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Project Idea Note (PIN)

A PROJECT IDENTIFICATION

A 1 Project summary	
Title of project activity	Small Hydro Plant at Enguri HPP
Applicant	To be defined (ERPA will be negotiated after investor is finally determined)
Host Country	Georgia
Project type	○ Joint Implementation X Clean Development Mechanism
Category of project activity	Renewable energy – hydro energy
Generation of emission reductions	2010-2020
Estimated emission reductions *(in t CO_{2e} up to 2012)*	2010-2012 85 227 **tCO_2**
Crediting Period	10 years
Offered amount of emission reductions	CERs: **284 090 tCO_2**
Proposed CER price (EUR)	12 €

B PROJECT PARTICIPANTS

B 1 Applicant	
Name	To be defined (ERPA will be negotiated after investor is finally determined)
Type of organisation *Please also describe the ownership structure.*	
Other functions of the Applicant within the project	
Main activities, knowledge and experience	
Name of contact person	
Address	
Phone/fax	
E-mail	

B 2 Project developer	
Name	Gross Energy Ltd.
Type of organisation	
Other functions of the project developer within the project	○ Sponsor ○ Intermediary X Technical consultant ○ Other: _____
Main activities, knowledge and experience	The members of initiative group, which has prepared the concept, "Security of Energy Supply in Georgia", in 2003, established Gross Energy Ltd. in April 2007. Founder members are leading energy specialist, financial experts, engineers and executives. The members have a long and successful experience in research and designing sphere. Gross Energy Ltd., together with Norwegian International Company ECON has prepared the pre-feasibility study of 14 sites, according to international standards, which call attention to the beneficial usage of Georgian hydro resources and proves the development huge prospective. **"Gross Energy" Ltd., has also prepared the technical-economic study of 35 small and medium size hydro power stations, which is the company intellectual property**

Name of contact person	Vladimer Tatarishvili
Address	45, Kazbegi Avenue, 0177,Tbilisi, Georgia
Phone/fax	Tel:8(99)588976
E-mail	gross_energy@yahoo.com

B 3 Other project participants	
Name of project participant	Energy Efficiency Center Georgia
Type of organisation	○ Governmental body: _____ ○ Private enterprise X NGO ○ Other: _Independent consulting company_____
Function within the project	○ Sponsor ○ Intermediary X Technical consultant ○ Other: _____
Name of contact person	Liana Garibashvili
Address	10 Lermontov St. Tbilisi 0105 Georgia
Phone/fax	+ 995 32 92 16 40 /99; +995 32 92 15 08
E-mail	eecgeo@eecgeo.org; l_gari@eecgeo.org

C HOST COUNTRY

C 1 Location of project activity	
Host Country Party(ies)	Georgia
Region/State/Province etc.	Samegrelo-Zemo-Svaneti Region
City/Town/Community etc.	Jvari district
Brief description of the project location	The construction of the small Enguri hydro power station site is located close to the operating Enguri Arch Dam (250m), on the left embankment of the river close to the afterbay of the Enguri arch dam, left side of the dissipater sump, the area close to construction tunnel outlet portal.

C 2 Status of Host Country	
Host Country	X Signed and ratified, accepted, approved or acceded to the Kyoto Protocol

	○ Signed the Kyoto Protocol and has demonstrated a clear interest in becoming a Party in due time ○ Has already started or is on the verge of starting the national accession process

D GENERAL PROJECT INFORMATION

D 1 General Information	
Project name	Small Hydro Plant at Enguri HPP
Project objective	The project is a small HPP with installed capacity 10 MW located in Samegrelo-Zemo-Svaneti Region, Jvari district, Georgia. The purpose of the project is to dispatch renewable electricity to the national grid thus improving energy supply of the agricultural region.
Description of project background	The design flow of the small Enguri HPP is considered to be 8.4 m3/sec., corresponding to minimal afterbay sanitary-ecological demands of the constant water discharge. The construction of the small HPP at afterbay of the Enguri HPP would be reasonable, and would enable safety of the energy consumption for Enguri HPP and Vardnili HPP head building and energy assembly. (Picture 1)

D 2 Category(ies) of project activity	
Project category *Please mark accordingly.*	○ Construction (or retrofitting) of combined heat and power installations; ○ Fuel-switch projects in energy conversion installations and production plants to renewable energy sources or from energy sources with high carbon content to energy sources with lower carbon content, especially in existing district heating systems; X Construction (or retrofitting) of generating plants operated with renewable energy sources (especially wind power plants, biogas or biomass combined heat and power plants as well as hydroelectric power plants); ○ Projects whose purpose is the avoidance or (energy) recovery of landfill gas; ○ Waste management measures which contribute to the avoidance of greenhouse gas emissions, especially through energy recovery from waste, if possible with waste heat utilisation; ○ Energy efficiency projects: projects serving the reduction of end-user energy consumption in residential buildings, public and private office buildings as well as industrial applications and processes (including waste heat potentials); ○ Other: _____

D 3 Technical aspects	
Technical description *The essential technical aspects should be briefly presented.* *A detailed description (max. 3 A4 pages) should be enclosed with the PIN including the following aspects:* *Project purpose* *Applicant's facilities to generate Emission Reductions* *Description of technology employed and associated risks* *Milestones, time schedule and current status of implementation* *Key permits and expected date of approval* *Key contracts and expected date of signing* *Risks during project implementation and operation*	The proposed HPP at the Enguri Arch dam is a 10MW run of river site with an estimated annual output of 80m kWh. The area for the construction of the small Enguri hydro power station has been chosen close to the afterbay of the arch dam, left side of the dissipater sump, the area close to construction tunnel outlet portal, which has comparably better topographic conditions. The construction site is located close to the operating Enguri Arch Dam (250m), on the left embankment of the river. The discussed area, from engineering-geologic point of view, has Cretaceous rocky carbonate rocks, which mostly consists of limestone and dolomites. The rock layers have average collapse angle toward the river direction, which is 50-60º. It was considered that construction of the small hydro power station at afterbay would be reasonable, which would enable safety of the energy consumption for Enguri HPP and Vardnili HPP head building and energy assembly.

E PROJECT ORGANISATION

E 1 Project team	
Project-specific qualifications and experiences	"Gross Energy" Ltd., has also prepared the technical-economic study of 35 small and medium size hydro power stations, which is the company intellectual property. EEC Georgia-the NGO which operates *in energy, industrial and building sectors and provides consultancy services* such as energy audits, policy analysis and development of pre-feasibility studies, pre-investment surveys Since 2002, EEC Georgia has been working on Climate Change issues and Implementation of the Kyoto Protocol in the country through the involvement in various projects initiated by international and foreign organizations, in particular: 2002- Eastern Climate Change Synergy Project- 10 various CDM project ideas prepared (EU DG TREN); 2004-Preparation of UNFCCC 2nd National Communication- (UNDP/UNFCCC); 2006-2008-CDM as instrument for industrial development and poverty alleviation in Caucasus-(Norwegian MOFA, Norsk Energy; ECON) - CDM Capacity building workshops, identification and development of PINs. On 31st of August 2007, the ERPA has been signed between the International Bank for Reconstruction and Development –IBRD (World Bank) "Community Development Carbon Fund-CDCF" and Energy Efficiency Centre Georgia - EEC Emission Reductions Purchase Agreement. This is the first Clean Development Mechanism (CDM) agreement in Georgia. The mentioned agreement will enter into force after the UNFCCC and Designated National Agency (Ministry of Environment and Natural Resources of Georgia) procedures are finalized. EEC acts as a Bundling Agency for this ERPA and will bundle Verified Emission Reduction (VER) of 9 Small Hydro Power Stations rehabilitated in the frame of USAID funded "Rural Energy Development-RED" project and supply to World bank during 7 years (2008-2015).

E 2 Schedule	
Current project status	○ Project idea X Planning ○ Implementation
Status of financing	

Status of negotiations with the Host Country	
Status of permission procedures of authorities	As has been decided by the government of Georgia development of the country's huge hydro potential will be the cheapest and cleanest way to meet the growing electricity demand. The Government has hired Econ (Norway) in cooperation with the Energy Efficiency Centre Georgia and Gross Energy to undertake and independent assessment of the risks associated with the investments in the sector and developed pre-investment studies for 7 sites approved by the government for development. **Procedures (stages) for acquiring permissions (licenses) for the construction of the HPP after the feasibility stage** I. The investor's proposal is reviewed in the Ministry of Energy of Georgia and upon positive resolution, recommendations are given to the State Energy Commission (Chairman – Prime-minister) for licensing the construction. II. The agreement is signed between the company (owner of the HPP) and "Electric-energy system commercial operator" on electricity purchase, where the purchase terms, rights of the parties and obligations will be reviewed in details. P.S. A) Agreement with the Ministry of Environmental Protection and Natural Resources as well as Ministry of Economic Development will be mandatory. B) Comprising with the existing Legislation, the required procedures will be provided by "Gross Energy" Ltd., as the project author and investor's partner in Georgia. ECON's rights will be reserved.
Project preparation	Pre-Investment Feasibility study has been prepared for the Ministry of Energy by "Gross Energy" with the participation of "Econ" (Norway)
Construction/assembly	12 months
Project lifetime	**10years**
Generation of CERs	**Crediting period 10 years**
Other milestones	
Effect of PIN acceptance on the time schedule of the project	Will increase the plant economical efficiency. Will speed up the project implementation process

E 3 Financial aspects	
Costs of project development (EUR)	**Construction cost estimation in thousand USD** Construction site preparation – 1.52 Main buildings (pressure diversion, power house, tailrace, auxiliary works)-7,224.61 Auxiliary and service buildings- 24.49 Energetic production -27.40 Transportation and communication- 66.15 Water delivery, sewage buildings &external network – 12.25 Infrastructure development—12.25 Temporary buildings and constructions -237.94 Administration maintenance and copyright protection -7.35 Staff training -1.22 Projection research works -143.69 Contingences- 1,163.83 Total -8,922.70 VAT (18%)- 1,606.09 **TOTAL – 10,528.79** **Total - 10,528,790 USD = 6,870,511.EUR**
	(**1USD-0.65243 euro- 06.03.2008**)
Estimated annual operating costs (EUR) **Please give figures and briefly explain (background of) calculations.**	330.000 USD the Operating costs are assumed to total 3% of capital expenditures
Estimated annual revenues (EUR) **Please give figures and briefly explain (background of) calculations.**	3 various alternatives have been considered: Electricity tariff -0,05 USD - 3,700.000 USD Electricity tariff -0,04 USD - 2,960.000 USD Electricity tariff -0,02 USD - 1,480.000 USD
Financing sources (equity/debt capital, financing institutions)	Equity 22% -2,420.000 USD (1,577.428 EUR) Loan/Investor -8,580.000 USD (5,592.699 EUR) Total Investment- 11.000.000 USD (7.170.877 EUR)
	Loan conditions have been estimated as follows: Loan Amount -8,580,000 USD Interest -14% Years-10 years Term-12 months Grace period- construction period 1 year
Proposed CER price (EUR)	12 €

F GREENHOUSE GAS EMISSION REDUCTIONS

Only projects resulting in emission reductions of greenhouse gases listed in table F1 can be accepted as JI or CDM projects. All emissions and/or emission reductions must be stated in metric tonnes of CO_2 equivalent.

F 1 Greenhouse gases	
Greenhouse gases to be reduced by the project	X CO_2 ○ CH_4 ○ N_2O ○ HFCs ○ PFCs ○ SF_6

The Project Boundary shall encompass all anthropogenic emissions by sources of greenhouse gases under the control of the project participants that are significant and reasonably attributable to the project activity.

F 2 Project Boundary	
Description of Project Boundary	As per the Appendix B of simplified modalities and procedures for small-scale CDM-project activities, the project boundary is defined as follows: *"The project boundary encompasses the physical, geographical site of the renewable generation source."* The spatial extent of this project activity includes the project site (SHP location) and the physical electrical system to which the power plant is connected. The project boundary encompasses the diversion structure, power canal, penstock, powerhouse, power evacuation system, tailrace canal, the metering equipment for each generator and substation and the Georgian electricity grid.

F 3 Project emissions	
Description and estimation of project-specific greenhouse gas emissions within the Project Boundary	Project Emissions by sources of GHGs due to the project activity within the project boundary are zero since hydro power is a GHG emission free source of energy.

F 4 Baseline	
Outline of considered Baseline methodology/scenario and estimation of Baseline emissions within the Project Boundary	In the absence of the CDM project activity, the electricity would have been produced by other generating facilities. The grid emission factor defined by DNA has been used to quantify the baseline emissions.

Leakage is defined as the net change of anthropogenic emissions by sources of greenhouse gases which occurs outside the Project Boundary, and which is measurable and attributable to the project activity.

F 5 Leakage	
Description and estimation of Leakage	**Leakage is not applicable as the renewable energy technology used is not equipment transferred from another activity. Therefore, as per the simplified procedures for SSC project activities, no leakage calculation is required.** Total project activity emissions, including leakage are zero for the project activity. Therefore, Net anthropogenic emission reductions due to the proposed project are equal to the baseline emissions on a yearly basis.

F 6 Emission reductions	
Crediting period	
Estimated annual and total abatement of greenhouse gas emissions in tonnes of CO_2 equivalent in comparison to the Baseline scenario (taking into account Leakage)	**Average annual capacity kW** / **Expected Annual Generation kWh** / **Baseline Emission Factor (EF_y) (kg CO_2/ kWh)** / **Emission Reductions (tons of CO_2)** **10,000** / **74,000,000** / **0,3839** / **28,409** **Emission Reductions for 10 years crediting period** **284, 090 tCO_2**

G (ADDITIONAL) ECOLOGICAL, SOCIO-ECONOMIC AND/OR DEVELOPMENT EFFECTS

G 1 Expected environmental effects	
Expected global/local environmental effects (positive and negative) of the project[1]	The project will contribute to the local environmental sustainability since it will decrease the use of fossil energy and decreases the amount of associated pollution. Therefore the project contributes to the better use of the local natural resources. In addition the project uses clean and efficient technologies. The project will contribute to meeting the Kyoto Protocol goals by helping to reduce GHG emissions.

G 2 Socio-economic and development aspects	
Expected social and economic effects of the project	The project will contribute: ➢ towards better working conditions and will increase the employment opportunities in the area- the new plant will require the employees for operation, management and repair services; ➢ towards better local economic conditions since the use of the renewable energy will decrease the dependence on fossil fuels; The project diversifies the sources of electricity generation and decreases dependence on imported natural gas from Russia. Considering that Georgia's energy sector is heavily dependent on importing gas to supplement hydro-power during electricity shortfalls (which constitutes the largest item in the country's import bill), reduction of gas imports will have a significant positive effect on the weak Balance of Payments of Georgia. ➢ towards improving the living conditions of the population in the area through the improvement of the power supply in the region and increased energy security. ➢ Improved water supply of Zugdidi and Poti and surrounding villages as the project implementation will enable to collect water from afterbay (2 m3/sec) ➢ technological and capacity development- all technology, labour and technical maintenance will be provided inside Georgia transfer of technology (turbines) locally as well support from outside the country. There will be some local capacity building as a result of this technology transfer as local staff will operate and maintain the technology.
Project-related employment structure	○ Employees under 14 years X Employees over 14 years

H ADDITIONALITY AND SUSTAINABILITY EFFECTS

H 1 Additionality	
Presentation of the Additionality of the project	A number of significant barriers to the implementation of this project demonstrate clearly that the proposed CDM project is additional. These barriers include: **Investment barrier:** Despite improvements in Georgia's economic conditions over the last few years, the country still remains in the non-investment rating category. The low ratings for Georgia reflect weak external liquidity, high inflation, substantial infrastructure needs, poor institutional capacity and political uncertainty from regional conflicts. Shortage of local capital in the country is barrier for project developers. **Institutional Barrier:** The plant will face a certain risk because of the low collection rates of the distribution company to which it will sell. The low collection efficiencies results from high system losses, theft and failure to realize on billed amounts. It hampers the ability of the distribution companies to pay the generators. Carbon revenues can help to mitigate these risks. Transmission line failure is also a risk as it would affect the ability of the HPP to sell the generated electricity.

Financial calculations without CDM in USD

Alternative	Investment	Net savings	PB	PO	IRR	NPV	NPVQ
Tariff-0,05	11,000,000	3,370,000	3,3	4,2	24%	5,406,571	0,49
Tariff-0,04	11,000,000	2,630,000	4,2	5,7	15%	1,803,941	0,16
Tariff-0,02	11,000,000	1,150,600	9,6	32,9	1%	- 5,401,308	-0,49

Financial calculations with CDM in USD

Alternative	Investment	Net savings	PB	PO	IRR	NPV	NPVQ
Tariff-0,05	11,000,000	3,796,500	2,9	3,3	33%	16,285,294	1,48
Tariff-0,04	11,000,000	3,055,000	3,6	4,2	25%	10,961,876	1,00
Tariff-0,02	11,000,000	1,575,600	7	9,6	8%	326,721	0,03

Real interest rate-6,5%

H 2 Sustainability Effects	
Summarising description of the project's contribution to the sustainable development of the Host Country	This project contributes to sustainable development in Georgia. Specifically, the project contributes as follows to the three aspects of sustainable development: economic, environmental and social aspects: Economic: The investments that the projects bring will have a positive impact on the local economy New employment is created during construction works at project site. The operation of the plant will also create new employment opportunities for the region. The project diversifies the sources of electricity generation and decreases dependence on imported natural gas from Russia. Considering that Georgia's energy sector is heavily dependent on importing gas to supplement hydro-power during electricity shortfalls. *Environmental* *Substitution of fossil fuels*: The project will substitute the power plants on the margin of the electricity system in Georgia. These are thermal power plants running on natural gas. *Air quality*: The project can reduce over 30,712 tCO_2 annually. In addition, the project will reduce local pollutant emissions (NOx, SO2, VOCs) associated with electricity generation in Georgia and provide positive health impacts for the local population. *Contribution to environmental conventions*: The project will contribute to meeting the Kyoto Protocol goals by helping to reduce GHG emissions. *Social aspects* *better living conditions*: -

	the project generally contributes to increased energy security in the country, particularly in the region because the plant will improve reliability of power supply the project implementation will create possibilities to arrange water supply of Zugdidi and Poti and surrounding villages. *Development of local intellectual capacity*:-Local staff will be involved in the construction and maintenance of the plant