INFORMATION ON THE INGA PROJECTS

1/ Background on the INGA Hydropower Projects

Existing Plants: Inga 1 & 2	- Location: 250 km South West of Kinshasa, DRC - Inga 1: Installed Capacity: 351 MW (commissioned in 1972) - Inga 2: Installed Capacity: 1424 MW (commissioned in 1982)
Under Development: Inga 3	- Installed Capacity: 4320 MW (to be commissioned progressively in the period 2018/2021) – pre-feasibility study by SNC-LAVALIN now completed and presented in February 2008 to DRC Authorities in Kinshasa - Investment cost of the power generation plants ~ US$ 3.5bn - Investment cost of the transmission system to Westcor countries ~ US$ 1.5bn (estimated) - Investment cost of the transmission line Inga-Moanda (150 km) to supply BHP Billiton aluminium smelter) – (TBD)
To be developed: Grand Inga (*)	- Potential Capacity: 40 GW (pre- feasibility study done by EDF & Lahmeyer International 1997, and preliminary studies by SNEL 2005) - Investment cost of the hydro plants ~ estimated over US$40 billion (TBD) - Investment cost of the transmission system ~ estimated over US$40 billion (TBD) Selected Interconnection transmission system (HVDC) would include: . Northern Highway (Between Inga and Egypt), . Southern Highway (Between Inga and South Africa), and . Western Highway (Between Inga and Nigeria).

(*) - Grand Inga overall project would be capital intensive and will require huge investments (likely exceeding US$80billion) and also technical and managerial skills and expertise to operate and maintain the facilities.

Characteristics of the Inga site and Projects

- The Inga Projects are located in the low course of the Congo River, with a significant river flow along the whole year, and favourable natural conditions for hydropower infrastructure and facilities.
- A hydropower potential of more than 44 000 MW is concentrated in the Inga site, with potential annual energy production estimated at more than 320 TWh.

- Inga 1 & 2 are quite operational, with the following respective data: water head 50 m and 58 m; turbine water flow 780 and 2800 m3/s; maximum production 2.4 and 10.4 TWh/year, versus 1.241 and 3.50 TWh in 2005. These two power stations concentrated 73% of the total installed capacity of the country (73.4% of total hydropower installed capacity) and produced 66% of the electricity generated in the country in 2005.
- Inga 3 will be built on the run-of-the-river, and thus is expected to have a much reduced environmental impact; the average rate of the water flow for the power station is 6680 m3/s; the cost of generation is estimated at US cents 2.1/ KWh, and the internal rate of return at 18.4 %.
- Grand Inga would be the most powerful hydropower in the World, with a very low production cost estimated between US cents 1.1 to 1.4 / kWh.
  The site is naturally laid as a big basin with its own side and front walls;
  Key technical data of Grand Inga:
  - Height of the dam 205 m
  - Water flow volume 8.4 billion cubic meters
  - Water flow distance 150 km
  - Length of the reservoir 15 km
  - Average annual flow rate 42 000 m3/s

2/ Key issues related to the Inga Hydropower Projects

The key issues of the Inga projects consist of the following:

- *The complete refurbishment of existing power plants of Inga 1 and Inga 2 for 1775 MW*; at present, Inga 1 & 2 are functioning well below their nominal generating capacity (respectively 52 and 34%). The main difficulties these installations are facing are: lack or poor maintenance, due to inability to provide adequate resources to the power plants and lack of adequate reserve capacity for the country; silting in the canal and the valley ; and entry and evacuation of flotsams in the canal. Revamping works are currently being undertaken on a few plants (Plant number 2 of Inga 1, funded by the World Bank; and Plant number 3 of Inga 2, funded thanks to public/private partnership with Mag-Energy). Nevertheless, these works remain insufficient and ought to be reinforced by a complete and in-depth rehabilitation program, which will probably last between 4 and 5 years. It is also worth mentioning that the work currently being undertaken for the revamping of the power plants of Inga 1 & 2 are experiencing a least 15-month delay.

- *The refurbishment and renovation of the following existing transmission and distribution system*, with the aim of improving the electricity supply inside DRC and toward the Southern Africa electricity market:
  1/ the 1774 km Inga-Kolwezi 500 kV HVDC, doubling the transit capacity up to 1120 MW to meet the energy needs of Katanga province and to export toward Zambia, Zimbabwe and South Africa;
  2/ the 1386 km Inga- Kinshasa- Congo Brazzaville 220 kV HVAC line; and
  3/ the MV and LV distribution network, in the city of Kinshasa and its suburbs.

- *The development and construction of Inga 3 (4320 MW)* – (which will be a pusher for the development of Grand Inga, as these two projects are complementary, rather than competitor) - along with the associated

interconnection lines will contribute to meet the huge growing energy needs for DRC development (Katanga province and Kinshasa, and BHP aluminium smelter in Moanda), and to supply other Westcor countries.

The pre-feasibility study funded by CIDA (US$ 1 337 917) and SNC-LAVALIN (US$ 445 306) is completed and has been officially presented to the RDC authorities in February 2008. Further geological and hydraulic (mathematical model) studies, along with feasibility study of the associated transmission system, will complete feasibility on Inga 3 for a construction phase to start in 2009 and to be completed by 2018 (50%) and 2021 (100%).

- *The development of Grand Inga, as an African integrator project*, will offer great opportunity for supplying the African energy market, including other SAPP countries in Southern Africa, and African countries in the West and North and East regions.
  It has been estimated that when commissioned by around 2020-2025, Grand Inga contribution to Africa electricity demand would be around 20%. Consequently, most of the African energy demand would be met through the five African power pools, and the Project would improve the lives of over 500 million Africans who are without access to electricity.
  In order to allow the construction phase to start in 2014, as stated in WEC Inga Action Plan, and in line with the need of meeting the growing and urgent energy needs of South Africa (Eskom) and other African countries, the feasibility study should be funded and performed in timely fashion.
  Among other aspects, the feasibility study of Grand Inga should encompass: technical study, environmental impacts and commitments assessment study, social impacts and commitments study, cost estimates, implementation schedule, financial and economic evaluations, cooperation agreement, sustainable management plan (construction and operation phases), conclusions and recommendations. Great attention should be placed on the social and environmental issues to minimise their impact.

3/ Creation of Zone Integrated INGA

In the framework of the development, construction and operation of the Inga Projects, WEC is proposing the creation of an "*Inga Infrastructure & Services Integrated Zone*". More precisely, this zone would be a hub to support engineering, equipment maintenance and other services and manufacturing, in order to develop technology transfer and local capacities and to facilitate job creation for the Africans.
It could be established from around 2009 before the beginning of the construction phase of Inga 3 Project and would be located in the Hinterland of the Inga River.
Its establishment would be facilitated and supported by a consortium of Suppliers (Equipment and Material Constructors and other Contractors, PROCOM, DRC and other Governments.
WEC and Team Inga will help in establishing this Zone.
Political support of the DRC authorities is highly recommended.