



EXTRAMURAL TALK

"Recent advances in renewable energy research"

By Dr. Subarna Maiti,
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CSMCRI- Central Salt & Marine
Chemicals Research Institute,
Bhavnagar.



PLATFORM : MS TEAMS

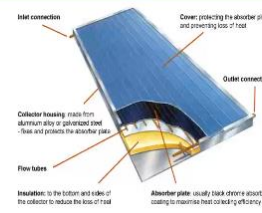
SEPTEMBER 4, 11:00 AM TO 11:45 AM

G H Patel College of Engineering & Technology
(A Constituent College of CVM University)

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SOLAR WATER HEATER : FPC & ETC : Both work on the principle of thermo-syphon mode

Flat plate collector(FPC)



Flat Plate Collector Systems contain an insulated metallic box covered with a toughened glass. The metallic box has a layer of a copper sheet which is good for absorbing heat. The copper sheet is further coated with a black coating which improves heat absorption. The metallic box contains copper tubes arranged vertically and connected at the top and bottom by two horizontal copper pipes called headers. The cold water enters the collector (the metallic box) from the bottom pipe and rises up into the vertical pipes. It gets heated up in the vertical pipes. As it gets heated the water expands and it rises up into the top horizontal pipe.

Evacuated tube collector (ETC)



Evacuated Tube Collector systems have vertical tubes that are made out of two co-axial glass tubes. The air between the two coaxial tubes is removed to create a vacuum which improves insulation. Additionally, the surface of the inner tube is coated to provide better heat absorption and insulation. Coldwater is filled up in these glass tubes and it gets heated up due to the sunlight. As it gets heated up, the water expands and it rises up into the top horizontal pipe.

47:00

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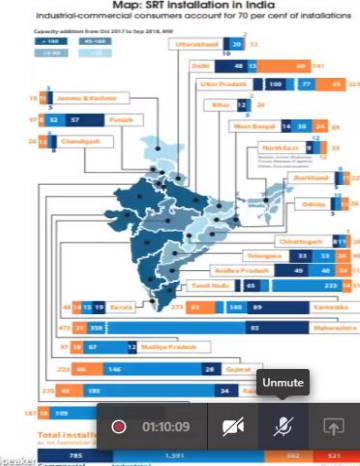
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170110105058 Speaker Prof Vinay Patel

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Map: SRT Installation in India

Industrial-commercial consumers account for 70 per cent of installations



State	Commercial	Industrial	Residential	Total
Andhra Pradesh	40	27	46	113
Assam	2	2	2	6
Bihar	1	1	1	3
Chhattisgarh	1	1	1	3
Goa	1	1	1	3
Gujarat	1	1	1	3
Haryana	1	1	1	3
Himachal Pradesh	1	1	1	3
Karnataka	1	1	1	3
Kerala	1	1	1	3
Madhya Pradesh	1	1	1	3
Madhesh Pradesh	1	1	1	3
Maharashtra	1	1	1	3
Manipur	1	1	1	3
Mizoram	1	1	1	3
Nagaland	1	1	1	3
Narandhar Pradesh	1	1	1	3
Odisha	1	1	1	3
Punjab	1	1	1	3
Rajasthan	1	1	1	3
Tamil Nadu	1	1	1	3
Telangana	1	1	1	3
Uttar Pradesh	1	1	1	3
West Bengal	1	1	1	3
Other States	1	1	1	3
Total	785	1,331	523	2,639

Policies at the state level

- Several states and Union territories (UTs) have announced regulations governing SRT installation .
- These regulations focus primarily on clarifying the limits on capacity that a consumer can install.
- Gujarat provides as much subsidy as the Centre; this means the cost of solar rooftop systems for homeowners in the state becomes Rs 30,000 per kilowatt (kW).
- Uttar Pradesh is disbursing up to Rs 30,000 as incentive to residential customers, while Maharashtra provides 100 per cent subsidy to government and semi-government offices and 15 per cent to private offices

01:10:09

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Biomass Energy

The diagram illustrates the biomass energy cycle. On the left, 'BIOMASS SOURCES' are categorized into Agricultural Crops & Residues, Forestry Crops & Residues, Sewage, Municipal Solid Waste, Animal Residues, and Industrial Residues. On the right, a circular process shows 'PHOTOSYNTHESIS' where 'CARBON DIOXIDE' is taken up by plants, which produce 'BIOMASS'. This biomass is then converted into 'RESIDUES and BY PRODUCTS', which are fed back into the cycle.

01:23:24

Request control

People

Invite someone

Presenters (2)

- PP Prof Vinay Patel (Organizer)
- S Speaker

Attendees (77)

- Dr Kaushik Nath
- 170110105003
- 170110105005
- 170110105007 (On hold)
- 170110105011
- 170110105017
- 170110105019

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11:52 AM 9/4/2020

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PLANT BIOMASS

The flowchart details the conversion of plant biomass into energy. It is divided into three main categories:

- Thermochemical conversion:** Includes Combustion (producing Heat), Pyrolysis (producing Bio-oil), and Gasification (producing Syn-gas (H₂+CO) and Burner gas).
- Biological conversion:** Includes Fermentation (producing Grain alcohol) and Anaerobic digestion (producing Burner gas).
- Physical conversion:** Includes Squeezing (producing Burning oil).

Additional detailed processes shown include:

- Pyrolysis:** Biomass is converted to Bio-oil, which can be used for Biochar or Biofuel. Syn-gas (H₂+CO) can be used for Catalytic Upgrade/synthesis to produce Chemicals or CVP.
- Gasification:** Biomass is converted to Syn-gas (H₂+CO), which can be used for Biomass Pyrolysis, Ethanol Production, Ethanol Fermentation, Ethanol Recovery, or Lignin Utilization.
- Biological Conversion:** Biomass is converted to Ethanol Production, Ethanol Fermentation, Ethanol Recovery, and Lignin Utilization. Ethanol can be used for Ethanol Fermentation or Ethanol Recovery.
- Physical Conversion:** Biomass is converted to Squeezing, which produces Burning oil.
- Complex organic matter:** Carbohydrates, proteins, fats are converted to Soluble organic molecules (Sugars, amino acids, fatty acids) via Hydrolysis. These are then converted to volatile fatty acids via Acetogenesis, which can be used for Methanogenesis to produce H₂, CO₂, CH₄, and CO.

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
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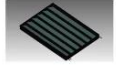
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KEY RESEARCH	SALIENT R&D INPUTS	SNAPSHOT OF RESULTS	STATUS
Solar thermal distillation for potable water	<ol style="list-style-type: none"> 1. Single basin stepped tilted absorber in V-trough 2. Distance between glass and water surface minimum for facile evaporation 3. Metallic condensers at back and sides and making use of night sky radiation for cooling 4. Maintenance easy as cleaning of the deposited salts conducted easily by overflowing water due to tilt 	<ul style="list-style-type: none"> • Average 4-5LPD/m² • 28-30 % efficiency 	<ul style="list-style-type: none"> • Technology transferred • Discussion with Lakshadweep Govt. for installation of 800LPD at Bitra island • Discussion with Waree Energies for 100 LPD


Development of stepped still




Conventional type




Reflectors in V-trough




insulated tank to store cool water, chilled through night sky evaporation




Back condenser



Side condensers with cover



HOUSE HOLD AT GOGHA COASTAL VILLAGE, BHAVNAGAR (Under OLP)



DEPT. OF PHYSICS, BHAVNAGAR UNIVERSITY

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12:09 PM 9/4/2020