

Programme Area 1**Strengthening the Implementing Capacity of Renewable Energy Policies****PROPOSAL OF WORKING PROCEDURES
FOR
DEVELOPMENT OF
RURAL OFF-GRID ELECTRIFICATION PROJECTS**

Final draft version

Hanoi, March 2006

Introduction

The document was prepared in the framework of VSRE programme, as an output of the Activity 4, Area 1 “*Strengthening the Implementing Capacity of Renewable Energy Policies*”. The Project Document describes the task of Activity 4 as to prepare “*Proposals of Working Procedures for the Development and Assessment of Rural Off-grid Electrification Projects*”. The document, however, provided only the working procedure for *Development* of a project, whereas the working procedure for *Assessment* of project proposals will be discussed in a separate document. The document will be used by investors/developers for the preparation of project proposals and shall also be provided to DOI (PPC) and MOI for their reference to carry out the project assessment and approval that proposed by the investors/developers.

We could follow the guideline described in the Project Document for carrying out the task as: “the existing working procedures for the development and approval of off-grid rural energy projects will be reviewed such as the World Bank’s Operation Manual. When applicable, the same procedures will be used in order to have consistent procedures for dealing with the same type of projects in Vietnam. When not applicable, alternative procedures will be developed and proposed”. The conformity with the existing procedures determined by the present legal documents in Vietnam was also taken into consideration.

In addition, to clarify the subject and scope of assigned work, some general aspects of the Rural Off-grid Electrification Projects in Vietnam should be considered.

According to the information received from Electricity of Vietnam (EVN), as a result of Vietnam’s successful Rural Electrification Programme, currently around 98% of the rural districts (525/536 districts), 94.6% of rural communes (8,524/9,008 communes) are connected to the national electricity grid. A small number of rural communes were electrified by local power sources, such as small hydro and/or diesel generators. Currently, 335 communes and around 11% (1,468,022/13,235,380) of rural households still have no access to electricity. Those remote or mountainous villages are the target areas that VSRE Programme is aiming at. The villages should be supplied with electricity through off-grid systems based on least cost options such as small hydro, wind power, solar photovoltaic systems, etc, in other words by Renewable Energy sources. So, the terms of *Rural Off-grid Electrification* could be understood as *Rural Renewable Off-grid Electrification*. Therefore, the Procedures for project proposals mentioned in this document refer to electrification based on renewable energy sources.

The remote and mountainous villages in Vietnam have a very scattered inhabitation with few tens of households per village located far from each others. A commune consists of some villages amounting to a total of one or a few hundreds of households. For an off-grid renewable energy system, such as a system based on an MHP plant (micro or mini hydropower), usually the part of electric network takes about 20-40% of total project investment, therefore to reduce the expenditure for lines as well as to increase the electricity quality, the powerhouse of a hydropower system should be selected not too far from the supply areas, preferably less than 4 km for the group of approximately 400 households and 2 km for 100 households respectively. Assume up that, each household requires an electric capacity of ~ 350 W, so the total capacity/plant is around 50-200 kW per village.

From above, it can be concluded that *Working Procedures for the Development of Rural Off-grid Electrification Projects* mentioned in the Project Document means *Working Procedures for the Development of small-scaled (less than 200 kW of capacity) rural renewable off-grid power projects*.

Rural Electrification projects will be divided into three categories. The target of this document as well as of VSRE Programme is the third category - Off grid Community Based Rural Electrification Projects, as shown in Chart 1.

In accordance with Vietnam legal guidelines, as shown in Chart 2, a project will be developed through 4 stages, namely Forming a Project, Investment Preparation, Investment Implementation and Project Operation and Management. The *project proposal* work,

however will cover only the two first stages (Forming a Project, Investment Preparation) where the main tasks of the developer are to prepare an *Investment Opportunity Report* – for the first stage of development (formerly called Pre-feasibility Report) and an *Investment Project Report* – for the second stage (formerly called Feasibility Report).

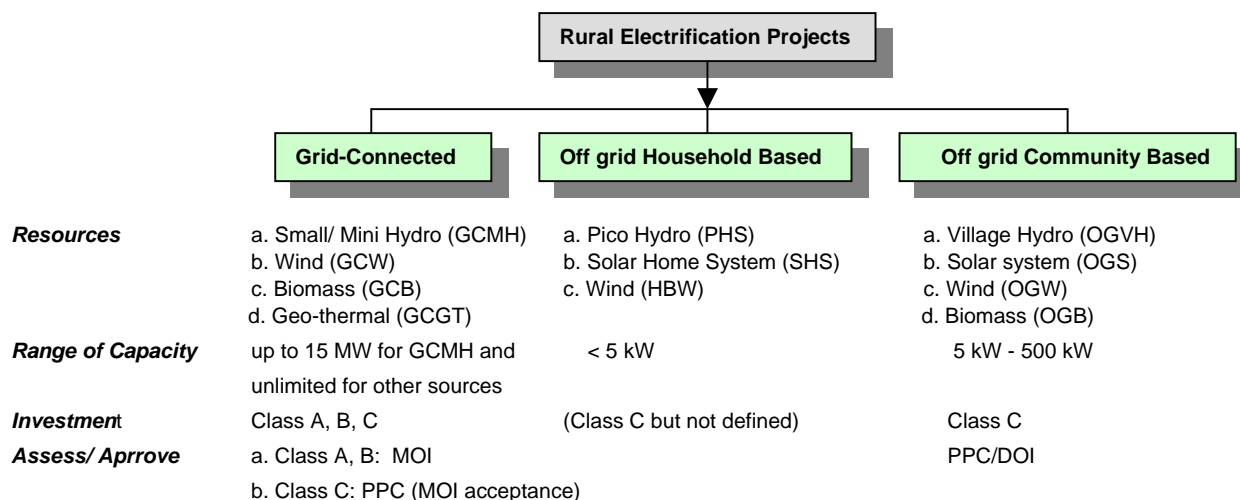


Chart 1. RRE Project Categories

A *project proposal* will be considered to be terminated immediately after approval of the Report of Investment Project. Hence, the contents of the procedures proposed in this document for the proposal of Rural Renewable Energy off-grid Electrification projects are also limited and referring only to the two first stages.

That is the scope and the subject of this document.

Tools and methods to prepare project proposals according to the established working procedures presented here will be discussed in a separate document. It is an output of the Activity 2 of Area 1 “*Preparation of Tools and Methods for Preparation and Assessment of Project Proposals*”.

So far, the legal documents in Vietnam do not provide the specific procedures for Rural Renewable Energy off-grid Electrification project proposals. However, some Vietnamese legal documents are directly related to management of energy project, namely:

Law on Promotion of Domestic Investment, No. 03/1998/QH10, dated on June 01,1998;

Law on Investment, No. 59/2005/QH11, dated Nov. 29, 2005;

Electricity Law, No. 28/2004/QH11, dated Dec. 03,2004;

Construction Law, No. 16/2003/QH11, dated Nov. 26, 2003;

Decree No. 209/2004/ND-CP, dated Dec. 16, 2004 on Project Quality Management;

Decree No. 16/2005/ND-CP, dated Feb. 02, 2003 on Project Investment Management;

Decree No. 105/2005/ND-CP, dated Aug. 17, 2005 on the Guidelines for Implementing some Articles of the Electricity Law;

Ministerial Decision No. 50/2002/QD-BCN, dated Nov. 25, 2002 of the Ministry of Industry on Project Investment Management for the IPP Projects;

Ministerial Decision No. 709/2004/QD-BCN, dated Apr. 3, 2004 of the Ministry of Industry on the Temporary Guidelines for Financial – Economic Analysis and electricity tariffs of electricity generation projects

In addition, it can be referred to:

The World Bank Operational Manual on Renewable Energy for Rural Economic Development Project;

The Asian Development Bank (ADB) Operations Manual

ABBREVIATIONS

ADB	Asian Development Bank
CEC	Commune Electricity Cell
DOI	Department of Industry
EPC	Equipment Procurement Contract
EVN	Electricity of Vietnam
GCB	Grid Connected Biomass system
GCMH	Grid Connected Mini/Small Hydro system
GCGT	Grid Connected Geo-thermal system
HBW	Household Based Wind system
MHP	Micro and mini-hydropower project
MOI	Ministry of Industry
MOU	Minutes of Meeting
OGB	Off grid Biomass system
OGVH	Off grid Village Hydro system
OGW	Off grid Wind system
O&M	Operation and Maintenance
PHS	Pico Hydro system
PPA	Power Purchase Agreement
PPC	Provincial People Committee
RE	Renewable Energy
RRE	Rural Renewable Energy
SHS	Solar Household based system
VND	Vietnam Dong
WB	World Bank

I. COMMON STAGES FOR PROJECT DEVELOPMENT

Four stages are common for the development of any project. They are shown in Chart 2 below

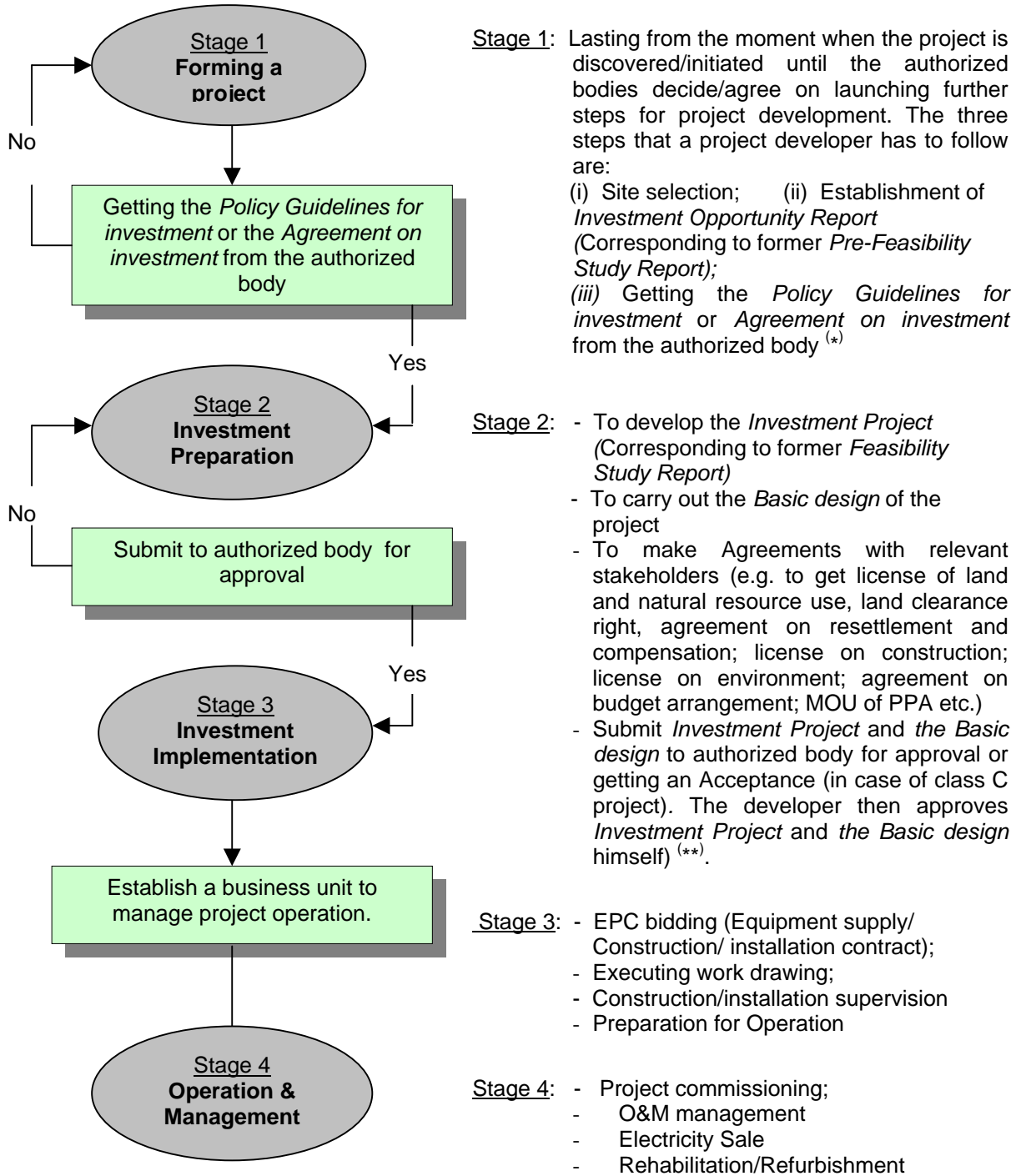


Chart 2. The common stages of a project development

Note:

^(*) - In case of RRE projects which are discussed in our very document, the term of authorized body has to be always understood as Provincial People Committee

- In case that a project has already been listed in any of the approved Provincial/ District Electricity/ Energy Plans the *Investment Opportunity Report* for RRE projects can be omitted and the developer can immediately start with the *Investment Project*.

- The developers of projects select a consultant and contract the services of him for preparing the *Investment Opportunity Report*.
- Developers of Class C projects (which RRE projects fall into) obtain the *Investment Opportunity Report* and *relevant documents* from the consultant, preliminarily evaluate and submit it to Provincial People Committee to request an *Agreement for Investment* instead of the *Policy Guidelines for investment*.

(* *) a) In compliance with the Government Decree No 16/2005/ND-CP dated on 17 February 2005, the power projects are divided into 3 classes:

- Class A: Investment capital is more than VND 600 billions (or about 37.84 million USD),
- Class B: Investment capital is more than VND 30 to 600 billions (or about \$US 1.89 to 37.8 million),
- Class C: Investment capital is less than VND 30 billions (or about \$US 1.89 millions).

b) The developers of Class A projects which are considered of high importance must prepare the *Investment Report* (contract the services of a selected consultant), submit it to the Ministry of Industry for assessment and then finally to the Prime Minister for approval. For other Class A projects, the Ministry of Industry will approve the *Investment Report*.

The developers of Class A projects must elaborate a *Basic Design* (done by the consultant) and submit it to the Ministry of Industry for approval

The developers of Class B projects must prepare an *Investment Report* (contract the services of a selected consultant), submit it to the Ministry of Industry for approval, or to the Provincial Department of Industry for assessment and finally submit it to the Provincial People Committee for approval.

The developers of Class B projects must elaborate a *Basic Design* (done by the consultant) and submit it to the Provincial Department of Industry for approval.

The developers of Class C projects must prepare an *Investment Report* (contract the services of a selected consultant), submit it to the Provincial Department of Industry for assessment and finally submit it to the Provincial People Committee for getting *Acceptance*. The developer then approves *Investment Report* himself.

The *Basic Design* of Class C projects must to be submitted to Provincial Industrial Department for approval.

II. DETAILED DESCRIPTION OF THE PROCEDURES PROPOSED FOR THE OFF-GRID RURAL ELECTRIFICATION PROJECT PROPOSALS.

The off-grid rural electrification projects are usually small-size projects (less than 500kW of capacity) based on renewable resources (Class C projects). Although the overall procedures applicable for any project should also be applied to rural renewable off-grid projects, however, some details can be simplified.

II.1. Stage 1: FORMING PROJECT

Three steps to form a project (refer to Chart 3):

- Selection of potential project sites.
Preparation of **Investment Opportunity Report** .
- Acknowledgment on purchasing electricity (whole/retail selling) with a business entity or the public.
- Submit *Investment Opportunity Report* to authorized bodies for approval.

Note:

The *Investment Opportunity Report* is required only for new projects unlisted in any of the approved Provincial/District Electricity/Energy Plans. However, due to the high risk linked to financial/business aspects of RRE projects and to avoid futile high expenses and preparatory work for the *Investment Project*, it is recommended to stipulate the preparation of a brief and consistent *Investment Opportunity Report* also for any RRE projects.

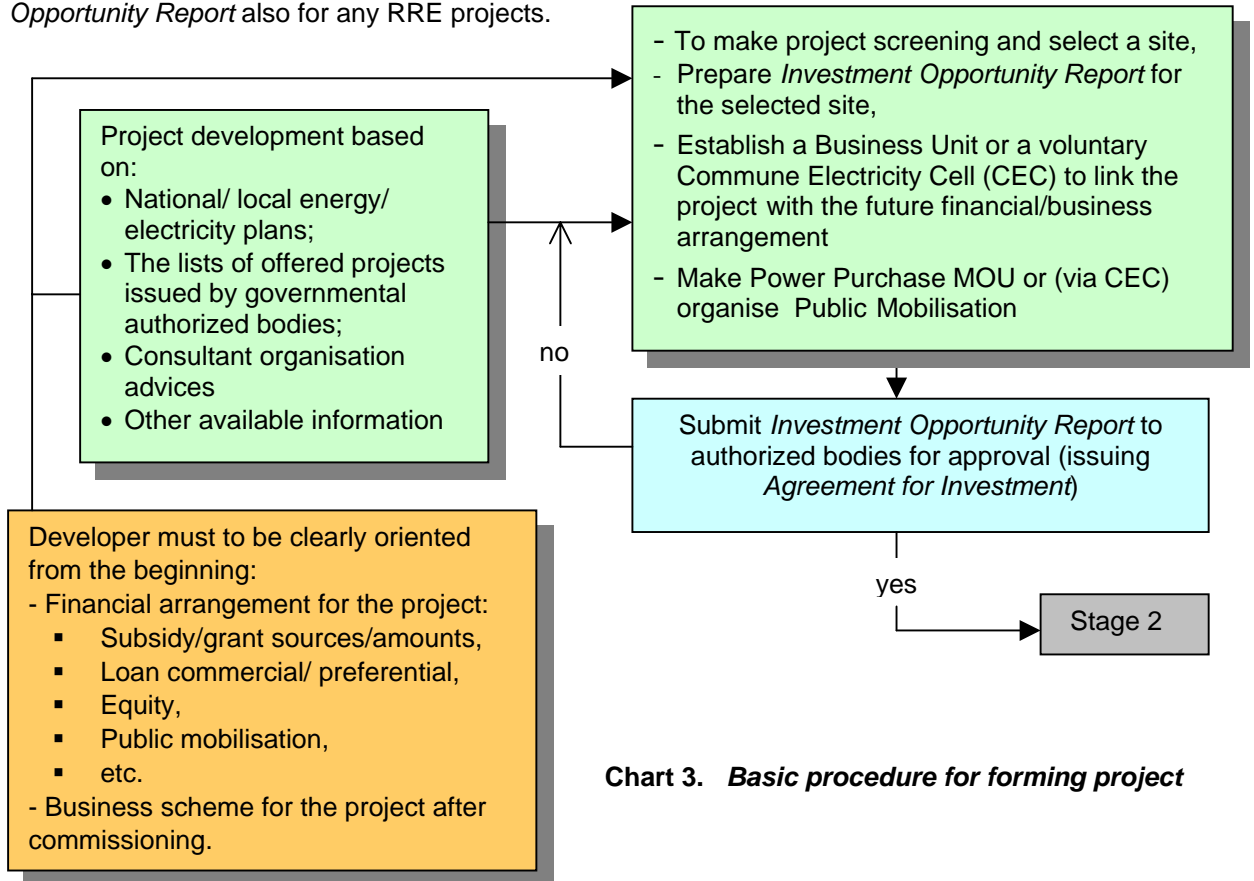


Chart 3. Basic procedure for forming project

Note: - A model of financial arrangement for RE off-grid electrification projects will be taken for reference from other sources (e.g. the documents of the VSRE Area 3 “Mobilising investments for Renewable Rural Electrification”, WB-MOI financial model for RARE project ...) which will not be discussed in detail here;

- The very procedure for project proposals described in our document is technically related only, however, the financial arrangement and the business scheme of the project must be clarified just in the Investment Opportunity Report.

Requirements for *Investment Opportunity Report* :

Investment Opportunity Report has to clarify two issues:

- Technical measures are feasible;
- Electricity price of the project is reasonable and appropriate; financial aspects of the project are healthy, sustainable.

Contents of the *Investment Opportunity Report*

Investment Opportunity Report should have the following contents:

- Basic documents/database of:
 - Socio-economic situation of the area (current state and future potential); electricity demand (forecast of the load; purposes of use...)
 - Basic data of the project site (topographical, geological, meteorological-hydrological, environmental data; catchment, slope and flow of river etc. for hydropower plant).
- Alternatives of project lay-out and preliminary technical solutions; technical specification of the plant, main equipments; electric network/connection;
- Access to the site;
- Preliminary assessment of environmental issues; resettlement and compensation;
- Construction measures;
- Total investment. Financial, economic features of the project.
- Operational/ Maintenance/ Business Management of the project after commissioning; business arrangement.

The last two points are of vital importance and have to be carefully considered before deciding on further project development.

The contents proposed for the *Investment Opportunity Report* is provided in the Annex 1.

To get the *Agreement for Investment from Provincial People Committee*

Rural Renewable off-grid electrification projects basically fall into the class C of investment (of which total investment is less than VND 30 billions). So, the developer only has to get an *Agreement for Investment* from the Provincial People Committee instead of getting full *Policy Guidelines for Investment* from the authorized body (meaning from the Prime Minister for projects of class A; from the Ministry of Industry for projects of class A, B). The Department of Industry – by the assignment of PPC – will assess the Documents before submitting to PPC for issuing agreement regarding three aspects:

- Documents are reliable and complete;
- Investment Opportunity Report is transparent, rational;
- Project does not overlap with other ones in the provincial territory.

Timing for issuing the Agreement: Feedback of PPC is required within no more than 20 working days since DOI has received the complete documents from the developer.

The documents submitted to the Department of Industry should include:

As an example, the technical aspects of the Investment Opportunity Report for small hydropower project should have the following contents:

- Preliminary survey of meteorological and hydrological, topographical and geological conditions;
- Preliminary determination of power lines, project size, basic parameters of the project (capacity, energy produced, water head, water flow available for electricity production, flow duration curve, tail water level);
- Preliminary determination of location/ alignment of weir and spillway, water conveyance, power plant, tail race, roads to the project, electric network and connection.
- Preliminary determination of main technical options, like weir and spillway, water conveyance, power plant, tail race, mechanical equipments, electricity supply, roads to the project, electric network and connection.
- Preliminary assessment of environmental issues, the impact on the aquatic and surrounding terrestrial ecosystem on protected objects; resettlement and compensation issue. In cases, when these impacts and issues are significant and unsolvable, the project should be stopped.
- Preliminary determination of the construction measures.
- Preliminary determination of the construction volume and total investment. Making rough preliminary financial and economic analyses.

- Request for investment/ Letter of Intent;
- Investment Opportunity Report;
- Application for Business Licence and other relevant legal documents;

II.2. Stage 2: INVESTMENT PREPARATION

Stage 2 - *Investment preparation* is lasting from the moment when the project has to be entrusted to the developer (Stage 1 is finished) to the moment when the *Report of Investment Project* (formerly called the *Feasibility Study Report*) has been approved.

- **Timing for stage 2 completion** (for projects of class C): No more than 12 months since the project has been entrusted until the *Report of Investment Project* has been approved.

- **Project approval:**

A Developer must submit the *Report of Investment Project* to the Provincial People Committee - PPC (via the Department of Industry) for getting the *Acceptance*. Then the developer approves the *Investment Project* himself.

The time for PPC’s feedback (to issue the *Acceptance*) should not exceed 20 working days since the developer has submitted the complete documents relevant to the *Report of Investment Project*.

The documents which a developer submits to PPC should include:

- Statement letter of the developer;
- Complete *Report of Investment Project* and at least 20 copies of summary report;
- *Basic Design* of the project;
- Independent third party consultant assessment report.

The job in the *Investment Preparation Stage* includes:

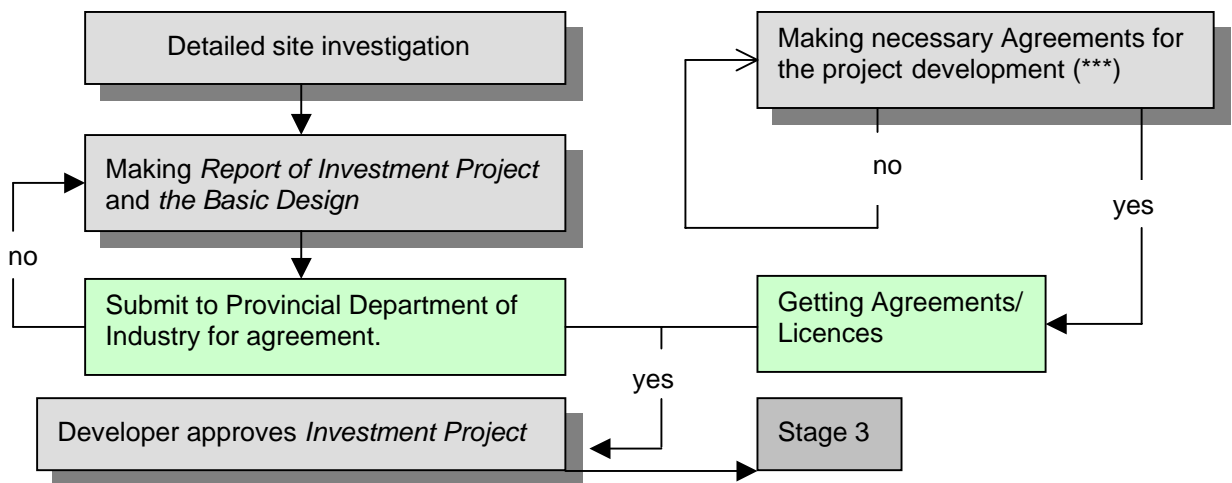


Chart 4. Basic Procedure proposed for Investment Preparation

- **Note:** (***) Developer must get Agreements with relevant stakeholders to get license of land and natural resource use, land clearance right; agreement on resettlement and compensation; license on construction; license on environment; agreement on budget arrangement; MOU of PPA etc.)

Contents of the Report of Investment Project

The *Report of Investment Project* has to solve the following basic issues:

- Optimize the options for the size and parameters of the project (capacity; number of units, amount of energy produced and the option for relevant conjunctional objects);
- Rational option for technological, electrical and mechanical alternatives;
- Rational constructional solution;

- Rational option for the auxiliary objects;
- Rational option for electric network and connection;
- Rational option for the access roads to the project;
- Rational solution for the project layout, construction yard, construction measures and construction organisation, construction schedule etc;
- Detailed assessment of environmental issues; resettlement and compensation;
- Detailed determination of technological equipments, construction materials, the volume of construction and erection works, the volume of management, consultant and investigation works;

As an example, the following description provides a scope of investigations to be made for small hydropower project

(i) *Hydrological investigation:*

- Assemble meteorological, hydrological database of the catchment-area of the hydropower site of interest. The database must be legal ones.
- Ideally, if runoff data are not yet available, establish a water gauging station (for daily measurement for water level and additional runoff measurements. The latter should be realised one time/month in dry season and three times/month in rainy season) in the main stream close to the location selected for the intake structure. In case that the roughly estimated dry season runoff of the river by far exceeds the required design flow such measurements are not required. However, the highest flood level is required to protect all structures adequately.

(ii) *Topographic job:*

- Establish a network to control the standard co-ordinates and altitudes;
- Establish topographic map

Power line – power plant	1:2000
Auxiliary areas	1:2000
access road to the project (if required)	1:2000
Electric network	1:2000

- Vertical section drawings

Across the river at reservoir/ tail race/ weir line	1:500
Along river, along power line	1:500
Alongside and across sections to the plant	1:500

- Geological investigation (if required):

Establish geological map	1:50000
Drilling on water conveyance line	selected option comparative option
Drilling on plant line	selected option comparative option
Drilling on plant site	selected option comparative option

- Excavation at the construction material mine at the area intended for tunnel construction
- Using geophysics to determine
 - Soil resistance
 - Stratum tectonics (in case of necessity);
- In site examinations;
- In door examinations;
- Drilling/ excavation of access road to the site and electric lines.

(iii) *Environmental investigations*

- Collect data for Environmental Impact Assessment (EIA)
- Evaluation of resettlement and compensation.

- Estimation of final account for the project, schedule for mobilisation of finance;

- Financial and economic analysis, proposal of feasible electricity price for the project.

The contents proposed for the Report of *Investment Project* is provided in the Annex 2

Detailed site investigation:

a) Investigate and gather documents:

- Geographic and administrative maps of different scales;
- Geographical conditions;
- Socio-economic situations of the area (commune, district) and development plan; welfare of the people;
- Electric network, electric supply and development plan;
- Transport situation and development plan;
- Irrigation system and development plan (for hydropower projects); details of raw materials and energy resource potentials (for other renewable energy projects);
- Environmental conditions in the selected site.

b) Detailed investigation: Depends on the renewable energy resource to be used for the project, detailed investigations must be carried out appropriately and specifically for such resource e.g. hydro/solar/wind/biomass etc.

Contents of a Basis Design: The contents proposed for a Basic Design is provided in the Annex 3.

Annex 1.

THE CONTENTS PROPOSED FOR THE INVESTMENT OPPORTUNITY REPORT

1. Introduction of the project

1.1 Preface

1.1 Site location

1.2 The process of the project forming

2. Natural conditions

2.1 Meteorological and hydrological conditions

2.2 Topographical conditions

2.3 Geological conditions

3. Alternatives of project size and the basic parameters

3.1 Alternatives of the project

3.2 Preliminary option, size and basic parameters

4. Preliminary assessment of environmental impacts

4.1 Description of environmental conditions in the project area

4.2 Preliminary assessment of environmental impacts

4.3 Measures for the site preparation and evacuation

5. Basic project technical measures

(Specific for SHP, Solar, Wind, Biomass etc.)

5.1 Plant

5.2 Auxiliary objects

5.3 Electric network and connection

5.4 The roads accessing to the site

6. Project implementing organisation

6.1 Forming project

6.2 Preparation

6.3 Implementation

6.4 Construction schedule

7. Total investment and financial, economic indexes

7.1 Total investment

7.2 Financial and economic indexes

8. Conclusions and Proposals

8.1 The benefit gained from the project

8.2 Implementing works

9.3 Proposals

Annex 2.

THE CONTENTS PROPOSED FOR THE REPORT OF INVESTMENT PROJECTS

- 1. Chapter 1. Overview**
 - 1.1 Introduction
 - 1.2 The history of the project forming
 - 1.3 Approach to the project
 - 1.4 Basic specific characteristics of the project
 - Annexes
 - Pictures and drawings
- 2. Chapter 2. Natural conditions**
 - 2.1 Meteorological and hydrological conditions
 - 2.2 Topographical conditions
 - 2.3 Geological conditions
 - Annexes
 - Drawings
- 3. Chapter 3. Options of size and basic parameters**
 - 3.1 Introduction
 - 3.2 Optional bases
 - 3.3 Alternatives for consideration
 - 3.4 Preliminary option
 - 3.5 Basic parameters
 - 3.6 The option of installed capacity
 - Annexes
 - Drawings
- 4. Chapter 4. Environmental Impact Assessment**
 - 4.1 Description of environmental conditions in the project area
 - 4.2 Preliminary Environmental Impact Assessment
 - 4.3 Measures for site preparation/evacuation
 - Drawings
- 5. Chapter 5. Technological and construction measures**
 - 5.1 Project layout of the selected alternative
 - 5.2 Technology solution
 - 5.3 Mechanical technology solution
 - 5.4 Access roads to the project solution
 - Annexes and Drawings
- 6. Chapter 6. Electric and electric connection measures**
 - 6.1 Option for electric connection
 - 6.2 Option for generator
 - 6.3 Electric network scheme
 - 6.4 Measurement – Control – Protection
 - 6.5 Lightning protection and earth connection
 - 6.6 Communication
 - Drawings
- 7. Chapter 7. Construction organisation**
 - 7.1 Construction layout
 - 7.2 Equipment's, material supply sources and major masses
 - 7.3 Infrastructures for construction (electricity, water, roads, tents...)
 - 7.4 Construction measures
 - 7.5 Construction schedule
 - Drawings
- 8. Chapter 8. Total investment and the major Financial - Economic Indexes**
 - 8.1 Total Investment
 - 8.2 Economic evaluation
 - 8.3 Financial evaluation
 - 8.4 Conclusion

Annexes
Total Investment

9. Chapter 9. Conclusions and Proposals

- 9.1 Basic indexes of the project
- 9.2 The benefits of the project
- 9.3 The following works
- 9.4 The proposals

Annex 3.

THE CONTENTS PROPOSED FOR THE BASIC DESIGN

Volum	Content	Remark
Volume 1	General description	
	Natural conditions	
Volume 2	Power line option – size and the basic parameters	
	Electrical and mechanical equipments	
	Operational regime and management	
Volume 3	Environment impact assessment	
Volume 4	Construction measures	
	Construction organisation	
Volume 5	Total account	
Volume 6	Drawings	

Specific topic		
Topic 1	Electric network and connection – construction technical design	
Topic 2	Assess roads - construction technical design	If necessary
Topic 3	Fire protection design	
Topic 4	Project for land clearance and compensation	
Topic 5	Project for resettlement	If necessary
Summary report		

Agreements		
1	Agreement on fire protection	
2	Agreement on map for project layout	
3	Agreement on land clearance and compensation	
4	Agreement on project for resettlement	