

TECHNICAL SPECIFICATION

**Recommendations for renewable energy and hybrid systems for rural
electrification –
Part 4: System selection and design**



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**Recommendations for renewable energy and hybrid systems for rural
electrification –
Part 4: System selection and design**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	9
4 Functional requirements of production and distribution subsystems	10
4.1 General.....	10
4.2 Overall needs to be satisfied.....	11
4.2.1 Main factors to be considered.....	11
4.2.2 Needs and characteristics to be considered.....	11
4.3 Introduction to subsystems	14
4.4 Functional description of a production subsystem	15
4.4.1 General	15
4.4.2 Detailed functions to be achieved by a production subsystem.....	15
4.4.3 Detailed performances criteria to be achieved by a production subsystem.....	16
4.5 Functional description of a distribution subsystem	16
4.5.1 Detailed functions to be achieved by a distribution subsystem (or rural micro-grid).....	16
4.5.2 Detailed performances criteria to be achieved by a distribution subsystem.....	17
4.6 Functional description of a demand subsystem	18
4.7 Constraints to be complied with by production distribution and demand subsystems.....	18
5 Energy management rules	19
5.1 General.....	19
5.2 Functional description for an energy management of an isolated system	20
5.3 Demand side management.....	21
6 Expected results from the sizing process.....	21
6.1 Overview.....	21
6.2 Participants in the sizing process.....	21
6.3 Elements for comparing various design proposals.....	21
6.4 Frameworks for proposal.....	22
6.4.1 General	22
6.4.2 General commitments to supply.....	22
6.4.3 Assumptions and classification of input.....	24
6.4.4 Technical characteristics for the main equipment proposed	28
6.4.5 Characteristics for a photovoltaic array.....	29
6.4.6 Characteristics for wind turbines.....	30
6.4.7 Characteristics for the generator set.....	31
6.4.8 Characteristics for micro hydro turbines.....	32
6.4.9 Characteristics for biomass generators	33
6.4.10 Characteristics for power converters.....	33
6.4.11 Characteristics for the load manager/meter.....	35
6.4.12 Characteristics for system controllers	35
6.4.13 Characteristics for batteries	36

6.4.14	Characteristics for links and wiring	37
6.4.15	Energy outputs	37
6.4.16	Presentation of the costs	38
6.4.17	Design warranty.....	38
6.4.18	Steps to reduce the impact of climatic hazards on system performance	39
6.4.19	Presentation of the environmental and social impact.....	39
6.4.20	Presentation of the socio- economic impact assessment.....	39
6.5	Proposal for a sizing process	39
6.6	Impact of design assumptions on system sizing and cost	39
6.7	Guarantee of results	41
7	Data acquisition rules for system management	41
7.1	Overview.....	41
7.2	General.....	41
7.3	Levels of data acquisition and data necessity.....	42
7.3.1	General	42
7.3.2	Information to provide to the energy manager and relevant data to be collected.....	42
7.3.3	Information to provide to the operator and relevant data to be collected	44
7.3.4	Information to provide to the user and relevant data to be collected.....	45
7.3.5	Summary of the information required	46
7.3.6	Scientific data collection	46
7.4	Data to be collected	46
7.5	Operating conditions, electrical and engineering requirements for data acquisition	48
Annex A (informative)	Example for detailed performance criteria and levels for a production subsystem	49
Annex B (informative)	Example for detailed performance criteria and levels for a distribution subsystem	50
Annex C (informative)	Example framework for proposal specification	51
C.1	Knowledge of site	51
C.2	Knowledge of consumption data.....	51
C.3	Knowledge of resources	52
C.4	Technical characteristics for the main equipment proposed.....	53
C.4.1	Photovoltaic modules.....	53
C.4.2	Modules supporting structure.....	53
C.5	Characteristics for wind turbines	53
C.5.1	Wind turbine	53
C.5.2	Structure support.....	54
C.6	Characteristics for the generator set	54
C.7	Characteristics for micro hydro turbine.....	55
C.8	Characteristics for biomass generators	55
C.9	Characteristics for power converters	55
C.10	Characteristics for load manager/meter.....	56
C.11	Characteristics for system controllers	57
C.12	Characteristics for battery	57
C.13	Energy outputs.....	58
C.13.1	From renewable energies	58
C.13.2	From fossil energies	58
Annex D (informative)	Formula for costs calculations	59

D.1	Yearly cash flow.....	59
D.2	Calculation of total life cycle cost.....	59
D.3	Calculation of the levelized cost of energy.....	60
D.4	Annualized maintenance, operating, and replacement expense.....	60
D.5	Further economic calculations applicable to energy businesses.....	61
Annex E	(informative) Proposal for a sizing process.....	63
E.1	General.....	63
E.2	Comments on the proposed sizing process.....	64
E.2.1	General.....	64
E.2.2	Step 01: Definition of power requirements to be fulfilled.....	65
E.2.3	Step 02: Conversion of available weather data into relevant data.....	66
E.2.4	Step 03: Statement of economic data to be accounted for.....	67
E.2.5	Step 04: Inventory of the constraints to account for.....	67
E.2.6	Step 05: Management assumptions.....	68
E.2.7	Step 06: Technical choices.....	69
E.2.8	Step 07: Calculations.....	70
E.2.9	Step 08: Analysis of the results.....	70
E.2.10	Step 09: Examination of the opportunity of other choices.....	71
E.2.11	Step 10: Change in technical choices.....	71
E.2.12	Step 11: Definition of desired equipment characteristics.....	71
E.2.13	Step 12: Identification of existing/available equipment complying with the characteristics.....	71
E.2.14	Step 13: New calculations.....	71
E.2.15	Step 14: Analysis of the results.....	71
E.2.16	Step 15: Examining the opportunity of other choices.....	71
E.2.17	Step 16: New choices of equipment.....	71
E.2.18	Step 17: Technical characteristics for the finally chosen equipment.....	72
E.2.19	Step 18: Forwarding the results to the project implementer.....	72
E.2.20	Step 19: Modification of the input data.....	72
Figure 1	– Factors involved in the design of a system.....	11
Figure 2	– Functional diagram of a radial structure for rural micro-grid.....	18
Figure 3	– Functional impact of energy management and safety.....	19
Figure E.1	– Sizing process flow chart.....	64
Table 1	– Technical factors – needs or characteristics to be considered.....	12
Table 2	– Economic factors – needs and characteristics to be considered.....	12
Table 3	– Site characteristics.....	13
Table 4	– Regulations and requirements to be considered.....	14
Table 5	– Participants in the sizing process.....	21
Table 6	– Perspectives to be considered.....	23
Table 7	– Commitments indicators.....	24
Table 8	– Knowledge of site.....	25
Table 9	– Knowledge of consumption data.....	26
Table 10	– Knowledge of resources: data accuracy levels.....	26
Table 11	– Knowledge of resources: data retained for considered site.....	28
Table 12	– Knowledge of resources: range of data history.....	28

Table 13 – Characteristics for photovoltaic modules	29
Table 14 – Characteristics for modules supporting structure	29
Table 15 – Characteristics for the wind turbine	30
Table 16 – Characteristics for wind turbine structure	30
Table 17 – Characteristics for the generator set	31
Table 18 – Characteristics for micro hydro turbines	32
Table 19 – Characteristics for biomass generators	33
Table 20 – Characteristics for power converters	34
Table 21 – Characteristics for load manager/meter	35
Table 22 – Characteristics for system controllers	36
Table 23 – Characteristics for batteries	36
Table 24 – Characteristics for links and wiring	37
Table 25 – Energy output from renewable energies	37
Table 26 – Energy output from fossil energies	37
Table 27 – Energy output from storage	38
Table 28 – Incidence of energy management assumptions on system sizing	40
Table 29 – Incidence of cost management assumptions on system dimensions	41
Table 30 – Information required by the energy manager and data to collect	43
Table 31 – Information required by the operator and data to collect	45
Table 32 – Information required by the user and data to collect	45
Table 33 – Summary of the needed information	46
Table 34 – Minimum set of data to be collected	47
Table 35 – Relationship between required information and system architecture	48
Table A.1 – Detailed performance criteria and levels for a production subsystem	49
Table A.2 – Typical example of Table A.1	49
Table B.1 – Detailed performance criteria and levels for a distribution subsystem	50
Table B.2 – Typical example of Table B.2	50
Table E.1 – Description of utilities to be power supplied	65
Table E.2 – Consumption characteristics	66
Table E.3 – Meteorological data used for sizing	66
Table E.4 – Proposals for types of cost to be accounted for	67
Table E.5 – Site constraints inventory	67
Table E.6 – Impact of energy management assumptions on plant sizing	68
Table E.7 – Impact of cost management assumptions on plant sizing	69

INTERNATIONAL ELECTROTECHNICAL COMMISSION

RECOMMENDATIONS FOR RENEWABLE ENERGY AND HYBRID SYSTEMS FOR RURAL ELECTRIFICATION –

Part 4: System selection and design

FOREWORD

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62257-4, which is a technical specification, has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

This second edition cancels and replaces the first edition issued in 2005. It constitutes a technical revision.

The main technical changes with regard to the previous edition are as follows:

- redefine the maximum AC voltage from 500 V to 1 000 V, the maximum DC voltage from 750 V to 1 500 V;
- removal of the limitation of 100 kVA system size. Hence the removal of the word “small” in the title and related references in this technical specification.

This technical specification is to be used in conjunction with the IEC 62257 series.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
82/949/DTS	82/1000A/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62257 series, published under the general title *Recommendations for renewable energy and hybrid systems for rural electrification*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

The IEC 62257 series intends to provide to different players involved in rural electrification projects (such as project implementers, project contractors, project supervisors, installers, etc.) documents for the setting up of renewable energy and hybrid systems with AC voltage below 1 000 V and DC voltage below 1 500 V.

These documents are recommendations:

- to choose the right system for the right place;
- to design the system;
- to operate and maintain the system.

These documents are focused only on rural electrification concentrating on but not specific to developing countries. They should not be considered as all inclusive to rural electrification. The documents try to promote the use of renewable energies in rural electrification; they do not deal with clean mechanisms developments at this time (CO₂ emission, carbon credit, etc.). Further developments in this field could be introduced in future steps.

This consistent set of documents is best considered as a whole with different parts corresponding to items for safety, sustainability of systems aiming at the lowest life cycle cost as possible. One of the main objectives is to provide the minimum sufficient requirements, relevant to the field of application that is: renewable energy and hybrid off-grid systems.

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RECOMMENDATIONS FOR RENEWABLE ENERGY AND HYBRID SYSTEMS FOR RURAL ELECTRIFICATION –

Part 4: System selection and design

1 Scope

This part of IEC 62257 provides a method for describing the results to be achieved by the electrification system independently of the technical solutions that could be implemented.

The purpose of this part of IEC 62257 is to provide a method to assist project contractors and project developers to select and design the electrification system for isolated sites while matching the identified needs, such as those described in IEC TS 62257-2. IEC TS 62257-2 assesses the needs of the users and the different power system architectures which can be used for meeting these needs. In relation to the needs of the different participants to the project, functional requirements that shall be achieved by the production and distribution subsystems are listed.

In Clause 5, energy management rules to be considered are described. These are key issues as they have a great influence on the sizing of the electrification system.

In Clause 6, the informations provided by the system sizing process to allow the participants to select the equipment or component able to fulfil the functional requirements are listed.

To allow and facilitate the management of the micro-power plant and the maintenance of the whole electrification system, some information is collected and monitored.

Clause 7 is dedicated to defining the parameters and specifying rules for data acquisition.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC TS 62257-2:2015, *Recommendations for renewable energy and hybrid systems for rural electrification – Part 2: From requirements to a range of electrification systems*

IEC TS 62257-3:2015, *Recommendations for renewable energy and hybrid systems for rural electrification – Part 3: Project development and management*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

renewable energy

RE

energy from a source that is not depleted when used