

PHILIPPINE BIDDING DOCUMENTS

Procurement of Equipment for the Establishment of
Educational Smart Grid Laboratory for the Mariano Marcos
State University, City of Batac

(Project Title)

PhP20,500,000.00

(Approved Budget for the Contract)

**Sixth Edition
July 2020**

Preface

These Philippine Bidding Documents (PBDs) for the procurement of Goods through Competitive Bidding have been prepared by the Government of the Philippines for use by any branch, constitutional commission or office, agency, department, bureau, office, or instrumentality of the Government of the Philippines, National Government Agencies, including Government-Owned and/or Controlled Corporations, Government Financing Institutions, State Universities and Colleges, and Local Government Unit. The procedures and practices presented in this document have been developed through broad experience, and are for mandatory use in projects that are financed in whole or in part by the Government of the Philippines or any foreign government/foreign or international financing institution in accordance with the provisions of the 2016 revised Implementing Rules and Regulations of Republic Act No. 9184.

The Bidding Documents shall clearly and adequately define, among others: (i) the objectives, scope, and expected outputs and/or results of the proposed contract or Framework Agreement, as the case may be; (ii) the eligibility requirements of Bidders; (iii) the expected contract or Framework Agreement duration, the estimated quantity in the case of procurement of goods, delivery schedule and/or time frame; and (iv) the obligations, duties, and/or functions of the winning bidder.

Care should be taken to check the relevance of the provisions of the PBDs against the requirements of the specific Goods to be procured. If duplication of a subject is inevitable in other sections of the document prepared by the Procuring Entity, care must be exercised to avoid contradictions between clauses dealing with the same matter.

Moreover, each section is prepared with notes intended only as information for the Procuring Entity or the person drafting the Bidding Documents. They shall not be included in the final documents. The following general directions should be observed when using the documents:

- a. All the documents listed in the Table of Contents are normally required for the procurement of Goods. However, they should be adapted as necessary to the circumstances of the particular Procurement Project.
- b. Specific details, such as the "*name of the Procuring Entity*" and "*address for bid submission*," should be furnished in the Instructions to Bidders, Bid Data Sheet, and Special Conditions of Contract. The final documents should contain neither blank spaces nor options.
- c. This Preface and the footnotes or note in italics included in the Invitation to Bid, Bid Data Sheet, General Conditions of Contract, Special Conditions of Contract, Schedule of Requirements, and Specifications are not part of the text of the final document, although they contain instructions that the Procuring Entity should strictly follow.

- d. The cover should be modified as required to identify the Bidding Documents as to the Procurement Project, Project Identification Number, and Procuring Entity, in addition to the date of issue.
- e. Modifications for specific Procurement Project details should be provided in the Special Conditions of Contract as amendments to the Conditions of Contract. For easy completion, whenever reference has to be made to specific clauses in the Bid Data Sheet or Special Conditions of Contract, these terms shall be printed in bold typeface on Sections I (Instructions to Bidders) and III (General Conditions of Contract), respectively.
- f. For guidelines on the use of Bidding Forms and the procurement of Foreign-Assisted Projects, these will be covered by a separate issuance of the Government Procurement Policy Board.

Table of Contents

Glossary of Acronyms, Terms, and Abbreviations	4
Section I. Invitation to Bid.....	7
Section II. Instructions to Bidders.....	8
1. Scope of Bid	9
2. Funding Information.....	9
3. Bidding Requirements	9
4. Corrupt, Fraudulent, Collusive, and Coercive Practices	10
5. Eligible Bidders.....	10
6. Origin of Goods	11
7. Subcontracts	11
8. Pre-Bid Conference	11
9. Clarification and Amendment of Bidding Documents	11
10. Documents comprising the Bid: Eligibility and Technical Components	11
11. Documents comprising the Bid: Financial Component	12
12. Bid Prices	12
13. Bid and Payment Currencies	13
14. Bid Security	13
15. Sealing and Marking of Bids	13
16. Deadline for Submission of Bids	14
17. Opening and Preliminary Examination of Bids	14
18. Domestic Preference	14
19. Detailed Evaluation and Comparison of Bids	14
20. Post-Qualification	15
21. Signing of the Contract	15
Section III. Bid Data Sheet	16
Section IV. General Conditions of Contract	18
1. Scope of Contract	19
2. Advance Payment and Terms of Payment	19
3. Performance Security	19
4. Inspection and Tests	19
5. Warranty	20
6. Liability of the Supplier	20
Section V. Special Conditions of Contract	21
Section VI. Schedule of Requirements	26
Section VII. Technical Specifications	26

Glossary of Acronyms, Terms, and Abbreviations

ABC – Approved Budget for the Contract.

BAC – Bids and Awards Committee.

Bid – A signed offer or proposal to undertake a contract submitted by a bidder in response to and in consonance with the requirements of the bidding documents. Also referred to as *Proposal* and *Tender*. (2016 revised IRR, Section 5[c])

Bidder – Refers to a contractor, manufacturer, supplier, distributor and/or consultant who submits a bid in response to the requirements of the Bidding Documents. (2016 revised IRR, Section 5[d])

Bidding Documents – The documents issued by the Procuring Entity as the bases for bids, furnishing all information necessary for a prospective bidder to prepare a bid for the Goods, Infrastructure Projects, and/or Consulting Services required by the Procuring Entity. (2016 revised IRR, Section 5[e])

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

Consulting Services – Refer to services for Infrastructure Projects and other types of projects or activities of the GOP requiring adequate external technical and professional expertise that are beyond the capability and/or capacity of the GOP to undertake such as, but not limited to: (i) advisory and review services; (ii) pre-investment or feasibility studies; (iii) design; (iv) construction supervision; (v) management and related services; and (vi) other technical services or special studies. (2016 revised IRR, Section 5[i])

CDA - Cooperative Development Authority.

Contract – Refers to the agreement entered into between the Procuring Entity and the Supplier or Manufacturer or Distributor or Service Provider for procurement of Goods and Services; Contractor for Procurement of Infrastructure Projects; or Consultant or Consulting Firm for Procurement of Consulting Services; as the case may be, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

CIF – Cost Insurance and Freight.

CIP – Carriage and Insurance Paid.

CPI – Consumer Price Index.

DDP – Refers to the quoted price of the Goods, which means “delivered duty paid.”

DTI – Department of Trade and Industry.

EXW – Ex works.

FCA – “Free Carrier” shipping point.

FOB – “Free on Board” shipping point.

Foreign-funded Procurement or Foreign-Assisted Project– Refers to procurement whose funding source is from a foreign government, foreign or international financing institution as specified in the Treaty or International or Executive Agreement. (2016 revised IRR, Section 5[b]).

Framework Agreement – Refers to a written agreement between a procuring entity and a supplier or service provider that identifies the terms and conditions, under which specific purchases, otherwise known as “Call-Offs,” are made for the duration of the agreement. It is in the nature of an option contract between the procuring entity and the bidder(s) granting the procuring entity the option to either place an order for any of the goods or services identified in the Framework Agreement List or not buy at all, within a minimum period of one (1) year to a maximum period of three (3) years. (GPPB Resolution No. 27-2019)

GFI – Government Financial Institution.

GOCC – Government-owned and/or –controlled corporation.

Goods – Refer to all items, supplies, materials and general support services, except Consulting Services and Infrastructure Projects, which may be needed in the transaction of public businesses or in the pursuit of any government undertaking, project or activity, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, including non-personal or contractual services such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services, as well as procurement of materials and supplies provided by the Procuring Entity for such services. The term “related” or “analogous services” shall include, but is not limited to, lease or purchase of office space, media advertisements, health maintenance services, and other services essential to the operation of the Procuring Entity. (2016 revised IRR, Section 5[r])

GOP – Government of the Philippines.

GPPB – Government Procurement Policy Board.

INCOTERMS – International Commercial Terms.

Infrastructure Projects – Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/power and electrification facilities, national buildings, school buildings, hospital buildings, and other related construction projects of the government. Also referred to as *civil works or works*. (2016 revised IRR, Section 5[u])

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PhilGEPS - Philippine Government Electronic Procurement System.

Procurement Project – refers to a specific or identified procurement covering goods, infrastructure project or consulting services. A Procurement Project shall be described, detailed, and scheduled in the Project Procurement Management Plan prepared by the agency which shall be consolidated in the procuring entity's Annual Procurement Plan. (GPPB Circular No. 06-2019 dated 17 July 2019)

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

Supplier – refers to a citizen, or any corporate body or commercial company duly organized and registered under the laws where it is established, habitually established in business and engaged in the manufacture or sale of the merchandise or performance of the general services covered by his bid. (Item 3.8 of GPPB Resolution No. 13-2019, dated 23 May 2019). Supplier as used in these Bidding Documents may likewise refer to a distributor, manufacturer, contractor, or consultant.

UN – United Nations.



MARIANO MARCOS STATE UNIVERSITY

Section I. Invitation to Bid

2021-039

INVITATION TO BID FOR THE PROCUREMENT OF EQUIPMENT FOR THE ESTABLISHMENT OF EDUCATIONAL SMART GRID LABORATORY FOR THE MARIANO MARCOS STATE UNIVERSITY, CITY OF BATAC

1. The **MARIANO MARCOS STATE UNIVERSITY**, through the Special Purpose Fund of 2022, intends to apply the sum of **Twenty Million Five Hundred Thousand Pesos only (PhP20,500,000.00)**, being the Approved Budget for the Contract (ABC), to payments under the contract of the above project. Bids received in excess of the ABC shall be automatically rejected at bid opening.
2. The **MARIANO MARCOS STATE UNIVERSITY** now invites bids for the above project. Delivery of the Goods is required within **60 calendar days** from receipt of Notice to Proceed. Bidders should have completed, within two (2) years from the date of submission and receipt of bids, a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in section II (Instruction to Bidders).
3. Bidding will be conducted through open competitive bidding procedures, using a non-discretionary "pass/fail" criterion as specified in the 2016 Revised Implementing Rules and Regulations (IRR) of Republic Act (RA) 9184, otherwise known as the "Government Procurement Reform Act,".

Bidding is open to all interested bidders, whether local or foreign, subject to the conditions for eligibility provided in the 2016 revised IRR of RA No. 9184.

4. Prospective bidders may obtain further information from **MARIANO MARCOS STATE UNIVERSITY** and inspect the Bid Documents at the address below, during regular office hours.
5. A complete set of bid documents may be acquired by interested Bidders on **October 29, 2021** from the given address and website below upon payment of the corresponding fee in the amount of **Twenty-Five Thousand Pesos (P25,000.00)**.
6. The MMSU shall allow the bidder to present its proof of payment for the fees in person and electronic means.
7. The **MARIANO MARCOS STATE UNIVERSITY** will hold a Pre-Bid Conference on **November 9, 2021** at 3:00 PM at the Conference Room, FEM Hall Extension Building,

MMSU, City of Batac and/or through video conferencing or webcasting via Google Meet (meet.google.com/wsh-kpyp-qex) which will be open to prospective bidders.

8. Bids must be duly received by the BAC Secretariat thru a) manual submission at the office address indicated below, b) online or electronic submission as indicated below, or both on or before **November 23, 2021 at 2:00 PM**. Late bids shall not be accepted.
9. All bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in ITB Clause 14.
10. Bid opening shall be on **November 23, 2021; 2:00 PM** at the given address below and/or via e-mail algabriel@mmsu.edu.ph. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity or thru google meet (meet.google.com/cyz-iowg-dxb)
11. **The MARIANO MARCOS STATE UNIVERSITY reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of the 2016 revised IRR of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.**
12. For further information, please refer to:

Ms. AGNES L GABRIEL
Chief, BAC Secretariat
Mariano Marcos State University
City of Batac, Ilocos Norte
Email: algabriel@mmsu.edu.ph
13. You may visit the following websites:

For downloading of Bidding Documents:

<https://notices.philgeps.gov.ph>

<https://bac-admin.mmsu.edu.ph/bids>

October 28, 2021


NATHANIEL R. ALIBUYOG
BAC CHAIR

Section II. Instructions to Bidders

Notes on the Instructions to Bidders

This Section on the Instruction to Bidders (ITB) provides the information necessary for bidders to prepare responsive bids, in accordance with the requirements of the Procuring Entity. It also provides information on bid submission, eligibility check, opening and evaluation of bids, post-qualification, and on the award of contract.

1. Scope of Bid

The Procuring Entity, Mariano Marcos State University wishes to receive bids for the **Procurement of Equipment for the Establishment of Educational Smart Grid Laboratory for the Mariano Marcos State University, City of Batac with Identification Number ITB2021-039**, the details of which are described in Section VII (Technical Specifications).

2. Funding Information

- 2.1. The GOP through the Special Purpose Fund of 2021 as indicated below for 2021 in the amount of **P20,500,000.00**.
- 2.2. The source of funding is: **Special Purpose Fund of 2021**

3. Bidding Requirements

The Bidding for the Project shall be governed by all the provisions of RA No. 9184 and its 2016 revised IRR, including its Generic Procurement Manuals and associated policies, rules and regulations as the primary source thereof, while the herein clauses shall serve as the secondary source thereof.

Any amendments made to the IRR and other GPPB issuances shall be applicable only to the ongoing posting, advertisement, or **IB** by the BAC through the issuance of a supplemental or bid bulletin.

The Bidder, by the act of submitting its Bid, shall be deemed to have verified and accepted the general requirements of this Project, including other factors that may affect the cost, duration and execution or implementation of the contract, project, or work and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

4. Corrupt, Fraudulent, Collusive, and Coercive Practices

The Procuring Entity, as well as the Bidders and Suppliers, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex "I" of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

- 5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.
- 5.2. Foreign ownership exceeding those allowed under the rules may participate pursuant to:
 - i. When a Treaty or International or Executive Agreement as provided in Section 4 of the RA No. 9184 and its 2016 revised IRR allow foreign bidders to participate;
 - ii. Citizens, corporations, or associations of a country, included in the list issued by the GPPB, the laws or regulations of which grant reciprocal rights or privileges to citizens, corporations, or associations of the Philippines;
 - iii. When the Goods sought to be procured are not available from local suppliers; or
 - iv. When there is a need to prevent situations that defeat competition or restrain trade.
- a. Foreign ownership limited to those allowed under the rules may participate in this Project.
- 5.3. Pursuant to Section 23.4.1.3 of the 2016 revised IRR of RA No.9184, the Bidder shall have an SLCC that is at least one (1) contract similar to the Project the value of which, adjusted to current prices using the PSA's CPI, must be at least equivalent to:
 - a. For the procurement of Non-expendable Supplies and Services: The Bidder must have completed a single contract that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC.
 - b. For the procurement of Expendable Supplies: The Bidder must have completed a single contract that is similar to this Project, equivalent to at least twenty-five percent (25%) of the ABC.

- c. For procurement where the Procuring Entity has determined, after the conduct of market research, that imposition of either (a) or (b) will likely result to failure of bidding or monopoly that will defeat the purpose of public bidding: the Bidder should comply with the following requirements:
 - i. Completed at least two (2) similar contracts, the aggregate amount of which should be equivalent to at least *fifty percent (50%) in the case of non-expendable supplies and services or twenty-five percent (25%) in the case of expendable supplies*] of the ABC for this Project; and
 - ii. The largest of these similar contracts must be equivalent to at least half of the percentage of the ABC as required above.

5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.1 of the 2016 IRR of RA No. 9184.

6. Origin of Goods

There is no restriction on the origin of goods other than those prohibited by a decision of the UN Security Council taken under Chapter VII of the Charter of the UN, subject to Domestic Preference requirements under **ITB** Clause 18.

7. Subcontracts

The Procuring Entity has prescribed that:

- a. Subcontracting is not allowed.

8. Pre-Bid Conference

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time through videoconferencing/webcasting and face-to-face at its physical address **MMSU, Brgy. Quiling Sur, City of Batac, Ilocos Norte** as indicated in paragraph 6 of the **IB**.

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of the Bidding Documents. Such requests must be in writing and received by the Procuring Entity, either at its given address or through electronic mail indicated in the **IB**, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10. Documents comprising the Bid: Eligibility and Technical Components

- 10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Section VIII (Checklist of Technical and Financial Documents)**.
- 10.2. The Bidder's SLCC as indicated in **ITB** Clause 5.3 should have been completed within *2 years* prior to the deadline for the submission and receipt of bids.
- 10.3. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. Similar to the required authentication above, for Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.

11. Documents comprising the Bid: Financial Component

- 11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Section VIII (Checklist of Technical and Financial Documents)**.
- 11.2. If the Bidder claims preference as a Domestic Bidder or Domestic Entity, a certification issued by DTI shall be provided by the Bidder in accordance with Section 43.1.3 of the 2016 revised IRR of RA No. 9184.
- 11.3. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.
- 11.4. For Foreign-funded Procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Bid Prices

- 12.1. Prices indicated on the Price Schedule shall be entered separately in the following manner:
 - a. For Goods offered from within the Procuring Entity's country:
 - i. The price of the Goods quoted EXW (ex-works, ex-factory, ex-warehouse, ex-showroom, or off-the-shelf, as applicable);
 - ii. The cost of all customs duties and sales and other taxes already paid or payable;

- iii. The cost of transportation, insurance, and other costs incidental to delivery of the Goods to their final destination; and
 - iv. The price of other (incidental) services, if any, listed in e.
- b. For Goods offered from abroad:
- i. Unless otherwise stated in the **BDS**, the price of the Goods shall be quoted delivered duty paid (DDP) with the place of destination in the Philippines as specified in the **BDS**. In quoting the price, the Bidder shall be free to use transportation through carriers registered in any eligible country. Similarly, the Bidder may obtain insurance services from any eligible source country.
 - ii. The price of other (incidental) services, if any, as listed in **Section VII (Technical Specifications)**.

13. Bid and Payment Currencies

- 13.1. For Goods that the Bidder will supply from outside the Philippines, the bid prices may be quoted in the local currency or tradeable currency accepted by the BSP at the discretion of the Bidder. However, for purposes of bid evaluation, Bids denominated in foreign currencies, shall be converted to Philippine currency based on the exchange rate as published in the BSP reference rate bulletin on the day of the bid opening.
- 13.2. Payment of the contract price shall be made in:
- a. Philippine Pesos.

14. Bid Security

- 14.1. The Bidder shall submit a Bid Securing Declaration¹ or any form of Bid Security in the amount indicated in the **BDS**, which shall be not less than the percentage of the ABC in accordance with the schedule in the **BDS**.
- 14.2. The Bid and bid security shall be valid for 120 days from the opening of bids. Any Bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

15. Sealing and Marking of Bids

Each Bidder shall submit two copies of the first and second components of its Bid.

¹ In the case of Framework Agreement, the undertaking shall refer to entering into contract with the Procuring Entity and furnishing of the performance security or the performance securing declaration within ten (10) calendar days from receipt of Notice to Execute Framework Agreement.

The Procuring Entity may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.

If the Procuring Entity allows the submission of bids through online submission or any other electronic means, the Bidder shall submit an electronic copy of its Bid, which must be digitally signed. An electronic copy that cannot be opened or is corrupted shall be considered non-responsive and, thus, automatically disqualified.

16. Deadline for Submission of Bids

16.1. The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph 7 of the **IB**.

17. Opening and Preliminary Examination of Bids

17.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 9 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

17.2. The preliminary examination of bids shall be governed by Section 30 of the 2016 revised IRR of RA No. 9184.

18. Domestic Preference

18.1. The Procuring Entity will grant a margin of preference for the purpose of comparison of Bids in accordance with Section 43.1.2 of the 2016 revised IRR of RA No. 9184.

19. Detailed Evaluation and Comparison of Bids

19.1. The Procuring BAC shall immediately conduct a detailed evaluation of all Bids rated "*passed*," using non-discretionary pass/fail criteria. The BAC shall consider the conditions in the evaluation of Bids under Section 32.2 of the 2016 revised IRR of RA No. 9184.

19.2. If the Project allows partial bids, bidders may submit a proposal on any of the lots or items, and evaluation will be undertaken on a per lot or item basis, as the case may be. In this case, the Bid Security as required by **ITB** Clause 15 shall be submitted for each lot or item separately.

19.3. The descriptions of the lots or items shall be indicated in **Section VII (Technical Specifications)**, although the ABCs of these lots or items are indicated in the **BDS** for purposes of the NFCC computation pursuant to Section 23.4.2.6 of the 2016 revised IRR of RA No. 9184. The NFCC must be sufficient for the total of the ABCs for all the lots or items participated in by the prospective Bidder.

19.4

Option 1 – One Project having several items that shall be awarded as one contract.

19.4. Except for bidders submitting a committed Line of Credit from a Universal or Commercial Bank in lieu of its NFCC computation, all Bids must include the NFCC computation pursuant to Section 23.4.1.4 of the 2016 revised IRR of RA No. 9184, which must be sufficient for the total of the ABCs for all the lots or items participated in by the prospective Bidder. For bidders submitting the committed Line of Credit, it must be at least equal to ten percent (10%) of the ABCs for all the lots or items participated in by the prospective Bidder.

20. Post-Qualification

20.2. Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS) and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

21.1. The documents required in Section 37.2 of the 2016 revised IRR of RA No. 9184 shall form part of the Contract. Additional Contract documents are indicated in the **BDS**.

Section III. Bid Data Sheet

Notes on the Bid Data Sheet

The Bid Data Sheet (BDS) consists of provisions that supplement, amend, or specify in detail, information, or requirements included in the ITB found in Section II, which are specific to each procurement.

This Section is intended to assist the Procuring Entity in providing the specific information in relation to corresponding clauses in the ITB and has to be prepared for each specific procurement.

The Procuring Entity should specify in the BDS information and requirements specific to the circumstances of the Procuring Entity, the processing of the procurement, and the bid evaluation criteria that will apply to the Bids. In preparing the BDS, the following aspects should be checked:

- a. Information that specifies and complements provisions of the ITB must be incorporated.
- b. Amendments and/or supplements, if any, to provisions of the ITB as necessitated by the circumstances of the specific procurement, must also be incorporated.

Bid Data Sheet

ITB Clause	
5.3	<p>For this purpose, contracts similar to the Project shall be:</p> <ul style="list-style-type: none"> a. Delivery of electrical equipment and components b. completed within <i>[indicate period]</i> prior to the deadline for the submission and receipt of bids.
7.1	<i>Subcontracting is not allowed.</i>
12	The price of the Goods shall be quoted DDP, MMSU, City of Batac or the applicable International Commercial Terms (INCOTERMS) for this Project.
14.1	<p>The bid security shall be in the form of a Bid Securing Declaration, or any of the following forms and amounts:</p> <ul style="list-style-type: none"> a. The amount of not less than <i>two percent (2%) of ABC</i>, if bid security is in cash, cashier's/manager's check, bank draft/guarantee or irrevocable letter of credit; or b. The amount of not less than <i>five percent (5%) of ABC</i> if bid security is in Surety Bond.
19.3	<i>The project will be awarded as 1 lot</i>
20.2	<i>[List here any licenses and permits relevant to the Project and the corresponding law requiring it.]</i>
21.2	<i>Bidders are required to submit a credit line certificate in the amount of 100% of the approved budget ceiling.</i>

Section IV. General Conditions of Contract

Notes on the General Conditions of Contract

The General Conditions of Contract (GCC) in this Section, read in conjunction with the Special Conditions of Contract in Section V and other documents listed therein, should be a complete document expressing all the rights and obligations of the parties.

Matters governing performance of the Supplier, payments under the contract, or matters affecting the risks, rights, and obligations of the parties under the contract are included in the GCC and Special Conditions of Contract.

Any complementary information, which may be needed, shall be introduced only through the Special Conditions of Contract.

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuances, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No. 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

Additional requirements for the completion of this Contract shall be provided in the **Special Conditions of Contract (SCC)**.

2. Advance Payment and Terms of Payment

2.1. Advance payment of the contract amount is provided under Annex "D" of the revised 2016 IRR of RA No. 9184.

2.2. The Procuring Entity is allowed to determine the terms of payment on the partial or staggered delivery of the Goods procured, provided such partial payment shall correspond to the value of the goods delivered and accepted in accordance with prevailing accounting and auditing rules and regulations. The terms of payment are indicated in the **SCC**.

3. Performance Security

Within ten (10) calendar days from receipt of the Notice of Award by the Bidder from the Procuring Entity but in no case later than prior to the signing of the Contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR of RA No. 9184.

4. Inspection and Tests

The Procuring Entity or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Project *{[Include if Framework Agreement will be used:] or Framework Agreement}* specifications at no extra cost to the Procuring Entity in accordance with the Generic Procurement Manual. In addition to tests in the **SCC, Section IV (Technical Specifications)** shall specify what inspections and/or tests the Procuring Entity requires, and where they are to be conducted. The

Procuring Entity shall notify the Supplier in writing, in a timely manner, of the identity of any representatives retained for these purposes.

All reasonable facilities and assistance for the inspection and testing of Goods, including access to drawings and production data, shall be provided by the Supplier to the authorized inspectors at no charge to the Procuring Entity.

5. Warranty

5.1 In order to assure that manufacturing defects shall be corrected by the Supplier, a warranty shall be required from the Supplier as provided under Section 62.1 of the 2016 revised IRR of RA No. 9184.

5.2 The Procuring Entity shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall, repair or replace the defective Goods or parts thereof without cost to the Procuring Entity, pursuant to the Generic Procurement Manual.

6. Liability of the Supplier

The Supplier's liability under this Contract shall be as provided by the laws of the Republic of the Philippines.

If the Supplier is a joint venture, all partners to the joint venture shall be jointly and severally liable to the Procuring Entity.

Section V. Special Conditions of Contract

Notes on the Special Conditions of Contract

Similar to the BDS, the clauses in this Section are intended to assist the Procuring Entity in providing contract-specific information in relation to corresponding clauses in the GCC found in Section IV.

The Special Conditions of Contract (SCC) complement the GCC, specifying contractual requirements linked to the special circumstances of the Procuring Entity, the Procuring Entity's country, the sector, and the Goods purchased. In preparing this Section, the following aspects should be checked:

- a. Information that complements provisions of the GCC must be incorporated.
- b. Amendments and/or supplements to provisions of the GCC as necessitated by the circumstances of the specific purchase, must also be incorporated.

However, no special condition which defeats or negates the general intent and purpose of the provisions of the GCC should be incorporated herein.

Special Conditions of Contract

GCC Clause	
	<p>Delivery and Documents –</p> <p>For purposes of the Contract, “EXW,” “FOB,” “FCA,” “CIF,” “CIP,” “DDP” and other trade terms used to describe the obligations of the parties shall have the meanings assigned to them by the current edition of INCOTERMS published by the International Chamber of Commerce, Paris. The Delivery terms of this Contract shall be as follows:</p> <p><i>[For Goods supplied from abroad, state:]</i> “The delivery terms applicable to the Contract are DDP delivered <i>[indicate place of destination]</i>. In accordance with INCOTERMS.”</p> <p><i>[For Goods supplied from within the Philippines, state:]</i> “The delivery terms applicable to this Contract are delivered <i>[indicate place of destination]</i>. Risk and title will pass from the Supplier to the Procuring Entity upon receipt and final acceptance of the Goods at their final destination.”</p> <p>Delivery of the Goods shall be made by the Supplier in accordance with the terms specified in Section VI (Schedule of Requirements).</p> <p>For purposes of this Clause the Procuring Entity’s Representative at the Project Site is <i>[indicate name(s)]</i>.</p> <p>Incidental Services –</p> <p>The Supplier is required to provide all of the following services, including additional services, if any, specified in Section VI. Schedule of Requirements:</p> <p><i>Select appropriate requirements and delete the rest.</i></p> <ol style="list-style-type: none"> a. performance or supervision of on-site assembly and/or start-up of the supplied Goods; b. furnishing of tools required for assembly and/or maintenance of the supplied Goods; c. furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods; d. performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract; and

e. training of the Procuring Entity's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods.

f. *[Specify additional incidental service requirements, as needed.]*

The Contract price for the Goods shall include the prices charged by the Supplier for incidental services and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.

Spare Parts –

The Supplier is required to provide all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:

Select appropriate requirements and delete the rest.

1. such spare parts as the Procuring Entity may elect to purchase from the Supplier, provided that this election shall not relieve the Supplier of any warranty obligations under this Contract; and
2. in the event of termination of production of the spare parts:
 - i. advance notification to the Procuring Entity of the pending termination, in sufficient time to permit the Procuring Entity to procure needed requirements; and
 - ii. following such termination, furnishing at no cost to the Procuring Entity, the blueprints, drawings, and specifications of the spare parts, if requested.

The spare parts and other components required are listed in **Section VI (Schedule of Requirements)** and the costs thereof are included in the contract price.

The Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spare parts or components for the Goods for a period of *[indicate here the time period specified. If not used indicate a time period of three times the warranty period]*.

Spare parts or components shall be supplied as promptly as possible, but in any case, within *[insert appropriate time period]* months of placing the order.

	<p>Packaging –</p> <p>The Supplier shall provide such packaging of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in this Contract. The packaging shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packaging case size and weights shall take into consideration, where appropriate, the remoteness of the Goods’ final destination and the absence of heavy handling facilities at all points in transit.</p> <p>The packaging, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified below, and in any subsequent instructions ordered by the Procuring Entity.</p> <p>The outer packaging must be clearly marked on at least four (4) sides as follows:</p> <p>Name of the Procuring Entity Name of the Supplier Contract Description Final Destination Gross weight Any special lifting instructions Any special handling instructions Any relevant HAZCHEM classifications</p>
	<p>A packaging list identifying the contents and quantities of the package is to be placed on an accessible point of the outer packaging if practical. If not practical the packaging list is to be placed inside the outer packaging but outside the secondary packaging.</p> <p>Transportation –</p> <p>Where the Supplier is required under Contract to deliver the Goods CIF, CIP, or DDP, transport of the Goods to the port of destination or such other named place of destination in the Philippines, as shall be specified in this Contract, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.</p> <p>Where the Supplier is required under this Contract to transport the Goods to a specified place of destination within the Philippines, defined as the Project Site, transport to such place of destination in the Philippines, including insurance and storage, as shall be specified in this Contract, shall be arranged by the Supplier, and related costs shall be included in the contract price.</p>

	<p>Where the Supplier is required under Contract to deliver the Goods CIF, CIP or DDP, Goods are to be transported on carriers of Philippine registry. In the event that no carrier of Philippine registry is available, Goods may be shipped by a carrier which is not of Philippine registry provided that the Supplier obtains and presents to the Procuring Entity certification to this effect from the nearest Philippine consulate to the port of dispatch. In the event that carriers of Philippine registry are available but their schedule delays the Supplier in its performance of this Contract the period from when the Goods were first ready for shipment and the actual date of shipment the period of delay will be considered force majeure.</p> <p>The Procuring Entity accepts no liability for the damage of Goods during transit other than those prescribed by INCOTERMS for DDP deliveries. In the case of Goods supplied from within the Philippines or supplied by domestic Suppliers risk and title will not be deemed to have passed to the Procuring Entity until their receipt and final acceptance at the final destination.</p> <p>Intellectual Property Rights –</p> <p>The Supplier shall indemnify the Procuring Entity against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof.</p>
2.2	<p><i>[If partial payment is allowed, state] “The terms of payment shall be as follows: _____.”</i></p>
4	<p>The inspections and tests that will be conducted are: <i>[Indicate the applicable inspections and tests]</i></p>

Section VI. Schedule of Requirements

The delivery schedule expressed as weeks/months stipulates hereafter a delivery date which is the date of delivery to the project site.

Item #	Qty	Unit	Description	Unit price	Total	Delivered ,
	1	LOT	Procurement of Equipment for the Establishment of Educational Smart Grid Laboratory for the Mariano Marcos State University, Batac, Ilocos Norte			60 days
			DETAILS AS FOLLOWS:			
		unit	<p>Double busbar unit, three-phase, incoming / outgoing feeder</p> <p>The panel comprises two busbars for operation with parallel lines. The busbars have two outgoing feeders, which can be connected or disconnected using isolators. The circuit breaker connects to the load or power supply.</p> <ul style="list-style-type: none"> • Switch elements: • 2x Isolators, with remote switching mechanism and auxiliary contact • 1x Circuit breaker 5A, with remote switching mechanism and auxiliary contact • Indicators: status lamps for the isolators and the circuit breaker • controlled by pushbuttons, control inputs or Ethernet interface • Inputs/outputs: 4mm safety sockets • 2 Ethernet ports • Acoustic alarm for warning and alarm signals • Three-phase current measurement up to 5 A • 3 x three-phase voltage measurement up to 500 V • Integrated monitors: <p>Over-current, over-voltage, phase angle, voltage differential</p>			

	unit	<p>Double busbar unit, three-phase, coupler panel</p> <ul style="list-style-type: none"> • Switch elements: 2x Isolators, with remote switching mechanism and auxiliary contact 1x Circuit breaker 5A, with remote switching mechanism and auxiliary contact • Indicators: status lamps for the isolators and the circuit breaker • controlled by pushbuttons, control inputs or Ethernet interface • Inputs/outputs: 4mm safety sockets • 2 Ethernet ports • Acoustic alarm for warning and alarm signals • Three-phase current measurement up to 5A • 3 x three-phase voltage measurement up to 500 V • Integrated monitors: Over-current, over-voltage, phase angle, voltage differential 			
	unit	<p>Transmission line model 150km/300km (93.2miles/186.4miles)</p> <p>Transmission line length: 150km or 300km Transmission line length: 93.2 miles or 196.4 miles</p> <ul style="list-style-type: none"> • Resistance per phase: 3,6Ohm 7,2 Ohm • Inductance per phase: 115mH 230mH • Capacity per phase: Line-to-line: 2 x 150nF 300nF Line-to-ground: 2 x 0,55μF 1,1μF • Max power consumption: 1kW • Voltage: 3x 400V; 50/60Hz • Current: 2A • Inputs/outputs: 4mm safety sockets 			

	unit	<p>Time</p> <ul style="list-style-type: none"> Nominal frequency: 50 to 60 Hz Power consumption in the circuit path: 0.1 VA at IN =1A Thermal load capacity of current circuit: <p>Surge current (half-wave) 250x IN for 1s 100x IN for 10s 30x IN continuous 4x IN</p> <p>Overcurrent</p> <ul style="list-style-type: none"> Output relay: <p>Switch-on current: 20A Nominal current: 5A Max. contact rating: 1250 VA/DC; 120W/DC, ohmic 500VA/AC; 75W/DC, inductive</p> <p>Relay</p> <ul style="list-style-type: none"> Trip parameters: <p>I > 0.5-2x IN I > 1-15x IN tI > 0-100s tI > 0-2.5s</p>			
		<ul style="list-style-type: none"> LED indicators: "ON" for ready I> and I>> starting (flashing) I> and I>> tripping (permanently On) Controls: "TEST" button to initiate the self-test 6 potentiometers for adjusting operate and trip times 8 DIP switches for adjusting the characteristics Adjustments for time factors and nominal data Inputs/outputs: 4mm safety sockets The integrated interface RS 485 is suitable for setting the relay parameters. It is also possible to store and transmit measured relay values to and from the PC. Optical signal transmission guarantees galvanic isolation. <p>Indicators of the interface: 1. LED green = operation indicator 2. LEDs green = data transfer</p>			
	unit	<p>Ohmic load 3x 560 Ohm</p> <p>Three rheostats, each with a fuse.</p> <ul style="list-style-type: none"> for parallel, series, star and delta circuits Resistance: 3 x 560 Ohm Current: 3 x 0,5 A Inputs/outputs: 4mm safety sockets 			

	unit	Adjustable 3-phase power supply, 0-450V/2A <ul style="list-style-type: none"> • Power connection: 230/400V, 50/60Hz • Output voltage: 3x 0...450V, 50/60Hz variable by means of 3-phase regulating transformer (tolerance 0.5%) • DC output 0...250V • Output current: 2.0A • 4-mm safety sockets (L1, L2, L3, N, PE, L-, L+) • 1 Voltmeter, 0...450V (moving iron instrument) • 1 Ammeter, 0...3A (moving iron instrument) • 3 Phase control lights • 1 Measuring point selector switch. L1-N, L2-N, L3-N, L1-L2, L1-L3, L2-L3 • 1 Measuring point selector switch. I1, I2, I3 • Protection: 3 thermo-magnetic device circuit breakers, Motor protection switch adjustable from 1.6...2.5A with undervoltage trip • Table-top housing with fold-away stand 			
	units	Power switch module The voltage can be switch on and off manually or automatically. <ul style="list-style-type: none"> • Nominal voltage: 200-400V, 50/60Hz • Control voltage: 24V • Nominal operating current: 16A, ohmic • Functions: 2 pushbutton switches and remote control for switch-off relay • Indicators: signal lamps for "on" and "off" • Contacts: 3 n.o. & 2 auxiliary • Inputs/outputs: 4mm safety sockets 			
	pcs	Multiple socket outlet, 6 fold, with illuminated switch			

	units	<p>Three-phase power quality meter, display and long-term memory</p> <ul style="list-style-type: none"> • Three-phase measurement of current and voltage 3x400V/5A • Measurement of phase voltages, line-to-line voltages and currents • Determination of the apparent, active and reactive power • Determination of active, reactive and apparent work • Determination of the frequency and distortion factors for current and voltage • Detection of harmonic oscillations and neutral conductor current in the electricity supply • Pulse measurement • Peak and mean value detection • Event logging • Real-time clock • Large-scale, contrast-rich graphic display with background illumination • Display in tables, diagrams and vector diagrams • 2 Digital inputs and outputs for free configuration including functions 			
		<ul style="list-style-type: none"> • Ethernet interface • Menu navigation in German/English/French/Spanish/Italian/Portuguese/Turkish/Chinese/Russian/Polish • Demonstration measuring instrument for making measurements on the electricity supply grid Maximum measurement values • Voltage P-P: 690 V • Current: 5 A Fault tolerances: • Voltage 0.2% • Current 0.2% • Apparent power 0.5% • Active power 0.2% • Reactive power 1% • Active energy Class 0.2 • Reactive energy Class 2 			

	pc	<p>Interactive Lab Assistant: Smart Grid</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring • Documents can be printed out for hardcopy of experiment instructions including solutions • CD-ROM with browser, course software and SCADA Viewer <p>Training contents:</p> <ul style="list-style-type: none"> • Smart Grid: Energy generation, distribution and transmission • Smart Grid: Energy management (Demand Side Management) • Smart Grid: Set up of a basic system • Smart Grid: Extension of the basic system • Smart Grid: Reactive power compensation using remotely located wind power plants 			
	pc	<p>Interactive Lab Assistant: Bus bar systems</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring • Documents can be printed out for hardcopy of experiment instructions including solutions • CD-ROM with browser, course software and SCADA Viewer <p>Training contents:</p> <ul style="list-style-type: none"> • Basic circuits of a three-pole, double bus bar system • Three-phase, double bus bar system with load • Bus bar change-over without interruption of the branch • Preparation of algorithms for various switching operations • Bus bar coupling 			

	pc	<p>Interactive Lab Assistant: High-voltage transmission lines</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring • Documents can be printed out for hardcopy of experiment instructions including solutions • CD-ROM with browser, course software and SCADA Viewer <p>Training contents:</p> <p>Studies of three-phase lines</p> <ul style="list-style-type: none"> • Voltage increases on open-circuit lines • Voltage drop as a function of line length • Voltage drop as a function of $\cos \phi$ • Capacitive and inductive power losses on a line as a function of V and I 			
		<ul style="list-style-type: none"> • Phase shift on a line <p>Parallel and series connection of transmission lines</p> <ul style="list-style-type: none"> • Distribution of power and current among parallel-connected lines of equal length • Distribution of power and current among parallel-connected lines of unequal length • Distribution of power and current among series-connected lines of equal length • Distribution of power and current among series-connected lines of unequal length • Load distribution, power flow • Voltage distribution • Quantitative and qualitative evaluations of operational relationships <p>Study of lines with earth-fault compensation</p> <ul style="list-style-type: none"> • Earth fault on a line with an isolated star point • Response to earth faults • Earth-fault compensation <p>Studies on power transmission systems with synchronous generators</p>			

		<ul style="list-style-type: none"> • Power and current distribution in a line network fed by a generator • Parallel operation of a generator and line via the network • Control of active power feed • Control of reactive power feed <p>Investigations on three phase cables</p> <ul style="list-style-type: none"> • Ferranti effect, charging capacity, critical length • Resistive, inductive and resistive-inductive mixed loads • Compensation for a resistive-inductive load • Determining zero impedance • Symmetric and asymmetric shorts • Dealing with star points and shorts to earth <p>Combined networks of cables and lines</p> <ul style="list-style-type: none"> • Differences between cables and transmission lines • Investigation of connections: <ul style="list-style-type: none"> - Transmission lines, transformers and cables - Cables, transformers and transmission lines • Losses from individual components • Parameters for sub-stations <p>Controlling flow of power in meshed networks</p> <ul style="list-style-type: none"> • Variable transformers • Transformer with in-phase regulation (in-phase booster) • Transformer with regulation in quadrature (quadrature booster) • Phase-angle-regulating transformer (phase-shifting transformer) • Affect flow of power via two identical conductors parallel to one another 			
	pc	<p>Interactive Lab Assistant: Protective systems for high-voltage transmission line</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring • Documents can be printed out for hardcopy of experiment instructions including solutions 			

		<ul style="list-style-type: none"> • CD-ROM with browser, course software and SCADA Viewer Training contents: • Circuit diagrams • Non-directional overcurrent time protection • Directional overcurrent time protection • Overvoltage and undervoltage protection • Directional power protection • Earth-fault voltage protection • Protection of parallel-connected lines • High-speed distance protection 			
	pc	<p>Software SCADA for Power Engineering, designer software</p> <p>SCADA is an acronym that stands for supervisory control and data acquisition (SCADA) of technical processes in real time. In electrical power engineering SCADA is deployed for a range of operations from power generation, transmission and line protection all the way to power utilisation. SCADA provides staff with the opportunity to track and enter data into technical processes. Measurement values are displayed on the screen in real time. Control signals can be modified during the process. The SCADA system can also be used for automatic process control. The recording of multiple measured values permits both future planning and economic optimisation. The system can be remotely controlled by means of local access networks (LAN).</p>			

		<p>SCADA Power Engineering Lab is a software program designed for the control and monitoring of power engineering systems. In the software all measured values and operating states can be displayed on existing system instrumentation in real time. Furthermore, important parameters and signals can be controlled by the software. The measured values and equipment operating states can be selected, recorded, depicted with respect to time and finally evaluated and exported.</p> <p>Software functionality:</p> <ul style="list-style-type: none"> • Symbolic equipment arrangement of all equipment on the screen • Standardised electronic circuit symbols for the circuit visualisation • Freely configurable circuit setup • Individually configurable tabular list of as many measurement values as desired 			
		<ul style="list-style-type: none"> • Real-time display of measured values and operating states • Recording and plotting of measured values in diagrams • Processing, analysing and export of diagrams • Integrated soft PLC • SCADA Viewer • SCADA Panel Designer • SCADA Remote Client / Server • SCADA OPC Client • SCADA IEC 61850 Client • Implementation and analysis of intelligent grids (Smart Grid) <p>Includes:</p> <ul style="list-style-type: none"> • CD-ROM with SCADA Software package • 1 USB-dongle for operation of program 			
		pcs	Patch cable Cat5E 1x 1 m yellow, 2x 2 m yellow		
		pc	Safety connecting plug 4mm with tap (2x), blue, 1000V/32A CAT II		

		pc	Safety connecting plug 4mm with tap (2x), gr/ye, 1000V/32A CAT II			
		set	<p>Set of safety measurement cables, 4mm (31 leads) Safety measurement cables with 4mm safety plugs, coloured, PVC insulation, highly flexible Each set includes the following:</p> <ul style="list-style-type: none"> • 6 x 25cm long, black • 4 x 50cm long, black • 2 x 100cm long, blue • 2 x 100cm long, red • 1 x 100cm long, green/yellow • 1 x 150cm long, blue • 1 x 150cm long, green/yellow • 2 x 150cm long, green • 4 x 150cm long, brown • 4 x 150cm long, black • 4 x 150cm long, grey • Wire cross section 2.5 mm² • Capacity/category: 600V CAT II, 32A 			
		pcs	<p>Safety measurement cable (4mm), 25cm/10", black, 600 V, CAT III ' 1000 V, CAT II / 32A Safety measurement lead with stackable, contact-proof 4 mm plugs</p> <ul style="list-style-type: none"> • colour: black • length: 25 cm • cable cross-section 2,5 mm² • ratings deliver: 600V CAT II, 32 A • Long life-span and ability of the contact component to withstand being plugged in and out many times with the minimum of junction resistance • Plugs comply with the requirements of the standard IEC EN 61010-031 			
		pc	Interface converter USB/RS485			

		unit HDD with installation software according to order <ul style="list-style-type: none"> • 2.5" hard disk with software • Ready to use including tailor-made set of software products • For convenient and safe installation and backup of software • USB 2.0 connector 			
		unit Mobile aluminum experiment stand, 3 levels, power strip with 6 sockets, 49"x28"x79" WxDxH (1250x700x1995mm) Table top + Shelf: <ul style="list-style-type: none"> • 30-mm table top made of highly compressed, multi-layer fine chipboard conforming to DIN EN 438-1 • Colour grey, RAL 7035, with 0.8-mm slightly textured laminate coating (Resopal) on both sides, conforming to DIN 16926 • Resistant to many chemicals and reagents including dilute acids and alkalis • Resistant to heat, e.g. molten solder or heating at specific points such as by soldering tips or cigarette ends • Frame with solid impact-resistant protective edging made of 3 mm thick RAL 7047 coloured plastic • Coating and adhesive are PVC free • Power strip with 6 outlet sockets mounted underneath the table top, lead and earthed plug 			

		<p>Frame:</p> <ul style="list-style-type: none"> • 2 extruded aluminium profiles with multiple grooves 1800 x 120 x 40 mm (WxHxD) • 8 equally sized grooves in extruded aluminium profiles (3 on each side and 1 each on the front and back) • Grooves accommodate standard industrial mountings • 4 H-shaped aluminium profiles, 1150 mm, for 3-layer organisation of DIN A4 panels • Space for extension of power supply duct • Base made of rectangular tubing with 4 swiveling double casters, 2 of which have brakes • Table frame made of tough combination of rectangular tubing around the full perimeter • Acid-resistant epoxy-resin coating, 80 µm thick (approx.), colour RAL 7047 			
		<p>Cable holder:</p> <ul style="list-style-type: none"> • Width 200 mm with 12 cable slots to accommodate 48 x 4-mm safety measurement leads <p>PC attachment bracket:</p> <ul style="list-style-type: none"> • With 3 screw-on rubber stoppers, dimensions 65x65x114 mm approx. (top fixing for PC) <p>> The height of the cable holder and PC attachment bracket can be adjusted along the aluminium profiles</p> <p>> For attachment to left or right, fastening materials included</p> <p>> Acid-resistant epoxy-resin powder coating of thickness 80 µm approx., colour RAL 7047</p> <p>Dimensions:</p> <ul style="list-style-type: none"> • Height of table top 760 mm • 1250 x 1970 x 700 mm (WxHxD) <p>The mobile experiment stand is supplied in kit form and needs to be assembled by customers themselves.</p>			

	unit	<p>Display for Smart Grid equipment Labelled display, 1250 x 500 mm, with photo-realistic color printing. For attachment to aluminum profiles on mobile experiment stands with a width of 1250 mm. Includes fastening material and metal reinforcement for edges.</p> <p>Dimensions: 1225 x 500 x 5 mm (WxHxD)</p>			
	pc	<p>Monitor holder for flat screen monitor of weight up to 15kg / 33lbs</p>			
	pc	<p>Keyboard adapter for flat screen monitor holders</p>			
	pc	<p>Protection cover for three-level experiment trolleys</p>			
	pc	<p>Lamp board 230V The lamp board permits the investigation and the comparison of light bulb, energy saving lamp and LED bulb. All illuminant have the same brightness and can be switched on individually. Technical Data:</p> <ul style="list-style-type: none"> • Light bulb: 25W • Energy saving lamp: 4W • LED-bulb 4W • Operating Voltage: 230V/ 50/60Hz • 3 sockets E27 			
	pc	<p>Inductive load, three-phase, 1kW Consist of three inductive loads with the following taps: 1,2H (0,65A), 1,6H (0,5A), 2H (0,45A), 2,4H (0,35A), 2,8H (0,30A), 3,2H (0,25A)</p> <ul style="list-style-type: none"> • for parallel, series, star and delta circuits • Inputs/outputs: 4mm safety sockets 			
	pc	<p>Capacitive load, three-phase, 1kW Three groups of MP-capacitor, each consists four capacitors.</p> <ul style="list-style-type: none"> • for parallel, series, star and delta circuits • capacity: 3 x 2/4/8/30 μF, 450 V • Inputs/outputs: 4mm safety sockets 			

	pc	<p>Variable Ohmic load, three-phase, 1kW</p> <p>Three synchronously adjustable circular rheostats with scale 100 - 0%, each with a fuse in the sliding-contact connection.</p> <ul style="list-style-type: none"> • for parallel, series, star and delta circuits • Resistance: 3 x 750 Ohm • Current: 3 x 2 A • Inputs/outputs: 4mm safety sockets 			
	pc	<p>Three-phase asynchronous motor, squirrel-cage, 1kW</p> <p>Three-phase asynchronous motor with pronounced pull-out torque.</p> <ul style="list-style-type: none"> • Nominal voltage: 690/400V, 50Hz • Nominal current: 1.2A / 2.1A • Nominal speed: 2900rpm • Nominal power: 1kW • cos phi: 0.83 			
	pc	<p>Star-Delta switch</p> <p>Switch positions: O - star - delta (rotary switch)</p> <ul style="list-style-type: none"> • Contact rating: 690V, 12A, max. • Inputs/outputs: 4mm safety sockets 			
	pc	<p>Reactive power controller</p> <ul style="list-style-type: none"> • Operating voltage: 200-400V • Frequency: 50/60Hz (48 to 62Hz) • Control contacts: 6 floating relay contacts • Load rating of control contacts: Switch voltage compliant with VDE 0110 group B, 400V/AC; compliant with VDE 0110 group C, 250V/AC • Switching current: 5A, maximum • Rating: 1800VA, maximum • Alarm contact: Load rating as for control contacts • Operator controls: Foil keypad • Inputs/outputs: 4-mm safety sockets 			

	pc	<p>Switchable Capacitor Battery</p> <p>This capacitor battery includes 4 switching states, which can be activated and deactivated by means of power contactors. These circuits each consist of 3 capacitors in star configuration along with discharging resistors.</p> <ul style="list-style-type: none"> Capacitance values: <p>State 1: 3 x 2 μF, 450 V, 50 Hz State 2: 3 x 4 μF, 450 V, 50 Hz State 3: 3 x 8 μF, 400 V, 50 Hz State 4: 3 x 16 μF, 400 V, 50 Hz</p> <ul style="list-style-type: none"> Compensating reactive power: max. 1546 var I/O: 4mm safety sockets 			
	unit	<p>Servo machine test bench for 1kW machines incl. ActiveServo software</p> <p>The controller has the following features:</p> <ul style="list-style-type: none"> Dynamic and static four-quadrant operation 10 selectable operating modes/machine models (torque control, speed control, flywheel, lifting drive, roller/calander, fan, compressor, winding gear, arbitrarily defined time-dependent load, manual and automated network synchronization) Integrated galvanically isolated amplifier for voltage and current measurement Speed and torque displays Four-quadrant monitor USB interface Thermal monitoring of the machine under test Testing for the presence of a shaft cover. 			

		<ul style="list-style-type: none"> • Connection voltage: 400V, 50Hz • Maximum power output: 10kVA <p>The brake is self-cooled asynchronous servo-brake with resolver.</p> <p>The motor and sensor leads are connected via polarity-safe plugs. The machine has thermal monitoring and, in conjunction with the controller, it constitutes a driving and braking system that is free of drift and requires no calibration.</p> <ul style="list-style-type: none"> • Maximum speed: 4000rpm • Maximum torque 30Nm • Temperature monitoring: continuous temperature sensor (KTY) • Resolver resolution: 65536 pulses/revolution <p>ActiveServo is a program for recording characteristics of machines and for determining dynamic and static operating points. It emulates seven different loads (flywheel, pump, calander, lifting drive, compressor,</p>			
		<p>winding gear, arbitrarily configurable time-dependent load) for which the parameters can be individually configured.</p> <p>Features:</p> <ul style="list-style-type: none"> • Measurement, calculation and display of mechanical and electrical variables • (Speed, torque, mechanical power output, current, voltage, active, apparent and reactive power, efficiency, power factor) • Simultaneous display of measured and calculated values (e.g. instant display of efficiency) • Measurement of voltage and current (including RMS values even for non-sinusoidal waveforms) • Speed or torque-controlled operation • Recording of variables over time • Programming of limiting values of speed or torque to prevent inappropriate loading of the machine under test. 			

		<ul style="list-style-type: none"> • Operation in all four quadrants (display of generated torque) • Arbitrarily defined ramp functions for PC-controlled load experiments • Display of characteristics from several experiments to better illustrate the effect of parameter changes • Export of graphics and measurements 			
	pc	Rubber coupling sleeve, 1kW			
	pc	Coupling guard <ul style="list-style-type: none"> • Equipment : polycarbonate transparent with function plug • Integrated lighting signals correct operation of safety functions 			
	pc	Quick Chart, Servo-machine test stand safety and operating instructions Short documentation covering the putting into operation of complex equipment and experiment set-ups. <ul style="list-style-type: none"> • Terminal assignment, safety instructions, help • Circuit and assembly diagrams • Colour print in DIN A3 format • Laminated: 2 x 250 µm 			
	set	Universal power supply for electrical machines <ul style="list-style-type: none"> • Outputs: Three phase: L1, L2, L3, N from 4-mm safety sockets DC: 0...240 V DC variable, controlled and electronically protected against overload and short circuits. Output current: 3...10 A (adjustable current limiting) • Second DC supply ca. 210 V DC, 6 A fixed • Protective systems: Motor protection switch adjustable from 6.3...16 A Under voltage trip Safety cut-out • Power connection: 3x 230/400 V, 50/60 Hz via CEE plug with 1.8 m power lead 			

	pc	<p>Three-phase supply for electrical machines</p> <p>Power supply for Ac and three-phase. The supply is specially designed for use with electrical machines</p> <ul style="list-style-type: none"> • Outputs: Three-phase: L1, L2, L3, N from 4-mm safety sockets • Protective systems: Motor protection switch adjustable from 6.3 ... 16 A • Under voltage trip Safety cut-off • Power connection: 3x 320/400V, 50/60 Hz via CEE plug with 1.8 mm power lead 			
	pc	<p>Motor protection switch, 3 pole, 1.8-2.5A</p> <p>Power circuit breaker incorporating thermal overload trip and undelayed current trip.</p> <ul style="list-style-type: none"> • Contact rating: 500V AC at 10A • Nominal current: 1.8A...2.5A adjustable 			
	pc	<p>Power switch module</p> <p>The voltage can be switch on and off manually or automatically.</p> <ul style="list-style-type: none"> • Nominal voltage: 200-400V, 50/60Hz • Control voltage: 24V • Nominal operating current: 16A, ohmic • Functions: 2 pushbutton switches and remote control for switch-off relay • Indicators: signal lamps for "on" and "off" • Contacts: 3 n.o. & 2 auxiliary • Inputs/outputs: 4mm safety sockets 			
	pc	<p>Multiple socket outlet, 6 fold, with illuminated switch</p>			

	unit	<p>Three-phase power quality meter, display and long-term memory</p> <ul style="list-style-type: none"> • Three-phase measurement of current and voltage 3x400V/5A • Measurement of phase voltages, line-to-line voltages and currents • Determination of the apparent, active and reactive power • Determination of active, reactive and apparent work • Determination of the frequency and distortion factors for current and voltage • Detection of harmonic oscillations and neutral conductor current in the electricity supply • Pulse measurement • Peak and mean value detection • Event logging • Real-time clock • Large-scale, contrast-rich graphic display with background illumination • Display in tables, diagrams and vector diagrams 			
		<ul style="list-style-type: none"> • 2 Digital inputs and outputs for free configuration including functions • Ethernet interface • Menu navigation in German/English/French/Spanish/Italian/Portuguese/Turkish/Chinese/Russian/Polish • Demonstration measuring instrument for making measurements on the electricity supply grid <p>Max. measurement values:</p> <ul style="list-style-type: none"> • Voltage P-P: 690 V • Current: 5 A <p>Fault tolerances:</p> <ul style="list-style-type: none"> • Voltage 0.2% • Current 0.2% • Apparent power 0.5% • Active power 0.2% • Reactive power 1% • Active energy Class 0.2 • Reactive energy Class 2 			

	pc	<p>Interactive Lab Assistant: Energy management</p> <p>The experiment instructions come in the form of an Interactive Lab Assistant course. This multimedia course is a step-by-step guide through the topic of modern energy systems. The fundamentals are conveyed using easy to understand animations. The Interactive Lab Assistant in conjunction with the SCADA Viewer constitutes a comfortable experimenting environment.</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring 			
		<ul style="list-style-type: none"> • Documents can be printed out for hardcopy of experiment instructions including solutions • CD-ROM with browser, course software and SCADA Viewer <p>Training Contents:</p> <p>Complex loads, power consumption measurement and peak load monitoring</p> <ul style="list-style-type: none"> • Three-phase consumers with star and delta connections (R, L, C, RL, RC and RLC loads) • Measurement with active and reactive energy meters: • For symmetric and asymmetric RL loads • In the event of a phase failure • In the event of over-compensation (RC load) 			

		<ul style="list-style-type: none"> • For active loads • In the event of energy-flow reversal • Determination of the first and second power maxima • Determination of the power maximum in the event of an asymmetric load • Recording of load profiles <p>Dynamic loads</p> <ul style="list-style-type: none"> • Dynamic, three-phase load (asynchronous motor) • Power measurement in the case of energy-flow reversal <p>Manual and automatic compensation of reactive power</p> <ul style="list-style-type: none"> • Operating an asynchronous machine and recording its characteristic parameters • Calculating parameters for compensation capacitors • Compensation using various capacitors 			
		<ul style="list-style-type: none"> • Determining stage power • Manual compensation of reactive power • Automatic identification of a reactive power controller's connections • Automatic compensation of reactive power 			
	pc	<p>Interactive Lab Assistant: Asynchronous machines 0.3/1kW</p> <ul style="list-style-type: none"> • Interactive experiment set-ups • Measurements and graphics can be copied to the experiment pages by means of drag and drop • Virtual instruments can be started directly from the experiment instruction pages themselves • Questions with feedback and logic for testing knowledge • Document print-out for simple printing of experiment instructions with solutions • CD-ROM with browser, course software and software for braking systems and measuring equipment 			

		<p>Training contents:</p> <ul style="list-style-type: none"> • Motor connection • Reversing rotation direction • Manual switching • Machine-specific values and characteristics • Measurement evaluation • Star-delta connection • Steinmetz circuit • Reactance power compensation with capacitors of various capacitance 			
	pc	Patch cable Cat5E 1x 1 m yellow, 2x 2 m yellow			
	pc	USB Network Adapter 10/100 BaseTX RJ45			
	pc	5-Port Ethernet Switch			
	pc	Safety connecting plug 4mm with tap (2x), black, 1000V/32A CAT II			
	pc	Safety connecting plug 4mm with tap (2x), blue, 1000V/32A CAT II			
	pc	Safety connecting plug 4mm with tap (2x), gr/ye, 1000V/32A CAT II			
	set	<p>Set of safety measurement cables with 4mm safety plugs, coloured, PVC insulation, highly flexible</p> <p>Each set includes the following:</p> <ul style="list-style-type: none"> • 6 x 25cm long, black • 4 x 50cm long, black • 2 x 100cm long, blue • 2 x 100cm long, red • 1 x 100cm long, green/yellow • 1 x 150cm long, blue • 1 x 150cm long, green/yellow • 2 x 150cm long, green • 4 x 150cm long, brown • 4 x 150cm long, black • 4 x 150cm long, grey • Wire cross section 2.5 mm² • Capacity/category: 600V CAT II, 32A 			

	set	<p>Measurement leads, 4mm, length 10m, includes fastening set (1 set)</p> <p>5 safety measurement leads, with stackable 4-mm plugs and highly flexible double-insulated wires</p> <ul style="list-style-type: none"> • 1 x 10m long, black • 1 x 10m long, blue • 1 x 10m long, grey • 1 x 10m long, brown • 1 x 10m long, green/Yellow • Wire cross-section 2.5 mm² • Nominal data: 600 V CAT II, 32 A <p>20 Velcro cable ties in 5 different colours</p> <ul style="list-style-type: none"> • Cable ties made of material with hook-and-loop Velcro fastenings, for multiple reuse • 5 different colours (black, red, yellow, blue, green) • Size 150x12 mm <p>5 cable binder blocks which can be inserted by rotating them into the front and rear grooves of aluminium profiles</p>			
	pc	Safety measurement cable (4mm), 150cm, brown			
	pc	Safety measurement cable (4mm), 150cm, black			
	pc	Safety measurement cable (4mm), 150cm, grey			
	pc	Safety measurement cable (4 mm), 150 cm, blue, 600 V, CAT III ' 1000 V, CAT II / 32 A			

	pc	<p>Mobile aluminum experiment stand, 3 levels, power strip with 6 sockets, 49"x28"x79" WxDxH (1250x700x1995mm)</p> <p>Table top + Shelf:</p> <ul style="list-style-type: none"> • 30-mm table top made of highly compressed, multi-layer fine chipboard conforming to DIN EN 438-1 • Colour grey, RAL 7035, with 0.8-mm slightly textured laminate coating (Resopal) on both sides, conforming to DIN 16926 • Resistant to many chemicals and reagents including dilute acids and alkalis • Resistant to heat, e.g. molten solder or heating at specific points such as by soldering tips or cigarette ends • Frame with solid impact-resistant protective edging made of 3 mm thick RAL 7047 coloured plastic • Coating and adhesive are PVC free 			
		<ul style="list-style-type: none"> • Power strip with 6 outlet sockets mounted underneath the table top, lead and earthed plug <p>Frame:</p> <ul style="list-style-type: none"> • 2 extruded aluminum profiles with multiple grooves 1800 x 120 x 40 mm (WxHxD) • 8 equally sized grooves in extruded aluminum profiles (3 on each side and 1 each on the front and back) • Grooves accommodate standard industrial mountings • 4 H-shaped aluminum profiles, 1150 mm, for 3-layer organisation of DIN A4 panels • Space for extension of power supply duct • Base made of rectangular tubing with 4 swiveling double casters, 2 of which have brakes • Table frame made of tough combination of rectangular tubing around the full perimeter • Acid-resistant epoxy-resin coating, 80 µm thick (approx.), colour RAL 7047 			

			<p>Cable holder:</p> <ul style="list-style-type: none"> • Width 200 mm with 12 cable slots to accommodate 48 x 4-mm safety measurement leads <p>PC attachment bracket:</p> <ul style="list-style-type: none"> • With 3 screw-on rubber stoppers, dimensions 65x65x114 mm approx. (top fixing for PC) • The height of the cable holder and PC attachment bracket can be adjusted along the aluminium profiles • For attachment to left or right, fastening materials included • Acid-resistant epoxy-resin powder coating of thickness 80 µm approx., colour RAL 7047 <p>Dimensions:</p> <ul style="list-style-type: none"> • Height of table top 760 mm • 1250 x 1970 x 700 mm (WxHxD) 			
		unit	<p>Display for Energy Management equipment</p> <p>Labelled display, 1250 x 500 mm, with photo-realistic color printing. For attachment to aluminum profiles on mobile experiment stands with a width of 1250 mm. Includes fastening material and metal reinforcement for edges.</p> <p>Dimensions: 1225 x 500 x 5 mm (WxHxD)</p>			
		unit	<p>Protected power distribution for working stations</p> <p>400-V CEE distribution panel with automatic circuit breakers for attachment to profiles on experiment trolleys or direct to table-top.</p> <ul style="list-style-type: none"> • 2 CEE sockets (400 V, 16 A, 5-pole) with safety flap • 1 Socket outlet with earth (230 V) • Circuit breaker: 1 x 3-pole line circuit breaker, type B, 16 A • Power connection: 3 x 230/400 V, 50/60 Hz via CEE plug, 4-m power lead 			
		pc	<p>Monitor holder for flat screen monitor of weight up to 15kg / 33lbs</p>			

		pc	Keyboard adapter for flat screen monitor holders			
		pc	Protection cover for three-level experiment trolleys			
			RENEWABLE:			
		unit	Interface with virtual instruments Equipment: <ul style="list-style-type: none"> • 32-bit processor with storage memory for measurements • USB interfaces, transfer rate 12 Mbits/s • WLAN/WiFi interface, 2.4 GHz, IEEE 802.11 b/g/n • Simultaneous connection of any number of Experimenters via serial bus system • High-quality designer casing with aluminium feet and surface-hardened Plexiglas front panel • Suitable for accommodating in training panel frames for DIN A4 training panels • Designed for connection of 2-mm safety measuring leads • Multi-coloured LEDs for displaying status 			
			<ul style="list-style-type: none"> • Adjustable analog output, +/-10 V, 0.2 A, DC – 5 MHz, via BNC and 2-mm sockets • 4 Analog differential amplifier inputs with 10 MHz band width, safe for voltages up to 100 V, sampling rate 100 mega samples, 9 measuring ranges, memory depth 4 x 8 k x 10 bits, inputs via BNC (2 inputs) or 2-mm sockets (4 inputs) • 2 Analog inputs for current measurement, overcurrent-protected up to 5 A, sampling rate 250 kilo samples, 2 measuring ranges, resolution 12 bits, connection via 2-mm sockets • 3 variable analog outputs +/- 20V, 1 A, DC-150 Hz • 16-bit digital signal output, of which 8 bits are accessed via 2-mm sockets, TTL/CMOS, clock frequency 0 – 100 kHz, electric strength +/- 15 V 			

		<ul style="list-style-type: none"> • 16-bit digital signal input, of which 8 bits are accessed via 2-mm sockets, memory depth 16 bit x 2 k, TTL/CMOS, sampling rate 0 – 100 kHz, electric strength +/- 15 V, • 8 Relays, 24 V DC/1 A, of which 4 are accessed via 2-mm sockets • Dimensions: 29.6 x 19 x 8.6 cm • External power supply with wide range input 100-264 V, 47-63 Hz, output 24 V / 5 A 			
		<p>Virtual instruments (meters and sources):</p> <ul style="list-style-type: none"> • 2 x Voltmeter VIs, 2 x Ammeter VIs: AC, DC, 9 ranges, 100 mV to 50 V, true RMS, AV • 1 x Power meter, 9 ranges, 100 mV to 50 V • 1 x VI with 8 relays, 1 x Multimeter VI: multimeter display in Software • 1 x 2-channel ammeter VI: AC, DC, 2 ranges, 300 mA and 3 A, TrueRMS, AV • 1 x 2-channel voltmeter VI: AC, DC, 9 ranges, 100 mV to 50 V, TrueRMS, AV • 1 2-/4-channel oscilloscope: band width 10 MHz, 25 time ranges, 100 ns/div to 10 s/div, 9 ranges 20 mV/div to 10 V/div, trigger and pre-trigger, XY and XT modes, cursor function, addition and multiplication function for 2 channels • 1 x VI Spectrum Analyzer: 9 voltage ranges 100 mV to 50 V, input frequency range 3 Hz to 1 MHz, time domain display 			

		<ul style="list-style-type: none"> • 1 X VI Bode-Plotter: 9 voltage ranges 100 mV to 50 V, frequency range 1 Hz - 5MHz, time domain display and locus diagram • 1 x Adjustable DC voltage VI 0 - 10 V • 1 x Function generator VI: 0.5 Hz - 5 MHz, 0 - 10 V, sine, square, triangular, • 1 x Arbitrary generator VI, 1 x Pulse generator VI • 1 x VI with 16 digital outputs, 1 x VI with 16 x digital inputs, 1 x VI with 16 digital input/outputs. Display modes: binary, hex, decimal and octal numerals • 1 x Three-phase power supply VI, 0 - 150 Hz, 0 - 14 Vrms, 2 A • 1 x Adjustable DC power supply VI, 3 x (-20 V - +20 V), 2 A • 1 x Three-phase power supply VI with additional phase-shift and clock rate adjustment <p>Includes:</p> <ul style="list-style-type: none"> • Power Interface • Power supply • Power lead • USB cable • Operating manual 			
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	unit	<p>Experimenter Equipment:</p> <ul style="list-style-type: none"> • Connects to the Unit Interface and additional Experimenters via Unit bus • Unit bus connection for experiment cards • High-quality designer casing with aluminium feet and surface-hardened Plexiglas front window • Suitable for accommodating training panel frames for DIN A4 training panels • Fixed and variable voltages available via 8 2-mm sockets • Designed for connection of 2-mm safety measuring leads • Accommodates Unit experiment cards • Eject mechanism for Unit experiment cards with return spring • Accommodates a breadboard for experimenting with discrete components and integrated circuits • Accommodates a multimeter using IrDa interface • Dimensions: 29.6 x 19 x 8.6 cm • Weight: 1.0 kg 			
	set	<p>Measurement accessories, shunts and connection cables</p> <p>Shunt resistors on a PCB, for current measurement using the analog inputs of the system.</p> <ul style="list-style-type: none"> • 6 Shunt resistors: 2 x 1 ohm, 2 x 10 ohm, 2 x 100 ohm • Screen print of symbols for identifying resistors, the voltage taps and current inputs • 24 x 2-mm sockets • Dimensions: 100 x 40 mm <p>Set of connection cables 2 mm (28 pcs) consisting of:</p> <ul style="list-style-type: none"> • 8 x connection leads 2 mm, 15 cm, blue • 4 x connection leads 2 mm, 15 cm, yellow 			
		<ul style="list-style-type: none"> • 5 x connection leads 2 mm, 45 cm, black • 2 x connection leads 2 mm, 45 cm, yellow • 5 x connection leads 2 mm, 45 cm, red • 2 x connection leads 2 mm, 45 cm, blue • 1 x safety adapter lead 4 mm to 2mm, 50 cm, black • 1 x safety adapter lead 4 mm to 2mm, 50 cm, red • 10 x 2-mm connector plugs / Plug spacing 5 mm, white 			

	unit	<p>Course: Photovoltaics</p> <p>Includes:</p> <p>Experiment board with:</p> <ul style="list-style-type: none"> • 4 Monocrystalline solar modules, 6 V/40 mA • 1 Rechargeable solar battery, 12V/1.2 Ah • Integrated micro controlled charger regulator, discharge and overload protection • 12 V PC fan and 12 V LED lamp for use as fixed loads • Variable load for recording characteristics • Dimmable 120 W reflector lamp • browser and course software <p>Course contents:</p> <ul style="list-style-type: none"> • Function and principle of solar cells • Meaning of terms "solar radiation" and "solar constant" • Various types of solar cell • Manufacturing of solar cells • Connection of solar cells 			
		<ul style="list-style-type: none"> • Recording characteristic for a solar cell • Determine the Maximum Power Point (MPP) • Dependence of I and V from temperature, illumination and angle of incidence • Design of a rechargeable solar cell • Storage of energy in a solar cell • Various types of solar plant • Design of an insular network with solar cells 			
	unit	<p>Course: Fuel cell technology</p> <p>Includes:</p> <p>Experiment panel with:</p> <ul style="list-style-type: none"> • PEM double fuel cell • PEM electrolyser with scaled gas storage device • Power supply 2V/ 2.5A • Consumers • Hoses, hose clamps • Variable load for characteristic recording • browser and course software 			

		<p>Course content:</p> <ul style="list-style-type: none"> • Functional and operating principle of fuel cells • Recording the characteristics of a fuel cell • Learn to explain the electrochemical processes of electrolysis (Faraday's first and second law) • Faraday's laws and determining the energy efficiency of a fuel cell • Series and parallel configuration of fuel cells • Considerations regarding the power of fuel cells • Functional and operating principles of electrolysers • Recording the VI characteristic of the electrolyser • Faraday's laws and determining the energy efficiency of an electrolyser 			
		<p>Include: training at least 5-days of 20 faculty and staff for the operation of the equipment; Training manual or module; At least 3 years warranty of parts and services</p>			

Section VII. Technical Specifications

Notes for Preparing the Technical Specifications

A set of precise and clear specifications is a prerequisite for Bidders to respond realistically and competitively to the requirements of the Procuring Entity without qualifying their Bids. In the context of Competitive Bidding, the specifications (*e.g.* production/delivery schedule, manpower requirements, and after-sales service/parts, descriptions of the lots or items) must be prepared to permit the widest possible competition and, at the same time, present a clear statement of the required standards of workmanship, materials, and performance of the goods and services to be procured. Only if this is done will the objectives of transparency, equity, efficiency, fairness, and economy in procurement be realized, responsiveness of bids be ensured, and the subsequent task of bid evaluation and post-qualification facilitated. The specifications should require that all items, materials and accessories to be included or incorporated in the goods be new, unused, and of the most recent or current models, and that they include or incorporate all recent improvements in design and materials unless otherwise provided in the Contract.

Samples of specifications from previous similar procurements are useful in this respect. The use of metric units is encouraged. Depending on the complexity of the goods and the repetitiveness of the type of procurement, it may be advantageous to standardize the General Technical Specifications and incorporate them in a separate subsection. The General Technical Specifications should cover all classes of workmanship, materials, and equipment commonly involved in manufacturing similar goods. Deletions or addenda should then adapt the General Technical Specifications to the particular procurement.

Care must be taken in drafting specifications to ensure that they are not restrictive. In the specification of standards for equipment, materials, and workmanship, recognized Philippine and international standards should be used as much as possible. Where other particular standards are used, whether national standards or other standards, the specifications should state that equipment, materials, and workmanship that meet other authoritative standards, and which ensure at least a substantially equal quality than the standards mentioned, will also be acceptable. The following clause may be inserted in the Special Conditions of Contract or the Technical Specifications.

Sample Clause: Equivalency of Standards and Codes

Wherever reference is made in the Technical Specifications to specific standards and codes to be met by the goods and materials to be furnished or tested, the provisions of the latest edition or revision of the relevant standards and codes shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national or relate to a particular country or region, other authoritative standards that ensure substantial equivalence to the standards and codes specified will be acceptable.

Reference to brand name and catalogue number should be avoided as far as possible; where unavoidable they should always be followed by the words "*or at least equivalent.*" References to brand names cannot be used when the funding source is the GOP.

Where appropriate, drawings, including site plans as required, may be furnished by the Procuring Entity with the Bidding Documents. Similarly, the Supplier may be requested to provide drawings or samples either with its Bid or for prior review by the Procuring Entity during contract execution.

Bidders are also required, as part of the technical specifications, to complete their statement of compliance demonstrating how the items comply with the specification.

Technical Specifications

Item #	Qty	Unit	Description	Compliance to Tech. Specifications
	1	LOT	Procurement of Equipment for the Establishment of Educational Smart Grid Laboratory for the Mariano Marcos State University, Batac, Ilocos Norte	
			DETAILS AS FOLLOWS:	
		unit	<p>Double busbar unit, three-phase, incoming / outgoing feeder</p> <p>The panel comprises two busbars for operation with parallel lines. The busbars have two outgoing feeders, which can be connected or disconnected using isolators. The circuit breaker connects to the load or power supply.</p> <ul style="list-style-type: none"> • Switch elements: • 2x Isolators, with remote switching mechanism and auxiliary contact • 1x Circuit breaker 5A, with remote switching mechanism and auxiliary contact • Indicators: status lamps for the isolators and the circuit breaker • controlled by pushbuttons, control inputs or Ethernet interface • Inputs/outputs: 4mm safety sockets • 2 Ethernet ports • Acoustic alarm for warning and alarm signals • Three-phase current measurement up to 5 A • 3 x three-phase voltage measurement up to 500 V • Integrated monitors: <p>Over-current, over-voltage, phase angle, voltage differential</p>	

	unit	<p>Double busbar unit, three-phase, coupler panel</p> <ul style="list-style-type: none"> • Switch elements: 2x Isolators, with remote switching mechanism and auxiliary contact • 1x Circuit breaker 5A, with remote switching mechanism and auxiliary contact • Indicators: status lamps for the isolators and the circuit breaker • controlled by pushbuttons, control inputs or Ethernet interface • Inputs/outputs: 4mm safety sockets • 2 Ethernet ports • Acoustic alarm for warning and alarm signals • Three-phase current measurement up to 5A • 3 x three-phase voltage measurement up to 500 V • Integrated monitors: Over-current, over-voltage, phase angle, voltage differential 	
	unit	<p>Transmission line model 150km/300km (93.2miles/186.4miles)</p> <p>Transmission line length: 150km or 300km</p> <p>Transmission line length: 93.2 miles or 196.4 miles</p> <ul style="list-style-type: none"> • Resistance per phase: 3,60hm 7,2 Ohm • Inductance per phase: 115mH 230mH • Capacity per phase: Line-to-line: 2 x 150nF 300nF Line-to-ground: 2 x 0,55µF 1,1µF • Max power consumption: 1kW • Voltage: 3x 400V; 50/60Hz • Current: 2A • Inputs/outputs: 4mm safety sockets 	

	unit	<p>Time</p> <ul style="list-style-type: none"> Nominal frequency: 50 to 60 Hz Power consumption in the circuit path: 0.1 VA at $I_N = 1A$ Thermal load capacity of current circuit: Surge current (half-wave) 250x I_N for 1s 100x I_N for 10s 30x I_N continuous 4x I_N <p>Output relay:</p> <ul style="list-style-type: none"> Switch-on current: 20A Nominal current: 5A Max. contact rating: 1250 VA/DC; 120W/DC, ohmic 500VA/AC; 75W/DC, inductive <p>Trip parameters:</p> <ul style="list-style-type: none"> $I > 0.5-2x I_N$ $I > 1-15x I_N$ $t_l > 0-100s$ $t_l > 0-2.5s$ 	
		<ul style="list-style-type: none"> LED indicators: "ON" for ready $I >$ and $I >>$ starting (flashing) $I >$ and $I >>$ tripping (permanently On) Controls: "TEST" button to initiate the self-test 6 potentiometers for adjusting operate and trip times 8 DIP switches for adjusting the characteristics Adjustments for time factors and nominal data Inputs/outputs: 4mm safety sockets The integrated interface RS 485 is suitable for setting the relay parameters. It is also possible to store and transmit measured relay values to and from the PC. Optical signal transmission guarantees galvanic isolation. Indicators of the interface: 1. LED green = operation indicator 2. LEDs green = data transfer 	
	unit	<p>Ohmic load 3x 560 Ohm</p> <p>Three rheostats, each with a fuse.</p> <ul style="list-style-type: none"> for parallel, series, star and delta circuits Resistance: 3 x 560 Ohm Current: 3 x 0,5 A Inputs/outputs: 4mm safety sockets 	

		unit	Adjustable 3-phase power supply, 0-450V/2A <ul style="list-style-type: none"> • Power connection: 230/400V, 50/60Hz • Output voltage: 3x 0...450V, 50/60Hz variable by means of 3-phase regulating transformer (tolerance 0.5%) • DC output 0...250V • Output current: 2.0A • 4-mm safety sockets (L1, L2, L3, N, PE, L-, L+) • 1 Voltmeter, 0...450V (moving iron instrument) • 1 Ammeter, 0...3A (moving iron instrument) • 3 Phase control lights • 1 Measuring point selector switch. L1-N, L2-N, L3-N, L1-L2, L1-L3, L2-L3 • 1 Measuring point selector switch. I1, I2, I3 • Protection: 3 thermo-magnetic device circuit breakers, Motor protection switch adjustable from 1.6...2.5A with undervoltage trip • Table-top housing with fold-away stand 	
		units	Power switch module <p>The voltage can be switch on and off manually or automatically.</p> <ul style="list-style-type: none"> • Nominal voltage: 200-400V, 50/60Hz • Control voltage: 24V • Nominal operating current: 16A, ohmic • Functions: 2 pushbutton switches and remote control for switch-off relay • Indicators: signal lamps for "on" and "off" • Contacts: 3 n.o. & 2 auxiliary • Inputs/outputs: 4mm safety sockets 	
		pcs	Multiple socket outlet, 6 fold, with illuminated switch	

		<p>units</p> <p>Three-phase power quality meter, display and long-term memory</p> <ul style="list-style-type: none"> • Three-phase measurement of current and voltage 3x400V/5A • Measurement of phase voltages, line-to-line voltages and currents • Determination of the apparent, active and reactive power • Determination of active, reactive and apparent work • Determination of the frequency and distortion factors for current and voltage • Detection of harmonic oscillations and neutral conductor current in the electricity supply • Pulse measurement • Peak and mean value detection • Event logging • Real-time clock • Large-scale, contrast-rich graphic display with background illumination • Display in tables, diagrams and vector diagrams • 2 Digital inputs and outputs for free configuration including functions 	
		<ul style="list-style-type: none"> • Ethernet interface • Menu navigation in German/English/French/Spanish/Italian/Portuguese/Turkish/Chinese/Russian/Polish • Demonstration measuring instrument for making measurements on the electricity supply grid <p>Maximum measurement values</p> <ul style="list-style-type: none"> • Voltage P-P: 690 V • Current: 5 A <p>Fault tolerances:</p> <ul style="list-style-type: none"> • Voltage 0.2% • Current 0.2% • Apparent power 0.5% • Active power 0.2% • Reactive power 1% • Active energy Class 0.2 • Reactive energy Class 2 	

		<p>pc Interactive Lab Assistant: Smart Grid</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring • Documents can be printed out for hardcopy of experiment instructions including solutions • CD-ROM with browser, course software and SCADA Viewer <p>Training contents:</p> <ul style="list-style-type: none"> • Smart Grid: Energy generation, distribution and transmission • Smart Grid: Energy management (Demand Side Management) • Smart Grid: Set up of a basic system • Smart Grid: Extension of the basic system • Smart Grid: Reactive power compensation using remotely located wind power plants 	
		<p>pc Interactive Lab Assistant: Bus bar systems</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring • Documents can be printed out for hardcopy of experiment instructions including solutions • CD-ROM with browser, course software and SCADA Viewer <p>Training contents:</p> <ul style="list-style-type: none"> • Basic circuits of a three-pole, double bus bar system • Three-phase, double bus bar system with load • Bus bar change-over without interruption of the branch • Preparation of algorithms for various switching operations • Bus bar coupling 	

		<p>pc Interactive Lab Assistant: High-voltage transmission lines</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring • Documents can be printed out for hardcopy of experiment instructions including solutions • CD-ROM with browser, course software and SCADA Viewer <p>Training contents:</p> <p>Studies of three-phase lines</p> <ul style="list-style-type: none"> • Voltage increases on open-circuit lines • Voltage drop as a function of line length • Voltage drop as a function of $\cos \phi$ • Capacitive and inductive power losses on a line as a function of V and I 	
		<ul style="list-style-type: none"> • Phase shift on a line <p>Parallel and series connection of transmission lines</p> <ul style="list-style-type: none"> • Distribution of power and current among parallel-connected lines of equal length • Distribution of power and current among parallel-connected lines of unequal length • Distribution of power and current among series-connected lines of equal length • Distribution of power and current among series-connected lines of unequal length • Load distribution, power flow • Voltage distribution • Quantitative and qualitative evaluations of operational relationships <p>Study of lines with earth-fault compensation</p> <ul style="list-style-type: none"> • Earth fault on a line with an isolated star point • Response to earth faults • Earth-fault compensation <p>Studies on power transmission systems with synchronous generators</p>	

		<ul style="list-style-type: none"> • Power and current distribution in a line network fed by a generator • Parallel operation of a generator and line via the network • Control of active power feed • Control of reactive power feed <p>Investigations on three phase cables</p> <ul style="list-style-type: none"> • Ferranti effect, charging capacity, critical length • Resistive, inductive and resistive-inductive mixed loads • Compensation for a resistive-inductive load • Determining zero impedance • Symmetric and asymmetric shorts • Dealing with star points and shorts to earth <p>Combined networks of cables and lines</p> <ul style="list-style-type: none"> • Differences between cables and transmission lines • Investigation of connections: <ul style="list-style-type: none"> - Transmission lines, transformers and cables - Cables, transformers and transmission lines • Losses from individual components • Parameters for sub-stations <p>Controlling flow of power in meshed networks</p> <ul style="list-style-type: none"> • Variable transformers • Transformer with in-phase regulation (in-phase booster) • Transformer with regulation in quadrature (quadrature booster) • Phase-angle-regulating transformer (phase-shifting transformer) • Affect flow of power via two identical conductors parallel to one another 	
	pc	<p>Interactive Lab Assistant: Protective systems for high-voltage transmission line</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring • Documents can be printed out for hardcopy of experiment instructions including solutions 	

			<ul style="list-style-type: none"> • CD-ROM with browser, course software and SCADA Viewer Training contents: • Circuit diagrams • Non-directional overcurrent time protection • Directional overcurrent time protection • Overvoltage and undervoltage protection • Directional power protection • Earth-fault voltage protection • Protection of parallel-connected lines • High-speed distance protection 	
		pc	<p>Software SCADA for Power Engineering, designer software</p> <p>SCADA is an acronym that stands for supervisory control and data acquisition (SCADA) of technical processes in real time. In electrical power engineering SCADA is deployed for a range of operations from power generation, transmission and line protection all the way to power utilisation.</p> <p>SCADA provides staff with the opportunity to track and enter data into technical processes. Measurement values are displayed on the screen in real time. Control signals can be modified during the process. The SCADA system can also be used for automatic process control. The recording of multiple measured values permits both future planning and economic optimisation. The system can be remotely controlled by means of local access networks (LAN).</p>	

			<p>SCADA Power Engineering Lab is a software program designed for the control and monitoring of power engineering systems. In the software all measured values and operating states can be displayed on existing system instrumentation in real time. Furthermore, important parameters and signals can be controlled by the software. The measured values and equipment operating states can be selected, recorded, depicted with respect to time and finally evaluated and exported.</p> <p>Software functionality:</p> <ul style="list-style-type: none"> • Symbolic equipment arrangement of all equipment on the screen • Standardised electronic circuit symbols for the circuit visualisation • Freely configurable circuit setup • Individually configurable tabular list of as many measurement values as desired 	
			<ul style="list-style-type: none"> • Real-time display of measured values and operating states • Recording and plotting of measured values in diagrams • Processing, analysing and export of diagrams • Integrated soft PLC • SCADA Viewer • SCADA Panel Designer • SCADA Remote Client / Server • SCADA OPC Client • SCADA IEC 61850 Client • Implementation and analysis of intelligent grids (Smart Grid) <p>Includes:</p> <ul style="list-style-type: none"> • CD-ROM with SCADA Software package • 1 USB-dongle for operation of program 	
		pcs	Patch cable Cat5E 1x 1 m yellow, 2x 2 m yellow	
		pc	Safety connecting plug 4mm with tap (2x), blue, 1000V/32A CAT II	

		pc	Safety connecting plug 4mm with tap (2x), gr/ye, 1000V/32A CAT II	
		set	<p>Set of safety measurement cables, 4mm (31 leads)</p> <p>Safety measurement cables with 4mm safety plugs, coloured, PVC insulation, highly flexible</p> <p>Each set includes the following:</p> <ul style="list-style-type: none"> • 6 x 25cm long, black • 4 x 50cm long, black • 2 x 100cm long, blue • 2 x 100cm long, red • 1 x 100cm long, green/yellow • 1 x 150cm long, blue • 1 x 150cm long, green/yellow • 2 x 150cm long, green • 4 x 150cm long, brown • 4 x 150cm long, black • 4 x 150cm long, grey • Wire cross section 2.5 mm² • Capacity/category: 600V CAT II, 32A 	
		pcs	<p>Safety measurement cable (4mm), 25cm/10", black, 600 V, CAT III ' 1000 V, CAT II / 32A</p> <p>Safety measurement lead with stackable, contact-proof 4 mm plugs</p> <ul style="list-style-type: none"> • colour: black • length: 25 cm • cable cross-section 2,5 mm² • ratings deliver: 600V CAT II, 32 A • Long life-span and ability of the contact component to withstand being plugged in and out many times with the minimum of junction resistance • Plugs comply with the requirements of the standard IEC EN 61010-031 	
		pc	Interface converter USB/RS485	

		unit	HDD with installation software according to order <ul style="list-style-type: none"> • 2.5" hard disk with software • Ready to use including tailor-made set of software products • For convenient and safe installation and backup of software • USB 2.0 connector 	
		unit	Mobile aluminum experiment stand, 3 levels, power strip with 6 sockets, 49"x28"x79" WxDxH (1250x700x1995mm) Table top + Shelf: <ul style="list-style-type: none"> • 30-mm table top made of highly compressed, multi-layer fine chipboard conforming to DIN EN 438-1 • Colour grey, RAL 7035, with 0.8-mm slightly textured laminate coating (Resopal) on both sides, conforming to DIN 16926 • Resistant to many chemicals and reagents including dilute acids and alkalis • Resistant to heat, e.g. molten solder or heating at specific points such as by soldering tips or cigarette ends • Frame with solid impact-resistant protective edging made of 3 mm thick RAL 7047 coloured plastic • Coating and adhesive are PVC free • Power strip with 6 outlet sockets mounted underneath the table top, lead and earthed plug 	

		<p>Frame:</p> <ul style="list-style-type: none"> • 2 extruded aluminium profiles with multiple grooves 1800 x 120 x 40 mm (WxHxD) • 8 equally sized grooves in extruded aluminium profiles (3 on each side and 1 each on the front and back) • Grooves accommodate standard industrial mountings • 4 H-shaped aluminium profiles, 1150 mm, for 3-layer organisation of DIN A4 panels • Space for extension of power supply duct • Base made of rectangular tubing with 4 swiveling double casters, 2 of which have brakes • Table frame made of tough combination of rectangular tubing around the full perimeter • Acid-resistant epoxy-resin coating, 80 µm thick (approx.), colour RAL 7047 	
		<p>Cable holder:</p> <ul style="list-style-type: none"> • Width 200 mm with 12 cable slots to accommodate 48 x 4-mm safety measurement leads <p>PC attachment bracket:</p> <ul style="list-style-type: none"> • With 3 screw-on rubber stoppers, dimensions 65x65x114 mm approx. (top fixing for PC) > The height of the cable holder and PC attachment bracket can be adjusted along the aluminium profiles > For attachment to left or right, fastening materials included > Acid-resistant epoxy-resin powder coating of thickness 80 µm approx., colour RAL 7047 <p>Dimensions:</p> <ul style="list-style-type: none"> • Height of table top 760 mm • 1250 x 1970 x 700 mm (WxHxD) <p>The mobile experiment stand is supplied in kit form and needs to be assembled by customers themselves.</p>	

	unit	<p>Display for Smart Grid equipment Labelled display, 1250 x 500 mm, with photo-realistic color printing. For attachment to aluminum profiles on mobile experiment stands with a width of 1250 mm. Includes fastening material and metal reinforcement for edges.</p> <p>Dimensions: 1225 x 500 x 5 mm (WxHxD)</p>	
	pc	<p>Monitor holder for flat screen monitor of weight up to 15kg / 33lbs</p>	
	pc	<p>Keyboard adapter for flat screen monitor holders</p>	
	pc	<p>Protection cover for three-level experiment trolleys</p>	
	pc	<p>Lamp board 230V The lamp board permits the investigation and the comparison of light bulb, energy saving lamp and LED bulb. All illuminant have the same brightness and can be switched on individually. Technical Data:</p> <ul style="list-style-type: none"> • Light bulb: 25W • Energy saving lamp: 4W • LED-bulb 4W • Operating Voltage: 230V/ 50/60Hz • 3 sockets E27 	
	pc	<p>Inductive load, three-phase, 1kW Consist of three inductive loads with the following taps: 1,2H (0,65A), 1,6H (0,5A), 2H (0,45A), 2,4H (0,35A), 2,8H (0,30A), 3,2H (0,25A)</p> <ul style="list-style-type: none"> • for parallel, series, star and delta circuits • Inputs/outputs: 4mm safety sockets 	
	pc	<p>Capacitive load, three-phase, 1kW Three groups of MP-capacitor, each consists four capacitors.</p> <ul style="list-style-type: none"> • for parallel, series, star and delta circuits • capacity: 3 x 2/4/8/30 μF, 450 V • Inputs/outputs: 4mm safety sockets 	

		pc	<p>Variable Ohmic load, three-phase, 1kW</p> <p>Three synchronously adjustable circular rheostats with scale 100 - 0%, each with a fuse in the sliding-contact connection.</p> <ul style="list-style-type: none"> • for parallel, series, star and delta circuits • Resistance: 3 x 750 Ohm • Current: 3 x 2 A • Inputs/outputs: 4mm safety sockets 	
		pc	<p>Three-phase asynchronous motor, squirrel-cage, 1kW</p> <p>Three-phase asynchronous motor with pronounced pull-out torque.</p> <ul style="list-style-type: none"> • Nominal voltage: 690/400V, 50Hz • Nominal current: 1.2A / 2.1A • Nominal speed: 2900rpm • Nominal power: 1kW • cos phi: 0.83 	
		pc	<p>Star-Delta switch</p> <p>Switch positions: O - star - delta (rotary switch)</p> <ul style="list-style-type: none"> • Contact rating: 690V, 12A, max. • Inputs/outputs: 4mm safety sockets 	
		pc	<p>Reactive power controller</p> <ul style="list-style-type: none"> • Operating voltage: 200-400V • Frequency: 50/60Hz (48 to 62Hz) • Control contacts: 6 floating relay contacts • Load rating of control contacts: Switch voltage compliant with VDE 0110 group B, 400V/AC; compliant with VDE 0110 group C, 250V/AC • Switching current: 5A, maximum • Rating: 1800VA, maximum • Alarm contact: Load rating as for control contacts • Operator controls: Foil keypad • Inputs/outputs: 4-mm safety sockets 	

	pc	<p>Switchable Capacitor Battery</p> <p>This capacitor battery includes 4 switching states, which can be activated and deactivated by means of power contactors. These circuits each consist of 3 capacitors in star configuration along with discharging resistors.</p> <ul style="list-style-type: none"> • Capacitance values: <p>State 1: 3 x 2 μF, 450 V, 50 Hz State 2: 3 x 4 μF, 450 V, 50 Hz State 3: 3 x 8 μF, 400 V, 50 Hz State 4: 3 x 16 μF, 400 V, 50 Hz</p> <ul style="list-style-type: none"> • Compensating reactive power: max. 1546 var • I/O: 4mm safety sockets 	
	unit	<p>Servo machine test bench for 1kW machines incl. ActiveServo software</p> <p>The controller has the following features:</p> <ul style="list-style-type: none"> • Dynamic and static four-quadrant operation • 10 selectable operating modes/machine models (torque control, speed control, flywheel, lifting drive, roller/calander, fan, compressor, winding gear, arbitrarily defined time-dependent load, manual and automated network synchronization) • Integrated galvanically isolated amplifier for voltage and current measurement • Speed and torque displays • Four-quadrant monitor • USB interface • Thermal monitoring of the machine under test • Testing for the presence of a shaft cover. 	

		<ul style="list-style-type: none"> • Connection voltage: 400V, 50Hz • Maximum power output: 10kVA <p>The brake is self-cooled asynchronous servo-brake with resolver. The motor and sensor leads are connected via polarity-safe plugs. The machine has thermal monitoring and, in conjunction with the controller, it constitutes a driving and braking system that is free of drift and requires no calibration.</p> <ul style="list-style-type: none"> • Maximum speed: 4000rpm • Maximum torque 30Nm • Temperature monitoring: continuous temperature sensor (KTY) • Resolver resolution: 65536 pulses/revolution <p>ActiveServo is a program for recording characteristics of machines and for determining dynamic and static operating points. It emulates seven different loads (flywheel, pump, calander, lifting drive, compressor,</p>	
		<p>winding gear, arbitrarily configurable time-dependent load) for which the parameters can be individually configured.</p> <p>Features:</p> <ul style="list-style-type: none"> • Measurement, calculation and display of mechanical and electrical variables • (Speed, torque, mechanical power output, current, voltage, active, apparent and reactive power, efficiency, power factor) • Simultaneous display of measured and calculated values (e.g. instant display of efficiency) • Measurement of voltage and current (including RMS values even for non-sinusoidal waveforms) • Speed or torque-controlled operation • Recording of variables over time • Programming of limiting values of speed or torque to prevent inappropriate loading of the machine under test. 	

			<ul style="list-style-type: none"> • Operation in all four quadrants (display of generated torque) • Arbitrarily defined ramp functions for PC-controlled load experiments • Display of characteristics from several experiments to better illustrate the effect of parameter changes • Export of graphics and measurements 	
		pc	Rubber coupling sleeve, 1kW	
		pc	Coupling guard <ul style="list-style-type: none"> • Equipment : polycarbonate transparent with function plug • Integrated lighting signals correct operation of safety functions 	
		pc	Quick Chart, Servo-machine test stand safety and operating instructions Short documentation covering the putting into operation of complex equipment and experiment set-ups. <ul style="list-style-type: none"> • Terminal assignment, safety instructions, help • Circuit and assembly diagrams • Colour print in DIN A3 format • Laminated: 2 x 250 µm 	
		set	Universal power supply for electrical machines <ul style="list-style-type: none"> • Outputs: Three phase: L1, L2, L3, N from 4-mm safety sockets DC: 0...240 V DC variable, controlled and electronically protected against overload and short circuits. Output current: 3...10 A (adjustable current limiting) • Second DC supply ca. 210 V DC, 6 A fixed • Protective systems: Motor protection switch adjustable from 6.3...16 A Under voltage trip Safety cut-out • Power connection: 3x 230/400 V, 50/60 Hz via CEE plug with 1.8 m power lead 	

		pc	<p>Three-phase supply for electrical machines Power supply for Ac and three-phase. The supply is specially designed for use with electrical machines</p> <ul style="list-style-type: none"> • Outputs: Three-phase: L1, L2, L3, N from 4-mm safety sockets • Protective systems: Motor protection switch adjustable from 6.3 ... 16 A Under voltage trip Safety cut-off • Power connection: 3x 320/400V, 50/60 Hz via CEE plug with 1.8 mm power lead 	
		pc	<p>Motor protection switch, 3 pole, 1.8-2.5A Power circuit breaker incorporating thermal overload trip and undelayed current trip.</p> <ul style="list-style-type: none"> • Contact rating: 500V AC at 10A • Nominal current: 1.8A...2.5A adjustable 	
		pc	<p>Power switch module The voltage can be switch on and off manually or automatically.</p> <ul style="list-style-type: none"> • Nominal voltage: 200-400V, 50/60Hz • Control voltage: 24V • Nominal operating current: 16A, ohmic • Functions: 2 pushbutton switches and remote control for switch-off relay • Indicators: signal lamps for "on" and "off" • Contacts: 3 n.o. & 2 auxiliary • Inputs/outputs: 4mm safety sockets 	
		pc	<p>Multiple socket outlet, 6 fold, with illuminated switch</p>	

		<p>unit</p> <p>Three-phase power quality meter, display and long-term memory</p> <ul style="list-style-type: none"> • Three-phase measurement of current and voltage 3x400V/5A • Measurement of phase voltages, line-to-line voltages and currents • Determination of the apparent, active and reactive power • Determination of active, reactive and apparent work • Determination of the frequency and distortion factors for current and voltage • Detection of harmonic oscillations and neutral conductor current in the electricity supply • Pulse measurement • Peak and mean value detection • Event logging • Real-time clock • Large-scale, contrast-rich graphic display with background illumination • Display in tables, diagrams and vector diagrams 	
		<ul style="list-style-type: none"> • 2 Digital inputs and outputs for free configuration including functions • Ethernet interface • Menu navigation in German/English/French/Spanish/Italian/Portuguese/Turkish/Chinese/Russian/Polish • Demonstration measuring instrument for making measurements on the electricity supply grid <p>Max. measurement values:</p> <ul style="list-style-type: none"> • Voltage P-P: 690 V • Current: 5 A <p>Fault tolerances:</p> <ul style="list-style-type: none"> • Voltage 0.2% • Current 0.2% • Apparent power 0.5% • Active power 0.2% • Reactive power 1% • Active energy Class 0.2 • Reactive energy Class 2 	

		pc	<p>Interactive Lab Assistant: Energy management</p> <p>The experiment instructions come in the form of an Interactive Lab Assistant course. This multimedia course is a step-by-step guide through the topic of modern energy systems. The fundamentals are conveyed using easy to understand animations. The Interactive Lab Assistant in conjunction with the SCADA Viewer constitutes a comfortable experimenting environment.</p> <p>Special features:</p> <ul style="list-style-type: none"> • Interactive experiment setups • Measured values and diagrams can be stored in the experiment instructions per drag and drop • The SCADA Viewer can be started directly from the experiment instructions • Includes questions with feedback and evaluation logic for progress monitoring 	
			<ul style="list-style-type: none"> • Documents can be printed out for hardcopy of experiment instructions including solutions • CD-ROM with browser, course software and SCADA Viewer <p>Training Contents:</p> <p>Complex loads, power consumption measurement and peak load monitoring</p> <ul style="list-style-type: none"> • Three-phase consumers with star and delta connections (R, L, C, RL, RC and RLC loads) • Measurement with active and reactive energy meters: • For symmetric and asymmetric RL loads • In the event of a phase failure • In the event of over-compensation (RC load) 	

		<ul style="list-style-type: none"> • For active loads • In the event of energy-flow reversal • Determination of the first and second power maxima • Determination of the power maximum in the event of an asymmetric load • Recording of load profiles <p>Dynamic loads</p> <ul style="list-style-type: none"> • Dynamic, three-phase load (asynchronous motor) • Power measurement in the case of energy-flow reversal <p>Manual and automatic compensation of reactive power</p> <ul style="list-style-type: none"> • Operating an asynchronous machine and recording its characteristic parameters • Calculating parameters for compensation capacitors • Compensation using various capacitors 	
		<ul style="list-style-type: none"> • Determining stage power • Manual compensation of reactive power • Automatic identification of a reactive power controller's connections • Automatic compensation of reactive power 	
	pc	<p>Interactive Lab Assistant: Asynchronous machines 0.3/1kW</p> <ul style="list-style-type: none"> • Interactive experiment set-ups • Measurements and graphics can be copied to the experiment pages by means of drag and drop • Virtual instruments can be started directly from the experiment instruction pages themselves • Questions with feedback and logic for testing knowledge • Document print-out for simple printing of experiment instructions with solutions • CD-ROM with browser, course software and software for braking systems and measuring equipment 	

			<p>Training contents:</p> <ul style="list-style-type: none"> • Motor connection • Reversing rotation direction • Manual switching • Machine-specific values and characteristics • Measurement evaluation • Star-delta connection • Steinmetz circuit • Reactance power compensation with capacitors of various capacitance 	
		pc	Patch cable Cat5E 1x 1 m yellow, 2x 2 m yellow	
		pc	USB Network Adapter 10/100 BaseTX RJ45	
		pc	5-Port Ethernet Switch	
		pc	Safety connecting plug 4mm with tap (2x), black, 1000V/32A CAT II	
		pc	Safety connecting plug 4mm with tap (2x), blue, 1000V/32A CAT II	
		pc	Safety connecting plug 4mm with tap (2x), gr/ye, 1000V/32A CAT II	
		set	<p>Set of safety measurement cables with 4mm safety plugs, coloured, PVC insulation, highly flexible</p> <p>Each set includes the following:</p> <ul style="list-style-type: none"> • 6 x 25cm long, black • 4 x 50cm long, black • 2 x 100cm long, blue • 2 x 100cm long, red • 1 x 100cm long, green/yellow • 1 x 150cm long, blue • 1 x 150cm long, green/yellow • 2 x 150cm long, green • 4 x 150cm long, brown • 4 x 150cm long, black • 4 x 150cm long, grey • Wire cross section 2.5 mm² • Capacity/category: 600V CAT II, 32A 	

		set	Measurement leads, 4mm, length 10m, includes fastening set (1 set) 5 safety measurement leads, with stackable 4-mm plugs and highly flexible double-insulated wires <ul style="list-style-type: none"> • 1 x 10m long, black • 1 x 10m long, blue • 1 x 10m long, grey • 1 x 10m long, brown • 1 x 10m long, green/Yellow • Wire cross-section 2.5 mm² • Nominal data: 600 V CAT II, 32 A 20 Velcro cable ties in 5 different colours <ul style="list-style-type: none"> • Cable ties made of material with hook-and-loop Velcro fastenings, for multiple reuse • 5 different colours (black, red, yellow, blue, green) • Size 150x12 mm 5 cable binder blocks which can be inserted by rotating them into the front and rear grooves of aluminium profiles	
		pc	Safety measurement cable (4mm), 150cm, brown	
		pc	Safety measurement cable (4mm), 150cm, black	
		pc	Safety measurement cable (4mm), 150cm, grey	
		pc	Safety measurement cable (4 mm), 150 cm, blue, 600 V, CAT III ' 1000 V, CAT II / 32 A	

		pc	<p>Mobile aluminum experiment stand, 3 levels, power strip with 6 sockets, 49"x28"x79" WxDxH (1250x700x1995mm)</p> <p>Table top + Shelf:</p> <ul style="list-style-type: none"> • 30-mm table top made of highly compressed, multi-layer fine chipboard conforming to DIN EN 438-1 • Colour grey, RAL 7035, with 0.8-mm slightly textured laminate coating (Resopal) on both sides, conforming to DIN 16926 • Resistant to many chemicals and reagents including dilute acids and alkalis • Resistant to heat, e.g. molten solder or heating at specific points such as by soldering tips or cigarette ends • Frame with solid impact-resistant protective edging made of 3 mm thick RAL 7047 coloured plastic • Coating and adhesive are PVC free 	
			<ul style="list-style-type: none"> • Power strip with 6 outlet sockets mounted underneath the table top, lead and earthed plug <p>Frame:</p> <ul style="list-style-type: none"> • 2 extruded aluminum profiles with multiple grooves 1800 x 120 x 40 mm (WxD) • 8 equally sized grooves in extruded aluminum profiles (3 on each side and 1 each on the front and back) • Grooves accommodate standard industrial mountings • 4 H-shaped aluminum profiles, 1150 mm, for 3-layer organisation of DIN A4 panels • Space for extension of power supply duct • Base made of rectangular tubing with 4 swiveling double casters, 2 of which have brakes • Table frame made of tough combination of rectangular tubing around the full perimeter • Acid-resistant epoxy-resin coating, 80 µm thick (approx.), colour RAL 7047 	

			<p>Cable holder:</p> <ul style="list-style-type: none"> • Width 200 mm with 12 cable slots to accommodate 48 x 4-mm safety measurement leads <p>PC attachment bracket:</p> <ul style="list-style-type: none"> • With 3 screw-on rubber stoppers, dimensions 65x65x114 mm approx. (top fixing for PC) • The height of the cable holder and PC attachment bracket can be adjusted along the aluminium profiles • For attachment to left or right, fastening materials included • Acid-resistant epoxy-resin powder coating of thickness 80 µm approx., colour RAL 7047 <p>Dimensions:</p> <ul style="list-style-type: none"> • Height of table top 760 mm • 1250 x 1970 x 700 mm (WxHxD) 	
		unit	<p>Display for Energy Management equipment</p> <p>Labelled display, 1250 x 500 mm, with photo-realistic color printing. For attachment to aluminum profiles on mobile experiment stands with a width of 1250 mm. Includes fastening material and metal reinforcement for edges.</p> <p>Dimensions: 1225 x 500 x 5 mm (WxHxD)</p>	
		unit	<p>Protected power distribution for working stations</p> <p>400-V CEE distribution panel with automatic circuit breakers for attachment to profiles on experiment trolleys or direct to table-top.</p> <ul style="list-style-type: none"> • 2 CEE sockets (400 V, 16 A, 5-pole) with safety flap • 1 Socket outlet with earth (230 V) • Circuit breaker: 1 x 3-pole line circuit breaker, type B, 16 A • Power connection: 3 x 230/400 V, 50/60 Hz via CEE plug, 4-m power lead 	

		pc	Monitor holder for flat screen monitor of weight up to 15kg / 33lbs	
		pc	Keyboard adapter for flat screen monitor holders	
		pc	Protection cover for three-level experiment trolleys	
			RENEWABLE:	
		unit	Interface with virtual instruments Equipment: <ul style="list-style-type: none"> • 32-bit processor with storage memory for measurements • USB interfaces, transfer rate 12 Mbits/s • WLAN/WiFi interface, 2.4 GHz, IEEE 802.11 b/g/n • Simultaneous connection of any number of Experimenters via serial bus system • High-quality designer casing with aluminium feet and surface-hardened Plexiglas front panel • Suitable for accommodating in training panel frames for DIN A4 training panels • Designed for connection of 2-mm safety measuring leads • Multi-coloured LEDs for displaying status 	
			<ul style="list-style-type: none"> • Adjustable analog output, +/-10 V, 0.2 A, DC – 5 MHz, via BNC and 2-mm sockets • 4 Analog differential amplifier inputs with 10 MHz band width, safe for voltages up to 100 V, sampling rate 100 mega samples, 9 measuring ranges, memory depth 4 x 8 k x 10 bits, inputs via BNC (2 inputs) or 2-mm sockets (4 inputs) • 2 Analog inputs for current measurement, overcurrent-protected up to 5 A, sampling rate 250 kilo samples, 2 measuring ranges, resolution 12 bits, connection via 2-mm sockets • 3 variable analog outputs +/- 20V, 1 A, DC-150 Hz • 16-bit digital signal output, of which 8 bits are accessed via 2-mm sockets, TTL/CMOS, clock frequency 0 – 100 kHz, electric strength +/- 15 V 	

		<ul style="list-style-type: none"> • 16-bit digital signal input, of which 8 bits are accessed via 2-mm sockets, memory depth 16 bit x 2 k, TTL/CMOS, sampling rate 0 – 100 kHz, electric strength +/- 15 V, • 8 Relays, 24 V DC/1 A, of which 4 are accessed via 2-mm sockets • Dimensions: 29.6 x 19 x 8.6 cm • External power supply with wide range input 100-264 V, 47-63 Hz, output 24 V / 5 A 	
		<p>Virtual instruments (meters and sources):</p> <ul style="list-style-type: none"> • 2 x Voltmeter VIs, 2 x Ammeter VIs: AC, DC, 9 ranges, 100 mV to 50 V, true RMS, AV • 1 x Power meter, 9 ranges, 100 mV to 50 V • 1 x VI with 8 relays, 1 x Multimeter VI: multimeter display in Software • 1 x 2-channel ammeter VI: AC, DC, 2 ranges, 300 mA and 3 A, TrueRMS, AV • 1 x 2-channel voltmeter VI: AC, DC, 9 ranges, 100 mV to 50 V, TrueRMS, AV • 1 2-/4-channel oscilloscope: band width 10 MHz, 25 time ranges, 100 ns/div to 10 s/div, 9 ranges 20 mV/div to 10 V/div, trigger and pre-trigger, XY and XT modes, cursor function, addition and multiplication function for 2 channels • 1 x VI Spectrum Analyzer: 9 voltage ranges 100 mV to 50 V, input frequency range 3 Hz to 1 MHz, time domain display 	

			<ul style="list-style-type: none"> • 1 X VI Bode-Plotter: 9 voltage ranges 100 mV to 50 V, frequency range 1 Hz - 5MHz, time domain display and locus diagram • 1 x Adjustable DC voltage VI 0 - 10 V • 1 x Function generator VI: 0.5 Hz - 5 MHz, 0 - 10 V, sine, square, triangular, • 1 x Arbitrary generator VI, 1 x Pulse generator VI • 1 x VI with 16 digital outputs, 1 x VI with 16 x digital inputs, 1 x VI with 16 digital input/outputs. Display modes: binary, hex, decimal and octal numerals • 1 x Three-phase power supply VI, 0 - 150 Hz, 0 - 14 Vrms, 2 A • 1 x Adjustable DC power supply VI, 3 x (-20 V - +20 V), 2 A • 1 x Three-phase power supply VI with additional phase-shift and clock rate adjustment <p>Includes:</p> <ul style="list-style-type: none"> • Interface • Power supply • Power lead • USB cable • Operating manual 	
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	unit	<p>Experimenter Equipment:</p> <ul style="list-style-type: none"> • Connects to the Unit Interface and additional Experimenters via Unit bus • Unit bus connection for experiment cards • High-quality designer casing with aluminium feet and surface-hardened Plexiglas front window • Suitable for accommodating training panel frames for DIN A4 training panels • Fixed and variable voltages available via 8 2-mm sockets • Designed for connection of 2-mm safety measuring leads • Accommodates Unit experiment cards • Eject mechanism for Unit experiment cards with return spring • Accommodates a breadboard for experimenting with discrete components and integrated circuits • Accommodates a multimeter using IrDa interface • Dimensions: 29.6 x 19 x 8.6 cm • Weight: 1.0 kg 	
	set	<p>Measurement accessories, shunts and cables</p> <p>Shunt resistors on a PCB, for current measurement using the analog inputs of the system.</p> <ul style="list-style-type: none"> • 6 Shunt resistors: 2 x 1 ohm, 2 x 10 ohm, 2 x 100 ohm • Screen print of symbols for identifying resistors, the voltage taps and current inputs • 24 x 2-mm sockets • Dimensions: 100 x 40 mm <p>Set of connection cables 2 mm (28 pcs) consisting of:</p> <ul style="list-style-type: none"> • 8 x connection leads 2 mm, 15 cm, blue • 4 x connection leads 2 mm, 15 cm, yellow 	

			<ul style="list-style-type: none"> • 5 x connection leads 2 mm, 45 cm, black • 2 x connection leads 2 mm, 45 cm, yellow • 5 x connection leads 2 mm, 45 cm, red • 2 x connection leads 2 mm, 45 cm, blue • 1 x safety adapter lead 4 mm to 2mm, 50 cm, black • 1 x safety adapter lead 4 mm to 2mm, 50 cm, red <p>10 x 2-mm connector plugs / Plug spacing 5 mm, white</p>	
		unit	<p>Course: Photovoltaics</p> <p>Includes:</p> <p>Experiment board with:</p> <ul style="list-style-type: none"> • 4 Monocrystalline solar modules, 6 V/40 mA • 1 Rechargeable solar battery, 12V/1.2 Ah • Integrated micro controlled charger regulator, discharge and overload protection • 12 V PC fan and 12 V LED lamp for use as fixed loads • Variable load for recording characteristics • Dimmable 120 W reflector lamp • browser and course software <p>Course contents:</p> <ul style="list-style-type: none"> • Function and principle of solar cells • Meaning of terms "solar radiation" and "solar constant" • Various types of solar cell • Manufacturing of solar cells • Connection of solar cells 	
			<ul style="list-style-type: none"> • Recording characteristic for a solar cell • Determine the Maximum Power Point (MPP) • Dependence of I and V from temperature, illumination and angle of incidence • Design of a rechargeable solar cell • Storage of energy in a solar cell • Various types of solar plant • Design of an insular network with solar cells 	

	unit	<p>Course: Fuel cell technology</p> <p>Includes:</p> <p>Experiment panel with:</p> <ul style="list-style-type: none"> • PEM double fuel cell • PEM electrolyser with scaled gas storage device • Power supply 2V/ 2.5A • Consumers • Hoses, hose clamps • Variable load for characteristic recording • browser and course software 	
		<p>Course content:</p> <ul style="list-style-type: none"> • Functional and operating principle of fuel cells • Recording the characteristics of a fuel cell • Learn to explain the electrochemical processes of electrolysis (Faraday's first and second law) • Faraday's laws and determining the energy efficiency of a fuel cell • Series and parallel configuration of fuel cells • Considerations regarding the power of fuel cells • Functional and operating principles of electrolysers • Recording the VI characteristic of the electrolyser • Faraday's laws and determining the energy efficiency of an electrolyser 	
		<p>Include: training at least 5-days of 20 faculty and staff for the operation of the equipment; Training manual or module; At least 3 years warranty of parts and services</p>	

Section VIII. Checklist of Technical and Financial Documents

Notes on the Checklist of Technical and Financial Documents

The prescribed documents in the checklist are mandatory to be submitted in the Bid, but shall be subject to the following:

- a. GPPB Resolution No. 09-2020 on the efficient procurement measures during a State of Calamity or other similar issuances that shall allow the use of alternate documents in lieu of the mandated requirements; or
- b. Any subsequent GPPB issuances adjusting the documentary requirements after the effectivity of the adoption of the PBDs.

The BAC shall be checking the submitted documents of each Bidder against this checklist to ascertain if they are all present, using a non-discretionary “pass/fail” criterion pursuant to Section 30 of the 2016 revised IRR of RA No. 9184.

Checklist of Technical and Financial Documents

I. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Legal Documents

- (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages);
or
- (b) Registration certificate from Securities and Exchange Commission (SEC), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document,
and
- (c) Mayor's or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas;
and
- (d) Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR).

Technical Documents

- (e) Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; **and**
- (f) Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided for in Sections 23.4.1.3 and 23.4.2.4 of the 2016 revised IRR of RA No. 9184, within the relevant period as provided in the Bidding Documents; **and**
- (g) Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission;
or
Original copy of Notarized Bid Securing Declaration; **and**
- (h) Conformity with the Technical Specifications, which may include production/delivery schedule, manpower requirements, and/or after-sales/parts, if applicable; **and**
- (i) Original duly signed Omnibus Sworn Statement (OSS);

and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

Financial Documents

- (j) The Supplier's audited financial statements, showing, among others, the Supplier's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission; **and**
- (k) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC);
or
A committed Line of Credit from a Universal or Commercial Bank in lieu of its NFCC computation.

Class "B" Documents

- (l) If applicable, a duly signed joint venture agreement (JVA) in case the joint venture is already in existence;
or
duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

II. FINANCIAL COMPONENT ENVELOPE

- (m) Original of duly signed and accomplished Financial Bid Form; **and**
- (n) Original of duly signed and accomplished Price Schedule(s).

Other documentary requirements under RA No. 9184 (as applicable)

- (o) *[For foreign bidders claiming by reason of their country's extension of reciprocal rights to Filipinos]* Certification from the relevant government office of their country stating that Filipinos are allowed to participate in government procurement activities for the same item or product.
- (p) Certification from the DTI if the Bidder claims preference as a Domestic Bidder or Domestic Entity.

