EVNPECC1

Enlightening trust

PECC1 PROFILE

POWER ENGINEERING CONSULTING JSC1

OUR VISION

Heading to be a professional prestiged Consulting company in the field of energy, industry, infrastructure in Vietnam and in the region.

OUR MISSION

To Clients

Offer clients efficient solutions and options by qualified and creative staffs and employees hence contributing to the sustainable development of the energy sector and the country.

To Employees

Furnish benefit package satisfactorily and equivalently to capability and contribution; Offer fair opportunities to every employees.

To Shareholders

Enhance the investment value to shareholders By sustainable development strategy.

DEVELOPMENT ORIENTATIONS

Invest to develop sustainable in the trend of professionalization, diversification, modernization various powers engineering consulting services and other potential technical economic services for benefits and interests of the country, of Client, of Shareholders and of every Employees in Company.

OVERVIEW

Company name: POWER ENGINEERING CONSULTING JOINT STOCK COMPANY 1

Abbreviation: **PECC1**

Head office: Km9+200 Nguyen Trai road - Thanh Xuan district - Ha Noi, Viet Nam.

Tel: (84-24) 3854 3133

Website: www.pecc1.com.vn * **Email:** contact@pecc1.com.vn

Charter capital: VND 266,913,190,000, in which EVN holds 54.34%.

The Company stock – code TV1 has been posted on Stock Exchange Department of Ho Chi Minh city since 23/09/2010.

Business sector: the company provides engineering consulting services and construction of power projects, water resources works, industrial works, civil infrastructure works, construction and investment on power generated projects.

Main markets: Vietnam and abroad.

Organization: the company has 12 departments including administrative and engineering design departments, investigation departments and 4 subsidiaries owned 100% by the company.

ABOUT US

With more than 50 years of history, the leading consulting company in the power sector of Vietnam, Power Engineering Consulting Joint Stock Company 1 (**PECC1**) performs engineering consulting services, site survey, investigation and testing, etc. PECC1 has been main consultant to many important large and complicated power projects in Vietnam as well as in Laos PDR and Kingdom of Cambodia.

The company employs high qualified staffs who have been trained and proved from many projects locally and internationally by working together with specialized engineers from international consulting agencies all over the world.

The company always keep leading in application of new technologies, updated software, new testing apparatus and equipment in engineering consulting services, particularly for projects in zones of strong earthquake, complicated geology, large storage reservoirs, underground powerhouse caverns, surface powerhouses of large capacities.

Highlights:

- The Concrete Faced Rockfill Dam (CFRD) technology was introduced successfully for the first time in Tuyen Quang CFRD which had helped shortening construction schedule by 2 years and therefore saved hundreds of billions VND.

Similarly, the decision of using Roller Compacted Concrete (RCC) technology in construction of Son La RCC dam had resulted in early commissioning of the first unit by 2 years and completion of the whole plant by 3 years comparing to the approved construction schedule. The RCC technology is now applying to other hydropower projects including Pleikrong, Song Bung 4, Ban Ve, Ban Chat, Song Tranh 2, Lai Chau and some others.

- Optimization studies to select boiler technologies considering the Vietnamese and other local coal characteristics so as to satisfy standards and requirements on environment.

- Performs studies and analysis for National Grid, select synchronous equipment in engineering design of transmission lines, substations with voltage up to 500kV, design GIS up to 500kV voltage. PECC1 was the consultant to design the very first 500kV Transmission Line in Vietnam in 1994.

- Equipment and apparatus used in topographical, geological, geo-physic surveys and investigations are modern and of high accuracy. Geological investigation are applied with seismic refraction survey method to define geological conditions of foundation, parameters of longitudinal, horizontal waves, massive modules, dynamic elasticity modulus, dynamic sliding modulus, etc required for seismicity studies and engineering design; performs testing to define physico-mechanical properties of foundation and material serving engineering design of the whole project.

- Concrete testing, trial mixture programs performed have gained a break through. Experiences, lesson learnt and standards from modern countries have been applied in selection of continuous mixtures to overcome technical difficulties in mass concrete placement technology which requires high placement rate, satisfying requirements on safety, cost and construction schedule saved.

- Monitoring displacements, deformations in various components of hydropower plants. The company has been performing monitoring at national key point projects including Son La, Ban Ve, Lai Chau, An Khe, Song Ba Ha and other projects abroad such as Xekaman 1, Xekaman 3 in Lao PDR, etc. Monitoring data are essential input data

for analysis, study of project stability, for dam safety evaluation and treatment of any emergence event which may happen.

PECC1 has recently paid special attention and given priority to the development of renewable energies including wind power, solar power, waste-to-energy, biomass power. With the experience and quality of consulting service which **PECC1** has performed successfully in lots of power projects, **PECC1** has gained and achieved the trust from national and international investors in selection and assignment to implement important stages in construction and design renewable energy power plants in Vietnam. With the dedicated, high-qualified engineers **PECC1** keeps the pioneer in designing waste-to-energy, solar power, wind power plants, etc. such as :

+ Vietstar waste-to-energy power plant, the most modern ones in Vietnam, located in Cu Chi province (burning 2,000 tons of household wastes/day, power generation capacity: 40MW);

+ Southeast Asia largest waste-to-energy plant in Soc Son district (burning 4,000 tons of household waste/day, power generation capacity: 75 MW);

+ An Khe biomass power plant (capacity of 95MW);

+ B&T wind farm project (capacity of 152 MW) with large-scaled foreign investment;

+ Ia Pet Dak Doa 1,2 Wind power plant project (200MWp). These two power plants are among the few power plants with large capacity to be fully COD recognized before the deadline of October 31, 2021.

+ Bac Lieu wind power project phase 3 (capacity of 142MW, 71 wind turbine posts), this project specifies the orientation of commercial and investment cooperation between Vietnam and Thailand;

+ Huong Dien floating solar PV power project (capacity of 50MW);

+ Ea Sup solar PV power project (capacity of 600MW);... and many of other renewable energy projects.

Projects performed by **PECC1** always meet requirements on schedule, high quality and satisfy technical and safety requirements as well as increasingly high requirement standard on environment, contributing timely in supplying power sources for the sake of national construction and development cause of the country. The Company always focuses on developing high-quality human resources, renewing technological equipment, investing in resources to implement renewable energy power projects, nuclear power projects in order to provide the best technical services for Clients for the sake of enhancing **PECC1** trademark and building up a sustainable development company.

AWARDS

Title "Labour Hero in Renovation Period"

01 Independent medal, 2nd grade

32 Labor medals, 1st, 2nd and 3rd grades

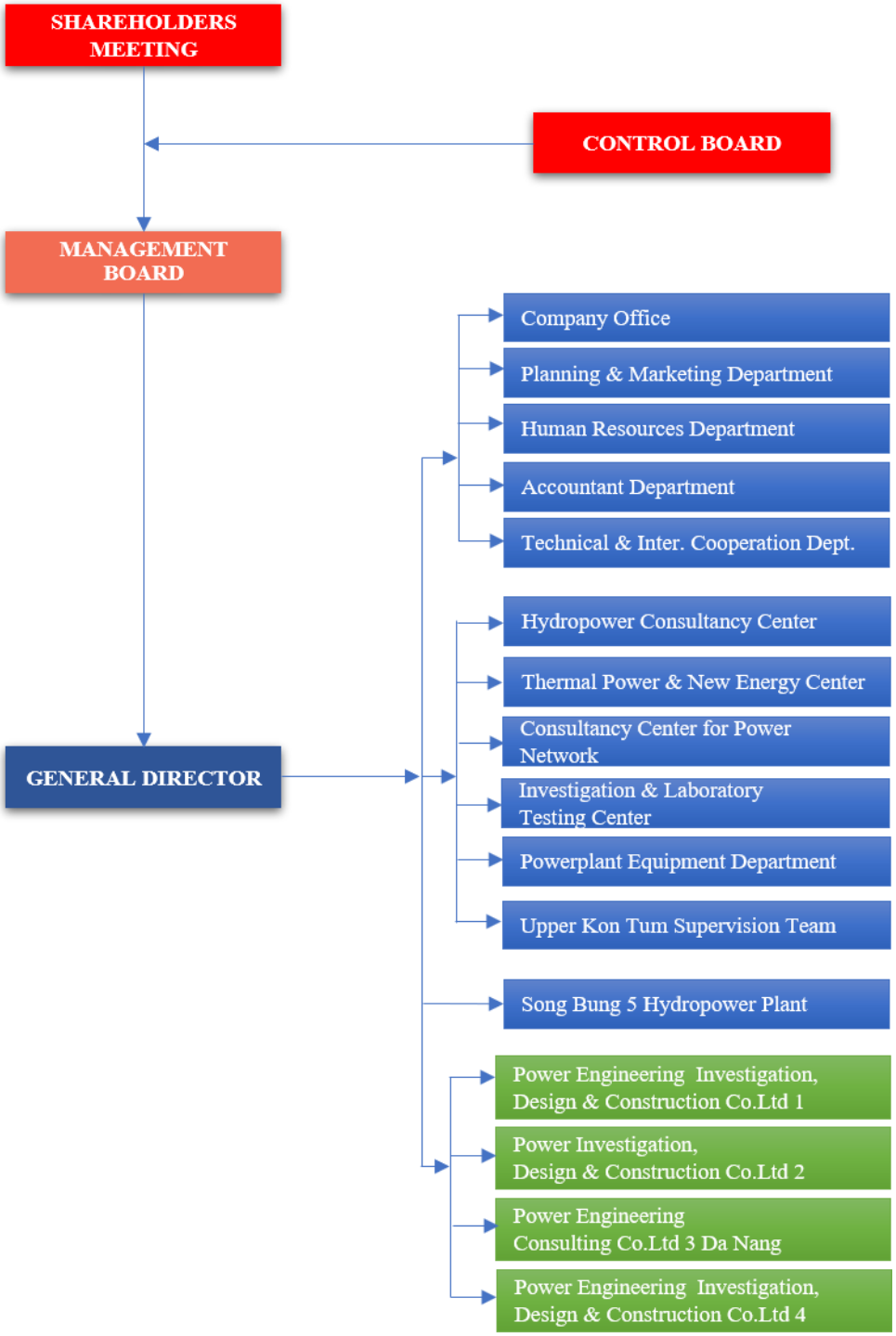
250 Certificates of Merit from the Government Prime Minister and various minitries

Many emulation flags from the Government and EVN

HIGHLIGHT PROJECTS:

- **Hoa Binh hydropower plant:** Labor medals of third grade awarded in 1983, 1984, 1985, 1986, 1987, 1989, 1995.
- **The 500kV North-South Transmission Line (circuit 1):** Independence Medal of the second grade awarded in 1994. The Labor medal of the first and second grades awarded both in 1994.
- **Yaly hydropower plant:** Labor Medal of the 3rd grade awarded in 2002.
- **Song Hinh hydropower plant:** Certificate of Merit and emulation flag from the Government, awarded in 2002, 2003.
- **The 500kV Transmission Line Ha Tinh-Nho Quan-Thuong Tin: Labor** Medal of 3rd grade awarded in 2006, Certificate of Merit awarded by the Government Prime Minister in 2006.
- **Lai Chau hydropower plant:**
  + Labor Medal of second grade, awarded in 2015.
  + "High quality Project in 2016" for "Engineering Designer" awarded by Ministry of Construction.
  + "Highlight Project" awarded by Asian Civil Engineering Council.
- **Son La hydropower plant:**
  + Labor Medal of 3rd grade, awarded in 2012.
  + "Asian Energy 2013" Golden medal.
- **Huoi Quang hydropower plant:**
  + Designed and supervised by EVNPECC1 awarded the: "Award of Merit" by International Federation of Consulting Engineers, FIDIC in 2018.

FLOW CHART


SHAREHOLDERS MEETING
CONTROL BOARD
MANAGEMENT BOARD
GENERAL DIRECTOR
Company Office
Planning & Marketing Department
Human Resources Department
Accountant Department
Technical & Inter. Cooperation Dept.
Hydropower Consultancy Center
Thermal Power & New Energy Center
Consultancy Center for Power Network
Investigation & Laboratory Testing Center
Powerplant Equipment Department
Upper Kon Tum Supervision Team
Song Bung 5 Hydropower Plant
Power Engineering Investigation, Design & Construction Co.Ltd 1
Power Investigation, Design & Construction Co.Ltd 2
Power Engineering Consulting Co.Ltd 3 Da Nang
Power Engineering Investigation, Design & Construction Co.Ltd 4

HUMAN RESOURCES

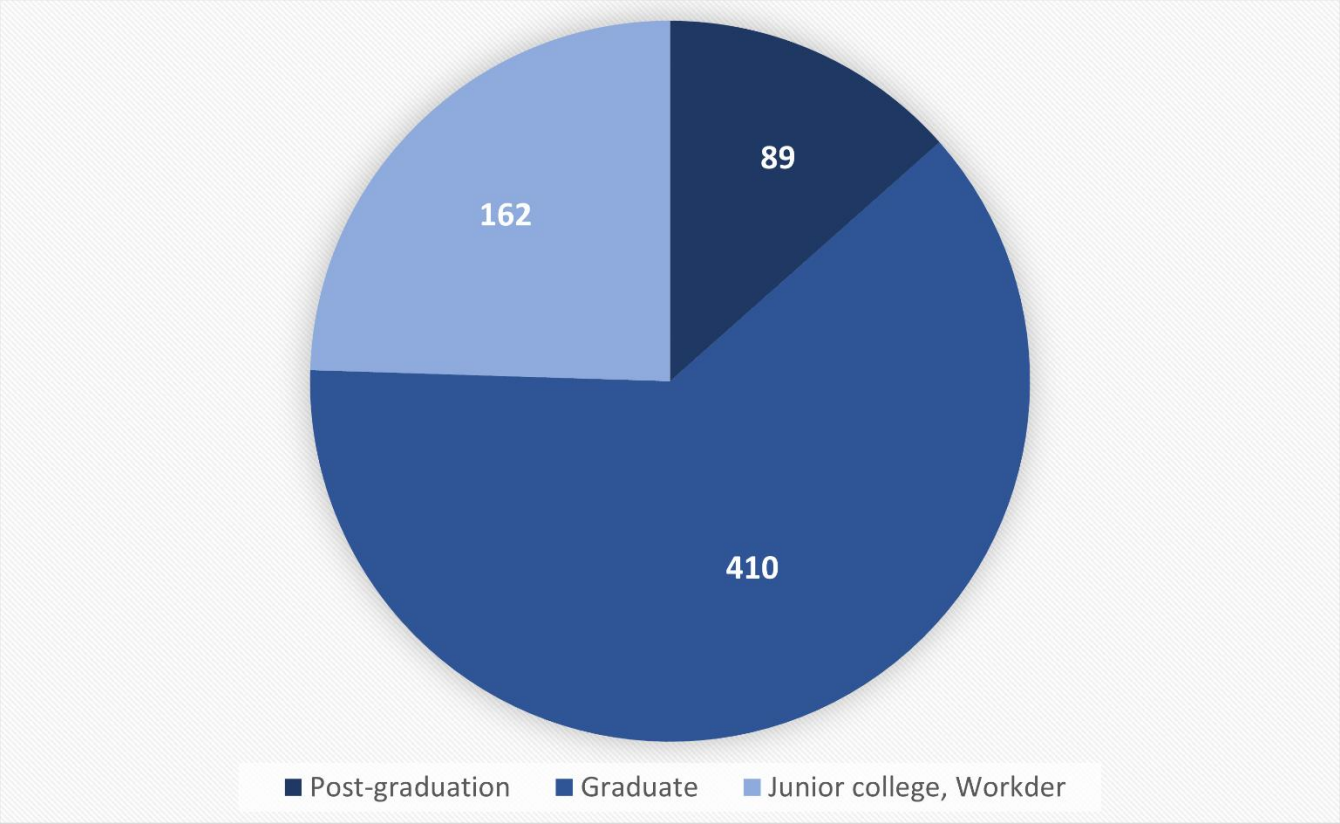
To be the first ranked consulting firm in Vietnam, the company has about 661 full-time employees of which more than 81% are engineers, masters, doctors who are trained specializely on various fields of works such as: technical, IT, foreign languages, enterprise management, business management, project management, high level political... qualification for studying and preparing reports for power projects under international standards.

The company has been main consultant for various National key point power projects from North to South, ever as large as thousands of MW as Son La, to medium and small scale hydropower projects. Transmission line and sub-station projects of 500kV, 220kV, 110kV.

PECC1 is the very first consulting firm proposing to apply new modern technology into design and construction of power projects including concrete with aggregate DMAX 150, the Roller Compacted Concrete technology, Concrete Faced Rockfill dam types, GIS sub-station.

As long as the development of EVN, the engineers, technician staff and admin staff of the company are getting stronger, capable to perform and complete properly any assignments in the field of power construction, ensuring high quality of work, meeting a tight schedule of work such as in cases of the 500kV Transmission Line project from North to South, Yaly, Son La, Huoi Quang, Tuyen Quang, Ban Ve hydropower projects, Pha Lai 2, Uong Bi thermal power plants, etc.

Chart of employees:



LEADERSHIP

MANAGEMENT BOARD

NGUYEN TAI ANH
Chairman of Management Board

NGUYEN HUU CHINH
Member of Management Board

TRAN THAI HAI
Member of Management Board

LE THANH CHUNG
Member of Management Board

LE VAN LUC
Member of Management Board

GENERAL DIRECTOR BOARD

NGUYEN HUU CHINH
General Director

TRAN THAI HAI
Deputy General Director

NGUYEN KIM CUONG
Deputy General Director

DO VIET KHOA
Deputy General Director

LEGAL INFORMATION

BUSINESS REGISTRATION CERTIFICATION

DEPARTMENT OF PLANNING AND INVESTMENT OF HANOI CITY

BUSINESS REGISTRATION OFFICE

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom – Happiness

JOINT STOCK COMPANY
CORPORATE REGISTRATION CERTIFICATE
Corporate Code: 0100100953
First registration on the January 2nd, 2008
Registration for changes for the: 13rd on May 11th 2021

1. **Name of company** in Vietnamese: **CÔNG TY CỔ PHẦN TƯ VẤN XÂY DỰNG ĐIỆN 1**

   Name in English: POWER ENGINEERING CONSULTING JOINT STOCK COMPANY 1

   Abbreviated name: PECC1

2. **Head office:** ***Km 9 + 200 Nguyen Trai Road, Thanh Xuan Nam Ward Thanh Xuan District, Hanoi City***

   Tel: ***0243 8544270*** Fax: ***02438541208***

   Email: ***pecc1@fpt.vn*** Website: ***http://www.pecc1.com.vn***

3. **Charter Capital:** ***VND 266,913,190,000***

   In words: *two hundred sixty six billion, nine hundred thirteen million and one hundred ninety thousand Vietnam Dong only.*

4. **Legally authorized representative of the company:**

   Full name: **NGUYEN HUU CHINH** Gender: Male

   Position: General Director

   Date of birth: *16/10/1971* Ethnicity: *Kinh* Nationality: *Vietnamese*

   Personal Identification Paper: Identification Card

   Number of Identification Card: *001071029073*

   Date of issue: *13/04/2021* Place of issue: *Police Department on Administrative Management of Social Order*

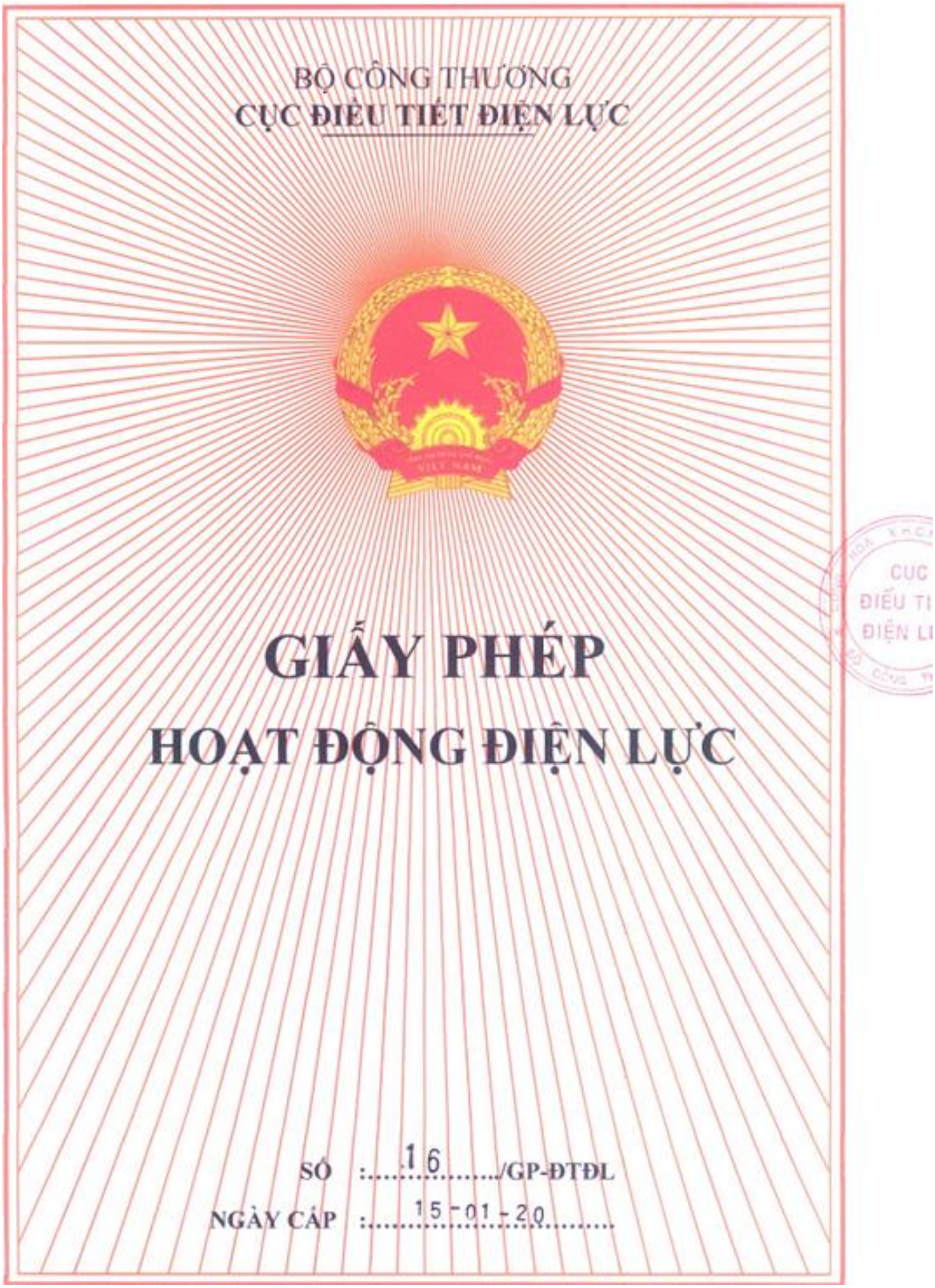
   Registered permanent residence: *Room 924 - R5 Building, 72A Nguyen Trai road, Thuong Dinh ward, Thanh Xuan district, Hanoi city, Vietnam*

   Current resident address: *Room 924 - R5 Building, 72A Nguyen Trai road, Thuong Dinh ward, Thanh Xuan district, Hanoi city, Vietnam*

Head of Business Registration Office

Do Van Tinh
(signed and sealed)

ELECTRICITY OPERATION LICENSE



BỘ CÔNG THƯƠNG

CỤC ĐIỀU TIẾT ĐIỆN LỰC

GIẤY PHÉP

HOẠT ĐỘNG ĐIỆN LỰC

SỐ : 16 /GP-ĐTĐL

NGÀY CẤP : 15 - 01 - 20

MINISTRY
OF INDUSTRY AND TRADE
ELECTRICITY REGULATION DEPARTMENT

No. 16 /GP-ĐTĐL

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom – Happiness

Hanoi, January 15th, 2020

ELECTRICITY OPERATION LICENSE

DIRECTOR OF ELECTRICITY REGULATION DEPARTMENT

Pursuant to Decision number: 3771/QĐ-BCT dated October 2nd 2017 of the Minister of Industry and Trade stipulating functions, assignments, authority and organizational structure of the Electricity Regulation Department;

Pursuant to the Electricity Law dated December 3rd 2004; and the Law on amendment and supplementation of some Clauses under Electricity Law dated November 20th 2012;

Pursuant to the Decree number: 137/2013/NĐ-CP dated October 21st 2013 of the Government on detailed regulations on implementation of some clauses of the Electricity Law and the Law on amendment and supplementation of some Clauses under Electricity Law;

Pursuant to Decree No. 08/2018/ND-CP dated January 15th 2018 of the Government on amendment of some Decrees relating to business investment conditions under the State's management of Ministry of Industry and Trade;

Pursuant to Circular No. 36/2018/TT-BCT dated October 16th 2018 of the Minister of Industry and Trade stipulating regulations of sequence, procedures for issuing and withdrawing the Electricity Operation License;

Pursuant to Circular No. 15/2019/TT-BCT dated August 26th 2019 of the Minister of Industry and Trade on amendment of the Sub-clause 1 and Sub-clause 4 in Clause 12 of Circular No.36/2018/TT-BCT dated October 16th 2018 of the Minister of Industry and Trade on regulation of sequence, procedures for issuing and withdrawing the Electricity Operation License;

In considerations of the Application and Request Dossier for issuing the Electricity Operation License of the Power Engineering Consulting Joint Stock Company 1;

In accordance with the proposal of the Manager of the Public Relations and License Issuing Unit.

DECIDES:

Clause 1. Issue Electricity Operation License to

1. Name of organization: Power Engineering Consulting Joint Stock Company 1
2. Joint Stock Company Business Registration Certificate number 0103021734 dated January 2nd 2008 issued by the

   Hanoi City Department of Planning and Investment.
3. Registered head office: Thanh Xuan Nam Ward, Thanh Xuan District, Hanoi City

   Telephone: 04 38544270 Fax: 04 38541208

Clause 2. Fields of Electricity Operation Licensed

1. Consultancy services for investment, construction of power hydropower projects without limitation to scale and installed capacity.

2. Consultancy services for investment, construction of power projects utilizing renewable energies following principle of using wind and solar energy without limitation to scale and installed capacity.

3. Consultancy services for investment, construction for thermal power projects (included biomass power projects) without limitation to scale and installed capacity.

4. Consultancy services for investment, construction of transmission line and substation projects with the voltage scale up to 500kV.

5. Consultancy services for construction supervision of hydropower projects without limitation to scale and installed capacity.

6. Consultancy services for construction supervision of power projects utilizing renewable energies following principle of using wind and solar energy without limitation to scale and installed capacity.

7. Consultancy services for construction supervision of thermal power projects (included biomass power projects) without limitation to scale and installed capacity

8. Consultancy services for construction supervision of transmission line and substation projects with the voltage scale up to 500kV.

Clause 3. Scope and validity of Operation

1. Operation scope: Nationwide

2. Validity of the License: until 14th January 2025.

Clause 4. Responsibilities of Power Engineering Consulting Joint Stock Company 1

1. Power Engineering Consulting Joint Stock Company 1 has duty to maintain operational conditions which have been licensed and report to License issued agency according to regulation.

2. Power Engineering Consulting Joint Stock Company 1 has duty to implement regulations specified in the Law of Electricity, Law of Amendment, supplementation some clauses of the Electricity Law and official documents on guidelines for execution, implementation of other relevant legal regulations.

Clause 5. Execution Effectiveness

This Electricity Operation License is effective from the date of signing and replaces the Electricity Operation License number 16/GP-DTDL dated 05th February 2010 issued to the Power Engineering Consulting Joint Stock Company 1 by the Electricity Regulation Department.

DIRECTOR OF THE DEPARTMENT

Nguyen Anh Tuan

(signed and sealed)

MINISTRY OF CONSTRUCTION
DEPARTMENT OF CONSTRUCTION ACTIVITY MANAGEMENT

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom - Happiness

CERTIFICATE

CONSTRUCTION ACTIVITY CAPABILITY

No. BXD-00004090

(Issued enclosed with Extension Decision No. 45/QĐ-HĐXD-DN dated October 21st 2022)

Name: POWER ENGINEERING CONSULTING JOINT STOCK COMPANY 1.
Certificate of Enterprise registration/ Decision of foundation No. 0100100953
Date of issuance: 02/1/2008.
Place of issuance: Planning and Investment Department of Hanoi.
Authorized representative:
Mr./Ms. Nguyen Huu Chinh Position: General Director
Address of head quarter: Km9+200 Nguyen Trai road, Thanh Xuan Nam ward, Thanh Xuan, district, Hanoi city.
Tel: 024.384 4270 Fax:
Email: Website:
Scope of construction activities:

1. Engineering investigation: Grade I
2. Design and review of project construction design:
   - Industry (energy): Grade I
   - Works servicing agriculture and rural development (water irrigation): Grade I
3. Supervision consultant for work construction:
   - Industry (energy): Grade I
4. Management consultant for construction investment project:
   - Industry: Grade I

This Certificate shall valid until the end of October 21st, 2032.

Hanoi, October 21st, 2022

DIRECTOR

(signed & sealed)

Hoang Quang Nhu

VIETNAM ENGINEERING CONSULTANT ASSOCIATION

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom - Happiness

CERTIFICATE

CONSTRUCTION ACTIVITY CAPABILITY

No. HTV-00004090

(Issued enclosed with Decision No. 103/2023/QĐ-VECAS dated December 29th, 2023)

Name: POWER ENGINEERING CONSULTING JOINT STOCK COMPANY 1.
Certificate of Business registration/ Decision of foundation No. 0100100953
Date of issuance: 1st registration on January 2nd, 2008, 13rd revision registration on May 11th, 2021
Place of issuance: Department of Planning and Investment of Hanoi City.
Legal authorized representative:
Mr. Nguyen Huu Chinh Position: General Director
Address of Head quarter: Km9+200 Nguyen Trai road, Thanh Xuan Nam ward, Thanh Xuan district, Hanoi city.
Tel: 024.385 44270 Fax: 024 385 41208
Email: contact@pecc1.com.vn Website: www.pecc1.com.vn

Scope of construction activities:

1. Design and review the construction design for technical infrastructure works (Water supply, water drainage): Grade II
2. Design and review the construction design for technical infrastructure works (Waste treatment): Grade II

This Certificate shall valid until the end of December 29th, 2033.

Hanoi, dated December 29th, 2023

VIETNAM ENGINEERING CONSULTANT ASSOCIATION
President

(signed & sealed)
Nguyen Thi Duyen

SOCIALIST REPUBLIC OF VIETNAM

Independence - Freedom - Happiness

LICENSE

OF SURVEYING AND MAPPING

NUMBER: 01289

Name of organization: POWER ENGINEERING CONSULTING JOINT STOCK COMPANY 1

Head Office: km9+200 Nguyen Trai road, Thanh Xuan Nam ward, Thanh Xuan dicstrict, Hanoi city.

Tel: 024 38544270. **Fax:** 024 38541208.

Email: contact@pecc1.com.vn. **Web:** www.pecc1.com.vn.

Certificate of Enterprise registration of Joint Stock Company:

Enterprise code: 0100100953;

Granted agency: Department of Planning and Investment of Hanoi city.

PERMIT FOR SURVEY AND MAPPING ACTIVITIES No. 01289

The following survey and mapping activities are allowed:

1. Prepare project, technical design – cost estimate for the specialized survey and mapping task.
2. Check the quality of survey and mapping product specifically in power sector.
3. Construct coordinate network, specialized base elevation.
4. Survey, prepare seabed terrain mapping at the scale of 1:2.000, 1:5.000 for power sector, technical infrastructure.
5. Survey, prepare terrain mapping at the scale of 1:500, 1:1.000, 1:2.000, 1:5.000.
6. Survey and prepare cadastral maps.
7. Survey and prepare project maps.

Permit validity: To be valid until July 25, 2027.

The scale of the permit: Within Vietnam.

The person in charge and technical staff for survey and mapping:

1. Phung The Anh
2. To Thi Phong Lan
3. Nguyen Thi Hoa

Hanoi, July 25, 2022

CHAIRMAN
DEPARTMENT OF SURVEY, MAPPING AND GEOGRAPHIC INFORMATION VIET

CỘNG HÒA X.H.C.N VIỆT NAM
CỤC ĐO ĐẠC BẢN ĐỒ VÀ THÔNG TIN ĐỊA LÝ VIỆT NAM
BỘ TÀI NGUYÊN VÀ MÔI TRƯỜNG

Hoang Ngoc Lam

BUREAU VERITAS

Bureau Veritas Certification

POWER ENGINEERING CONSULTING JOINT STOCK COMPANY 1 - PECC1

KM 9+200, NGUYEN TRAI STREET, THANH XUAN NAM WARD, THANH XUAN DISTRICT, HANOI CITY, VIETNAM

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

ISO 9001:2015

Scope of certification

CONSULTING, INVESTIGATION, DESIGN, CONSTRUCTION SUPERVISION AND MANAGEMENT OF POWER PROJECTS

Original Cycle Start Date:	05-12-2001
Expiry date of previous cycle:	NA
Certification / Recertification Audit date:	NA
Certification / Recertification cycle start date:	29-11-2022
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on:	04-12-2025

Certificate No.: **VN009867** Rev: **1** Issue date: **29-11-2022**

LUU THI MAI HUONG

UKAS MANAGEMENT SYSTEMS 0008

Certification Body Address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom

Local Office: Unit 4.4A, 4th Floor, E-Town 1 Building, 364 Cong Hoa Street, Tan Binh District, Ho Chi Minh City, Vietnam

Further clarifications regarding the scope and validity of this certificate, and the applicability of the management system requirements, please call: +84 28 3812 2246.

1/1

CONSUMER CONFIDENCE INDEX
TOP BRANDS 2015
VIET NAM

CHỨNG NHẬN
ĐÁNH GIÁ QUỐC TẾ ĐỘC LẬP
International Independent Assessment Certificate

minh chứng/ *attests that:*

EVNPECC1

CÔNG TY CỔ PHẦN TƯ VẤN XÂY DỰNG ĐIỆN 1
Power Engineering Consulting Joint Stock Company 1 (PECC1)

Km9+200 đường Nguyễn Trãi, phường Thanh Xuân Nam, quận Thanh Xuân, Tp. Hà Nội, Việt Nam
Km9 + 200, Nguyen Trai street, Thanh Xuan Nam ward, Thanh Xuan district, Ha Noi city, Vietnam

phù hợp với chuẩn mực chỉ số năng lực cạnh tranh doanh nghiệp
record has been assessed and comply with business competitiveness index standards

THƯƠNG HIỆU HÀNG ĐẦU
TOP BRANDS 2015

Approval by:
GLOBAL GTA trade alliance

Assessed by:
Assessment Certification International (Germany-Eu)

Issued at Vietnam by:
INSTITUTE FOR ECONOMIC RESEARCH

VN-TOPBrands-0040-10/15
Ngày cấp/ *Date of Issue:* 26/10/2015
Ngày hết hạn/ *Date of Expiry:* 25/10/2016
Mã công nhận/ *Global GTA business code:* 0100100953

VIỆN NGHIÊN CỨU KINH TẾ

Phillip Jones, QA.
Strategic Director, Global GTA

Nguyen Duc Tuan, Vice Rector
Institute for Economic Research

Please refer to http://www.globalgta.com/enterprise.(approval business code)
88 Wood Street, 11th floors, London, EC2V 7RS, United Kingdom, W. www.globalgta.com, E. helpdesk@globalgta.com

OUR SERVICES

ENGINEERING CONSULTING

Project construction: hydropower projects, thermal power projects, solar power projects, wind power projects, transmission line projects, waste-to-energy power projects, and substation projects up to 500kV, water resources works, industrial works, tele-communication projects and civil infrastructure works. The extent covers, but not limited to, the following:

- Prepare power development planning;
- Measure and draws cadastral map;
- Review project quality;
- Provide consulting service, assessment on project investment;
- Prepare, review total investment;
- Define investment unit cost, norms, unit price for project construction, construction price indicator;
- Carry out breakdown of construction quantities;
- Prepare pre-feasibility study report, feasibility study report; econo-technical reports;
- Prepare, review engineering design for project construction (basic design, construction drawing design, technical design, and other design stages as per international practice);
- Review planning report, pre-feasibility study report, feasibility study report, basic design, detail design, total cost estimates document;
- Prepare, review bidding plan, prequalification invitation documents, bidding document; bidding appointment documents;
- Prepare evaluation reports on prequalification documents, bids documents, proposal, prepares review report for bidding results;
- Provide supervision services to project construction;
- Design, fabricate hydro mechanical equipment;
- Design, install technological equipment for power project;
- Design total traffic lay-out for power projects;
- Design power control system for power plants;
- To be designer; provide site investigation, supervision services, constructs and installs underground cable works up to 500kv.
- Provide other consulting services required for project construction.

Policy consulting: PECC1 participates in consulting to finalize the legal framework on electricity law, renewable energy law and finance as well as training to improve the experts' capacity in this field to develop and operate the Vietnamese power system in a sustainable, stable and efficient manner. The company also performs consulting service on energy conversion from traditional fossil energy sources (such as coal, oil, natural gas) to renewable energy sources (such as wind, solar, hydropower, biomass, green hydrogen, biofuels, etc.) to meet the national power demand, while catch up with international trends in advanced and clean technology as well as be able to fulfill the government's commitment on Climate Change.

Planning: Performs, reviews resettlement planning for project construction investment. Be involved in preparation of national power planning, hydropower cascade planning on river systems, catchment areas; location planning for thermal power center; location of thermal power project; power supply system in province, city, district, industrial zone, residential areas.

Implementation:

- Provide observation services to monitor deformation displacement in various project components;
- Perform stability evaluation and study to various project components;
- Perform dam safety inspection services;
- Perform dam wave break studies and analysis;
- Establish flooding map in downstream area;
- Set up reservoir operation procedures as in cascades and as individual;
- Perform studies on reservoir sedimentation and back water curve.

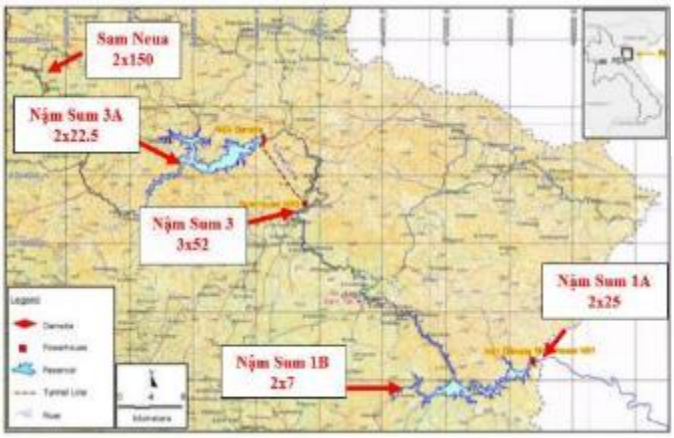
Nuclear power: PECC1 sends its staff and employees to training courses on nuclear technology held by Vietnam Atomic Energy Institute (VAEI), JAEA (JAPAN), Toshiba and Mitsubishi (JAPAN) on light reactor technology such as VVER-AEC 2006, VVER-AEC92 (RUSSIAN), AP 1000 (AMERICA), EPR (FRANCE), ABWR and APWR (JAPAN) to get ready in nuclear power sector. Pecc1 is involving in the nuclear technology and science center project and site survey program of Ninh Thuan 1 nuclear power project.

CONSULTING IN ELABORATION OF PLANNING

PECC1 participates in consulting on preparation and review of Power development planning for electricity, hydro power, thermal power, wind power, solar power, geothermal, tidal power, atomic energy and nuclear power sectors; general planning of river basins of inter-provincial scale; Power grid planning of provinces, cities, districts, industrial parks and residential areas. The projects undertaken by the Company are all built according to the plan and achieved high economic efficiency.

Some key projects that have been implemented by PECC1 such as:

- Consulting on preparation of planning for hydropower and power development in the basins of Lo Gam, Ba, Da, Chu, Ma, Se San, Ca, Huong, Vu Gia - Thu Bon, Dong Nai rivers etc.;
- Planning for National Small scaled Hydropower projects;
- Planning for National Hydropower projects (Cooperation with SWECO-STATKRAFT-NORLAN);
- Planning for Pumped storage Hydro power projects and optimization of peak coverage power generation (Cooperation with TOKYO Power Corporation);
- Supplementing the planning of Da Nang Pumped storage Hydro power project;
- Planning to clear all small and medium scaled hydropower projects in the North;
- Supplementing the planning of cascade hydro power projects in Red river, the section crossing through Lao Cai province;
- Preparing report on expansion of existing hydro power plants into the Power Master Plan VII;
- Supplementing the planning and proposing alternatives for overall connection to import power from plants in Laos to Vietnam.
- Supplementing the planning of group of Nam Mo HPPs with its capacity of 505MW, comprising of 11 plants built in the area of Xieng Khoang province, Lao PDR.
- Supplementing the planning of group of Nam Sum HPPs including 4 plants with a capacity of 465MW. The plant is constructed in Hua-Phan province, Lao PDR.
- Planning of Power transmission grid aiming at increasing power import from China (at the voltage level of 220kV-500kV) and to release capacity of hydro power sources in the Northern region where is planned in the period of 2020 – 2030 etc., and many other projects.



Map of location & capacity of plants in Nam Sum HPPs - Laos

Map of location & capacity of plants in Nam Mo HPPs - Laos

ENVIRONMENTAL CONSULTATION

CONSULTANCY FIELDS THAT HAVE BEEN DONE

- Consulting for elaboration of Technical requirements for topics on impacts of the project to environment - society: air environment, water, soil, biological resources and biodiversity; residential movement, resettlement and livelihoods.
- Consulting for elaboration of strategic environmental report for energy and infrastructural plans.
- Consulting for implementation of survey and assessment for background environment and consulting for preparation of specialized reports on natural environments (water, air, terrestrial and aquatic biodiversity etc.,), social environments (surveys on damages and compensation, resettlement planning, sociological and livelihood surveys, community consultation etc.,)
- Consulting for elaboration of Environmental impact assessment (EIA) reports for a series of large-scale projects in the fields of energy, industry, infrastructure, minerals etc., in the country and in the region.
- Consulting on investigation, survey, and making master plan on residential movement and resettlement; Map extracting.
- Consulting on elaboration of environmental - social profiles (EIA, ESIA, ESAP, EMP, EMDP, RP) to meet requirements of the sponsors satisfying with requirements of environmental safety policy, social safety policy etc., of international credit institutions such as: WB, ADB, JICA, IFC etc.,
- Consulting in reviewing for environmental and social aspects.

COMPETENCE OF SPECIALISTS AND EQUIPMENT/ DEVICES

- Pecc1's experts team involved in environmental and social projects includes dozens of experts with master's degrees, having 10-25 years of experience in surveying, energy and infrastructural engineering consulting, environmental and social consulting for various subjects: majoring in topography, geology, hydro-power, thermal power, power grid, renewable energies, environmental planning, environmental hydrology, environmental science, soil environment etc.,; and many long-time collaborators who are doctors, masters specialized in ecology, sociology and ethnography.
- In addition to large investment in professional software specialized in calculations, assessment for specialized surveying and engineering with highly reliability which is an important input of environmental impact assessment, PECC1 has equipped step by step computed software to forecast dispersion of environmental pollutants such as: Aermode, Arcgis, Mike 11, Mike 21…and GPS device for social environmental investigation.

PROJECTS THAT HAVE BEEN AND UNDER IMPLEMENTATION

❖ THERMAL POWER AND RENEWABLE ENERGIES

- Quang Trach 2 Thermal Power Plant (TPP): Calculate dust emission, heat spread and prepare environmental report for Pre-FS stage.
- Dung Quat Infrastructural facility: Conduct survey natural environment, terrestrial biodiversity, aquatic and fisheries in continent – on the sea; Collect and analyze samples of air, water and aquatic environment; Investigate and calculate, elaborate professional reports on EIA and Damage/Compensation Survey: according to Vietnamese regulations, at FS stage.
- Vinh Tan 4 Extension TPP: Prepare Social environment action plan according to equatorial principle and IFC standard.
- Review of Strategic Environmental Assessment (SEA), EIA and Damage/Compensation Survey reports of renewable energy projects:
  - Dung Quat II TPP, Long Phu 3 TPP, Hacom TPP, Nhon Trach 3 & 4 TPP;
  - Vinh Tan 2 Solar power;
  - Revision of the plan for Quang Trach Power Center;
  - Central I&II Gas Turbine combined cycle Power Plant;
  - Chinh Thang Wind Power Plant;
  - Phuong Mai 3 Wind Power Plant;
  - Vinh Hao Solar power;
  - O Mon IV, Gas Turbine combined cycle Power Plant;
  - Son My I Gas Turbine combined cycle Power Plant.

❖ HYDROPOWER AND PUMPED STORAGE HYDROPOWER

- Preparation of EIA, SEA reports for the project of small scale hydropower planning, hydropower planning on Se San river in Cambodian territory, hydropower planning on Red river etc.,
- HPPs of Vietnam such as: An Khe -Kanak and other hydropower projects across the entire country: Conduct surveys and prepare professional environmental reports of EIA, RP.
- Lower Se San 2 HPP (400MW): in charge for TOR elaboration, implementation of natural and social environmental surveys, general investigation, preparation of Report on damages and compensations, review the EIA report according to regulations of Vietnam and Cambodia.
- Preparation of Environmental Impact Assessment (EIA) report for Song Am HPP.
- Preparation of Survey report for assessment of impacts, preparation of general plan for resettlement of Khe Bo HPP, Nho Que 3 HPP, An Khe-Kanak HPP, Se San 3 HPP, Upper Auyun 1A HPP and Mong Duong Thermal Power Project -item of fresh water supply.

- Preparation of EIA report and elaboration of Survey report for assessment of impacts, preparation of general plan for resettlement of Phuong Do HPP, Nhan Hac HPP, Thanh Son HPP.
- Review for elaboration of temporary regulations on compensation & assistance and resettlement, survey on damages and compensation, assistance, resettlement for Phu Tan 2 HPP.
- Preparation of EIA report for Song Nang HPP, Trung Thu HPP, Bao Lam 1 HPP, Song Nhiem 3 HPP.
- Design for the cleaning at reservoir area of Son La HPP, Lai Chau HPP and Huoi Quang HPP.
- My Ly HPP (180 MW) and Nam Mo 1 HPP (90MW) – Nghe An province (in Vietnam) and Hua Phăn province (in Laos): Survey for investigation and preparation of ESIAs Report for taking the loan from Goldman sachs bank.
- Preparation of the project of Mine Closure and Environmental Restoration for Rock Quarry 1B - Lai Chau HPP; Rock Quarry No. 1 and Rock Quarry No.3- Ban Chat HPP.
- Preparation of EIA report and report for assessment of damages of Ialy Extension HPP.

❖ **POWER GRID**

Investigate, survey, prepare professional reports on Environment and Society (EIA report according to Vietnamese regulations; Reports in serving for taking ODA loans such as IEE, RP, EMDP, EMP etc., of FS stage for power transmission projects at various voltage levels of 500kV, 220kV such as:

- 500kV Transmission Line (T/L): 500kV T/L of Quynh Lap - Thanh Hoa thermal power; 500kV T/L connecting to Cong Thanh TPP; Son La - Lai Chau 500kV T/L and extension of 500kV Son La substation; etc., and many other 500kV T/Ls around the country.
- 500kV, 220kV substations: 500kV Dong Anh substation and connection; 500kV Bac Ninh substation and connection; 500kV Viet Tri substation and connection; 220kV Long Bien substation and connection; Increase capacity of 220kV Thanh Cong substation; etc., and many other 500kV and 220kV substations around the country.
- 200kV T/L: 220kV Cao Bang-Bac Kan T/L; 220kV Truc Ninh double -circuit T/L cuts through the 220kV Ninh Binh - Nam Dinh T/L; 220kV Nho Quan - Phu Ly T/L; 220kV Huoi Quang - Nghia Lo T/L; Improve and upgrade load capacity for the 220kV Ha Dong - Phu Ly T/L etc., and many other T/lines across the country.

INVESTIGATION

- Undertake the role as leader in topography, geology, geo-hydrological investigation, environment, socioeconomic investigation for various projects, etc;
- Measure, set up controlling network and geological map; perform project deformation monitoring and observation;
- Perform drilling and excavation required for engineering geological investigation and geo-hydrological investigation;
- Perform geological survey using seismic refraction sounding method on the ground and under water up to 100m depth.
- Perform seismic testing in borehole down to 200m depth in adits;
- Mapping the geological condition in project foundation pit;
- Provide supervision services to the consolidation grouting work at the project foundation;
- Prepare geological investigation report;
- Review and appraisal consultant in geology and environmental protection sectors;
- Prepare Terms of References, inspect and accept products resulted from topographical, geodesic investigations performed in various phase of study including Feasibility Study, Technical Design, and Construction Drawing Design, etc;
- Performs civil construction activities, measures hydro-controlling network, project the project axis to the site;
- Performs deformation observation and monitoring services to water resources works, hydropower works and thermal power projects.

TESTING

***PECC1** is always updating, capturing the latest issued testing standards to better satisfying the needs of the job. Simultaneously, always innovating testing equipment/devices to serve for testing, ensuring accuracy and safety when operation.*

SCOPE OF WORKS COMPRISE OF:

- Preparing program, cost estimates for professional testing, Geological investigation of hydropower, thermal power, transmission lines and substation projects, water resources, transportation, industry and civil work projects, etc.

- Construction, technical supervision, document preparation of Geological investigation: Drilling, excavating, geotechnical, collecting documents, synthesizing and preparing a complete report.

- Construction, technical supervision, preparation of testing document:

+ Types of samples: "Soil, rock, sand, gravel, water" for the purpose of assessment and classification according to current stipulated domestic and foreign standards for preparation of reports of engineering geological investigation, design and construction & installation.

+ Types of samples for plastic soil, rock, sand, pebble and gravel materials for the purpose of analysis and evaluation of quality and usability for the design and engineering construction etc.

+ Types of samples for construction materials: Cement, mineral admixtures, cementitious material, aggregates, sand, steel, etc. to evaluate quality and usability of various materials for construction of works.

+ Design, conducting mixture proportion test of CVC, cotinously mixture propotion up to d_{max} 150 and rolled compacted concorete (RCC) with purpose of pointing out the most optimized mixture proportion of concretes that assuring requirements from the design, technical specification and the most saving cost.

+ In-situ geomechanic tests in adit, excavated holes, boreholes, earthfilled, rockfilled embankment blocks, concrete, etc. in order to evaluate quality of concrete, and to manage construction quality of the Works.

+ Recommendation for parameters for the design, construction and installation.

PERFORMED PROJECTS:

PECC1 always takes the forefront of applying technologies, innovating equipment, and updating testing standards in the design consultancy works:

- Design dams that being constructed by local materials in such hydropower projects as Hoa Binh, Yaly, Song Hinh, Vinh Son, etc
- Design of the concrete faced rockfill dam (CFRD) which was the new technology at that time and being first applied successfully in Vietnam in 2002 in Tuyen Quang, Quang Tri, An Khe – Kanak HPPs, resulting to early operation of such reservoirs, saving investment costs up to hundreds of billion VND.
- Research, testing of concrete materials have made many breakthroughs, applying experience and state of art standards in selection of continuous mixture proportion, allowing to overcome difficulties in thermal requirements, technical requirement of massive concrete, satisfying the progress schedule and economic efficiency and, safety of the project
- Design of RCC technology applied in gravity dam for Son La HPP's dam that enables to put Unit 1 into 2 year early operation and complete the project before the planned schedule. The RCC technology has been and being applied to hydropower dams of Plei Krong, A Vuong, Ban Ve, Ban Chat, Song Bung 4, Song Tranh 2, Se San 4 and Lai Chau projects.
- Design the CVC gravity dam having d_{max} aggregate up to 150mm such as dams of Huoi Quang, Se San 3 HPPs, etc.

In additions, the Company has **performed testing works for investigation, design and construction a dozens of hydropower, water resource projects** in and outside EVN; **Thermal power projects** such as: Quang Ninh, Uong Bi, Hai Phong, Nghi Son 1, etc.; **Transmission line and substation projects** such as 500kV North-South Line 1, Line 2, 500kV Son La – Hiep Hoa, 500kV Nho Quan, 500kV Son la – Lai Chau transmission lines, etc.; **Transport projects** such as National Roads 18, 10, 5, 2, Lang Hoa Lac, Phap Van-Cau Gie, Thi Nai lagoon cross-bridge, Bai Chay, Thanh Tri, Nhat Tan cross-over bridges, Noi Bai Airport, Da Nang Airport, My Dinh stadium, etc.; **High-rise buildings:** DEAWE, KEANG NAM, Van Khe.

INVESTMENT & PROJECT MANAGEMENT

- Investment for construction of power projects, transmission line projects and substation projects;
- Power energy production and trading;
- Investment for project construction and trading of real estates;
- Management and operation of power plant;
- Operation consultation: maintenance, repair equipment;
- Assessment of current status of the system; improve and upgradel recovery incidents, maintaining power plants, substations and transmission lines.

CONSTRUCTION

- Perform curtain grouting, consolidation grouting activities to civil work foundations;
- Excavate tunnels serving construction and testing purposes;
- Construct small hydropower projects, distribution power system and civil infrastructures.

EQUIPMENT AND SOFTWARE

The company owns hundreds of advanced equipment, vehicles and apparatus required for the site investigation works including: borehole camera of Mount Sopri (American product), drilling machines Long Year 38, Diamec 262; Karota device, the topographical measuring machine GPS 4600 LS, high accuracy total station TM50, TC2003; UKB-VN50 geological driller; seismic receiving device of Geo Stuff; high accuracy water leveling apparatus NA2 enclosed with staff gauge INVAR 2m and 3m and other apparatus for testing etc. So far, ever from topographical investigation, geological investigation, in-situ and laboratory testing to the engineering design work, the Company is co-operating with specialized agencies, with foreign consultants to construct, transfer other modern computation software aiming at serving the investigation, design and construction of power plants.

Serving the investigation and design, the company has equipped synchronously modern and updated equipment, machinery making it more accuracy during investigation, equipping hundreds of high configuration computers, drawing machine and strong specialized software, connected with high speed internet network to upload and download data sending from the site to the head office and vice versa.

The company has copyright specialized strong software, applying new technology which are transferred during co-operation with foreign consultant firms. The company is now using 80 software for calculation, design, management in various fields of work: 3D design, calculating the power system, calculation of hydrology and hydro-energy of various river system, geo-technique, calculation of hydraulic, structure of project, geodesic survey to project area and managing the operation, etc.

Drill rig Long Year 38

Curtain grouting – Son La HPP

Seismic investigation
by Stravisor NZ24

Soil sample testing by tri-axial
compression/loading machine

primtech 3d | ANSYS | AUTODESK REVIT | AutoCAD | FLAC3D™

PLS-CADD™ | AVEVA bocad | STEAM PRO | S Wedge | 3D PLAXIS | PickNet 3.0 | EMTP-RV SIMULATION SOFTWARE | MIKE 21 Powered by DHI

RocTopple rocscience | RS2 | PSS®E SIEMENS | CDEGS | Bentley MicroStation | RS3 | StruCad® AceCad Software

SOLVIA | Be GEOPAK | PSIM | SEEP/W | Trimble | Roc Plane | SLOPE/W | INFRAWORKS

QUAKE/W | ROCKWORKS | Knovel | Un Wedge | MIKE 11HD Powered by DHI | SIGMA/W | PLAXIS 2D | 3D Examine

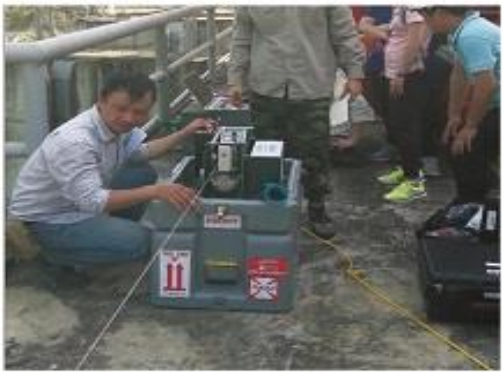
RCC core logging

RCC density measurement
By nuclear-densometer

Soil density defning by sand flowing
test at excavated pit

Testing to define coefficient of concrete
permeability by European equipment

Testing to define direct tensile strength
on joints and on parent material



Borehole camera testing by
Mount Sopris-ALT device

LIST OF SOFTWARE

List of software	Specification	Origin
EMTP (Electromagnetic Transients Program)	Electromagnetic Transients Simulates electromagnetic, electromechanical transient processes and controlling system in multi-phase power system	Canada
PSS/E Power System Simulator for Engineering	Simulates power system setting regime	USA
MIEXMAP	Converts drawing subjects from MicroStation into MapInfo	
EC1.0	Powerhouse earthing calculation	
ConTestPro	Thermal analysis in gravity concrete dam	Switzerland
Solvia	Static and dynamic analysis in gravity concrete dam	Sweden
GEO-SLOPE: - SLOPE/W - SIGMA/W - SEEP/W - QUAKE/W	Slope stability study Strain stress analysis Seepage calculation Seismic impact assessment	Canada
PROMIS-E	Design secondary electrical system	USA
CDEGS	Simulates and designs earthing system	USA
TCPRO	Thermal Cycle balance program for power plant	
BCPRO	Boiler Circulation Simulation Program	
RESIMPRO	Reservoir Simulation Program	
POWER SIM.B	Estimates cost of power system	
STRUCAD - StruMac (AceCAD Software Ltd - England)	Designs powerhouse architecture Details of steel structure in 3D	England
STRUMAC	Programmable Macro command in Strucad	
KNOVEL	Database in 2 sectors: 1. Electrical & Power Engineering 2. Mechanics&Me. Engineering	
MicroStation	Set up topographical map in 3D	USA
Bentley GeoPak Site Bentley GeoPak Survey	Graphics process, set up digital model for topography	USA
LEF-PC	Process seismic waves data	
FeaVEC	Support automatic digitalize map	
TK1.2	Design powerhouse using Kaplan turbine	
EMTP-RV	Electromagnetic transient calculation	Canada
ROCSCIENCE: - PHASE2 - SWEDGE - ROCPLANE	Rock mass tress pattern calculation. Designs support system to tunnel and rock slope Calculates flat sliding stability and wedge sliding stability to rock slope	Canada
PLAXIS: - PLAXIS - DYNAMICS - 3D FOUNDATION - 3D TUNNEL	Rock mechanic, soil mechanic. Modules for calculation in 3D.	Canada
MIKE 12	2D Hydraulic model	
MIKE 11-HD (mike flood)	Hydraulic simulation – flow simulation module	Denmark
Trimble Total Control	GPS data processing, site survey by GPS machine	
CGP3	Drawing geological section and profile	
MEF1	Prepares drawings for development of adit, foundation pit	

List of software	Specification	Origin
ROCSCIENCE: - Examine3D - Unwedge	- Calculates stress pattern in rock mass, design support to tunnel and rock slope - 3D stress calculation in underground works - Stability study, support arch and wall of underground works	Canada
MIKE 11 HD upgrades modules GT, ST and ACS	Simulates reservoir sedimentation	Denmark
TRANSIENTS	Calculates hammer water and water fluctuation in surge tank of power plant.	
STEAM Pro/Master	Thermal calculation Thermal balancing, selects equipment to thermal power plant.	USA
GT Pro/Master	Corresponding simulation program for off design calculations	USA
PEACE	The software provides accurate, detailed, cost estimates for all design stages for power plants	USA
BOCAD 3D Steel-Tower	Design steel tower	England
Rockwork	Set up 3D seismic section and profiles	USA
PICKNET	Processing data resulted from total station, geometrical leveling, and those from deformation monitoring.	
Cidala, MGE, MapTrans	Converts co-ordinates between systems, projection zones, meridian axis in same system.	Information Center - Cadastral Administration
RocTopple	Studies rock slope stability under rock overturning regime	Canada
ANSYS MECHANICAL	Simulates and analyzes engineering in various design phases	USA
AutoCAD	Support in drawings and graphics	
FLAC 3D	3D geotechnical study	Australia
PLS – CADD, TOWER^{TM}, PLS-POLE^{TM}	3D design for transmission line	USA
RS2	Study strain stresses and durability of geotechnical works in 2D	Canada
RS3	Study strain stresses and durability of work structures in 3D	Canada
Slide	Slope stability study	
Autodesk Revit	Designs architecture, structure, electrics in 3D	USA
Primtech 3D	Design 3D model for electrical parts in substation	Germany
Aermod/ISC	Software stimulating air emission	Canada
ArcGis	Softwares for geographical information system	USA
AVEVA BOCAD	Softwares for detailed design of steel structures.	UK
CSI SAP2000	Model, analysis, design and optimization of structure design.	USA
EnjiCad Pro 2019 Standalone	CAD 2D &3D software solution for the Vietnamese people	Vietnam
Telka Structures	Design, prosess of components and ptoject construction management.	Finland
WINDPRO	Design and planning of wind farm projects	Denmark
PVSYST 7.0	Solar power system design	Switzerland

EXPERIENCES

HYDROPOWER

1. **Design of Conventional Vibrated Concrete (CVC) dam:** Huoi Quang HPP dam 104 m, Se San 3 HPP dam 79m, Nho Que 1 HPP dam 53.5m, Nho Que 2 HPP dam 50m, Song Bung 5 HPP dam 40m, Khe Bo HPP dam 40m, Za Hung HPP dam 36m, Nho Que 3 HPP dam 28.5m, A Luoi HPP dam 50m, Hua Na HPP dam 90m, and others.

2. **Design of Roller Compacted Concrete (RCC) dam:** Son La HPP dam 138,1m, Lai Chau HPP dam 137m, Ban Chat HPP dam 132m, Pleikrong HPP dam 71m, Ban Ve HPP dam 135m, Song Tranh 2 HPP dam 97m, Song Bung 4 HPP dam 114m, Dong Nai 2 HP dam 79m.

3. **Design of Earthfill Dam:** Song Ba Ha HPP dam 50m, Song Tranh 2 HPP dam 30m, Song Hinh HPP dam 40.5m, Theun-Hinboun HPP dam expansion in Laos 50m, Vinh Son HPP dam 40m.

4. **Design of Earth Core Rockfill Dam (ECRD) and Earth - Rockfill Dam:** Yaly HP dam 73m, Upper Khao Mang HPP dam 70m.

5. **Design of Concrete Faced Rockfill Dam (CFRD):** Kanak HPP dam 68m, Quang Tri HPP dam 75m, Tuyen Quang HPP dam 92m.

6. **Design of bulb turbine powerhouse:** Se San 4A HPP dam, Phu Tho HPP dam, Chi Khe HPP dam, Thanh Son HPP dam, Yen Son HPP dam, Nam Mo HPP dam.

7. **Design of high head waterway:** Song Tranh 2 HPP dam with maximum head of 104m, Ban Ve HPP dam with maximum head of 123m, Song Bung 4 HPP dam with maximum head of 125m, An Khe HPP dam with maximum head of 377m, Quang Tri HPP dam with maximum head of 380m, Upper Kon Tum HPP dam with net head of 844m, Nho Que 3 HPP dam with net head of 133m.

8. **Design of on-ground steel penstock:** AnKhe HPP (on-ground steel penstock D=3.4m, Hmax = 377m); Quang Tri HPP (D=2.4m, Hmax=380m); H'Mun HPP (D=3.2mm, Hmax=80m); Nho Que 2 HPP (D=5.5m, Hmax=60m).

9. **Design of Pelton turbine powerhouse:** Upper Kon Tum HPP (Hnet=844m, 220MW), A Luoi HPP (Hnet=456m, 170MW).

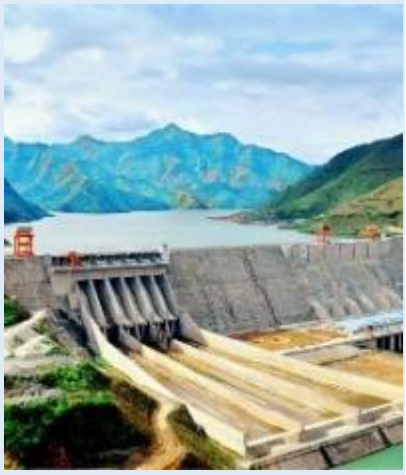
10. **Design of Francis turbine powerhouse:** Se San 3 HPP (260MW), Ban Ve HPP (320MW), Song Tranh 2 HPP (190MW); Song Bung 4 HPP (156MW), Ankhe HPP (150MW), Quang Tri HPP (64MW), Song Ba Ha HPP (220MW), Son La HPP (2400 MW), Lai Chau HPP (1200 MW), Huoi Quang HPP (520 MW), Ban Chat HPP (220 MW).

11. **Design of Kaplan turbine powerhouse:** PleiKrong HPP (Hnet = 34m, 100MW), Song Bung 5 HPP (Hnet = 27m, 52MW), Kanak HPP (Hnet = 36.5m, 13MW).

12. **Design of surge tank:** Song Tranh 2 HPP (tank height: 45m, inner diameter D=25m); Song Bung 4 HPP (tank height 30m, inner diameter D=16m), Song Hinh HPP (tank height 40m, inner diameter D=8.5m).

13. **Design of concrete lining tunnel:** Song Tranh 2 HPP (D=8.5m); Song Ba Ha (D=7.5m); Song Bung 4 HPP (D=7.2m); Ban Ve HPP (D=7m); Hua Na HPP (D=7.5m); AnKhe HPP (D=4m); Quang Tri HPP (D=3m).

14. **Design of non-lining tunnel:** ZaHung HPP (cross section F = 35m2, length L=1.4 km, 100% non-lining, no surge tank); Nam Toong HPP (cross section F = 9 m2, length L = 4.3 km, 95% non-lining, no surge tank); A Luoi HPP (cross section at D = 4.0m with F = 12.57m2, length L = 11.6km, 40% non- lining, with surge tank).



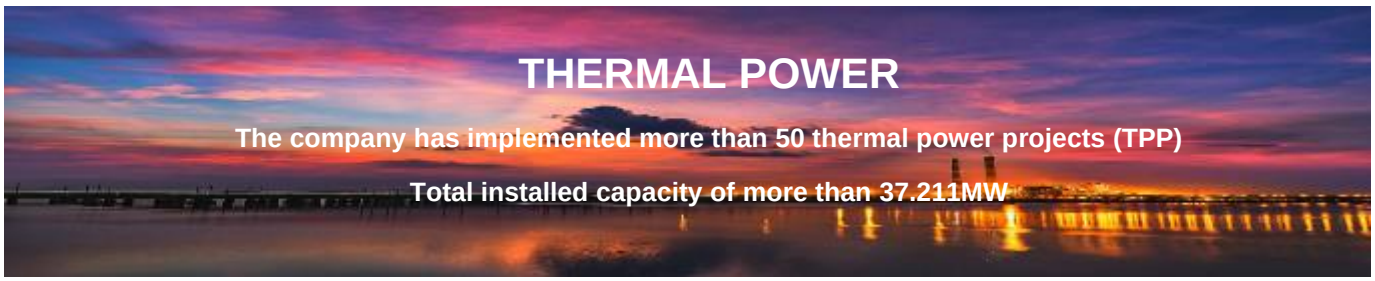
15. Design of hydro-mechanical equipment: Se San 3 HPP (radial gate 15m x16.5m and flat gate 7.5x7.5x23m); Quang Tri HPP (radial gate 10mx9,23m); Ban Ve HPP (radial gate 12mx14m, flat gate 6.5x6.5x61m); An Khe HPP (radial gate 12mx14.5m); Song Bung 5 HPP (radial gate at spillway 13m x15.7m and flat gate 5x11.5x23m); Huoi Quang HPP (radial gate at spillway 15mx16.5m and flat gate 7.5x7.5x21m); Lower Se San 2 HPP (radial gate at spillway15mx16m and flat gate 9.3x15x29m); Se San 4A HPP (flat gate 8.5x8.5x35m); Lai Chau HPP (radial gate at spillway 6x14.5x20m);

16. Design and manufacture of hydraulic equipment: Quang Tri HPP (radial gate at spillway10mx9.23m; on-ground steel lining penstock D=2.4m, Hmax=380m); An Khe HPP (radial gate at spillway12mx14.5m; on-ground steel lining penstock D=3.4m, Hmax = 377m); Song Tranh 2 HPP (radial gate at spillway14mx15.7m flat gate 4.75x8.5x53m); Song Bung 5 HPP (radial gate at spillway13mx15.7m flat gate 5x11.5x23m); Huoi Quang HPP (radial gate at spillway15m x 16.5m; flat gate 7.5x7.5x21m).

17. Project management experience:

With high qualified senior experts, engineers who have been working for long time in the project management consultancy sector, the Company is capable to provide management service to large projects and solve problems arisen from actual situation so as to bring long term benefits back to Clients, such as:

- Management of general schedule and planning;
- Schedule management and quality control;
- Cost management;
- Management of labor safety and construction environment;
- Risk management;
- Integral management (comprehensively connection) to optimise technical solutions;
- Project operation management to bring the project in to operation;



- Typical TPP with capacity ≥ 600MW:

+ O Mon II CCGT Plant (1050MW) – Pre-FS, FS;
+ Quang Ninh 1, 2 TPP (4x300MW) – Investigation, FS, TD, Bidding Document, Supervision;
+ Son My 1 CCGT Plant (2000MW) – Review FS;
+ Nhon Trach 3&4 TPP (2x750MW) – Review Pre-FS, FS, Technical design, Design of Construction Drawing;
+ LNG Quang Ninh (2x750MW) – Planning, Investment Proposal, Pre-FS, FS;
+ Quynh Lap 1 TPP (2x600MW) – Planning, FS;
+ Nghi Sơn 2 TPP (2x665MW) – FS, Technical design (TD), Construction Supervision
+ Vung Ang 1 TPP (2x600MW) – preparation of FS;
+ Dung Quat TPP (2x600MW) – preparation of Pre-FS, FS;
+ Vung Ang 2 TPP (2x665MW) – FS, Technical Design;

- Application of PC boiler (PC) technology to the following thermal power plants:

+ Uong Bi extension 1, 2 TPP (2x300MW) – Investigation, Technical Design, Tender document, Supervision Consultant;
+ Quang Ninh 1, 2 TPP (4x300MW) – Investigation, Pre-FS, Technical Design, Tender document, Supervision Consultant;
+ Thai Binh 1 TPP (2x300MW) – FS, Technical Design, Tender document, Construction Supervision;
+ Thai Binh 2 TPP (2x600MW) – Investigation, FS, Technical Design;
+ Nghi Son 2 TPP (2x600MW) – FS, Technical Design, Construction Supervision;

- Application of CFB boiler (CFB) technology to the following thermal power plants:

+ Cao Ngan TPP (2x50MW) – Investigation, FS, Technical Design, Tender document, Supervision Consultant;
+ Cam Pha 1 TPP (1x300MW) – Investigation, FS, Technical Design, Supervision Consultant;
+ Mong Duong 1 TPP (2x500MW) – Investigation, FS, Technical Design;
+ Bac Giang TPP (1x600MW) – preparation of FS;
+ Na Duong 2 TPP (1x200MW) – preparation of FS;
+ An Khánh TPP (2x50MW) – preparation of FS, Construction Supervision;

- Super critical (SC) technology has been applied to Nghi Sơn 2 TPP (2 x 500MW) – at various stages: FS, Technical Design, Construction Supervision.

- **Application of USC boiler (USC) technology:**

+ Vung Ang 2 TPP (2x665MW) – FS, Technical Design;
+ Quang Trach 2 TPP (2x600MW) – Pre-FS.

- Design of Construction Drawings for components of the following TPPs: ash-pond site item and access to the ash-pond site of Mao Khe TPP (2x220MW); ash pond site No. 2 of Mong Duong 2 TPP (2x600MW); fresh water supply system for Mong Duong Thermal Power Center (2200MW); technical cooling water channel item and connection road between the plant and the National road No. 18 of Mong Duong 1 TPP; drainage channel for cooling water of Uong Bi 1 TPP (1x300MW); portal and inlet channel, portal and discharge channel for cooling water of Nghi Son 1 TPP (2x300MW).

RENEWABLE ENERGY

In recent years, **PECC1** has gradually affirmed its prestige in Renewable Energy consulting field with diversified services in various stages including Planning, Feasibility Study Report, preparation of Bidding Documents, Technical design - construction drawings design, supervision consulting for plant construction, Project management consultant during construction process, review consultant of reports for **more than 135 projects** with a total capacity of **more than 21,000 MW**. Typical projects are:

- Consulting in elaboration of Investment Proposal report, supplementary document for power planning with more 32 projects, typically:

+ Thien An Krong Pa (49MWp) Solar power project
+ Son La (39.76MWp) Solar power project
+ Tay Ninh (30MWp) Solar power project
+ Hong Phong 7 (30MWp) Solar power project
+ Phu Tho (18MW) Waste-to-energy project
+ Thanh Hoa (18MW) Waste-to-energy project

- Consulting in preparation of bidding document and Bidding Evaluation for 04 projects, typically:

+ Hacom Solar solar power project (50MWp)…

- Review FS reports for 12 projects, typically:

+ Ami Khanh Hoa Solar power project (50MWp)
+ Sao Mai Solar power project (30MWp)
+ Phong Phu 1 Solar power project (42MWp),
+ Hacom Solar Solar power project (50MWp)
+ Phuong Mai 3 Wind power (21MW)
+ Chinh Thang Wind power (50MW)
+ Ham Kiem Wind power (15MW).

- Construction drawing design for 12 projects, typically:

+ Bac Lieu Wind power (142MW)
+ Soc Trang Wind power (30MW)
+ Hoa Binh 1 Wind power (50MW)
+ Hong Phong 1A, 1B Solar power project (250MWp)…

- Consulting for project management for 15 projects, typically:

+ Ia Pet Dak Doa 1, 2 Wind power (200MW)
+ Vinh Hao 4 solar power project (36MWp).
+ Hacom Solar solar power project (50MWp).
+ B&T1, B&T2 Wind farm (210MW)...

- Elaborating the Feasibility Study report for 33 projects, typically:

+ B&T wind farm (101 MW + 151 MW)
+ Cam Lam Solar power project (50MWp)
+ Soc Son Waste-to-energy (75MW)
+ Central Solar power project (50MWp)
+ Thuan Nam 12 Solar power project (50MWp)
+ Thanh Hoa Waste-to-energy (18MW)
+ Hong Phong 7.2 Solar power project (30MWp)
+ An Khe Biomass project (95MW)
+ Bac Kan Biomass project (29.3MWp)
+ Tri Viet Solar power project (30MWp)…

- Technical Design for 32 projects, typically:

+ Ca Mau 1A, B, C, D (350MW)
+ Bac Lieu Wind power (142MW)
+ Hoa Binh 1 Wind power (50MW)
+ Soc Trang Wind power (30MW)
+ Ami Khanh Hoa Solar power project (50MWp)
+ Mui Ne Solar power project (40MWp)
+ Hong Phong 1 Solar power project (250MWp)
+ Soc Son Waste-to-energy project (75MW)
+ Phu Tho Waste-to-energy project (18MW)
+ An Khe Biomass project (95MW)
+ Hoa Binh Biomass project (24MW)…

- Construction supervision for 12 projects, typically:

+ Ami Khanh Hoa solar power project (50MWp)
+ Vinh Hao 6 solar power project (50MWp)
+ Vinh Hao 4 solar power project (36MWp)
+ B&T Wind farm (152 MW)
+ Hong Phong 1A, 1B Solar power project (250MWp)…

TRANSMISION LINE

The company has designed hundreds of transmission lines both direct current and alternative current with voltage levels varies from 0.4kV to 500kV. Total length of 500kV transmission line so far designed by the company reaches to 4000km, while of 220kV and 110kV is more than 5000km. Typical projects among which were the 500kV North-South transmission line route 1, which is the spine of Vietnamese National Grid, almost 1500km long.

Being supported by experiences on engineering design, PECC1 always studies and proposes suitable engineering solutions, updates and applies modern technologies into the works so as to ensure economic technical efficiency and the schedule of the work. Typical solutions and technologies applied and offered by PECC1 conform to legislation, regulations and international standards including IEC, IEC, ASTM, DIN, BS, etc.

Let see what we have done:

- **Tower design solution**: the engineering design solution for tower has been proposed and supported with detail drawings which can be used in manufacturing, erection of steel tower and single pole for single line and multi-line transmission line (up to 6 lines) for various types of supporting tower, angle anchor tower, end anchor tower, braking anchor tower, over river, etc.

- **Solution in design insulation, accessories & fittings:** insulation used in the design is diversity and plentiful. Insulation normally applied in various projects is ceramic, glass, composite insulator.

SOME OTHER TYPICAL PROJECTS CARRIED OUT BY PECC1:

- The 500kV Ha Tinh – Nho Quan – Thuong Tin: 290km - Special graded project
- The 500kV Son La – Hoa Binh and Son La – Nho Quan: 287km - Special graded project
- The 500kV Son La – Lai Chau and feeder expansion of 500kV Son La substation: 158,5km - Special graded project
- The 500/220kV Hiep Hoa – Dong Anh – Bac Ninh 2: 42,4km - Special graded project
- The 500/220kV Nho Quan – Phu Ly – Thuong Tin: 77,4km - Special graded project
- The 220kV Thanh Hoa – Vinh: 148km - Project grade II
- The 220kV Nho Que 3 HPP – Cao Bang: 105km - Project grade I
- Cat Lai – High Techs (underground cable construction) - Project grade II

- **Solution in foundation design:** proposing detail design solution for construction of foundation, embankment, leveling taking into account geological, topographical conditions of each tower position. Various type of foundation includes: flat foundation, plinth foundation, pile foundation, slab foundation.

- **Solution for design of conductor**: use and select conventional conductor, thermal proof conductor, super thermal proof conductor, lightning wire suitable with specification of each projects

- **Solution of underground cabling:** underground cable and accessories have been studied for transmission line inside urban area and under the sea.

✓ **Scope of work:** site investigation, prepares Feasibility Study, Technical Design, Construction Drawing Design, Bidding Document, Total Cost Estimates, Construction Supervisor…

SUBSTATION AND TELECOMMUNICATION

The company has designed hundreds of substations, switchyard, power plant and telecommunication system for power grid with voltage level from 500kV.

SUBSTATIONS:

- In addition to the substation up to 500kV, 220kV substations using GIS technology, PECC1 also involves in instatllation of reactive power compensators in such substations as: 220kV Thai Nguyen substation, 220kV Viet Tri substation, 220kV Ha Dong substation, 220kV Chem substation, 220kV Mai Dong substation, 220kV Lao Cai substation, etc. We are experienced in calculation, selection of idle capacity compensator on the grid, in series capacitor calculation, in shunt capacitor calculation for 500kV, 220kV of great length. We also calculate, and select high voltage, short circuit-restricted equipment on the grid. Thanks to that, the power grid shall be enhanced its flexibility and stability.

TELECOMMUNICATION:

PECC1 takes part in design of telecommunication system to 500kV, 220kV substations, power plant, and dispatch centers such as:

- Projects at 500kV voltage: 500kV Ha Tinh substation, 500kV Da Nang substation, 500kV switchgear Vung Ang power centre, 500kV Dong Anh substation, 500kV Viet Tri substation, etc.,
- Projects at 220kV voltage: 220kV Son La substation, 220kV Son Tay substation, 220/110kV Tay Ho GIS substation, 220/110kV High-Technology GIS substation, etc.,
- Power plant projects: Uong Bi Extension Thermal power plant (TPP), Uong Bi 2 TPP, Quang Ninh TPP, Thai Binh 1,2 TPPs, Vung Ang 2 TPP, 500kV switchgear at Thang Long TPP, etc.,
- Power Load Dispatching Center: National Load Dispatching Center (A0), Northern Power Load Dispatching Center (A1), Power Grid Dispatch Center – Hanoi Power Corporation.

Large-scaled optical cabling design such as North-South optical cabling project for Ministry of Public Security, Commander Information center system for People's Police and some optical cablings from Hanoi, Ho Chi Minh to nearby areas, etc.

PECC1 always uses advanced software for calculation and equipment selection, calculates construction solutions, foundations, steel structures such as EMTP, PSS/E, SAP-2000, GEO-5, Robot Structure, as well as applies 3D technology in design of substation projects, etc. Synchronously, PECC1 always research and propose reasonable plans, diagrams and layout to optimize construction investment costs.

Besides, PECC1 is focusing on research and development of several new fields including:

- High-voltage Direct Current (HVDC) transmission technology.
- Research on solutions for asynchronous connection between the Vietnamese power grid and the Chinese grid through the Back to Back (AC - DC-AC) station expected to be located in Lao Cai and Ha Giang.
- Design of underground substations - a solution that has been deployed in many big cities all over the world to apply to big cities of Vietnam such as Hanoi, Ho Chi Minh City, etc. where the power demand gets higher, the construction space gets gradually limited and urban aesthetics are increasingly demanding.

HIGHLIGHT PLANTS

HYDROPOWER PLANTS

Son La hydropower house: The largest hydropower plant in the Southeast Asia with 138.1m concrete gravity dam which is constructed on the basis of roller compacted concrete (RCC) technology. The behind dam house has 6 units with the total installed capacity of 2400MW, mean annual energy of 10.246 billion kWh.

Scope of Services: Investigation, Main design consulting, Supervision.

Ialy hydropower house: The first large-scaled hydropower project organized for management, construction and operation by Vietnam. Its earth core rockfill dam (ECRD) dam is 70m high and 1142m long. The underground power house consists of 04 units with the total installed capacity of 720MW, mean annual energy is 3.68 billion KWh.

Scope of Services: Investigation, Feasibility Study, Technical design, Construction drawing design, Supervision.

Ban Chat hydropower house: The project with roller compacted concrete (RCC) dam with its maximum height of 133m, crest length of 425.3m. The surface power plant with the installed capacity of 220MW, has 2 units, Francis turbine, mean annual energy is 769.7 million kWh.

Scope of Services: Main design consultant, Investigation, Feasibility Study, Planning, pre-Feasbility Study, Technical design, Construction design, Supervision, Testing.

Lai Chau hydropower house: The project with 137m RCC dam, 3 units, total installed capacity of 1200MW. The plant supplies some of 4,670.8 million kWh annually to the national power grid.

Scope of Services: Main consultant, Investigation, pre-Feasbility Study, Feasiblity Study, Technical design, Construction drawing design, Supervision.

Song Bung 5 hydropower house:

The project carried out by PECC1 under Build – Own – Operation (BOO) form has total investment of VND 1,372 billion, installed capacity of 57MW, mean annual energy of 230.34 million kWh.

Scope of Services: Investigation, Technical design, Supervision.

Huoi Quang hydropower house: This is the first underground power plant ever designed by Vietnam which has the installed capacity of 520MW, 2 units, mean annual energy of 1904 million Kwh. The CVC gravity concrete dam, arch radius of R=410m, maximum dam height of 104m.

Scope of Services: Investigation, Planning, pre-Feasibility Study, Feasibility Study, Technical design, Construction drawing design, Construction supervision, Equipment installation.

Tuyen Quang hydropower house: The behind dam house comprises of 3 units, total installed capacity of 342MW, mean annual energy of 1.295 billion kwh. This is the fourth large –scaled plant in the North with Concrete faced rockfill dam (CFRD) on the weak base ever built in Vietnam. Its dam height is 92m with 62m-plinth belongs to the most complicated type in the world.

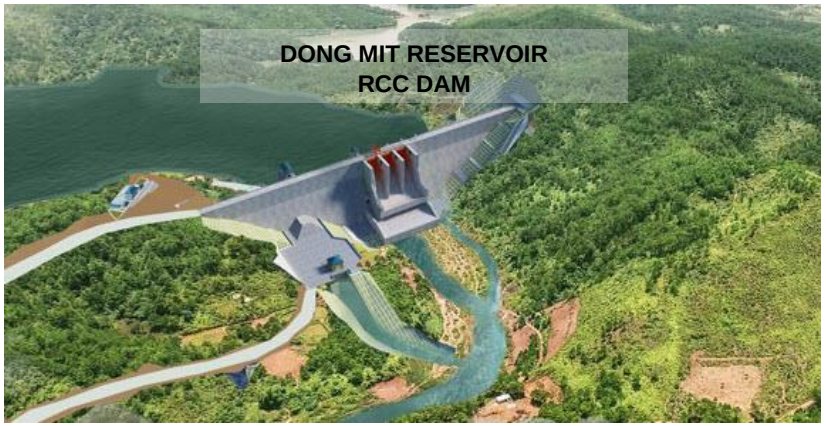
Scope of Services: Investigation, Technical design, Supervision.

Pleikrong hydropower house: The project is designed to be 2 units with the total installed capacity of 100MW, mean annual energy up to 417.2 million kWh. The gravity concrete dam is constructed based on RCC technology ever built in Vietnam with the dam height of 71m.

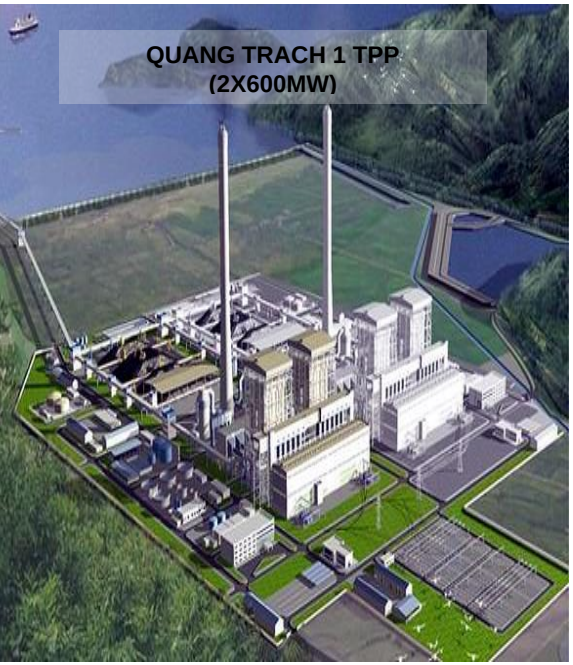
Scope of Services: Investigation, Feasiblity Study, Technical design.

WATER RESOURCES

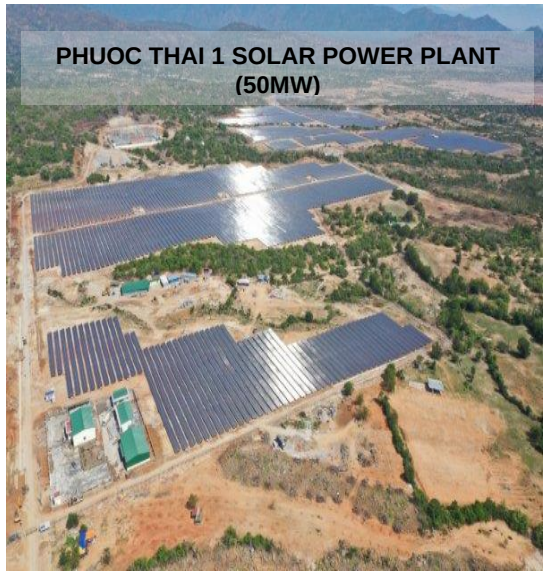
PECC1 has involved in various services such as Investigation, Technical design, Review on Technical design, and Construction drawing design in following projects:

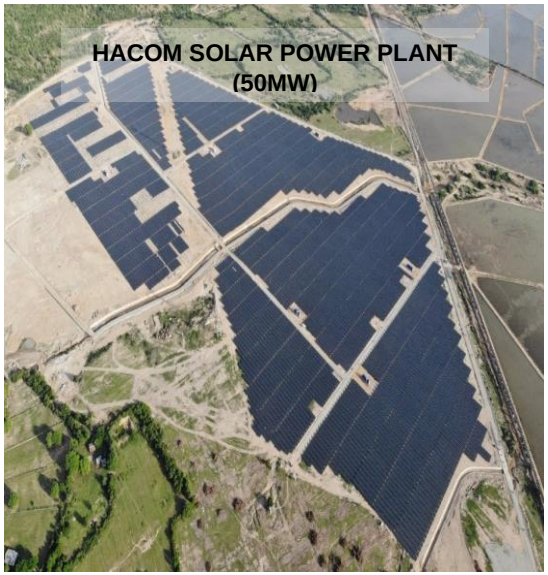


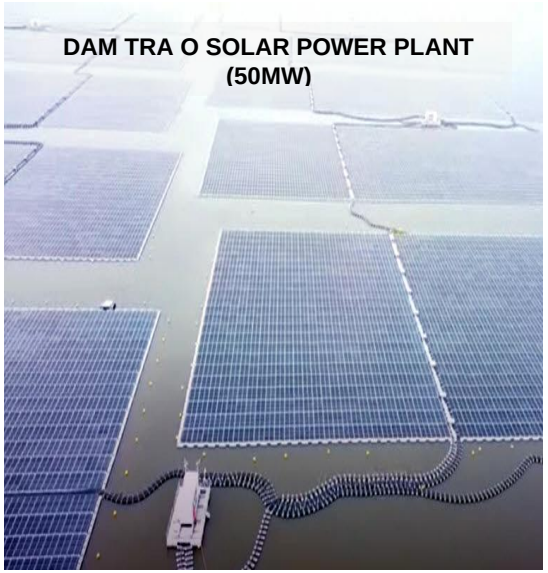
THERMAL POWER PLANT



RENEWABLE ENERGY PLANT

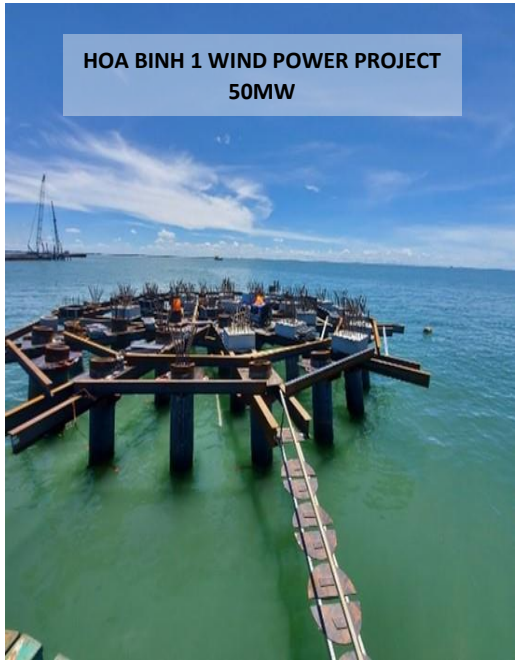






AN KHE BIOMASS POWER PROJECT
95MW

CHINH THANG WIND POWER PROJECT
50MW


HOA BINH 1 WIND POWER PROJECT
50MW

IA PET DAK DOA 1, 2 WIND POWER PROJECT
200MW

SOC TRANG WIND POWER PROJECT
30MW

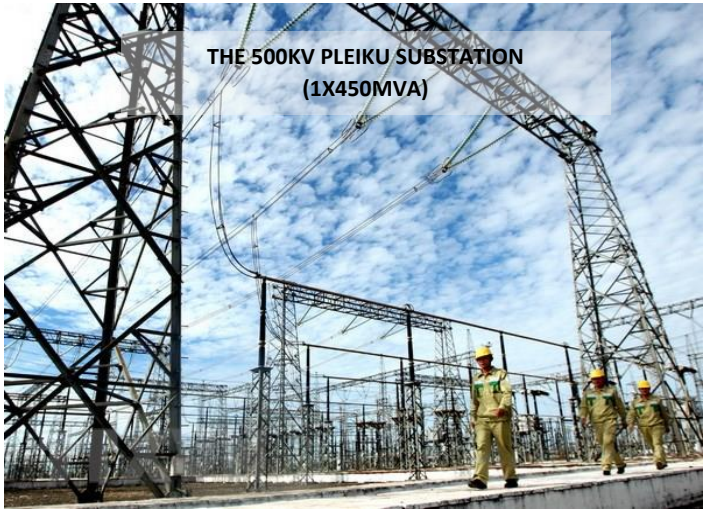
SOC SON WASTE TO ENERGY PLANT
75MW
VNEXPRESS

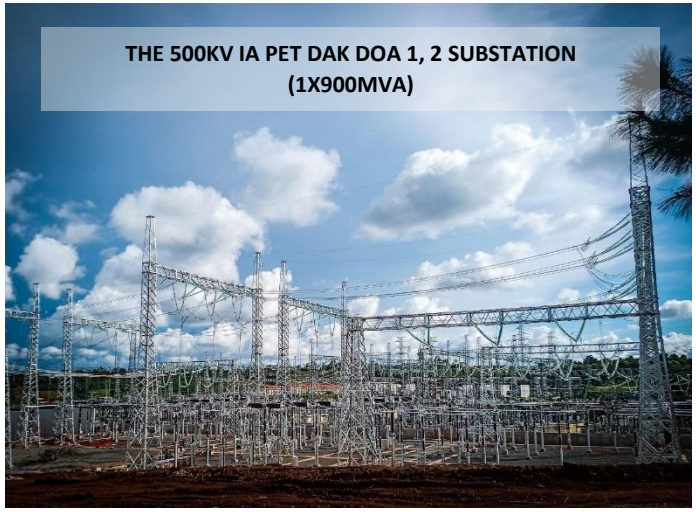
PHUONG MAI 3 WIND POWER PROJECT
21MW

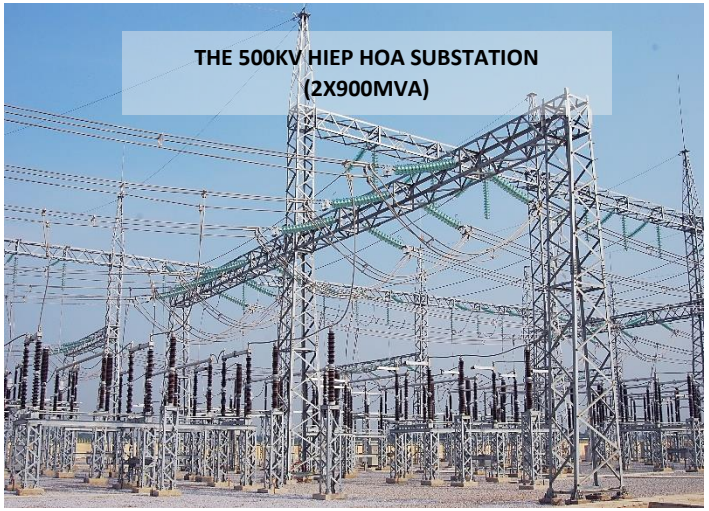
PHU THO WASTE TO ENERGY PLANT
18MW

TRANSMISSION LINE

SUBSTATIONS







PROJECTS PERFORMED BY PECC1

HYDROPOWER PROJECTS

The Company has performed more than **160 hydropower projects** with the total installed capacity of **more than 20,000MW** in which nearly 20 hydropower projects with dam height above 60m and some of 100km tunnel.

A: Planning - Planning supplement **B:** Investment Proposal **C:** Investigation **D:** pre FS **E:** FS **F:** TD
G: Construction Drawing Design **H:** Prepare Bids Document **K:** Supervision Consultant **L:** Review

PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE									
			A	B	C	D	E	F	G	H	K	L
Son La HPP	2400	EVN			x		x	x	x	x	x	
Hoa Binh HPP	1920	Ministry of Energy		x	x			x	x		x	
LuangPrabang HPP	1500	PVN		x	x							
East Phu Yen PSPP	1500	Xuan Thanh Group		x	x							
Lai Chau HPP	1200	EVN	x	x	x		x	x	x	x	x	
Bac Ai HPP	1200	EVN			x							x
Ialy HPP	720	EVN			x			x	x		x	
Huoi Quang HPP	520	EVN		x	x			x	x	x	x	
Extended Hoa Binh HPP	480	EVN	x		x	x	x	x	x	x		
Tri An HPP	420	Ministry of Energy		x	x			x	x		x	
Lower Se San 2 HPP	400	EVN International JSC		x	x			x				
Extended Ialy HPP	360	EVN		x	x		x	x		x	x	
Se San 4 HPP	360	EVN		x	x			x				
Tuyen Quang HPP	342	EVN			x		x	x	x		x	
Ban Ve HPP	320	EVN			x			x	x		x	
Xekaman 1 HPP	290	Viet Lao Power JSC			x		x					x
Nam Sum 1&3 HPP	280	EVN		x	x			x				
Se San 3 HPP	260	EVN			x			x	x		x	
Upper Kon Tum HPP	250	Vinh Son Song Hinh Power JSC			x		x	x	x	x	x	x
Xekaman 3 HPP	250	Viet Lao Power JSC			x			x	x	x		x
My Ly HPP	250	My Ly-Nam Mo Hydropower JSC			x			x	x			
Yabassi HPP	240	XTA			x	x						x
Ba Ha River HPP	220	Song Ba Ha Power JSC		x	x			x				
Ban Chat HPP	220	EVN		x	x		x	x	x		x	
Song Tranh 2 HPP	190	EVN			x			x	x	x		
Hua Na HPP	180	Hua Na JSC		x	x			x	x			
Dong Nai 6 HPP	180	Duc Long Gia Lai Corporation		x	x							
A Luoi HPP	170	Mien Trung Power JSC			x			x	x	x	x	

PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE									
			A	B	C	D	E	F	G	H	K	L
An Khe HPP	160	EVN			x		x	x	x	x		
Song Bung 4 HPP	156	EVN			x			x				
Tanahu HPP	140	Tanahu Hydropower Co., Ltd			x			x	x			
Pac Ma HPP	140	Pac Ma Hydropower JSC		x	x			x	x			x
Nam Emoun HPP	129	Song Da 5 Hydropower JSC							x	x		x
Nho Que 3 HPP	110	BITEXCO		x	x			x	x	x		
Nam Mo HPP	105	EVN			x			x	x	x		x
Hoi Xuan HPP	102	Hoi Xuan Hydropower Company							x			x
PleiKrông HPP	100	EVN		x	x			x			x	
Khe Bo HPP	100	Vietnam Power Development JSC		x	x			x	x	x		
Thai Nien-Bao Ha HPP	100	Binh Minh Sa Pa Co., Ltd	x		x							
Song Bung 2 HPP	100	EVNGENCO 2									x	
Bac Ha HPP	90	LICOGI			x			x	x			
Extended Da Nhim HPP	80	EVNHPC DHD							x			x
Dam'Bri HPP	75	Mien Nam Power JSC			x			x	x	x		
Yen Son HPP	75	Binh Minh Construction and Tourism JSC	x	x	x			x	x			
Extended Thac Mo HPP	75	EVN							x			
Xekaman 4 HPP	70	Viet Lao Power JSC			x		x	x				
Song Hinh HPP	70	EVN			x			x	x		x	
Dong Nai 2 HPP	70	Mien Nam Power JSC			x			x	x	x		
Vinh Son HPP	66	EVN			x			x	x			
Quang Tri HPP	64	EVNGENCO 2	x		x		x	x	x			
Se San 4A HPP	62	Se San 4A Hydropower JSC			x			x	x			
Song Lo 6 HPP	48	Xuan Thien Co.,Ltd		x	x			x	x			
Song Bung 5 HPP	57	PECC1			x			x	x		x	
Van Chan HPP	57	Van Chan Power JSC		x	x			x				
Nam Cum 4 HPP	54	Nam Cum Power JSCv			x			x				
Song Nam - Song Bac HPP	49.2	Geruco Song Con Power JSC	Optimization of basic design									
Nho Que 2 HPP	48	Nho Que Corp.			x			x	x	x		x
Song Tranh 4 HPP	48	Ha Do Group			x			x	x			
Bao Lam 3 HPP	46	PCC1						x				x
Chiem Hoa HPP	45	ICT			x						x	x
Nhan Hac HPP	45	Que Phong Power JSC		x	x			x	x	x		
Chi Khe HPP	44	AGRITA - Nghe Tinh Energy JSC			x			x	x	x		
Nam Ban 2,3 HPP	44	Nam Ban Hydropower Co.,Ltd			x			x	x			

PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE									
			A	B	C	D	E	F	G	H	K	L
Long Tao HPP	42	Long Tao Power JSC			x			x	x	x		
Nam Cun HPP	40	Song Da Corporation			x			x	x	x	x	
Cam Thuy 2 HPP	38	LICOGI		x	x			x				
Da Dang 2 HPP	34	Mien Nam Power JSC			x			x	x			
Nam Toong HPP	34	Vinacorp			x			x		x		
Nho Que 1 HPP	32	NEDI 1		x	x			x	x	x		
Bao Lam 1 HPP	30	PCC1						x	x	x		
Thanh Son HPP	30	Ha Thanh Co.,Ltd		x	x			x	x	x		
Mong An HPP	30	PCC1					x	x	x			
Nam Pong HPP	30	Ha Do Group			x			x				
Tr'Hy HPP	30	Finance and Energy Development JSC			x			x	x			
Cua Dat HPP	30	VNACONEX P&C									x	
Khao Mang Thuong HPP	24	Xuan Thien – Yen Bai						x	x			
Cam Thuy 1 HPP	22.8	Intracom		x	x			x				
Ma River HPP	21	Dong A Investment and Construction JSC	x		x			x	x			x
Bac Na HPP	20	Bac Na Hydropower JSC		x	x			x				
Daksrong HPP	18	Daksrong Hydropower JSC		x	x			x	x	x		
Ban Coc HPP	18	Que Phong Power JSC		x	x		x	x	x	x	x	
Nam Mo HPP	18	Nam Mo Hydropower JSC			x			x	x		x	
Tien Thanh HPP	16.5	Song Da 7.09 Co.,Ltd							x			x
H'Mun HPP	16.2	Gia Lai Investment and Development Co.,Ltd		x	x							
Doc Cay HPP	15	North Central Investment and Power Development JSC		x	x			x				
Nam Hueung HPP	15	Chitchareune Construction					x	x				
Xuan Minh HPP	15	HYCO4 - JSC		x	x			x	x			
Nam Nghiep 2C HPP	14,5	Nong Hai Group		x	x			x				x
Ho Ho HPP	14	NEDI2						x	x			
Dasiat HPP	13.5	Mien Nam Power JSC			x			x	x	x	x	
Ka Nak HPP	13	EVN			x			x	x			
La To HPP	12.6	Thanh An JSC	x		x		x	x	x			
Chu Va 2 HPP	12	Thang Long Group							x	x		
Extended Ngoi Phat HPP	12	NEDI 2	x		x		x		x	x		
Nam Chai 3 HPP	10	Hung Thuy Company			x			x	x			
Muong Tung HPP	10				x		x		x			
DakPihao 2 HPP	9	Gia Lai Power Company							x		x	x
Nam Phak HPP	9	Nong Hai Group			x		x					
DakPring HPP	8	Power Construction Corporation		x	x		x	x	x			
Tra Linh 3 HPP	7.2	Construction Company 699		x	x							
Nam Cun 2 HPP	6,8	Construction Company 299	x	x	x			x	x	x		
Ia Puch 3 HPP	6.6	Gia Lai Power Company		x	x		x	x	x			

PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE									
			A	B	C	D	E	F	G	H	K	L
Cha Val HPP	5.6	Power Construction Corporation		x	x							
WATER RESOURCES PROJECTS												
Ngan Tuoi Irrigation		MARD			x			x	x	x		
Canh Tang Reservoir		ICMB 1			x			x	x			
Dong Mit Reservoir		VNCC			x			x	x			
Song Cho 1 Reservoir		ICMB 7			x			x	x			x
Nuoc Trong Reservoir		ICMB 6										x
Ban Lai Reservoir		ICMB 2			x			x	x			
Dak Bla Reservoir--flood control & hydropower generation		Konia Co.,Ltd										x
Ea H'leo 1 Reservoir		ICMB 8										x
Ngoi Gianh Reservoir		MARD			x			x	x			x
Song Luy Reservoir		ICMB 7										x
Na San -H.Mai Son - Son La water resources		ICMB 1						x	x			x
Hydropower cascade planning on Lo Gam river, Ba river, Da river, Chu river, Ma river, Se San river, Ca river, Huong river, Vu Gia – Thu Bon river, Dong Nai river, etc.												
National Master Planning of Small Hydropower Plants												
National Hydropower Master Planning (in co-operation with SWECO-STATKRAFT-NORLAN)												
Master Planning of Pumped Storage Power Plant and peak load optimization (in co-operation with TOKYO Power Company)												
Revision of Planning on Pumped Storage Hydropower Project of Da Nang												

THERMAL POWER PROJECTS

A: Survey **B:** Planning - Planning supplement **C:** Investment Proposal **D:** pre FS **E:** FS **F:** TD
G: Prepare Bids Document **H:** Supervision Consultant **K:** Review

PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE								
			A	B	C	D	E	F	G	H	K
Bac Lieu LNG Gas Power	3200	Delta Offshore Energy PTE.LTD									x
Quynh Lap Power center and Dong Hai Port	2400	Pacific Corporation		x							
Mong Duong 1, 2 Power center	2300	EVN-TPMB1	x		x	x	x	x			
Cong Thanh LNG	2250	Cong Thanh Thermo Electric JSC				x					
Song Hau 3 TPP	2000	Viet Lao Energy Development Investment JSC			x						
Son My 1 CCGT Plant	2000	Electricité De France					x				x
Hai Lang LNG – Phase 1	1500	T&T; HEC; KOGAS; KOSPO									x
Nhon Trach 3&4 TPP	1500	PV Power						x			x
Mien Trung I & II CCGT Power plant	1500	PVN									x
O Mon II CCGT Plant	1050	Marubeni - WTO				x	x				
O Mon IV CCGT Plant	1050	EVN	x	x	x						x
Long An I, II LNG	2x750	Vinacapital & GS Energy									x
Van Phong 1 BOT TPP	1320	Van Phong Power Co., Ltd									x
Quang Ninh 1,2 TPP	1200	EVNTPC Quang Ninh	x			x	x	x	x	x	x
Vung Ang 1 TPP	1200	LILAMA				x	x	x	x		x
Thai Binh 2 TPP	1200	PV Power		x		x	x	x			
Vung Ang 2 TPP	1200	VAPCO				x	x	x			
Quynh Lap 1 TPP	1200	Vinacomin			x	x	x				
Song Hau 1 TPP	1200	PVN - SH1PP									x
Quang Trach 1 TPP	1200	EVNPMB2									x
Quang Tri 2 Coal-fired TPP	1200	DISECO	x	x	x		x				
Quynh Lap 2 TPP	1200	POSCO ENERGY Co., Ltd			x	x	x				
Quang Trach 2 TPP	1200	EVNPMB2	x			x	x				
Nghi Son 2 TPP	1200	Marubeni-Kepco					x	x		x	
Nam Dinh 1 TPP	1200	Taekwang Power Holdings Co.,LTD and ACWA POWER									x
LNG Quảng Ninh	2x750	COLAVI		x	x	x	x				
Nghi Son 2 Coal-fired TPP	1200	WSP Consultancy Pte. Ltd				x	x		x		
Kien Luong 1 TPP	1200	EVNEPTC									x

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PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE								
			A	B	C	D	E	F	G	H	K
Mong Duong 1 TPP	1000	EVNPMB1	x			x	x	x	x		
Duyen Hai Power center	4X200	TPC Duyen Hai					x				
Quang Tri Gas-fired TPP	750	EGATI			x	x	x				
Dung Quat 2 TPP	750	SEMBCORP Group									x
Dung Quat 3 CCGT Plant	750	EVN			x	x					
Dung Quat 1 CCGT Plant	750	EVN									x
Cam Pha 1,2 TPP	660	Cam Pha Thermal Power JSC	x	x		x	x	x	x	x	x
An Khanh Bac Giang TPP	650	An KhanhThermal Power JSC		x			x				
Uong Bi extension 1,2 TPP	600	EVN-TPMB1	x			x	x	x	x	x	
Thai Binh 1 TPP	600	Ninh Binh Thermal Power JSC			x		x	x	x	x	
Van Phong Coal-fired TPP	600	Sumitomo Group									x
Thang Long TPP	600	Geleximco Group									x
Hai Duong TPP	600	JAKS Hai Duong Electrical Power Co.,Ltd								x	x
Pha Lai 1 TPP	440	Pha Lai 1 Thermal Power JSC					x		x		
Cong Thanh TPP	300	Cong Thanh Group		x			x				x
Dong Phat Hai Ha 1 TPP	300	TEXHONG		x			x	x			
Son Dong TPP	220	Vinacomin				x	x	x	x	x	
An Khanh 1 TPP	120	An Khanh Thermal Power JSC					x		x	x	
Cao Ngan TPP	110	Vinacomin				x	x	x	x	x	
Na Duong TPP	110	Vinacomin				x	x	x	x	x	
Na Duong 2 TPP	100	Vinacomin					x		x		
An Khe Biomass Power Plant	95	Quang Ngai Sugarcane JSC				x		x			
Nong Son TPP	30	Vinacomin	x			x	x	x	x	x	
Multi-fuel firing power plant	15	Tin Thanh Group JSC		x	Connnection report preparation to National Grid Network						
Ly Son TPP	6	Vinacomin					x	x			
Fuel conversion of steam unit from HFO to multi-fuel consumption at Can Tho TPP		Tin Thanh Group JSC			x						
Fuel conversion of steam unit from HFO to multi-fuel consumption at Thu Duc TPP		Tin Thanh Group JSC			x						
O Mon V CCGT Power Plant		EVNGENCO2		x							

RENEWABLE ENERGY PROJECTS

A: Investment Proposal **B:** Planning - Planning Supplement **C:** Pre-Feasibility Study **D:** Feasibility Study (FS)
E: Technical Design **F:** Construction Drawing Design **G:** Prepare Bids Document **H:** FS Review
I: Review Technical Design **K:** Supervision Consultant **L:** Management Consultant

PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE										
			A	B	C	D	E	F	G	H	I	K	L
Renewable energy projects		GIZ	Consultancy services in the field of legal aspect; Assist in renewable energy report preparation										
SOLAR POWER PROJECTS													
05 floating solar power projects	1500	Cam Ranh Co., Ltd	x	x									
KN Ialy Gia Lai Floating Solar	500	Ialy Gia Lai Solar Power JSC	Report preparation for determining the substation location and the direction of transmission line connected to the plant and calculting the project capacity release										
Ea H'leo Solar	350	Vuong Bao Son Investment and Construction JSC	x	x									
Hong Phong 1A, 1B Solar	250	Hong Phong Energy JSC	Equipment Installation				x	x				x	
Phuong Nam Solar	240	Phuong Nam Solar Power JSC		x									
KN Ialy Kon Tum Floating Solar	200	Ialy Kon Tum Solar Power JSC	Report preparation for determining the substation location and the direction of transmission line connected to the plant and calculting the project capacity release										
Lutaco 2.4 Solar	188	Center of Consulting, Training, Information on Electricity and Renewable Energy								x			
Lutaco 2.1 Solar	178									x			
Lutaco 2.2 Solar	172									x			
Lutaco 2.3 Solar	162									x			
Cu Knia Solar	180	D&T technology and development JSC		x									
Vinh Hao 6.2 Solar	140	Fecon & Acwa Power		x									
Easup Solar	130	Thang Loi group investment consultant JSC	x	x									
Xuyen Ha Solar	130	D&T technology and development JSC		x									
Thien An - Phu Yen Solar	100	Thien An Energy JSC		x									
Phuoc Thai 2 Solar	100	EVNPMB2								x			
Ea Tling Solar	95	D&T technology and development JSC		x									
Floating solar on Dakdrinh HPP reservoir	80	PVPPower	x	Investigation Consulting									
EuroPlast Solar	52	EUROPLAST Phu Yen Energy JSC										x	
Hacom Solar	50	Hacom Energy Co.,Ltd							x	x			x
Cam Lam Solar	50	EVNCPC				x							
Ami Khanh Hoa Solar	50	Ami Khanh Hoa Energy JSC					x				x	x	x
Vinh Hao 6 Solar	50	Fecon & Acwa Power		x							x	x	
Phuoc Thai 1 Solar	50	EVNHPMB5										x	
Solar Power in Central region	50	EVNCPC			x	Investigation							
Hong Phong 7 Solar	50	Ami Binh Thuan Energy JSC		x									
Huong Dien Floating Solar	50	Vietnam Electricity Emission JSC		x									
Vinh Chau Solar	50	SOLARGREEN Co.,Ltd	x	x									
Phuoc Thai 3 Solar	50	EVNPMB2								x			
Dam Tra O Solar	50	Vietnam Renewable Energy JSC	Equipment Installation								x	x	
HCG Tay Ninh Solar	50	HCGlobal		x									

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PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE										
			A	B	C	D	E	F	G	H	I	K	L
Cu Jut Solar	50	EVNCHP				x					x		
Ami Binh Thuan Solar	50	Ami Binh Thuan Energy JSC		x									
Thuan Nam 12 Solar	49,92	Thanh Vinh Solar Power JSC				x							
Thien An Krong Pa Solar	49	Thien An Energy JSC		x									
Ialy Kon Tum Floating Solar	49	EVNCPC	x										
Se San 4 Solar	49	EVNPMB2								x	x		
Hong Phong 5.2 Solar	48	SCATEC SOLAR ASA					x						
Dakuy Solar	47	Power Green Vietnam JSC		x									
Vinh Tan 2 Solar	42,65	Vinh Tan TPP Management Board		x									
Phong Phu 1 Solar	42	Solarcom JSC								x	x		
Son La Solar	40	Corporation Energy BHL Son La	x	x									
Trung Son Solar	40	Trung Son Engergy Development JSC					x	x					
Ia Mo Nong Solar	40	EVNCPC	x										
Mui Ne Solar	40	Duc Thanh Mui Ne JSC					x						
Vinh Hao 4 Solar	38	Quynh Quang Real Estate Investment Co.,Ltd									x		x
Tay Ninh Solar	30	Asia Polytechnic Co.,Ltd		x									
Thanh Hoa 1 Solar	30	Asia Cube Renewable Energy Investment Pte.Ltd	x			x	Geological Investigation						
Bach Khoa A Chau 1 Solar	30	Bach Khoa A Chau JSC		x		x							
Tri Viet 1 Solar	30	Tri Viet Tay Ninh JSC	x	x		x							
Floating Solar on Yen My reservoir	30	Minh Thach D&L Construction JSC	x										
Hau Giang Solar	29,3	PVSH				x							
Hong Phong 7.2 Solar	22	Ami Binh Thuan Energy JSC		x		x							
Arico 2 Rooftop Solar		Phoenix Energy & Automation JSC	Engineering, Procurement & Construction (EPC)										
Solar power projects in Hau Giang province		PetroVietNam SongHong Investment and Trading JSC		x									
Rooftop Solar		Phoenix Energy & Automation JSC						x					
Rooftop Solar		Kim Ha Viet Co.,Ltd						x					
Searee Da Nang Rooftop Solar		LUMEN Energy JSC	Engineering, Procurement & Construction (EPC)										
Ninh Hai Eco Solar		Ove Arup & Partners Hong Kong Limited							x	x			
WIND POWER PROJECTS													
Ca Mau 1A, 1B, 1C, 1D wind power	350	GEDI					x	**x**			x		
BT1 & BT2 wind power	210	Wind Power BT1 JSC & Wind Power BT2 JSC					x						
Sac Ly wind power	200	An Phat JSC		x									
B&T wind farm	180	B&T Wind Power JSC				x	Basic design & specialized agreements, power plant license						
Tai Tam wind power	155,25	VINTEG JSC									x		
Yang Trung wind power	145	China Energy Engineering Group Guangdong					x	x				x	
Bac Lieu wind power	142	Super Wind Energy Cong Ly JSC					x	x			x		

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PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE										
			A	B	C	D	E	F	G	H	I	K	L
Bac Lieu wind power - Stage 3	142	Powerchina Zhongnan Engineering Corporation Limited	Investigation, preparation of FS, TD, CD for T/L & substation										
Thanh Phu wind power	120	China Huaneng Group Hong Kong Ltd	Prepare report on assessment of capacity clearance of Thanh Phu wind power										
Hanbaram wind power	115,6	Hanbaram Wind Power JSC										x	
Ia Le 1 wind power	100	Gia Lai Smart Energy Investment and Development JSC				x	x						
Ia Pet Dak Doa 1 & 2 wind power	100 + 100	Ia Pet Dak Doa WPP No.1 & 2	Review of Detailed Design								x		x
Hoa Thang 1.2 wind power	100	Hoa Thang Energy JSC					x	x					
Ia Pech & Ia Pech 2 wind power	50 + 50	Thien Vu Viet Nam New Energy Company Limited									x		
Huu Lung wind power	80	Energy Resources Technology JSC		x									
Hoa Thang wind power	19,8+49,5	Wind Energy JSC										x	
Hoa Binh 1 wind power	50	Hoa Binh 1 Wind Power Investment JSC					x	x					
Chinh Thang wind power	50	Chinh Thang Wind Power Co.,Ltd	Due diligence for FS							x			
Tan Tan Nhat wind power	50	Tan Tan Nhat JSC									x		
Wind power project No.19 in Ben Tre province	50	Duc Thuan Wind Power Co.,Ltd									x		
Wind power project No.20 in Ben Tre province	50	Phuoc Thuan Wind Power Co.,Ltd									x		
Thuan Thien Phong wind power	32	Vinacorp					x	x					
Soc Trang wind power	30	Song Hong Capital Group JSC					x	x					
Soc Trang wind power – Stage 1	30	Powerchina Zhongnan Engineering Corporation Limited	Investigation, preparation of FS, TD, CD for T/L & substation										
Quoc Vinh wind power	30	Quoc Vinh Soc Trang Wind Power Co. Ltd									x	x	
Nam Binh 1 wind power	30	Nam Binh Wind Power JSC									x		
Cau Dat wind power	28,8	ORE JSC									x		
Phuong Mai 3 wind power	21	Central Wind Power JSC					x			x			
Ham Kiem wind power	15	Construction Corporation No.1								x			
Windpower project No. 12,14,15,17		Song Hong Capital Group JSC			x								
Dak N'Drung wind power plant cluster 1, 2, 3		Dak Nong Dak NDrung Energy Co.,Ltd	Prepare report on assessment of capacity clearance of Dak N'Drung wind power plant cluster 1, 2, 3										
BIM wind power		PCC1					x	x					
Cho Long wind power		China Energy Engineering Group Guangdong					x					x	
Le Thuy 3.3 wind power		VNECO	Investigation Consulting, Prepration of Technical Design report for moving wind measuring collumns										
1A, B, C wind farm power		Synohydro Corporation Limited					x						
Savan Wind power plant cluster – Laos		SD Vietnam Construction Investment JSC	Preparation of pre-Feasibility Study report and connection alternative of Savan wind power plant cluster to the Vietnamese power system.										
Savan 1 wind power		T&T and Vinacom	Evaluation of connection possibility and capacity release.										
Evaluation of the Vietnam's energy situation and Gia Lai Wind power output		The ChuGoKu electric Power Co.,INC	Preparation of assessment report										

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PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE										
			A	B	C	D	E	F	G	H	I	K	L
WASTE TO ENERGY PROJECTS													
Soc Son waste-to-energy	75	TIANYU - Ha Noi Environment Energy JSC	x			x	x						
Seraphin waste-to-energy	75	SERAPHIN		x		x							
Thai Nguyen waste-to-energy	60	VEOLIA				x	x	x	x				
Vietstar waste-to-energy	40	VIETSTAR JSC		x		x	x						
Tam Sinh Nghia waste-to-energy	40	Tam Sinh Nghia Investment - Development JSC				x	x	Preparation of connection report to power system					
Hai Phong waste-to-energy	40	Geleximco				x							
Xuan Son waste-to-energy	37	SERAPHIN		x		x							
Phu Tho waste-to-energy	18	TIANYU - Phu Tho Environment Energy JSC	x	x		x	x						
Thanh Hoa waste-to-energy	18	TIANYU - Thanh Hoa Environment Energy Co.,Ltd	x	x		x	x						
Cam Lam - Khanh Hoa waste-to-energy	18	KH New City JSC	x	x		x							
Thai Nguyen waste-to-energy	13	CT Veolia Environmental Services ASIA Pte LTD					x						
Bac Giang waste-to-energy	12	SERAPHIN and Khe Sanh Wind Power JSC		x									
Bio-waste treatment plant Powered by Intec	11	Non Nuoc JSC	x	x									
Thai Binh waste-to-energy	5	TBG Enviro Co.,Ltd	x			x	x		x				
Hau Giang waste-to-energy	15	Petro Power renewable energy JSC	Project Assessment Consultant										
BIOMASS PROJECT													
An Khe Biomass Power	95	Quang Ngai Sugar JSC				x	x						
Bac Can Biomass Power	30	D&G Vietnam Co.,Ltd		x		x							
Hoa Binh Biomass Power	24	Hoa Binh Biomass Power JSC		x		x							
Tin Thanh Biomass Power	15	Tin Thanh Company		x		x							
Que Son Biomass Power	7	VIETPECO Co.,Ltd				x							
Tan Ky Biomass Power		APG Energy Nghe An JSC		x									

SUBSTATIONS

A: Planning - Planning supplement **B:** Feasibility Study **C:** Technical Drawing
D: Prepare Bids Document **E:** Construction Drawing Design

PROJECT	CAPACITY (MW)	CLIENT	SCOPE OF SERVICE				
			A	B	C	D	E
Expansion of 500kV MonSoon Substation		IEAD	Design consultancy services for Substation expansion				
500kV Da Nang Substation	2x450	NPT/EVN		x	x	x	x
500kV Doc Soi Substation	2x450	NPT/EVN		x	x	x	x
500kV Pleiku Substation	1x450	NPT/EVN		x	x	x	x
500kV Phu Lam Substation	2x450	NPT/EVN		x	x	x	x
500kV Ha Tinh Substation	1x450	NPT/EVN		x	x	x	x
500kV Thuong Tin Substation	2x450	NPT/EVN		x	x	x	x
500kV Nho Quan Substation	2x450	NPT/EVN		x	x	x	x
500kV Hoa Binh Substation	2x450	NPT/EVN		x	x	x	x
500kV Pho Noi Substation	2x600	NPT/EVN		x	x	x	x
500kV Son La Substation	2x450	NPT/EVN		x	x	x	x
500kV Quang Ninh Substation	3x150	NPT/EVN		x	x	x	x
500kV Dong Anh Substation	2x900	NPT/EVN		x	x	x	x
500kV Viet Tri Substation	2x450	NPT/EVN		x	x	x	x
500kV Hiep Hoa Substation	2x900	NPT/EVN		x	x	x	x
500kV Vung Ang Substation	1x450	PVN/EVN		x	x		x
500kV Lao Cai Substation	2x900	AD1 /EVN	x	x			
500kV Bac Ninh Substation	1x900	AD1 /EVN		x			
Upgrade of 500kV Son La Substation	2x900	NPT/EVN		x	x	x	x
Upgrade of 500kV Vung Ang Substation	1x900	NPT/EVN		x	x	x	x
500kV Long Phu TPP Switchyard		PVN/EVN					x
500kV Mong Duong TPP Switchyard		EVN					x
220kV Vinh Yen Substation	1x125	NPT/EVN		x	x	x	x
220kV Vat Cach Substation	1x125	NPT/EVN		x	x	x	x
220kV Trang Bach Substation	1x125	NPT/EVN		x	x	x	x
220kV Hoanh Bo Substation	2x125	NPT/EVN		x	x	x	x
220kV Thai Nguyen Substation	1x125	NPT/EVN		x	x	x	x
220kV Thai Binh Substation	1x125	NPT/EVN		x	x	x	x
220kV Pho Noi Substation	1x125	NPT/EVN		x	x	x	x
220kV Lao Cai Substation	1x125	NPT/EVN		x	x	x	x
220kV Hai Duong Substation	1x125	NPT/EVN		x	x	x	x

220kV Ha Giang Substation	1x125	NPT/EVN		x	x	x	x
220kV Bac Ninh Substation	1x125	NPT/EVN		x	x	x	x
220kV Phu Ly Substation	1x125	NPT/EVN		x	x	x	x
PROJECT	**CAPACITY (MW)**	**CLIENT**	**SCOPE OF SERVICE**				
			A	**B**	**C**	**D**	**E**
220kV Ca Mau 1A, 1B, 1C, 1D WPP Substation		Viettracimex			x		x
220kV Yang Trung, Cho Long WPP Substation		T&T Group			x		x
220kV Nghi Son Substation	1x125	NPT/EVN		x	x	x	x
220kV Bim Son Substation	2x250	NPT/EVN		x	x	x	x
220kV Cao Bang Substation	2x125	NPT/EVN		x	x	x	x
220kV Bac Kan Substation	1x125	NPT/EVN		x	x	x	x
220kV Bac Thang Substation	2x250	NPT/EVN		x	x	x	x
220kV Bac Lam Substation	2x125	NPT/EVN		x	x	x	x
220kV Son Tay Substation	2x250	NPT/EVN		x	x	x	x
220kV Nong Cong Substation	1x250	NPT/EVN		x	x	x	x
220kV Dak Nang Substation	2x125	NPT/EVN		x	x	x	x
220kV Truc Ninh Substation	2x250	NPT/EVN		x	x	x	x
220kV Thanh Cong substation - GIS	2x250	NPT/EVN		x	x	x	x
220kV Tay Ho substation - GIS	1x250	EVNHANOI/EVN		x	x	x	x
220kV High Technology substation - GIS	2x250+2x40	EVNHCM/EVN		x	x	x	x
220kV Muong Te Substation	2x250	NPT/EVN		x	x	x	x
220kV Muong La Substation	2x125	NPT/EVN		x	x	x	x
220kV Yen Hung Substation	2x125	NPT/EVN		x	x	x	x
220kV Nghia Lo Substation	2x250	NPT/EVN		x	x		
220kV Bat Xat Substation	2x250	NPT/EVN	x	x	x		
220kV Phong Tho Substation	2x250	NPT/EVN	x	x	x		
220kV Khe Than Substation	2x63	NPT/EVN		x	x		
220kV Van Dien Substation	2x250	NPT/EVN		x	x		
220kV Hai Hau Substation	2x250	NPT/EVN		x			
220kV Tam Duong Substation	2x250	NPT/EVN		x			
220kV Me Linh Substation	2x250	NPT/EVN		x			
220kV Pac Ma Substation	2x250	NPT/EVN	x	x			
220kV Ung Hoa Substation	2x250	NPT/EVN		x			
220kV Hau Loc Substation	1x250	NPT/EVN		x			
220kV Luc Yen Substation	1x125	NPT/EVN		x			
220kV An Khe Substation	2x125	NPT/EVN		x			
220kV Thanh Xuan Substation- GIS	2x250	EVNHANOI/EVN		x			
220kV Dai Mo Substation- GIS	2x250	EVNHANOI/EVN		x			
220kV Hoa Lac Substation	2x250	EVNHANOI/EVN		x			

220kV Thu Thiem Substation- GIS	2x250	EVNHCM/EVN		x			
220kV Phu My SPP Substation		EPC Contractor, PCC1			x		x
220kV BIM WPP Substation		EPC Contractor, PCC1			x		x

TRANSMISSION LINES

PROJECT	LENGTH (km)	CLIENT	SCOPE OF SERVICE
500kV North - South TL	1,498	Ministry of Energy	Investigation, Design of all stages
500kV Quang Trach - Doc Soi TL	500	EVN	Investigation, FS, TD - Total estimates cost, CDD, BD, Investigation Supervision
500kV Pleiku - Phu Lam TL	540	EVN	Investigation, Design of all stages
500kV Pleiku - Doc Soi - Da Nang TL	450	EVN	Investigation, Design of all stages
500kV Son La - Hoa Binh - Nho Quan TL	300	EVN	Investigation and design, FS, TD, BD, CDD
500kV Ha Tinh - Nho Quan - Thuong Tin TL	290	EVN	Investigation, TD, CDD, BD
500kV Vung Ang 3 – Quynh Lap TL	250	EVN	Investigation, FS, Investment Proposal, Specialized reports.
500kV NM Hatxan (Laos) - Pleiku substation TL	190	USAID	Preparation of kick-off project report to submit electricite du Laos; preparation of connection alternative report; FS report
500kV Son La – Lai Chau TL and feeder expansion of 500kV Son La substation	158	EVN	Investigation, Investment Proposal, FS, TD, BD, CDD
500kV Krong Buk - Tay Ninh 1 TL	148	EVN	pre-FS Review, FS
500kV Lao Cai - Vinh Yen TL	115	EVN	Investigation, FS
500kV Tay Ha Noi – Thuong Tin	40	EVN	Investigation, TD-Total estimates cost, CDD, BD
500kV TL expansion to 500kV Nho Quan substation	28	EVN	Investigation, Design of all stages
500kV Monsoon – Thanh My TL	45	Impact Energy Asia Development Ltd	Investigation, FS
500kV Tuabin khi mien Trung - Krong Buk TL		EVN	Investigation, pre-FS, FS, Construction Investment, and specialized reports
500kV Binh Duong 1 - Chon Thanh TL	104	EVN	FS Review
500kV Binh Duong 1 - re Song May - Tan Dinh TL	243	EVN	Basic Design Review
500kV TL connecting Cong Thanh TPP		EVN	Investigation, CDD, CSS-Estimates Cost, BD
500kV double lined Thuan Nam - Chon Thanh TL	308	EVN	pre-FS and FS Review
220kV Nam Yeuang- Nam Sum 3 TL (Laos)		Duc Khai Trading Investment Co., Ltd	FS, TDD, CDD
Temporary connection of 220kV Nam Mo - Tuong Duong TL		Duc Khai Trading Investment Co., Ltd	TDD, CDD
Đấu nối tạm ĐZ 220kV Nam Mo – Tuong Duong	74,4	Duc Khai Trading Investment Co., Ltd	CDD
220kV TL from Loc Ninh Solar Power Plant to 220kV Binh Long 2 substation	39	Vietnam A2 Technologies Co., Ltd	Investigation, FS, TDD, CDD
220kV TL connecting Nam Kong 3 HPP group	90	Chaleun Sekong Energy Co.,Ltd	Investigation, TD, CD, reports prepparation for specialized agreement to serve for PPA
220kV TL connecting Nam Emoun HPP to Dak Ooc substation	45	Chaluen Sekong Energy Co.,Ltd	Investigation, TD, CDD
220kV Pac Ma - Muong Te TL	31,2	EVNNPT	Investigation, FS, EIA, Construction Investment
220kV Bat Xat - Bao Thang TL to 500kV Lao Cai substation	40	EVNNPT	Investigation, EIA, FS, Construction Investment
220kV Phong Tho - Than Uyen TL	82,6	EVNNPT	Investigation, FS, EIA
220kV Loc Ninh - TBA 220kV Binh Long 2	39	Loc Ninh Energy JSC	Investigation, FS, TD-Total estimates cost, CDD
220kV Nam Dinh 1 - Ninh Binh 2 TL	30,9	EVN	Investigation, FS
220kV Than Uyen TL - 500kV Lao Cai substation	68	EVNNPT	Investigation, FS, Investment Proposal
220kV Yen Hung - Nam Hoa TL		EVNNPT	Basic Design Review
220kV Nho Quan - Phu Ly - Thuong Tin TL	77,4	EVN	Investigation, FS, TD - Total estimates cost, CDD

PROJECT	LENGTH (km)	CLIENT	SCOPE OF SERVICE
220kV Nam Sum - Nong Cong TL	130	EVN	Investigation, FS, TD, CDD, BD
500/220kV Hiep Hoa - Dong Anh - Bac Ninh 2 TL	42,4	EVN	Investigation, FS, TD, CDD, TD-Total estimates cost, BD
220kV Nam Dinh - Thai Binh - Hai Phong TL	76	EVN	Investigation, Design of all stages
220kV Ninh Binh - Thanh Hoa 2 TL	61	EVN	Investigation, Design of all stages
220kV Viet Tri - Son La TL	194	EVN	Investigation, TD, CDD, BD, Project construction
220kV TL from Thai Binh TPP to 220 kV Thai Binh substation	30,5	EVN	TD - Total estimates cost, FS, CDD
220kV Viet Tri - Yen Bai TL	67	EVN	Investigation, TD, CDD, BD, Project construction
220kV Bac Giang - Thai Nguyen TL	63	EVN	Investigation, Design of all stages
220kV Hai Duong – Pho Noi TL	56	EVN	Investigation, FS, Specialized reports, TD, CDD, BD
220kV Nho Que 3 – Cao Bang TL	105	EVN	Investigation, FS, EIA
220kV Uong Bi - Trang Bach TL	18	EVN	Investigation, Design of all stages
220kV Huoi Quang – Nghia Lo TL	103	EVN	Investigation, FS, Investment Proposal, Specialized reports
220kV Yen Bai - Lao Cai TL	131	EVN	Investigation, Design of all stages
220kV double lined Truc Ninh TL cuts 220kV Ninh Binh - Nam Dinh TL	29,437	EVN	FS, TD, CDD
220kV Thanh Thuy - Ha Giang - Tuyen Quang HPP TL	125	EVN	Investigation, Design of all stages
220kV Ha Khau - Lao Cai TL	30	EVN	Investigation, Design of all stages
220kV Tuyen Quang - Bac Kan- Thai Nguyen TL	134	EVN	Investigation, Design of all stages
220kV Tuyen Quang HPP - Yen Bai TL	117	EVN	Investigation, Design of all stages
220kV Dong Hoa - Thai Binh TL	51,8	EVN	Investment Proposal, TD-Total estimates cost, FS, CDD, BD
220kV Hoa Binh – West of Ha Noi TL	50,6	EVN	Investigation, TD, CDD, BD
220kV Quang Ninh – Cam Pha TL	31	EVN	Investigation, TD, CDD, BD
220kV Nam Mu (Laos) - Tuong Duong TL		EVN	FS Review
220kV Quang Ninh - Hoanh Bo TL	21	EVN	Investigation, Design of all stages
220kV Ha Khau - Lao Cai TL	30	EVN	Investigation, Design of all stages
220kV Hai Duong and Pho Noi Branch	38	EVN	Investigation, Design of all stages
220kV Thanh Hoa – Vinh (line 2) TL	147,87	EVN	FS, Investment Project, CDD, BD, EIA
Rehabilitation of 110kV Soc Son - Thai Nguyen TL, combined with 220kV Soc Son - Thai Nguyen TL	40	EVN	Investigation, Design of all stages
220kV Cao Bang – Bac Kan TL	70,7	EVN	Investigation, FS, TD, CDD, BD, Project construction
220kV Muong Te – Lai Chau TL	51	EVN	Investigation, FS, TD, CDD, BD
220kV Do Luong - Nam Cam TL	30,5	EVNNPT	Investigation, FS, Construction Investment
220kV Ha Dong – Phu Ly TL	40	EVN	Investigation, FS, CDD, BD
220kV TL connects Huoi Quang HPP to the grid	18	EVN	TD-Total estimates cost, FS, CDD, BD
220kV TL connects Ban Chat HPP to the grid	27,3	EVN	Investigation, FS, CDD, BD
220kV TL connects Mao Khe TPP to the grid	15,91	EVN	TD-Total estimates cost, FS, CDD, BD
220kV Nho Quan – Thanh Nghi TL	28	EVN	Investigation, TD, TD-Total estimates cost, CDD, BD
220kV TL connects 500kV Viet Tri substation	18	EVN	Investigation, Design of all stages
220kV TL connets 220kV Bac Quang substation	43,4	NPMB	TD-Total estimates cost
220kV TL connects 220kV Vinh Tuong substation	10	EVN	Investigation, Design of all stages
220kV Ha Dong – Thanh Cong TL	9	EVN	Investigation, FS, TD, CDD, BD
Underground cable 220kV Ha Dong - Thanh Cong	8		
220kV Cat Lai – Hi Tech TL	5.3	EVN	Investigation, TD, TD-Total estimates cost, CDD, BD
110kV Thai Binh - Vu Thu TL	16	EVN	Investigation, Design of all stages

PROJECT	LENGTH (km)	CLIENT	SCOPE OF SERVICE
110kV Do Luong - Tuong Duong TL	113	EVN	Investigation, Design of all stages
110kV Bac Giang - Luc Ngan TL	47	EVN	Investigation, Design of all stages
110kV Thieu Yen - Ba Thuoc TL	61	EVN	Investigation, TD, CDD
110kV Yen Bai - Nghia Lo TL	74	EVN	Investigation, Design of all stages
110kV Lao Cai - Phong Tho TL	80	EVN	Investigation, Design of all stages
110kV Ta Loong - Lao Cai TL	28	EVN	Investigation, Design of all stages
110kV Xuan Mai - Son Tay TL	30	EVN	Investigation, Design of all stages
110kV Phu Tho - Son Tay TL	11	EVN	Investigation, Design of all stages
110kV Thai Binh - Hung Ha TL	12	EVN	Investigation, Design of all stages
110kV Son La - Muong La TL	48	EVN	Investigation, Design of all stages
110kV Na Duong - Tien Yen TL	63	EVN	Investigation, Design of all stages
110kV Na Duong - Lang Son TL	39	EVN	Investigation, Design of all stages
110kV NR Thanh Xuan - Ha Noi TL (single pole)	6	EVN	Investigation, Design of all stages
Underground cable 110kV Phuong Liet - Thanh Cong	3	EVN	Investigation, Design of all stages
Submarine cable to Hon Tre island	3.4	Vinpearl Trade and Tourism JSC	Investigation, Design of all stages
Rural Energy of Vietnam		EVN	Investigation, Design of all stages
Rural energy system development in Quang Nam - DN		ODA Quang Nam	Investigation, Design of all stages
Rural energy development REII		EVN	Investigation, Design of all stages
Rehabilitation of medium voltage power system in cities of Vinh, Ha Long, Nam Dinh, Thanh Hoa, etc.		EVN	Investigation, Design of all stages
Capacity enlargement of series capacitor on 500kV Nho Quan - Ha Tinh TL		PTC1	TD - Total estimates cost

QUANTITY OF GEOLOGICAL INVESTIGATION PROVIDED TO HIGHLIGHT PROJECTS

No.	Work items	Unit	Geological Investigation Provided To Highlight Projects						
			Son La HPP	Lai Chau HPP	Ban Chat HPP	Huoi Quang HPP	Ban Ve HPP	Tuyen Quang HPP	Luang Phrabang HPP
1	Mapping geological map								
	1:100,000	Km^2			400				
	1:50,000	Km^2			400	250	217	550	1 470
	1:25,000	Km^2	200	170	70				
	1:10,000	Km^2	12		30	44		9	20
	1:5,000	Km^2	5						
	1:2,000	Km^2	4	1	2	3	3		
	1:1,000	Km^2	2	2	1	1	1		
2	Exploring drilling	m	37 582	16 335	12 138	13 595	10 897	16 084	2 527
3	Drilling in borrow areas	m^3	7 136	5 102			1 244	1 922	403
4	Excavates pit for survey	m^3		4 532	4 594	2 379	2 847	332	4 437
5	Excavates adit	m	1 001	460	215	455	415	60	
6	Geophysical measurement								
	- Karota borehole measurement	m	910						
	- Sound electric profiling	m	23km	1 026	5 491	1 706	9 315	17 400	564
	- Seismic profiling	m	28 200	736	564	498			385
	- Vertical electrical sounding	point	729	204	213	180			120
	- Seismic measurement in tunnel	point	0.84km	287	191				
7	Testing geo-hydrology in borehole, pit								
	- Water pressing test	stage	3 156	1 822	770	1 322	1 064	1 206	360
	- Water pouring + scooping	stage	542	325	379	374	227	488	46
	- Water absorption	stage	32	15	4	3		7	
	- Setting casing for underground monitoring	m							612
	- Setting underground water monitoring	hole						49	

No.	Work items	Unit	Geological Investigation Provided To Highlight Projects						
			Son La HPP	Lai Chau HPP	Ban Chat HPP	Huoi Quang HPP	Ban Ve HPP	Tuyen Quang HPP	Luang Phrabang HPP
8	In-situ test in borehole								
	- Pressure meter test	point		752	250		160	306	
	- Point testing in cored column	point						600	
	- Testing to determine rock density	sample		1 121	100		320		
	- Point pressure test for rock	sample		799	100		270		
9	In-situ test in excavated pit								
	- Shear test of soil block	test			24				
	- Static compressive test	test			24				
	- Shear, pressure test in excavated pit	point						38	
10	In-situ test in tunnel								
	- Shear test in rock block	test		10	25				
	- Shear test in concrete-rock contact	test		10	18				
	- Determination of modulus of deformation	test		8	18				
11	Sample testing in laboratory								
	- Testing undisturbed rock, soil samples	sample	79	120	121	66	272	124	150
	- Disturbed soil samples	sample	40		60	74		136	
	- Physo-mechanical test for rock samples	sample	1 732	211	271	408		578	
	- Sand, gravel samples	sample	225	63	18	6	56	103	31
	- Samples for moisture content test	sample			41	20			
	- Analysis for thin lithological slide	sample		200	382				397
	- Water sample test	sample	222	49	74	91	89	57	23
	- Lithological samples	sample				520	150	300	
	- Potential reaction test by chemical method	sample		8	10				

PARTNERSHIP AND CO-OPERATION

MAIN PARTNERS

- Vietnam Electricity (EVN) is the biggest Client to whom PECC1 has provided its professional consultancy services to their projects such as Son La HPP, Lai Chau HPP, Pha Lai thermal power plant, Uong Bi thermal power plant, the 500kV Transmission Line North-South, Pleiku-Phu Lam 500kV TL, Son La substation, Lao Cai substation, Ninh Thuan Nuclear Power, etc...
- Power companies in various provinces all over the country are partners in construction of medium and small sized power projects, varying from few MW to hundreds of MW in capacity.
- Co-operation with foreign consultants as Russia, Switzerland, Ukraine, Belgium, France, Canada, China, Germany, USA, Japan, Laos, Cambodia, etc.

INTERNATIONAL COOPERATION

Engineering Consulting Services for Designing works - Package 1 – Headworks – Tanahu Hydropower project (140MW) – Nepal – In cooperation with Song Da – Kalika Joint Venture.

Signing contract with SembCorp Utilities Pte Ltd (Singapore) on "Consultancy services provision for FS preparation of Dung Quat coal-fired thermal power project (2 x 600MW)"

In cooperation with AF-Consult's experts (Switzerland) and Ukraine's expert to design Lai Chau hydropower project (1200MW).

In cooperation with Lightbridge (USA) on Nuclear Power Science and Technology Centre.

In cooperation with POSCO ENERGY (South Korea) for FS preparation of Quynh Lap 2 TPP.

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