

PREGA FEASIBILITY STUDY REPORT FORMAT

TA 5972-REG: Promotion of Renewable Energy
Energy Efficiency and GHG Abatement (PREGA)



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Prepared For

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PROJECT TITLE

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List of Annexes

Author(s), Organisation(s), Date(s)

1. **Executive Summary** (summarizing key factors, findings, risks, risk mitigation means, and overall conclusions regarding project real world and specific technical and financial viability (bankability) - no more than one page)
2. **Map Showing the Location of the Project** - within Country and/or Region/City
3. **Introduction**

Briefly describe the current country economic, energy and greenhouse mitigation situation; the proposed project; the project's overall technical and financial viability; any additional benefits such as enhanced reputation or market positioning of the project site, product or parent firm; views of the stakeholders involved in terms of risks to obtaining initial project consents or long term viability; dates when feasibility study was undertaken, data gathered, investigations undertaken, detailed costing results, extent of detailed design undertaken, specific results of negotiation of power purchase/energy sales agreements, availability and specific detail of realistic CDM income streams, and details of commercial and/or donor loan negotiations including realistic terms, loan duration, interest rates, collateral requirements, and so forth (no more than two pages)

4. Background

- 4.1 Description and prospects for the specific sector in which the project will operate - such as municipal solid waste or agricultural residues, agricultural product processing, renewable or hybrid electricity generation for stand alone grid, and whether sector is profitable/growing or unprofitable/shrinking and why, project site/product/application's current utilization of cost-effective energy efficiency measures such as enhanced condensate return, existence of heating/drying/cooling process loads for use of waste heat, variable speed drives that if not considered could later affect project viability, and so forth.
- 4.2 Opportunities, constraints and issues related to the project sector (central/national and provincial/local legal contexts, general power export (purchase) prices and terms, existence of relevant fossil fuel and/or grid electricity explicit or implicit subsidies, enforcement of (any) environmental regulations, existence and capacity of energy service companies/providers/consultants to provide energy audits/process design/commissioning/financing/project ongoing maintenance, and so forth.
- 4.3 Sustainable development objectives likely to be contributed to by the project - such as reduced national air or water pollution, greater use of renewable energy, reductions in national energy import costs, contribution towards any renewable energy or energy efficiency targets, reduced reliance on imported fossil fuels, contribution towards alleviating peak electricity supply constraints, achieving improvements in industry competitiveness from reduced costs, reduced local or regional pollution, and so forth.

- 4.4 Government policies and strategies relevant to the project sector - such as standard power purchase contracts at defined prices and for multi-year duration, policies that facilitate foreign investment, waiver of import duties on capital equipment, repatriation of foreign investment income, and so forth.
- 4.5 Extent to which applicable policies are enforced – such as extent to which policies are/are likely to be backed up with necessary regulations or circulars etc, extent to which policies and regulations are or are likely to be consistently enforced, ability to access nominal power export policies as binding contracts for duration of project, and so forth.
- 4.6 Overlap of government and ADB objectives - such as increasing international competitiveness, poverty reduction, sustaining existing livelihoods, support for women and children's health, reduction in indoor/outdoor/local/regional pollution, support for rural sectors, improvement of cost reflectiveness of energy sector, and so forth.

5. Description of the Proposed Project

- 5.1 Project rationale from perspective of relevant key stakeholders, specifically why host government, sectoral organizations, civil society groups/NGOs should/do/will continue to support project objectives. Alignment with ADB, other development financial funding agencies and ODA priorities and funding.
- 5.2 Project goal, objective, expected results, activities, scopes, proposed specific characteristics and circumstances. Specifically, what concrete outputs are to be achieved in the project towards specific goals and objectives.
- 5.3 Poverty reduction and other MDG (Millenium Development Goal) impacts
- 5.4 Technology transfer - what technology will be transferred, intellectual property issues, ongoing technical support, and so forth.
- 5.5 Core business of the proposed project partners and the business and financial relationships between them (as required and available)
- 5.6 The specific product(s) or service(s) to be generated by the project: -
 - characteristics of energy produced (electricity, steam or hot water at specified temperature/pressure and daily, weekly and monthly quantities to match current measured and projected energy loads and profiles;
 - actual, and expected future (with rationale), annual production (GWh, GJ, TOE replaced, etc) to tie in with seasonal fuel supply/energy/production demands, using actual current and/or projected annual hours of use - including current and/or projected provision for scheduled maintenance and major plant/generator overhauls;
 - exactly how any electricity/fuel/steam/hot water produced will be utilized in an efficient/optimised production process including measured/specified current and future process temperature/pressures for steam/hot water/direct drying and so forth;
 - why the stated annual production/activity level is plausible for the plant concerned compared with other comparable plants/activities in the country and in relation to international practice
 - Customer/process ability to pay for full cost of providing energy service – for example with for small grid electricity to replace explicitly and more commonly implicitly subsidized/unrealistically low electricity prices with

high technical and non-technical losses where source of necessary ongoing subsidies is not identified, or source and likelihood of ongoing explicit or implicit subsidies continuing for project duration.

6. Detailed technical, economic, financial and environmental/social analysis

Conduct detailed technical, economic, financial and environmental/social analysis (in line with any Pre-FS framework undertaken in REGA Phase 1) to bankable project standard as follows: -

- Develop specific REGA technology equipment and installation costs (from any Pre-FS indicative cost stage) utilizing actual costs for necessary specific items from discussion with appropriate existing local suppliers and installers, review and quantify technical risks and means for their management,
- Detail track record of both the generic technology type and the specific proposed equipment in the country involved, applicable previous or similar application(s), and necessary technical and spares support, maintenance, operational expertise capacity and ongoing skills retention in the project location.
- Detailed review of proposed plant operations to determine actual process thermal energy and subsequent electricity outputs, establish actual hours of plant operation per year and range of actual plant output levels, review technical risks and any special operational requirements, provision of necessary back up power or energy storage, system integration issues, and so forth.
- Review plant viability in terms of product input and output prices, emerging competitive trends, impact of rising/more realistic/time of use/reduction in non-technical losses and other current and expected impacts on energy prices and costs, emerging trends in industry economies of scale and likely industry rationalization, impact of any future import protection tariff removal policies, levels and likelihood of continuation of any applicable subsidies (including cross-subsidies), any likely rising labor cost trends, likelihood and impact of any enhanced environmental protection policies and/or enforcement, applicability to wider replication.
- Review financial state of proposed site in terms of eligibility for loans from private and/or development sources, transparency and credibility of financial accounts over more than one previous year, asset or cash flow collateral quality and adequacy to support any necessary loans for REGA technology purchase and installation, existing financial relationships with relevant financial institutions, ability of plant or other management to formally commit to loans/leasing or other proposed loan terms, actual interest rates/loan period/terms that would apply to the necessary and applicable loans.

7. Project implementation plan

Include realistic and specific timeframes for the planning, implementation, and operational stages - such as project commencement date, construction starting dates, construction completion dates and project operational lifetimes.

8. Contribution to sustainable development

- 7.1 Long-term GHG and reduction of local pollutants.
- 7.2 Other benefits including economic, social, environmental and technological improvements.
- 7.3 Other impacts of the project (note - an example of a positive impact would be if the demonstrated project technology is replicated in other projects in the same country or elsewhere in the ADB region).

8. Project Baseline and GHG Abatement Calculation

8.2 Current production and delivery patterns - These provide the starting point for defining a framework of a baseline for monitoring activities. Therefore, technical information on the baseline (current delivery system or “without project” scenario), its status and adequacy in meeting the demand is required.

8.3 Flowchart of the current delivery system with the main components and their connections – such as process or power plant process schematics.

8.4 Status, adequacy and operation modes of the baseline or current delivery system.

8.4 Project boundary and monitoring domain

List the GHG emission sources and sinks related to the project, and make a distinction amongst: -

- Direct on-site emissions, specifically emissions from fuel combustion, say from coal or gas used in a power plant
- Direct off-site emissions - such as emissions from transportation of fossil fuels or biomass used in the power plant
- Flow chart of the project with its main components and connections.
- Project boundaries as drawn in the project flowchart, and excluding processes beyond the control or influence of the project, but including the relevant control processes beyond the strict project boundary – for example to generate secondary energy carriers like electricity and/or heat.

8.5 Baseline methodology and calculation of baseline emissions

- Statement of which approved methodology (as approved by the CDM Executive Board) has been selected, or why and how a proposed new CDM has been chosen..
- How the approved methodology will be applied in the context of the project.
- Present the baseline and its underlying assumptions and analysis in a clear and transparent manner, preferably in a spreadsheet model.
- Describe formula, state assumptions, calculate and project the anthropogenic emissions by sources of GHG of the baseline.

- Describe formula, calculate and project any leakage of the baseline.

8.6 Calculation of total project GHG emissions

- Describe formula and calculate the post-project implementation GHG emissions' total based on direct and indirect emissions.

8.7 Net emission reduction

- Calculate the emission reduction from the project by subtracting the total project emissions from the baseline emissions. Give emission reduction figures for all years from the start of the project until the end of the crediting time. Indicate clearly the proposed CDM crediting period of the project¹.

9. GHG emission reduction monitoring and verification

- 9.1 Identification of data needs and data quality with regard to accuracy, comparability, completeness and validity;
- 9.2 Describe methodology used for data collection and monitoring including quality assurance/control provisions for monitoring, collecting and reporting;
- 9.3 Estimates of costs for monitoring and verification

10. Financial Analysis of the Project [use manual of ADB (2002)]

10.1 Estimation of Overall Cost Estimates

List and sum total costs, in both foreign and local currencies.

10.2 Project Financial Analyses

- The FIRR and NPV without the benefits of CO₂ credits
- The FIRR and NPV with the inclusion of CO₂ credit prices at 3, 5 and 10 US \$/t of CO₂

10.3 Financing Plan

Indicate the detailed and specific sources and proportions of finance for all foreign and local costs

11. Economic Analyses [use manual of ADB (1997)]

11.1 Statement of poverty reduction impacts

11.2 Statement of social, gender and environment impacts

- Reduction of local pollutants, further findings and recommendations etc
- Land use impact, if relevant
- Migration, resettlement, good governance, community infrastructure, community organization, etc

11.3 Project Economic Analyses

- The EIRR and NPV without the benefits of CO₂ credits

¹ The crediting period can be either a period of seven years, with the potential for renewal for maximum 2 additional periods; or a period of ten years.

- The EIRR and NPV with the inclusion of CO₂ credit prices at US \$ 5/tonne of CO₂ with sensitivity analysis at \$3 and \$10/tonne

12. Stakeholders' comments

- 12.1 List of relevant Stakeholders
- 12.2 Comments of Stakeholders (such as public, individuals, groups and communities) likely to be affected by the project)
- 12.3 How any comments received have been incorporated in the project approach and/or design

13. Key factors impacting project viability and baseline emissions

- 13.1 List key legal, economic, political, socio-demographic, environmental and technical factors affecting: -
 - baseline of energy production, use, costs, emissions; and
 - project activity levels, energy production, energy use reductions, GHG emission composition or levels.
- 13.2 Project Uncertainties

List, rank and comment on risks and means proposed to manage all key factors that may affect the achievement of a successful project - such as reliance on passing and/or enforcement of government policies, risk that necessary multi-year binding power purchase agreements will not be available in practice, risk of trade liberalization lowering product prices, duration and cost impacts of process or product approval or implementation delays, and so forth).

14. Conclusions and Recommendations

15. Other relevant information

16. Annexes, with more detailed supporting data and reports

17. Reference

ADB – Asian Development Bank, (1997), Economic Analysis for Projects, Asian Development Bank, Manila, Philippines.

ADB – Asian Development Bank, (2002), Guidelines for the Financial Governance and Management of investment Projects Financed by the Asian Development Bank, January, Manila, Philippines