

Made-in-Japan Quality and Competitive Price

High-Performance Solar Power Plant with CIS Thin Film Modules of Solar Frontier

- 5-10% more energy production by CIS thin film modules of Solar Frontier
 - Competitive price with made-in-Japan solar modules
 - Alternative solution to enjoy solar power without cash on hand
- Invitation to 2,233 kW CIS solar power plants at Delta Electronics in Bangpoo



Delta Electronics, Factory 5
(Bangpoo Industrial Estate)
Metal Sheet: 1,724.80 kW
Slab roof: 217.60 kW
Carpark: 46.24 kW
Metal Sheet: 1,008.00 kW
(Under installation)
Total: 2,996.64 kW

(1) Energy Pro Corporation

■ Energy Pro Corporation Ltd. ("EPC") as a specialist of engineering, construction, operation and maintenance of solar power plants in Thailand. ■ Managed by Japanese MD and GM ex Mitsubishi Corp and NEC Corp. ■ Fully paid-up capital of THB 50 million. ■ Located at 14th floor of Bangkok Business Center, Ekamai. ■ Supply record to reputable customers such as SCG Chemical, Shell, Delta Electronics, AEON. ■ Expert of CIS thin film modules produced by Solar Frontier in Japan. ■ Solar Frontier as the world-largest CIS module manufacturer. A 100% subsidiary of Showa Shell Sekiyu (Founded in 1900 with US\$ 20 billion turnover) in Japan.



Solar Frontier, Kunitomi Plant in Miyazaki Prefecture, Japan



(2) CIS Thin Film Solar Modules

■ CIS thin film modules of Solar Frontier perform better than conventional silicon modules under high temperature and shaded environment. ■ With 100% made-in-Japan quality and 25-year after-sales support, CIS modules are widely employed for residential and industrial purposes, including Sekisui Heim, a leading house maker in Japan. ■ CIS is a thin film compound semiconductor of 3 major elements: Copper, Indium and Selenium. This is a unique technology, completely different from conventional crystalline silicon technology. ■ CIS modules are produced at Kunitomi Factory in Miyazaki, Japan under strict quality control.

(3) Advantages of Solar Power Plant

■ **[Reduction of Energy Expenses]** A solar power plant continues to generate electricity for more than 25 years. With a 1,000 kW plant, you can expect around THB 6 million energy cost saving a year when the plant is operated for 365 days. AEON MaxValu supermarket realized 20-25% energy expense reduction. ■ **[CO2 Emission Reduction]** You can contribute to CO2 emission reductions by generating clean energy without fossil fuels. This also creates better image of your company with CSR efforts. ■ **[Relaxing of Indoor Temperature Rise]** A solar power plant helps absorb solar energy and relax the rise of indoor temperature. The temperature under sheathing roof board will decrease by about 10 degrees C. ■ **[Reduction of Income Tax]** By use of BOI incentives for solar power investment, the maximum 50% of the invested amount can be offset with your income tax payment.



261 kW plant AEON MaxValu (Bangkok)



(4) Location of Solar Power Plant

■ **[Metal Sheet Roof]** In case of folded plate roof, we can fix mounting structures with clip lock clamps without making holes on the roof. ■ **[Slab Roof]** We fix mounting structures with chemical anchor bolts into slab roof, then install solar modules. ■ **[Carpark]** We install solar modules on carpark structures. In case of a newly built carpark, we design foundations and structures as well as a solar power plant. Without metal sheet roofs, we directly install solar panels on steel structures. You can save the cost of metal sheets and expect a refined design. Good appealing of your CSR efforts is expected to your visiting customers.

(5) Type of Contract and Plant Cost

■ **[Cash]** You procure a solar power plant from EPC in cash. Ownership of plant is transferred upon completion of the plant. Our idea price for a 1,000 kW capacity plant is THB 35 million, excluding VAT. The price may vary according to site conditions. We will quote after conducting detailed site surveys. ■ **[Lease]** A lease company procures a solar power plant from EPC in cash, leasing the plant to you over 5 to 10 years. Cash on hand is not required. You will pay a monthly lease fee within saved energy expenses by a solar power plant. The ownership is transferred upon full lease fee payment. ■ **[BOT: Build, Operate & Transfer]** EPC and Showa Shell Sekiyu invest on a solar power plant, while you offtake all the electricity generated by the plant. Power Purchase Agreement (PPA) is signed between the parties, specifying a purchase period and tariff rate (for instance, 15 years x 15% discount from MEA/PEA tariff). The ownership is transferred upon expiry of an agreed PPA period. We can offer a plant buy-out option during the PPA period.



120 kW plant
Shell Head Office (Bangkok)



484 kW plant
Kaosu Packing (Sriracha)

(6) Expected Energy Production

■ The energy production of a solar power plant depends on climate conditions, direction and angle of installed modules, and system design as well. ■ Our solar power plant with CIS thin film modules normally generates more than 1,500 kWh/kW a year. With 1,000 kW capacity, 1,500,000 kWh a year can be expected. We will prepare PVSyst simulation sheets as part of our proposal. ■ Our client in the left photo installed 2 separate plants of Chinese poly silicon modules and CIS modules. Our CIS plant is generating 15-20% more energy than the poly silicon plant. As a result, we received additional order for a 516 kW plant.

(7) Sale of Surplus Solar Energy to Grid

■ At this moment it is not allowed to export surplus solar energy back to grid of MEA/PEA. All electricity generated by solar power plants is to be consumed within your facilities. ■ Thai government is now studying introduction of Net Billing. If this scheme is realized, you will be able to sell surplus solar energy to grid, achieving better financial return of your investment.

(8) Contribution to CO2 Emission Reductions

■ EGAT is emitting 0.5 ton of CO2 for generation of each 1,000 kWh. ■ If you generate 1,500,000 kWh a year with a 1,000 kW solar power plant, you can contribute to reduction of CO2 emission by 750 tons. ■ This volume is equal to CO2 emitted from 320,000 liters of gasoline since one liter of gasoline emits 2,322 grams of CO2 when it is combusted.



743 kW plant
SCG Chemical (Rayong)

(9) Required Roof Area for Solar Power Plant

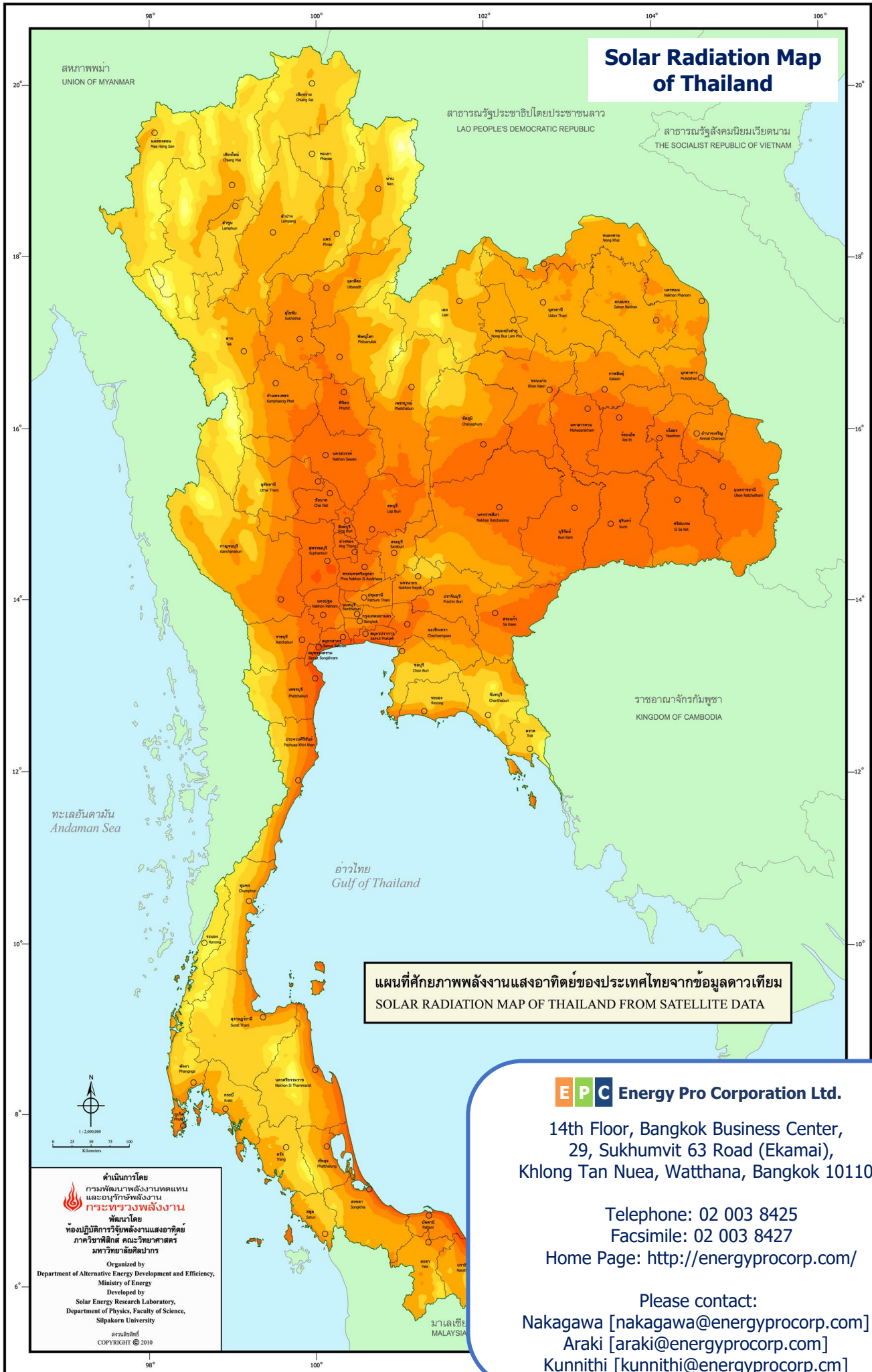
■ With Solar Frontier's 180 Watt CIS modules, 541 panels (100 kW) will occupy 665 m2. ■ Around 800 to 900 m2 rooftop area is required for 100 kW plant, including necessary space for installation and maintenance works.

(10) Required Information for System Design

■ Please provide us with your factory Layout and Structure Drawings, Single Line Diagram and copy of MEA/PEA monthly invoice. ■ We can design the most appropriate generating capacity if Load Profile of your factory is available.



245 kW plant
Delta Electronics, Factory 1 (Bangpoo)



ดำเนินการโดย
กรมพัฒนาพลังงานทดแทน
และอนุรักษ์พลังงาน
กระทรวงพลังงาน
พัฒนาโดย
ห้องปฏิบัติการวิจัยพลังงานแสงอาทิตย์
ภาควิชาฟิสิกส์ คณะวิทยาศาสตร์
มหาวิทยาลัยศิลปากร
Organized by
Department of Alternative Energy Development and Efficiency,
Ministry of Energy
Developed by
Solar Energy Research Laboratory,
Department of Physics, Faculty of Science,
Silpakorn University
สงวนลิขสิทธิ์
COPYRIGHT © 2010

EPC Energy Pro Corporation Ltd.
14th Floor, Bangkok Business Center,
29, Sukhumvit 63 Road (Ekamai),
Klong Tan Nuea, Watthana, Bangkok 10110
Telephone: 02 003 8425
Facsimile: 02 003 8427
Home Page: <http://energyprocorp.com/>
Please contact:
Nakagawa [nakagawa@energyprocorp.com]
Araki [araki@energyprocorp.com]
Kunnithi [kunnithi@energyprocorp.cm]