

Renewable Energy Technologies by PCRET

by
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PCRET**

www.pcret.gov.pk

**PCRET established on
8 May, 2001**

COMPONENTS

**PCAT: Pakistan Council of
Appropriate Technology (1974)**

**NIST: National Institute of
Silicon Technology (1981)**

Location

Head Office & Labs	:	Islamabad
Regional Offices	:	Karachi
		Lahore
		Peshawar
		Quetta
Field Offices	:	Abbotabad
		Muzafarabad
		Bahawalpur
		Gotki

MISSION STATEMENT

**Committed to research,
develop, promote, disseminate,
impart training, and create
Renewable Energy culture.**

RENEWABLE ENERGY

Major Technologies

1. Solar

- *Photovoltaics*
- *Thermal*

2. Micro-Hydel

3. Bio-Energy

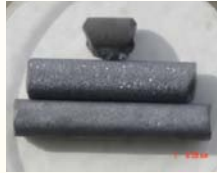
- *Biogas*
- *Biomass*

4. Wind

TECHNOLOGY STATUS

- 1. Know-how pertaining to Solar Cell production, system sizing, designing, installation and maintenance of Solar System is available.**
- 2. Solar Cells production capacity , 80 KW/year.**
- 3. Production will increase to 100 KW/year by June 2012.**
- 4. Planning to increase production upto 10 MW/year in next 2-3 years. (by extending lamination facilities with private public partnership)**
- 5. Testing labs (performance evaluation) of PV modules and system components.**

PV Technology Spectrum



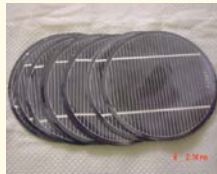
- **High purity Silicon**



- **Silicon Ingot**



- **As cut wafers**



- **Solar cells**



- **PV Module**



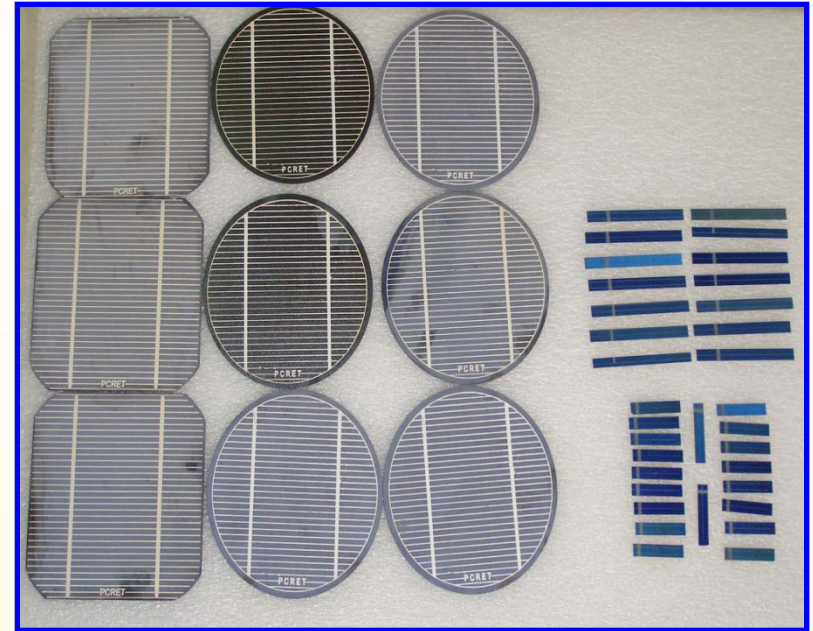
- **PV System**

PV Research Laboratories

- **Crystal Growth**
- **Wafering**
- **Cell Processing**
- **Lamination**
- **Analysis**
- **Test and Measurement**
- **Workshop (Solar Thermal)**

Photovoltaics Products Developed

- *Silicon Wafers
- *Silicon Solar Cells
- *PV Modules
- *Solar Light Home
- *Solar Lantern/Torch
- *Solar Street/Park Lights
- *Solar Cells/Battery Charge
- *Solar Home Solutions







PCRET Offer: Solar Photovoltaic (PV) Technology Production Facilities



- Mono crystalline Crystal Growing
- Silicon Ingot Wafering
- PV Cell Processing
- Lamination of solar cells into panels
- Dicing solar cells into smaller pieces
- Silicon chip detectors for Laser Land Leveller

PCRET Offer: Services

- PV system sizing & installation
- Solar Panels
- Solar Home electrification Systems
- Solar lights (Lantern, Emergency lights, Garden lights, Street lights etc)
- Solar water pumping
- PV system installation training

PCRET Offer: PV Panel Testing Services

- Solar (PV) Panels in/out door performance & life testing
- Batteries
- Invertors
- PV panel electric insulation
- Solar cell contact adhesion testing

PCRET Offer: Consultancy in PV



technology manufacturing facilities set up

- PV technology selection
- Selection of machinery & equipments
- PV technology Production
- PV technology manpower training
- PV technology marketing

TECHNOLOGY STATUS

- **Know-how and experience of fabrication, designing installation, maintenance, and training in the field of solar water heaters, solar dryers, solar cookers (Box & Dish type) exist.**
- **Testing laboratory for performance evaluation of solar water heaters.**
- **Research support mechanical workshop will be functional, in 2012, to help to develop and introduce high performance solar appliances, such as solar water heaters, solar dryers, etc.**

Solar Thermal

APPLICATIONS

- **Water Heaters**
- **Dryers**
- **Cookers**
 - * **Box type**
 - * **Dish type**
- **Desalination**

a) Water Heaters

Designed and developed 5 different modules of various capacities for commercialization



Solar Water Heater

Style of vacuum tube (mm)	Qty. of tubes	Tank capacity	Temp. C	Bathing Number
58-1800	12	135L	45-95	2~4
58-1800	15	165L	45-95	3~5
58-1800	20	200L	45-95	3~7
58-1800	24	225L	45-95	5~10
58-1800	32	330L	45-95	6~12



Prototype Solar Dryer 100 kg

Solar Dryers 500 kg





PCRET Offer: Consultancy in Solar thermal technology manufacturing facilities

- Selection of machinery & equipments
- Production
- Manpower training
- Marketing

PCRET Offer: Solar Thermal Testing Services

- Solar flat plate collector performance & life testing.
- Solar geyser testing.
- Solar dryer Testing.
- Evacuated tube & Heat pipe testing

TECHNOLOGY STATUS

1. PCRET has wide experience of site survey, installation and maintenance of Microhydel power plants and dissemination of technology.
2. PCRET electrified remote hilly human settlement through installation of (5 – 50 Kw) micro hydro power plants on community sharing basis.
3. PCRET is planning to establish testing laboratory for performance evaluation of the turbines and system components.

MICROHYDEL

- Plants Installed : 540 Nos. (8.2 MW capacity)
- Cost of installation : Rs.70,000 per KW
- House electrified : 70,000 Nos.



b) Canal Falls

Potential (<500KW) : 200 MW

Systems Installed : 2 units (60 KW)

In Pipeline : 200 KW



TECHNOLOGY STATUS

1. PCRET has wide experience in designing, installation and dissemination of technology at domestic level.
2. PCRET has standardized 3-5M³ Biogas plants and provide these at subsidized price.
3. Biogas purification kit has been developed and tested to run the Otto engines and Diesel engines (peter engine) for irrigation and power generation.

BiogasContd.

Plants Installed : 4000 (18000 M³ capacity)

•Designed developed and disseminated 10 to 25M³ biogas units for irrigation and power generation





A 25 hp Peter Engine run with 8 m³ biogas plants for 2-3 hours a day

TECHNOLOGY STATUS

1. Pakistan has tremendous Wind Potential.
2. Most of the remote villages in Sindh, Balochistan and Northern Area can be electrified through Wind Energy.
3. PCRET has installed (155 units; 161 KW net capacity) of small wind turbines (0.5 – 10 KW each) in Sindh and Balochistan electrifying 1560 houses and 9 costal guard check posts.

Wind EnergyContd.

Wind Turbines Installed : 155 Nos. (166 KW)
Houses electrified : 1560



Efficient Cook stoves

Distributed : 100,000

Fabrication/Sale Points : 20

Fuel Saving : 20 %



PCRET Offer: Rural Energy Technology Consultancy & Services:

- Designing, system sizing, site survey and installation of:
- Micro-hydel plants, Biogas plants, Wind-turbines



PCRET

THANK YOU