Technology Fact Sheet for Mitigation

C. The PHEV technology [i]

1. Introduction	
1.1. Historical	- The concept of PHEV option is well known in transport sector but its diffusion and deployment have not been characterized by a high speed of penetration in the market
1.2. Location of Resources	- Recharging batteries requires a set of stations providing electric energy preferably generated through use of renewable resources
1.3. Variability of Resources	- Renewable energy sources of electric power expected can be mainly the solar based options, geothermal and hydropower ; - Such sources are stable in Rwanda
2. Brief Description	
2.1. Conditions	- Large campaigns - Installation of appropriate stations for recharging the batteries running the electric motors of vehicles
2.2. Characteristics	- Any PHEV is mainly equipped with a combination of a classic efficient gasoline engine, a conventional electric motor and rechargeable batteries - Recharging batteries through a station connected to electric grid - Efficiency of internal combustion is 25% in urban areas - Efficiency of battery electric motor to wheels a conversion of chemical energy into rotation energy is about

	75%
3. Applicability and Potentialities in Rwanda	
3.1. Applicability	- PHEV can largely work in Rwanda as far as power projects for electric generation through renewable option are part priority at short and medium terms - PHEV technology and its components are commercially proven and ca be applied in Rwanda road transport market - PHEV is a potentially promising technology for mitigation purposes
3.2. Potentialities	- Opportunities and potentialities for PHEV technology are important especially within the current context of regular increase in the costs of importation of vehicles and gasoline and diesel fuels
3.3. Limitations	- Rechargeable batteries require a special maintenance and recharges with a relatively high frequency of returning to the station - A lot of second hand vehicles are available on the local market
4. Status of the Technology in Rwanda	
4.1. Local Production	- Not yet introduced in Rwanda - Both batteries, electric motors, internal combustion engines and other spare-parts are imported
4.2. Shared Power Plants	- NA
4.3. Projects	- PHEV option is still a project idea in Rwanda

	- Goals and visionary aims for efficient inclusive integrated transport system - fully secure domestic energy supply, multi-modal transport based efficient technologies) are projected up to 2050
5. Benefits to Development	
5.1. Social	- Introduction to the new vehicles on local market can induce an interest in setting up local units for manufacturing components of PHEV and hence for creating new jobs
5.2. Economic	- Benefits from increasing use of renewable resources and decreasing importation of gasoline and diesel for vehicles - Potential manufactures and industry of PHEV components - Cost of electricity is lower than the cost of fossil petroleum fuels
5.3. Environmental	- Using such vehicles based on a mixed «electric and liquid fuel» contribute in a significant decrease in GHG emissions
6. Climate Change Mitigation Benefits	
6.1. Reduction GHG Emissions	- The amount of CO_2 emissions is about 0.11 kg/km for PHEV against about 0.44 kg/km by usual non efficient gasoline vehicles in urban areas; - In rural areas and highways, CO_2 emission are respectively 0.09 kg/km and 0.26 kg/km respectively by PHEV and usual gasoline vehicles
6.2. Low Carbon Credits	- Carbon market is really recommended

	for such road transport option. - Once made available such a special incentive can result in a wide diffusion of PHEV in Rwanda
7. Financing Requirements and Costs	
7.1. Private Sector Involvement	- Once promoted and commercially available, the PHEV will greatly interest the private sector
7.2. Capital Cost	- The initial cost of a PHEV is higher than the conventional vehicles ; - In fact the PHEV, are still limited on international market
7.3. Generating Costs	- Cost of «gasoline-electric» fuel is 2 times lower than the cost of liquid fuel for classic gasoline vehicles; - The maintenance cost for classic gasoline vehicles is about 1.5 times more important than the PHEV maintenance

[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/**