Technology Fact Sheet for Mitigation

I. Peat-based IGCC (Integrated Gasification Combine Cycle) [i]

1. Introduction	
1.1. Historical	- Technology based on combustion on coal for electric energy generation is the most ancient and had played a great role in early steps of industrial development in Europe among others - Up to now, this technology is highly competitive - Peat resource is similar to coal resource as a combustible
1.2. Location of Resources	- Important resources of peat are located in marshlands of Akanyaru and Akagera river basins - Potential available and commercially extractable peat resources are about 50 millions of tons - Both electricity and heat are expected as outputs, according to EWSA strategies (MININFRA, 2006)
1.3. Variability of Resources	- This is a non-renewable resource; but spatial distribution is interesting and dense in low lands along Nyabarongo and Akanyaru rivers but also in Bugarama in SouthernWest of the country alon the Rusizi river
2. Brief Description	
2.1. Conditions	- Detailed environmental studies are required before any wider exploitation of peat resources
2.2. Characteristics	- Peat resource fuel is pulverized in

	typical peat or coal pulveriser - The boiler, into which combustion of peat is done, produces a steam (T < or = 565 °C; P > or = 17 megapascals) - Then the steam expansion results in a rotation - Capacity factor: 80% (i.e. 19 hours) - Efficiency of the system: 40% - Lifespan: 30 years - Remark: above data are adapted from databank on coal-steam technology
3. Applicability and Potentialities in Rwanda	
3.1. Applicability	- Very high for heat energy and electricity supply
3.2. Potentialities	- Important; exploration proved that large amount of reserves are available
3.3. Limitations	- Risks of conflict with land use for agriculture; - Low applicability of carbon sinks/sequestration in case of use of peat by small scale industries and households
4. Status of the Technology in Rwanda	
4.1. Local Production	- Extraction of peat is currently done at small scale for heat output purposes
4.2. Shared Power Plants	- NA
4.3. Projects	- A project on peat-steam to electric power is aiming at generating 100 MW by the year 2015; site for exploitation mainly in District of Nyanza in Southern Province
5. Benefits to Development	
5.1. Social	- Energy security

5.2. Economic	- Reduced use of wood and charcoal - Replacement of imported fossil fuels
5.3. Environmental	Reduction of pressure to forests and ecosystems
6. Climate Change Mitigation Benefits	
6.1. Reduction GHG Emissions	- Measures for carbon sequestration are undertaken before any wider exploitation of the peat resources - Given that important reserves of peat are those which are located along the main big rivers in Rwanda, technique of storing GHG underground and under water is quite feasible - Particular new options(IGCC...) are recommended - Compared to classic peat based technologies, IGCC with CCS can result in a GHG emission decrease of 74%; in fact the conventional peat to steam emits up to 1075 kg/MWh
6.2. Low Carbon Credits	- Not eligible - Unless above described measures for transforming
7. Financing Requirements and Costs	
7.1. Private Sector Involvement	-
7.2. Capital Cost	- Below costs are estimated and adapted with similarities to coal as far as in Rwanda the project of Peat-to-electric power is still in its early steps of implementation - Capital cost: 1 190 USD/kW and 1060 USD/kW respectively for the years 2005 and 2015 (equipment: 65%)

	- Generation cost: 4.5 US cents/kWh in year 2005 against 4.2 US cents/kWh projected for year 2015 (O & M costs: 16.5%; fuel cost: 44%); Remark: such above costs are indicative and require more investigations for such a coming peat-to-power project in Rwanda. It is also important to remind that such a technology, if we refer to above paragraphs is the cheapest of the ten selected technologies for this TNA Project
7.3. Generating Costs	-
7.4. GHG Emissions	- Within the option of IGCC, the use of peat for generating energy can result in reduction of GHG emissions and these can be lower than the acceptable standards - Combination to the CCS is quite recommended - Without such above required improvements, this technology results in very high GHG emissions reaching more than one tonne per MWh generated - Peat based IGCC with CCS option can replace the imported fossil fuels especially covering almost the half of electricity generation in Rwanda
7.5. Capability Building	- Identical to other technologies based on the gas/steam turbines and related exploitation of the peat, a GHG component

	- Great capacity in carbon sinks/sequestration is required also - Capacity in environmental assessment and with reference to coal options in specific countries is also required in Rwanda; in fact steps reached in process of installation the peat industry are advanced and a power capacity of 100 MW is awaited at short term.

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment and Technology Action Plans For Climate Change Mitigation– Rwanda. You can access the complete report from the TNA project website http://tech-action.org/**