7.4.4 Policy development for clean energy technology

DISCUSSION ON GREEN ENERGY POLICY DEVELOPMENT ALONG WITH TANGENCO

EEE department faculty Dr.G.Radhakrishnan, along with other EEE department faculy in collaboration with Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) has been actively involved in developing and implementing policies to promote clean energy technologies,

The following key highlight points were discussed for green energy promotion

1. Reducing Greenhouse Gas Emissions

- Achieve significant reductions in CO_2 and other greenhouse gas emissions to combat climate change.
- Align with international agreements like the Paris Accord to limit global warming to below 1.5°C.

2. Increasing Renewable Energy Deployment

- Promote the development and use of renewable energy sources such as solar, wind, hydro, biomass, and geothermal.
- Set measurable targets for the share of renewables in the energy mix.

3. Enhancing Energy Efficiency

- Implement policies to reduce energy consumption through improved efficiency in industrial, residential, and commercial sectors.
- Encourage adoption of energy-efficient appliances, technologies, and practices.

4. Ensuring Energy Security

- Diversify energy sources to reduce dependency on fossil fuels and imported energy.
- Develop domestic renewable energy capacities to ensure a stable and reliable energy supply.

5. Promoting Economic Growth and Job Creation

- Foster innovation and investment in green technologies.
- Create new employment opportunities in renewable energy sectors, such as manufacturing, installation, and maintenance.

- **Discussion on Green energy policy development along with TANGENCO**

6. Encouraging Sustainable Development

- Integrate energy policies with broader goals like biodiversity conservation and sustainable land use.
- Minimize environmental impact, such as land degradation and water use, in energy production.

7. Improving Public Health

- Reduce air pollution and related health issues by transitioning from fossil fuels to cleaner energy sources.
- Promote a healthier living environment by limiting industrial and vehicular emissions.

8. Facilitating Grid Modernization and Integration

- Invest in smart grid technologies to manage intermittent renewable energy sources effectively.
- Enhance storage solutions and grid infrastructure to support large-scale renewable energy deployment.

9. Empowering Communities

- Support community-led renewable energy projects and local ownership models.
- Ensure equitable access to affordable, sustainable energy for all, including marginalized populations.

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BIOGAS PLANT

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BIOGAS PLANT

Plant capacity	: 2m^3 FRP Biogas plant
Plant location	: Behind HoR men's Dinning hall
Project	: Food waste to Cooking Gas
Plant capacity	: 10 Kg of Food waste
Biogas Generated	: 2 Cubic meters.
Cooking Gas Equ.	: Max 1 Kg / day
Organic Fertilizer	: 25 Ltrs / day
Burning Time	: 1 ½ to 2 Hours Double Burner

Benefit of 2 Cubic Meter Biogas Plant

1 Cubic Biogas	: 0.4 Kg LPG
1 Kg LPG	: Rs. 100
	(19 Kg Commercial LPG Cylinder= Rs.1950)
LPG saving per day	: 1 x 100 = 100/-
Saving per Month	: 30 x 100 = 3,000/-
Saving per Year	: 3,000 x 12 = 36,000/-

The system consists of following stages:

Stage 1: Feeding at the Inlet pre-digester

Inlet digester is connected to the anaerobic digester. The feeding process is carried out through the inlet. This feed directly enters the digester where the anaerobic digestion takes place.

Stage 2: Treatment inside the Digestion chamber

The digester mainly consists of a digestion chamber and pressure dome gas holder. The feed directly enters the digester where the reaction carried out is an anaerobic digestion (in the absence of oxygen). The size of the digester is designed based on the type of waste and quantity of waste. Only the waste which completes its HRT (Hydraulic Retention Time) will be coming out of the digester as slurry. As the part of digestion methane gas will be formed which will be collected in the gas holder.

Stage 3: Slurry pumping at the Outlet tank

A digester is connected to an outlet tank in which slurry can be collected. This slurry can be directly used or can be connected to drainage or used as manure for garden.

INSTALLATION:

1. Pit Excavation

2. Unloaded Biogas unit

3. Lowering of Biogas unit into pit

4. Installation into ground

BIOGAS PLANT

Biogas plant full setup


1
2
3
4
5
6
7
Galaxy A23 5G

Biogas pipeline connection (From Plant to Kitchen)

Gas stove in HoR men’s kitchen burning the biogas generated from the plant

SUITABLE ORGANIC WASTES FOR BIOGAS PLANT

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போடகூடாத பொருட்கள் (BIO-GAS உருவாகுவதை தடுக்கும்)

- எலுமிச்சை பழம் மற்றும் தோல், ஊறுகாய்,
- நார்த்தங்காய், சாத்துக்குடி, ஆரஞ்சு
- பச்சைபுளி, எலுமிச்சை சாதம் , புளி சாதம்
- நெல்லிக்காய்,
- சோப்பு, பாத்திரம் கழுவும் பவுடர், ஷாம்பூ
- சோடா கூல்ட்ரிங்க்ஸ், ஆசிட் பொருட்கள்

தவிர்க்க வேண்டிய பொருட்கள் (BIO-GAS-ஐ உருவாக்காது)

- எலும்பு, மீன்முள், வாழைஇலை, வாழைத்தண்டு
- வெங்காயத்தொல், வெள்ளைபூண்டுத்தொல்,
- தேங்காய் ஓடு, முட்டை ஓடு, நண்டு ஓடு
- விதைகள், வேர்கடலை தோல், முருங்கைக்காய் சக்கை
- பேப்பர், பிளாஸ்டிக், கண்ணாடி, ரப்பர் பொருட்கள்
- செடிகொடிகளின் இலைதளைகள்

போடக்கூடிய பொருட்கள் (BIO-GAS உருவாக்கும்)

- மீதமான சாதம், குழம்பு, கூட்டு, பொரியல், அவியல்
- மிஞ்சிய மாவு வகைகள்
- புளித்தத் தயிர் , திரிந்த பால்
- நறுக்கிய காய்கறிகளின் கழிவுகள்
- அழுகிய காய்கறிகள், அழுகிய பழங்கள்
- கீரை வகைகள், கறிவேப்பிலை, மல்லிதழை
- மீன், இறால், மாமிச கழிவுகள்

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- பேக்கரி பொருட்கள்
- அழுகிய தேங்காய் பத்தை, தேங்காய் நீர்
- வேகவைத்த தானிய வகைகள்
- உதிரி பூக்கள், நறுக்கிய ஆகாய தாமரை
- அரிசி மற்றும் தானியங்களின் வடிநீர்
- அரிசி, பருப்பு, மீன், மாமிசம் போன்றவைகளை கழுவின நீர்

வாரம் ஒருமுறை மட்டும் கொடுக்கக்கூடிய பொருட்கள்

- மீன், இறால் கழிவுகள்
- முட்டைகோஸ்
- பலாப்பல தோல் மற்றும் கழிவுகள்
- நறுக்கிய ஆகாயத்தாமரை

கவனிக்க வேண்டியவைகள்

- Gas Tube -ல் வாட்டர் தேங்கிநின்றால், அது நீக்க பட வேண்டும்
- குறிக்கப்பட்ட திடக்கழிவின் அளவினை விட அதிகமாக கொடுக்கக்கூடாது

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Materials not to put (Those Prevents Bio-Gas Formations)

- Lemon and its skin, Pickles
- Orange, Mosambi, Citron
- Dry tamarind, Gooseberry, Lemon Rice, Tamarind Rice
- Soap and cleaning detergent power, Shampoo
- Cool drinks and Acid contents.

Products to be avoided (Those does not produce Bio-Gas)

- Bone, Fish thorn, Banana leaf, Banana stalk
- Peel of Onion, Ginger and Garlic
- Coconut Shell, Egg Shell, Crab Shell
- Seeds, Peanut's skin, Drumstick residue,
- Paper, Plastic, Glass, Rubber materials
- Plants and Leaves.
- Greens, Spinach, Coriander leaves and Curry leaves

Products that produce Bio-Gas

- Waste or leftover meals, Gravy, Curry, Etc.,
- Sour Curd, Fermented Milk,
- Leftover Flours,
- Chopped Vegetable Waste
- Fish, Shrimp (Prawn), Non-Veg items
- Bakery Waste
- Coconut water, Rotten coconut
- Steamed Cereals
- The Rotten Vegetables and Fruits
- Dropped flowers and Sliced Water Hyacinth (Agaya Thamarai).
- Infusions of Rice and Cereals
- Washed water of Rice, Pulses, Fish and Non-Veg.

Products that can generate more Bio-Gas (must be given weekly once)

- Fish waste and Shrimp (Prawn) waste
- Skin of Jack Fruit and its waste
- Cabbage
- Rice infusions, Rice washing water, Flour and flour products
- Sliced Water Hyacinth (Agaya Thamarai).

Things to Notice

- If water gets stagnant in the gas pipe is noticed, it should be removed.
- Along with the solid waste, add two times of water from its size (the water may be washed waste waters of rice, pulses, fish, meat etc,).

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Facilities for Alternate Energy Sources and Energy conservation

The exploration of alternate energy sources and the promotion of energy conservation have emerged as pivotal strategies in shaping a sustainable future. Alternate energy source sets a stage for an exploration into the realm of alternate energy sources and energy conservation, delving into significance, principles and potential pathways towards a more resilient and eco-friendly energy landscape. As an Alternate Energy Sources and Energy Conservation, Sri Krishna College of Engineering and Technology have initiated the Energy Conservation through-out the campus. The following are the Alternate Energy Sources and Energy Conservation schemes.

1. Solar Energy
2. Biogas Plant
3. Sensor based Energy Conservation
4. LED Lamps

1. SOLAR ENERGY

Solar Energy is utilized for water heating system to produce hot water. It can raise the water temperature to a range of 60 to 80 degrees Celsius. Employing a solar water heater can significantly reduce electricity or fuel expenses, offering a cost-effective means of producing hot water for various purposes. Moreover, solar heaters not only lead to substantial energy savings but also take advantage of the free energy source provided by the sun, as opposed to the costs associated with natural gas or fuel oil. Solar water heaters are installed in all housing blocks for both men and women.

Installed Capacity of Solar Water Heater

S. No.	Location	Capacity in litres	Qty Available
1	HORM – A	2000	2
2	HORM – B	2000	2
3	HORM – C	2000	2
4	HORM – D	1000	6
5	HORM – E	2000	2
6	HORW – B1	2000	2
7	HORW – B2	2000	2

- Average of 25 Litres of hot water utilized by single person per day.

  Total Strength of students in Hostel 2150
  Per day consumption of water (2150×25) : 53750 litres

- One litre of solar water heater per day saves 15 units/year

  No of units saved for per year : 53750 X 15 = 806250

  Renewable energy generated and used = 806250 / 274152 × 100 = 38.8%

*Average Units consumed per year 274152

Percentage of Renewable Energy Source in SKCET: 38.87 %

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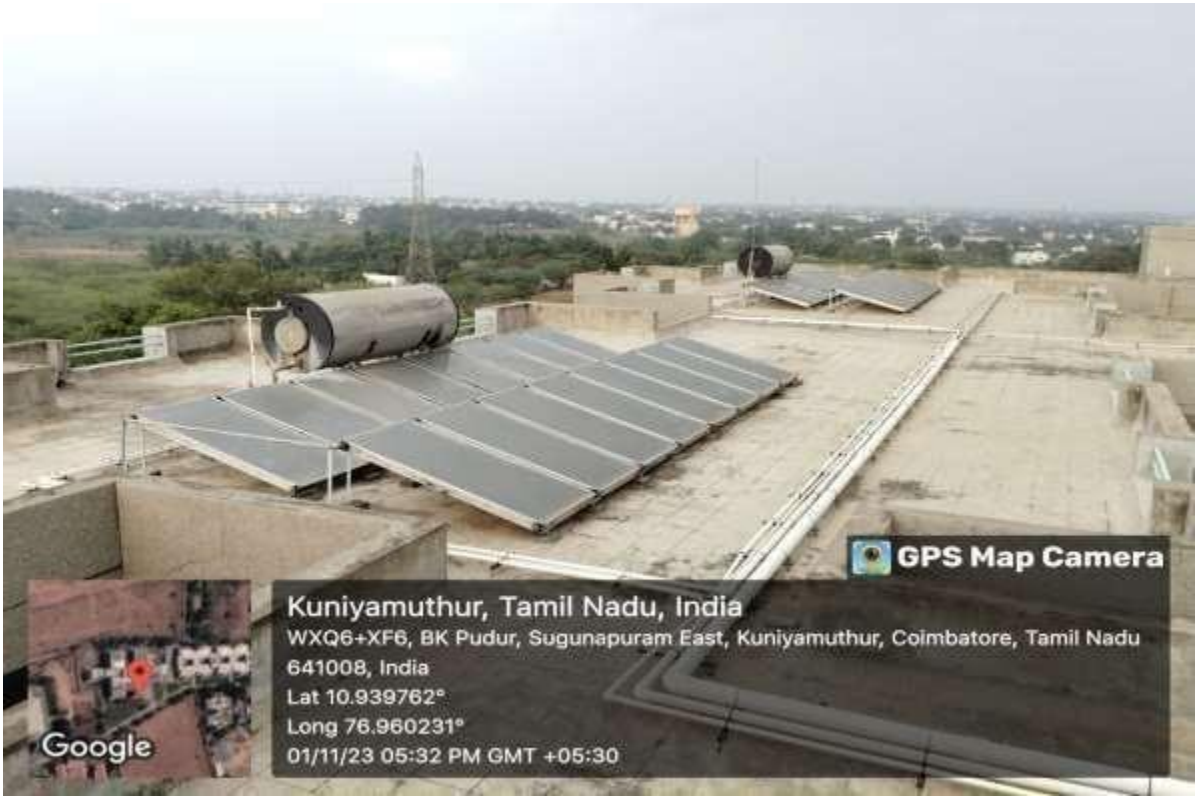
Solar water heater installed in Hall of Residence Men –'A' Block: 3000LPD with 5bar(kg/cm^2)



Solar water heater installed in Hall of Residence Men –'B' Block
3000LPD with 5bar(kg/cm^2)

Solar water heater installed in Hall of Residence Men –'C' Block

3000LPD with 5bar(kg/cm^2)

Solar water heater installed in Hall of Residence Men –'D' Block

1000LPD with 5bar(kg/cm^2)

Solar water heater installed in Hall of Residence Men –'E' Block

3000LPD with 5bar(kg/cm^2)

Solar water heater installed in Hall of Residence Women–'B1' Block
3000LPD with 5bar(kg/cm^2)

Solar water heater installed in Hall of Residence Women–'B2' Block
3000LPD with 5bar(kg/cm^2)

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