projects for which the WCD carried out in-depth case studies had average cost overruns of 89%, and the 81 projects in the Commission’s cross-check survey, of 52%.<sup>29</sup>

Multipurpose dams are complex schemes that aim to meet multiple goals that often work at cross-purposes, such as power generation, irrigation, and flood protection. Not surprisingly, the WCD report found that these projects had the worst economic track record among all project types. The report concluded that “the extent to which conflicts arising from multi-benefit operation will affect performance is probably under-estimated.”<sup>30</sup>

The findings of the World Commission on Dams are borne out by the experience with large, regional hydropower dams particularly in Africa. Projects such as Akosombo on the Volta, Inga 1 and 2 on the Congo, Kariba on the Zambezi and Manantali on the Bafing River were supposed to jumpstart the economic modernization of whole countries and regions. It has not happened. The projects did not deliver the expected benefits, suffered from massive cost overruns, and turned into an albatross on their countries’ development.

As mentioned above, the Inga 1 and 2 dams suffered massive time and cost overruns and currently only operate at 40% of their capacity. In 2003, the World Bank decided to rehabilitate the dams and their transmission lines. By 2011, both projects had seen massive delays, and their budgets had at least quadrupled.<sup>31</sup> After billions of dollars have been invested in centralized hydropower projects

on the Congo River over half a century, high-voltage customers take up 85% of all the electricity consumed in the DRC, while 94% of the country’s population have no access to electricity.<sup>32</sup>

Africa is the world’s most hydro-dependent region. Ten out of the 17 countries that depend on hydropower for more than 90% of their electricity supply are in Africa. High hydro-dependency appears to be a brake rather than stimulus for economic development. Of the world’s highly hydropower-dependent countries, only one – Norway – is prosperous, two – Albania and Georgia – have medium income levels, while

14 are poor or extremely poor.<sup>33</sup> Unlike most African countries, Norway has built its power sector primarily on medium-sized rather than large, centralized dam projects.

Trickle-down strategies may have worked in countries with a strong state such as Brazil, China and South Korea. They have generally not worked in Africa and other poor regions of the world. As mentioned above, the World Bank’s updated infrastructure strategy admits: “Overall, the business has been biased towards infrastructure investments that promote growth, with expected ‘trickle-down effects’. In reality, the results of any trickles have been slow.” The lessons from this experience are not reflected in the infrastructure strategies of the G20 and MDBs.

## **7. ENERGY POVERTY**

While the DRC is an extreme case, energy poverty affects most of Sub-Saharan Africa. The power generation capacity of the region’s 48 countries, without South Africa, is a mere 28 gigawatts, equal to the capacity of Spain. This translates into an electricity use of only 124 kilowatt hours per year and person, barely 1% of the consumption in rich countries.<sup>34</sup>

Even this modest capacity is heavily skewed towards energy-intensive industries. According to World Bank data from 2008, energy-intensive high-voltage customers (such as mines, steel plants and aluminum smelters) consumed 33% of all electricity in Sub-Saharan Africa – slightly more than the total of all residential consumers. In the DRC, Ghana, Namibia and South Africa, high-voltage customers took up more than three quarters of all electricity consumed in these countries.<sup>35</sup> Many of these energy-intensive industries consume electricity at heavily subsidized rates.<sup>36</sup>

While heavy industries benefit, only 31% of Sub-Saharan Africa’s population and 12% of the region’s rural

28 Ibid., p. 38

29 Ibid., p. 40

30 Ibid., p. 63

31 Congo’s Energy Divide, p. 2

32 Africa’s Power Infrastructure, p. 190

33 Compilation by International Rivers based on Hydropower & Dams 2011 World Atlas and Industry Guide and 2011 Human Development Report

34 Africa’s Infrastructure: A Time for Transformation, p. 182

35 Africa’s Power Infrastructure, pp. 190f.

36 Africa’s Infrastructure: A Time for Transformation., p. 191



population have access to electricity, and more than 30 countries face regular power shortages.<sup>37</sup> Of the world's 1,441 million people without access to electricity, 585 million live in Sub-Saharan Africa, 404 million in India, and 387 million in other Asian countries.<sup>38</sup> These people live in a situation of permanent power shortage. Lacking access to modern forms of energy impairs their health, their education levels, and their chances to exploit their productive potential.

Rural Sub-Saharan Africa is marked by low population density and stark poverty. The continent has a population of only 36 people per square kilometer, and only 15% of the rural population lives within 10 kilometers of a transmission substation.<sup>39</sup> Grid extension is only cost-effective in areas with a population density of at least 50 people per square kilometer.<sup>40</sup> According to the International Energy Agency, grid extension is "the most suitable option for all urban zones and for around 30% of rural areas, but not proving to be cost effective in more remote rural areas."<sup>41</sup>

For many poor people, access to electricity is not the most pressing energy need. Almost half the world's population still cooks food and warms their homes by burning wood, other biomass and coal in open fires and rudimentary stoves. The smoke from open fires and inefficient stoves leads to nearly two million avoidable deaths a year, mainly among women and children.<sup>42</sup> Traditional cooking methods take a high toll on women and girls who are forced to spend time and face safety risks when collecting firewood. They also put enormous pressure on local ecosystems.

The World Bank states that "the provision of clean and affordable household energy is an integral part of scaling up energy access for the poor." It acknowledges that the Bank Group "could play a major role in facilitating the success and scale-up of the new initiatives on advanced biomass cookstoves."<sup>43</sup> Yet from 2000–08, less than 1% of the Bank's energy investments were for cooking and biomass energy, both in Africa and on the global level.<sup>44</sup> The new infrastructure strategies of the Bank, the other MDBs and the G20 completely ignore the pressing need for clean household energy.

An energy sector strategy that focuses on centralized projects and grid extension not only denies electricity

and household energy to most poor rural households. It also shortchanges rural businesses and sectors (such as agriculture) that could bring about broad-based economic development. Luckily, a different model is available. (See the concluding section, Transformation for the Poor.)

Private investment does not contribute much to the expansion of energy access for the poor. In 2001–2006, the private sector only invested \$500 million per year in Africa's power sector – considerably less than the public sector (\$2.4 billion), aid donors (\$700 million) and non-OECD financiers (\$1.1 billion).<sup>45</sup> At the same time, private investment skewed the power sector towards the interests of industrial and urban consumers. A World Bank power sector evaluation found in 2003: "The little evidence available indicates that the poor are often the last to benefit from increased access. In most countries, the rural poor tend to be overlooked because private operators are reluctant to serve low-income clients given that these markets are not financially viable on a freestanding basis."<sup>46</sup>

Looking forward, it is unlikely that the G20's emphasis on centralized projects and private sector involvement will improve the contribution of such projects towards

**"The little evidence available indicates that the poor are often the last to benefit from increased access. In most countries, the rural poor tend to be overlooked because private operators are reluctant to serve low-income clients given that these markets are not financially viable on a freestanding basis."**

**World Bank 2003**

overcoming energy poverty. Ali Mbuyi Tshimpanga, the director of the Inga hydropower station, warns: "The problem is that, with a PPP, you patch up only the part of the grid that interests the private financiers. It's of almost no benefit to the community."<sup>47</sup> Adds Charlotte Johnson, a researcher with South Africa's Institute for Democracy in Africa: "Local power grids are not included in the budget [of the Grand Inga Project]. African communities living in darkness are not the intended beneficiaries of Grand Inga, and the 500 million people who have been promised electricity will remain in the dark."<sup>48</sup>

During the period 2000–08, the World Bank invested 20% of its total energy sector resources (and 23% of its energy investments in Africa) into expanding energy

37 Ibid., p. 182

38 Energy for All, p. 18

39 Africa's Infrastructure: A Time for Transformation, pp. 3, 182

40 Renewable energies in Africa: Current knowledge, p. 3

41 Energy for All, p. 21

42 Igniting Change, p. 4

43 Household Cookstoves, pp. vii, 31

44 Modernizing Energy Services for the Poor, p. xiv

45 Africa's Infrastructure: A Time for Transformation, pp. 9, 186. Private sector participation was concentrated on the communication sector with investment of \$5.7 billion per year.

46 Power for Development, p. 39

47 Tshimpanga quoted in East Africa: Dams That Could Power Continent

48 Johnson quoted in World's Biggest Hydropower Scheme Will Leave Africans in the Dark. Note that electricity has even been promised to 500 million households.

access.<sup>49</sup> This is insufficient. As Justin Guay at the Sierra Club commented in May 2011, the Bank sits “at a critical juncture. The World Bank can draft an Energy Strategy that largely resembles the one it drafted for the previous century, which will all but ensure energy poverty for hundreds of millions around the world, or it can move firmly into the next century by turning its rhetoric on access to energy for the poor into reality.”<sup>50</sup>

The poor West-African country of Guinea illustrates the priorities of the Bank and the other MDBs. Guinea’s electrification rate is estimated at 17%, and 3% in rural areas. Yet the MDBs aim to attract private funding so the country’s electricity potential can be exported to more prosperous areas. Among the exemplary regional projects which the MDBs identified for the G20 HLP report is a transmission line connecting the Côte d’Ivoire, Liberia, Sierra Leone and Guinea. The MDBs argue that “the existence of the inter-connector would pave the way for some of Guinea’s hydropower resources to be developed potentially as export-oriented Independent power projects.”<sup>51</sup>

With “quick wins” such as the connections between West African countries and between Ethiopia and Kenya,

the MDBs hope to gradually create experience with regional projects, “paving the way for adding more complexity over time.”<sup>52</sup> Fortunately, better solutions for expanding energy access to poor population groups are available. They will be presented in the concluding section.

## 8. SOCIAL IMPACTS

The World Bank’s updated infrastructure strategy states: “Large infrastructure projects have often been successful in making project affected people the beneficiaries of the project displacing them, as well as achieving development objectives, like the benefit sharing arrangements in hydropower.”<sup>53</sup> Given the global experience with involuntary displacement and the World Bank’s own evaluations on the topic, this is an astounding assertion.

Dams are among the projects with the most severe social impacts. As mentioned above, the World Commission on Dams found that “in too many cases” affected people paid “an unacceptable and often unnecessary price” for the construction of dams. It estimated that by the turn of the century, 40–80 million people had been displaced by dams. In many cases, these people were displaced through coercion, were not resettled, and did not receive adequate compensation. Where mitigation measures are implemented, the Commission found, “they typically

49 Modernizing Energy Sector Services for the Poor, p. xiv  
50 Justin Guay, What Role for Coal in the World Bank Energy Strategy, May 1, 2011, <http://www.celsias.com/article/coal-wrong-for-world-bank-energy-strategy/> (viewed on April 3, 2012)  
51 High Level Panel on Infrastructure, Appendix 3

52 Africa’s Infrastructure: A Time for Transformation, p. 200  
53 Transformation Through Infrastructure, pp. 14f.



*In spite of billions of dollars invested in the Inga dams and transmission line, 94% of the DRC population have no access to electricity. Almost one million inhabitants of Kikwit live under the Inga transmission line, but the town has no access to electricity or clean water. (IRIN)*

fail to address adequately the problems caused” by dams.<sup>54</sup>

The figure of displaced people does not include the hundreds of millions of people who lost land and access to common resources, were displaced by canals and other associated infrastructure, were affected by the upstream and downstream impacts of dams, and suffered from water-borne diseases and other public health impacts of reservoirs. A team of hydrologists has estimated that 472 million people have likely been negatively impacted by the downstream consequences of dams.<sup>55</sup>

The WCD report found that “the poor, vulnerable groups and future generations are likely to bear a disproportionate share of the social and environmental costs of large dam projects without gaining a commensurate share of the economic benefits.” Indigenous peoples are typically among the people affected most disproportionately by dams. The report concludes that “a dam can effectively take a resource from one group and allocate it to another.”<sup>56</sup>

Thayer Scudder is the world’s most experienced resettlement expert. Over five decades, he advised the World Bank on countless relocation projects, including its first hydropower scheme in Africa, the Kariba Dam on the Zambezi River. In 2005 Scudder concluded: “I now consider that in most cases, large dams, and especially those over 60 meters in height, are part of a flawed paradigm that causes an increasing disconnection between the necessary environmental health of river basins and the current needs of people and governments for the provision of water, energy and food.” In an implicit comment on the infrastructure strategies of the G20 and MDBs, Scudder reached his conclusion not just because of “the unacceptable cost of large dams but also their failure to reach their potential, including the potential that water resource projects have for achieving major multiplier effects.”<sup>57</sup>

The Inga 1 and 2 dams did not cause large-scale displacement. Yet in spite of written agreements, the authorities never compensated the affected people, who with their descendants now number about 9,000, for their lost land and property.<sup>58</sup> The World Bank began rehabilitating the dilapidated Inga Project in 2003, but did not include the rehabilitation of the affected communities in its project. Is this a harbinger for what would happen under the Grand Inga scheme?

The World Bank and other financiers claim that they have learned the lessons from the social impacts of dams

**“I now consider that in most cases, large dams, and especially those over 60 meters in height, are part of a flawed paradigm that causes an increasing disconnection between the necessary environmental health of river basins and the current needs of people and governments for the provision of water, energy and food.”**

**Prof. Thayer Scudder, World Bank resettlement expert, 2005**

and other infrastructure projects in the past. Yet they have identified the DRC and Ethiopia as the anchors of future power trading schemes and thus as the location of Africa’s key regional hydropower schemes. They have done so without any consideration of the abysmal social and environmental track record of dam building in these countries.

If the MDBs had learned the lessons of past experience, they would internalize the social and environmental costs of projects when they assess them. Yet this is not happening. In the Africa Infrastructure Country Diagnostic, a large-scale assessment process coordinated by the World Bank and other institutions, the unit costs of future power projects do not include additional social and environmental costs, but are assumed to be equal to the cost of completed projects.<sup>59</sup>

Similarly, the World Bank has never updated its estimate of the hydropower potential that it considers economically feasible. In 1997 the hydropower industry claimed that 93% of Africa’s economically feasible hydropower potential remained unexploited.<sup>60</sup> Twelve years later, after thousands of megawatts had been added, the World Bank continued to make the same claim.<sup>61</sup> If the Bank truly integrated social and environmental costs into its planning approach, this figure would need to be much lower.

## **9. CLIMATE CHANGE**

The World Bank’s infrastructure strategy update states: “Meeting environmental goals and adapting to climate change will require an infrastructure that is less damaging to the environment, and more resilient to shocks.”<sup>62</sup> Given the importance of climate change, it is remarkable that the selection criteria for priority infrastructure projects in the G20 High-Level Panel report do not refer to it. The issue is not even mentioned in the report.

The list of HLP priority projects includes several hydropower projects and associated transmission corridors. The World Bank’s draft energy strategy justifies the expansion of large hydropower with the need to mitigate

54 Dams and Development, pp. 97ff.

55 Lost in development’s shadow

56 Dams and Development, pp. 98, 124

57 The Future of Large Dams, pp. 16f.

58 See Community history of Inga I and II, accessed on March 2, 2012

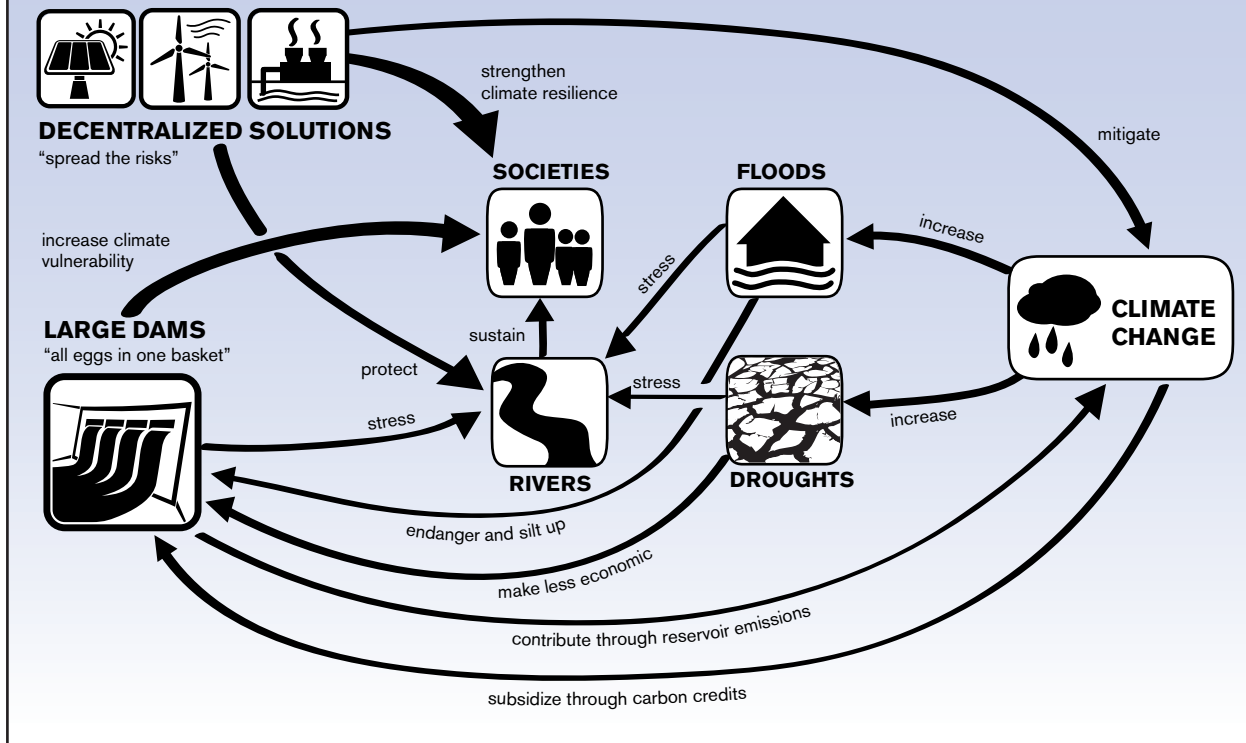
59 Africa Infrastructure Country Diagnostic, p. 8

60 Hydropower & Dams 1997 World Atlas and Industry Guide, p. 9

61 Directions in Hydropower, p. 6

62 Transformation Through Infrastructure, p. 12

# Dams, Rivers and Climate Change



climate change. Yet hydropower's balance sheet in terms of climate mitigation is mixed.

Most hydropower projects have lower greenhouse gas emissions than thermal power projects, yet they are not emission free. Because of decomposing organic matter in reservoirs, dams emit greenhouse gases such as methane and CO<sub>2</sub>. In the case of shallow tropical reservoirs, the emissions from hydropower projects can be significantly higher than those of thermal power projects with the same electricity output. They are certainly higher than the emissions from comparable renewable energy projects.<sup>63</sup>

Reservoir emissions are not the only way through which dams contribute to climate change. Rivers such as the Amazon and the Congo help sustain the role of oceans as global carbon sinks. Sediments from the Congo River travel through a submarine canyon which ends in a 300,000 square kilometers fan on the floor of the Atlantic Ocean. On the surface the river's plume has been detected 800 kilometers from the coast. The river's high sediment load and oxygen content help produce a large amount of phytoplankton in this plume, which sequesters carbon when it dies and sinks to the ocean floor.

The Grand Inga scheme would interrupt the biological activity in the fan and plume of the Congo River. Kate B. Showers, a researcher at the University of Sussex, warns that for this reason, "plans to divert, store or otherwise intervene in Lower Congo River dynamics

are truly alarming."<sup>64</sup> Yet the question of how dams interfere with carbon sequestration in the oceans has been neglected in scientific research, and is not addressed in environmental impact assessments for these projects.

While major questions regarding the role of hydropower dams in mitigating climate change remain open, there is strong evidence that large, centralized reservoirs are the wrong answer in terms of climate adaptation. Hydropower projects depend on predictable streamflows. Yet due to climate change, the time and location of snow and rainfall become ever less predictable and extreme weather events, droughts and floods become more frequent. These changes affect the economic viability and the safety of dams. Countries need to diversify and decentralize their water and energy infrastructure in order to strengthen their resilience to the vagaries of climate change. In contrast, building big, clunky dams will make water and energy sectors more vulnerable.<sup>65</sup>

Sub-Saharan Africa is exposed to a high degree of hydro-dependency. Prioritizing centralized hydropower dams in such an environment amounts to putting all power sector eggs into one basket. A report by the World Bank's Energy Sector Management Assistance Program (ESMAP) found in 2011 that "long-lifespan infrastructure, such as hydropower plants, is generally less adaptable to changes

63 See Fizzy Science

64 Congo River's Grand Inga hydroelectricity scheme

65 See for example *Converging Currents in Climate-Relevant Conservation* and the publications of the CGIAR Challenge Program on Water and Food



**“In addressing climate resilience, we need to develop renewable energy. Africa can leapfrog the rest of the world and adopt the latest, most efficient renewable energy technologies.”**

**Jamal Saghir, director of the World Bank’s Sustainable Development Department for Africa, in September 2011**

whereas short-lifespan infrastructure can be replaced in the long term as the climate changes.” The report warns that “heavy reliance on hydropower creates significant vulnerability to climate change,” and suggests that “an adaptation response may require a policy decision to diversify away from hydropower.”<sup>66</sup> Even though ESMAP is part of the World Bank, the Bank’s updated infrastructure strategy completely ignores this recommendation.

## **10. GOOD GOVERNANCE**

The assessment and prioritization of infrastructure needs and options – rural electrification for the poor or captive plants for aluminum smelters? – is an immensely political process. The interests of the poor are typically under-represented in the formal political process. This is why the World Commission on Dam has called for an “open and participatory” assessment of all needs and options before projects are identified. In practice, most options assessment processes – for example through the Infrastructure Consortium for Africa or the selection of priority projects for the HLP report – take place without any public participation.

The construction and operation of infrastructure projects throughout the world is beset by what the former World Bank President James Wolfensohn called the “cancer of corruption.” The MDB Working Group on Infrastructure finds that “mismanagement and corruption contribute to significant financial losses (estimated at 10 to 30% of a project’s value) during construction projects.”<sup>67</sup> Transparency International (TI) confirms that “public works and construction are singled out by one survey after another as the sector most prone to corruption.”<sup>68</sup> Large dams such as the Yacyreta, Itaipu, Lesotho Highlands, Turkwel, Bujagali and Inga projects illustrate the corruption risks of the sector.

Corruption is not only a financial drain on the infrastructure sector – it also skews infrastructure planning in a direction that is more prone to bribery, in particular in favor of capital-intensive greenfield projects. Explains Peter Eigen, a former World Bank country director and chair of TI: “Corruption (...) not only plunders economies; it shapes them. Corrupt government officials steer social and economic development towards large capital-intensive

infrastructure projects that provide fertile ground for corruption.” Similarly, the WCD report found that “decision-makers may be inclined to favor large infrastructure as they provide opportunities for personal enrichment not afforded by smaller or more diffuse alternatives.”<sup>69</sup>

Capital-intensive, centralized infrastructure projects don’t just benefit from corrupt practices – they may reinforce them. Like

other extractive industry sectors, large hydropower projects that are built and operated for the export of electricity can lead to a resource curse particularly in countries with weak governance structures. Large export revenues that accrue centrally under the control of the state encourage patronage systems and entrench corruption. Projects such as the Grand Inga scheme create winner-takes-all systems that discourage the democratization of political control.

Corruption needs to be held in check by strong governance systems and public accountability, including transparency and civil society participation. Such checks and balances are completely absent in Grand Inga and many other centralized projects. Typically, PPPs and other forms of private investments are not subject to strong public accountability either.

Large, regionalized projects such as Grand Inga are difficult to monitor for civil society, the media, national parliaments, local government bodies and other institutions in poor countries. Institutional capacity is one of the High-Level Panel’s six criteria for the selection of priority projects. In what can only be called a sad joke, the MDBs which selected the illustrative projects rated the institutional capacity of Grand Inga as “medium,” arguing that the next phase of the project “will involve the private investor/developer and a steering committee with external support.”<sup>70</sup> Small, decentralized projects are more appropriate for the absorptive capacity of most poor countries than the big regional projects proposed by the G20 and the MDBs.

In their new reports the G20 HLP, the World Bank and the MDB Working Group acknowledge the role of corruption in the infrastructure sector, but ignore the importance of public participation in the assessment of infrastructure needs. The World Bank admits that “large infrastructure projects are particularly vulnerable to rent-seeking opportunities” and claims that it has accelerated efforts “to tackle governance risks” in such projects.<sup>71</sup> The Bank expresses support for “good governance of the PPP process,” and the HLP implicitly supports “full disclosure of PPP contracts.”<sup>72</sup>

66 Climate Impacts on Energy Systems, pp. 58, 64

67 MDB Working Group on Infrastructure, p. 9

68 Global Corruption Report 2005, p. 2

69 Dams and Development, p. 187

70 High Level Panel on Infrastructure, Appendix 6

71 Transformation Through Infrastructure, p. 14

72 Ibid., p. 22, and High Level Panel on Infrastructure, p. 8

**“Corruption (...) not only plunders economies; it shapes them. Corrupt government officials steer social and economic development towards large capital-intensive infrastructure projects that provide fertile ground for corruption.”**

**Peter Eigen, former World Bank country director and chair of Transparency International, 2010**

In spite of such limited acknowledgments, the recommendations of the reports do not give appropriate weight to corruption, public participation and other governance issues. The HLP report vaguely proposes “institutional capacity” as one of its six criteria, and the MDB Working Group recommends “scaling up” the specific but limited Construction Sector Transparency Initiative.<sup>73</sup> Yet all three reports also call for making procurement guidelines more flexible to render infrastructure projects more attractive for private investors. Such measures can increase the risk of corruption in the procurement process.

HLP nor the development banks organized any kind of civil society consultation as they prepared their reports. In a letter to the panel, 73 NGOs from 39 countries called for civil society consultation and public disclosure of the HLP report in November 2011. They never received a response. The lack of accountability is typical for the whole G20 process. While the private sector has been invited to play a prominent role at G20 events and in bodies such as the HLP, civil society groups and trade unions have been locked out of the room.

The process by which the new strategy documents were prepared illustrates how little attention the G20 and the MDBs pay to civil society participation and other forms of accountability. The G20 HLP discussed the topic with one single NGO, and at least one panel member met with NGO representatives after the report was published on his own initiative. Yet neither the

73 MDB Working Group on Infrastructure, p. 8



*The communities which were displaced by the Inga dams are still fighting for their compensation after 50 years. (International Rivers)*

# Part III: The Way Forward

## 11. TRANSFORMATION FOR THE POOR

Kikwit is a sprawling town with close to a million inhabitants in the southwestern part of the DRC. The town hosts a switching station of the high-voltage transmission line which links the Inga dams with the mines of Katanga Province. In spite of the high-voltage current overhead, Kikwit's population has no access to the electric grid. Since the pumps are not working, the town has no access to clean water either. In 1995, poor sanitation contributed to an outbreak of the deadly Ebola virus. The traditional approach to African infrastructure with its focus on centralized, big projects has not served places like Kikwit well.

The G20 HLP, the World Bank and other development banks have defined transformation in terms of economic growth and expanding market access. They argue that complex, centralized infrastructure projects with private participation are best suited to bring such change about. This report demonstrates that such projects have often suffered from massive cost overruns, have underperformed in delivering services, and have a checkered record in terms of economic growth. This is particularly true for the big multipurpose dams that the World Bank is once again promoting.

**“Geothermal, small-scale hydro, solar, wind, tidal and local biomass fuels, including agriculture wastes, all offer significant potential for delivering both basic needs and for unlocking economic growth [in Africa].”**

**Christian Aid, 2011**

Big infrastructure projects tend to prioritize the demands of industrial consumers and urban centers over the basic needs of the poor. At the same time, they have often had serious social and environmental impacts, and have weakened the flexibility and climate resilience of the sectors which they dominate. Centralized projects can overwhelm the absorptive capacity of the governments and civil societies of poor countries. They can entrench the power of vested interests, and encourage corruption rather than democratic control. Tailoring projects to the needs of private investors tends to further undermine public accountability and increase corruption risks.

Hydropower can be an option for Africa and other parts of the world, and International Rivers is not in principle opposed to dam building. But the strong focus of the World Bank and the G20 on large hydropower projects is misguided, and better options are usually available.

Fortunately, a different approach that can facilitate a transformation not just toward economic growth, but toward meeting the infrastructure needs of the poor is available. The World Bank and the hydropower industry claim that only 7% of Africa's hydropower potential has been exploited.<sup>74</sup> Yet at the same time, less than 1% of the continent's geothermal, wind and solar energy potential has been exploited.<sup>75</sup> The cost of these technologies has fallen rapidly, and they are the cheapest options for expanding access to electricity in large parts of Africa and other regions.

Most rural Africans live closer to a river than to the electric grid. Through preliminary research, the Joint Research Center of the European Commission found that nearly 30% of Africa's population lives in areas where mini-grids based on mini hydropower projects are the cheapest source of electricity. In less water-rich regions such as the Sahel, Botswana and Namibia, solar photovoltaics will be the cheapest source of electricity.<sup>76</sup> In specific locations, wind or geothermal energy may be cheapest. Based on six country case studies, a report by Christian Aid also found that “geothermal, small-scale hydro, solar, wind, tidal and local biomass fuels, including agriculture wastes, all offer significant potential for delivering both basic needs and for unlocking economic growth.”<sup>77</sup>

The situation is similar in India, the biggest hotspot of energy poverty outside Africa. Using conservative cost estimates, Elizabeth Bast of Oil Change International found that in this country electricity from micro hydropower is cheaper than electricity from coal-fired power plants at a distance of less than 5 kilometers from the electric grid. Wind-solar hybrid electricity is cheaper than coal at 10 kilometers, and solar photovoltaics, at less than 20 kilometers distance from the electric grid.<sup>78</sup>

The International Energy Agency supports an approach that focuses on decentralized solutions. In a report jointly published with the OECD, the IEA found that 70% of rural areas are best electrified “either with mini-grids (65% of this share) or with small, stand-alone off-grid solutions (the remaining 35%).”<sup>79</sup> The Agency estimates that globally, \$32 billion per year need to be invested from 2010–2030 to achieve universal access to electricity. Of this amount, \$20 billion per year needs to be invested in mini-grid and off-grid solutions.<sup>80</sup>

<sup>74</sup> Directions in Hydropower, p. 6

<sup>75</sup> Low-Carbon Africa, pp. 21f.

<sup>76</sup> Renewable energies in Africa: Current knowledge, pp. 13, 43

<sup>77</sup> Low-Carbon Africa, p. 3

<sup>78</sup> Clean Energy Access for the Poor, p. 12

<sup>79</sup> Energy for All, p. 21

<sup>80</sup> Ibid., p. 22



According to the Lawrence Berkeley Laboratory's Lumina Project, the rural poor already pay an estimated \$40 billion per year for low-quality light from polluting kerosene lamps and candles. This amount would be sufficient to more than pay for the investment which the IEA suggests is required to achieve universal access to electricity from mini-grids and offgrid solutions.<sup>81</sup> The World Bank's Lighting Africa project estimates that even at current prices, poor rural consumers could buy high-quality solar lanterns for the cost of five to seven months'

**"Financial institutions, development agencies (public and private), and companies should be required to conduct independent poverty impact statements for all their major financial, political, and business endeavors in poor communities and countries."**

**Jim Yong Kim et al., 2000**

worth of kerosene.<sup>82</sup> Yet microcredits to facilitate this are often not available, and the markets for the poor don't function properly.

As the figures above suggest, renewable off-grid technologies typically do not need to be subsidized to compete with generators and other local sources of energy. Yet because the technologies are so new, suppliers of off-grid technologies often find it difficult to access credit and hire qualified personnel. Public guarantee schemes, technical assistance programs and a shift of tax cuts and other incentives from centralized power plants to renewable offgrid solutions could help jumpstart self-sustaining markets for renewable energy technologies.

A strategy that promotes decentralized renewable energy would not only offer a credible chance of providing universal energy access over the next decade. It would also support local infrastructure services such as schools and health posts, and strengthen rural economic sectors such as agriculture, agro-processing industries and tourism. It could create the rural jobs and support the local businesses that can bring about broad-based social and economic development.

As the cell phone revolution demonstrates, new technologies can leapfrog the centralized approaches of the past relatively quickly, and can effectively expand infrastructure access for the poor. They can do so without the social and environmental impacts of many centralized projects, and in ways that strengthen climate resilience and democratic control. "In addressing climate resilience," Jamal Saghir, the director of the World Bank's Sustainable Development Department for Africa, said in September

2011, "we need to develop renewable energy. Africa can leapfrog the rest of the world and adopt the latest, most efficient renewable energy technologies."<sup>83</sup>

## 12. RECOMMENDATIONS

At this juncture, infrastructure has regained a prominent place in the development debate. New actors have entered the fray, and financial flows into the sector are increasing. This creates an opportunity to finally address the basic needs of the one billion people who have been bypassed by previous cycles of infrastructure investment. The G20 will discuss the green economy and infrastructure development when it meets in Mexico in June 2012. Jim Yong Kim will take office as the World Bank's new President in July, and may reconsider the Bank's role in infrastructure. It is all the more important that the G20, the Bank and other actors integrate the lessons of past experience, so that this

historical opportunity is not wasted.

The following recommendations for governments, the G20, the World Bank and other actors in the infrastructure debate reflect the lessons described in this report:

1. The rich and poor, urban and rural populations, small farmers and large corporations have very different infrastructure needs. Setting priorities among these needs is a highly political process that needs to take place in an open, democratic way. A comprehensive, balanced, participatory assessment of all needs must be the foundation of any infrastructure strategy.
2. The cheapest and most efficient way to address infrastructure gaps are often increased maintenance and efficiency improvements in existing systems. While such measures will not address the needs of population groups that have no access to existing services, they will reduce the amount of investment needed to expand such services.
3. Infrastructure strategies need to address the basic needs of poor population groups directly rather than through a trickle-down approach. Even if there is no one-size-fits-all approach, funders need to massively scale up financial and policy support for decentralized water and energy projects, which offer benefits in terms of poverty reduction, environmental protection, and climate resilience.
4. Affected communities, civil society groups and interested citizens and consumers must be encouraged to participate in the planning and implementation of

81 See for example From Carbon to Light, p. 5

82 Solar Lighting for the Base of the Pyramid, p. 29

83 Jamal Saghir quoted in Low-Carbon Africa, p. 35





*Decentralized renewable energy technologies like this community-based micro-hydropower project have a huge potential to address the energy needs of the poor. (International Rivers)*

infrastructure projects, to prevent such projects from being skewed toward vested interests. This requires full transparency, ongoing consultation processes and other forms of public accountability.

5. If not implemented properly, infrastructure projects can irreversibly degrade critical ecosystems and destroy the livelihoods of large population groups. Projects must be carried out under the strictest social and environmental safeguards, such as those recommended for water and energy projects by the World Commission on Dams.<sup>84</sup>
6. Climate change is a game changer. Based on lifecycle greenhouse gas assessments, all infrastructure projects need to be devised so they can mitigate global warming. All projects must also be devised in a way that strengthens climate resilience rather than increasing climate vulnerability.
7. The World Bank admits that it is not well equipped to fund small projects with high administrative overhead costs such as many renewable energy and energy efficiency projects. The same is true for other traditional financiers. Governments should consider

new funding mechanisms for innovative, small projects such as the Leapfrog Fund within the Green Climate Fund that has been proposed by Christian Aid.<sup>85</sup>

8. Private enterprises have a big potential to supply equipment that can address the water and energy needs of the poor at low cost, from solar panels to improved biomass and micro hydropower sets. Their role should be welcomed and supported through appropriate measures. Yet private enterprises play a minor role in developing infrastructure projects for poor consumers as investors, and safeguards should not be relaxed to accommodate their interests.
9. Public institutions need to prepare their infrastructure strategies in open, participatory processes. The G20 HLP, the World Bank and the other MDBs should invite comments from civil society and review their strategies before implementing them.
10. The UN system is the most legitimate platform for debates and decision-making on global development issues. The G20 should take questions of social and economic development into account in its deliberations. Since it does not include most of the poor countries and population groups, it should however not set norms or take decisions on such issues.

<sup>84</sup> In support, we refer to the following recommendation which Dr. Jim Yong Kim and his co-authors made in 2000: "Financial institutions, development agencies (public and private), and companies should be required to conduct independent poverty impact statements for all their major financial, political, and business endeavors in poor communities and countries." (Dying for Growth, p. 388)

<sup>85</sup> See Low-Carbon Africa, pp. 35f.

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## INFRASTRUCTURE FOR WHOM?

There can be no prosperity without infrastructure, but infrastructure projects don't necessarily benefit the poor. Past energy, water and transport strategies have neglected the poorest population groups, and taken a heavy toll on affected people and the environment. Will the new infrastructure strategies of the World Bank and the Group of 20 address the needs of the poor, or will they entrench the power of privileged groups?