SUSTAINABLE GLOBAL ENERGY TRANSITION- S'GET
& Entrepreneurship opportunities
நிலையான உலக எரிசக்தி மாற்றமும் தொழில்முனைவோர் வாய்ப்புகளும்

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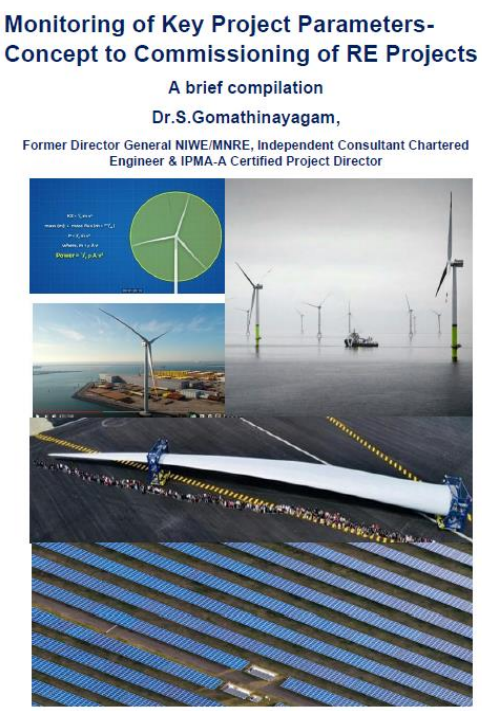
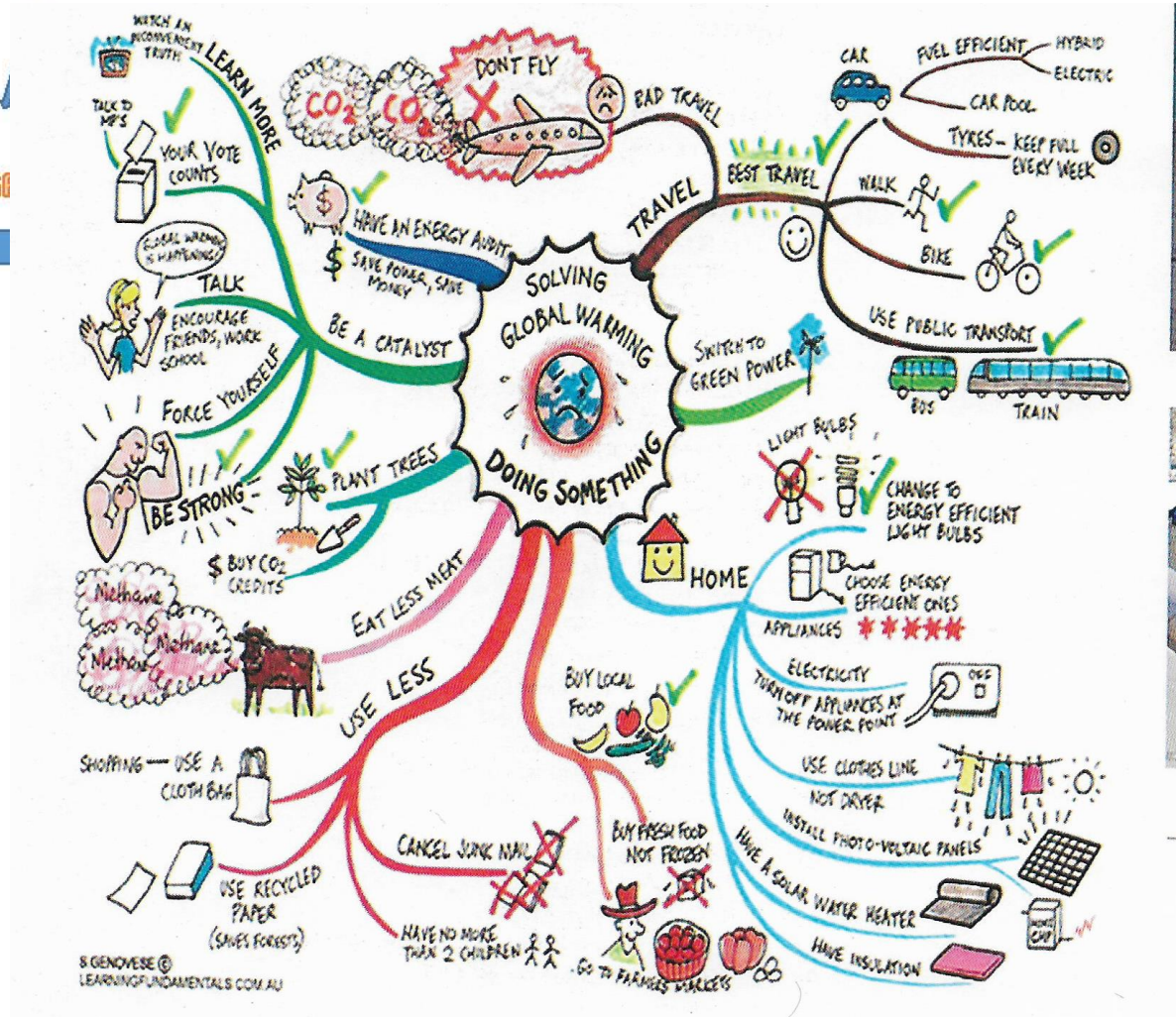
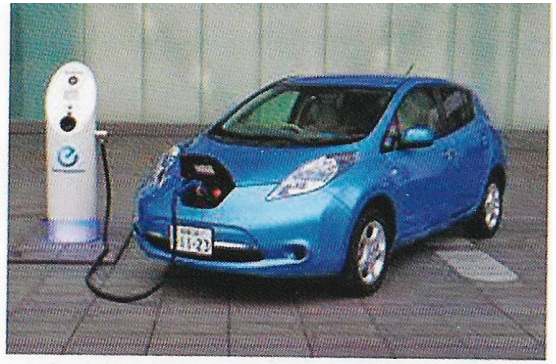
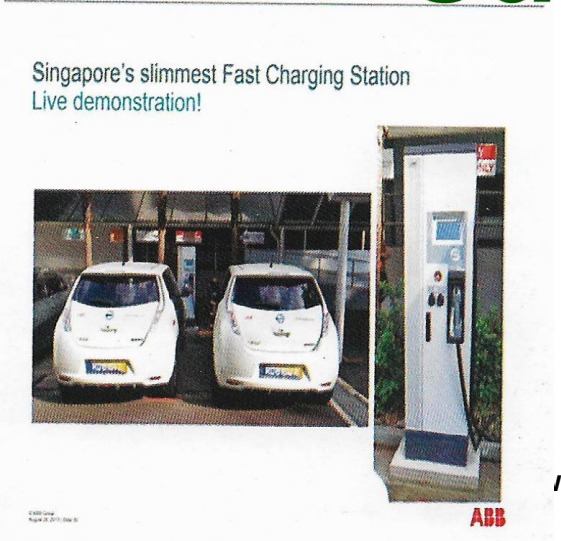
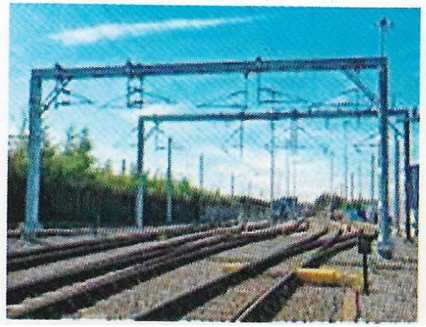


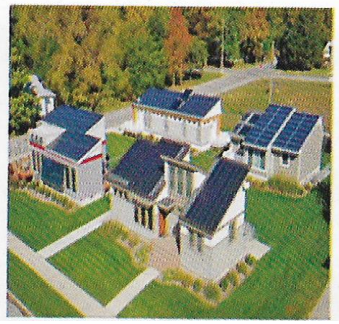


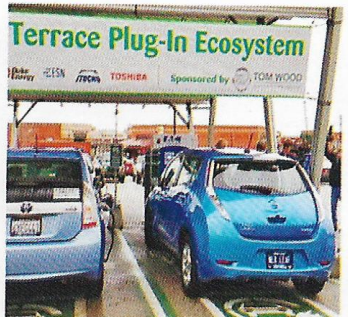


What we mean sustainable ?









IRENA RE-Jobs report 2021: Tech-Wise

Figure 1. Global renewable energy employment by technology, 2012-20

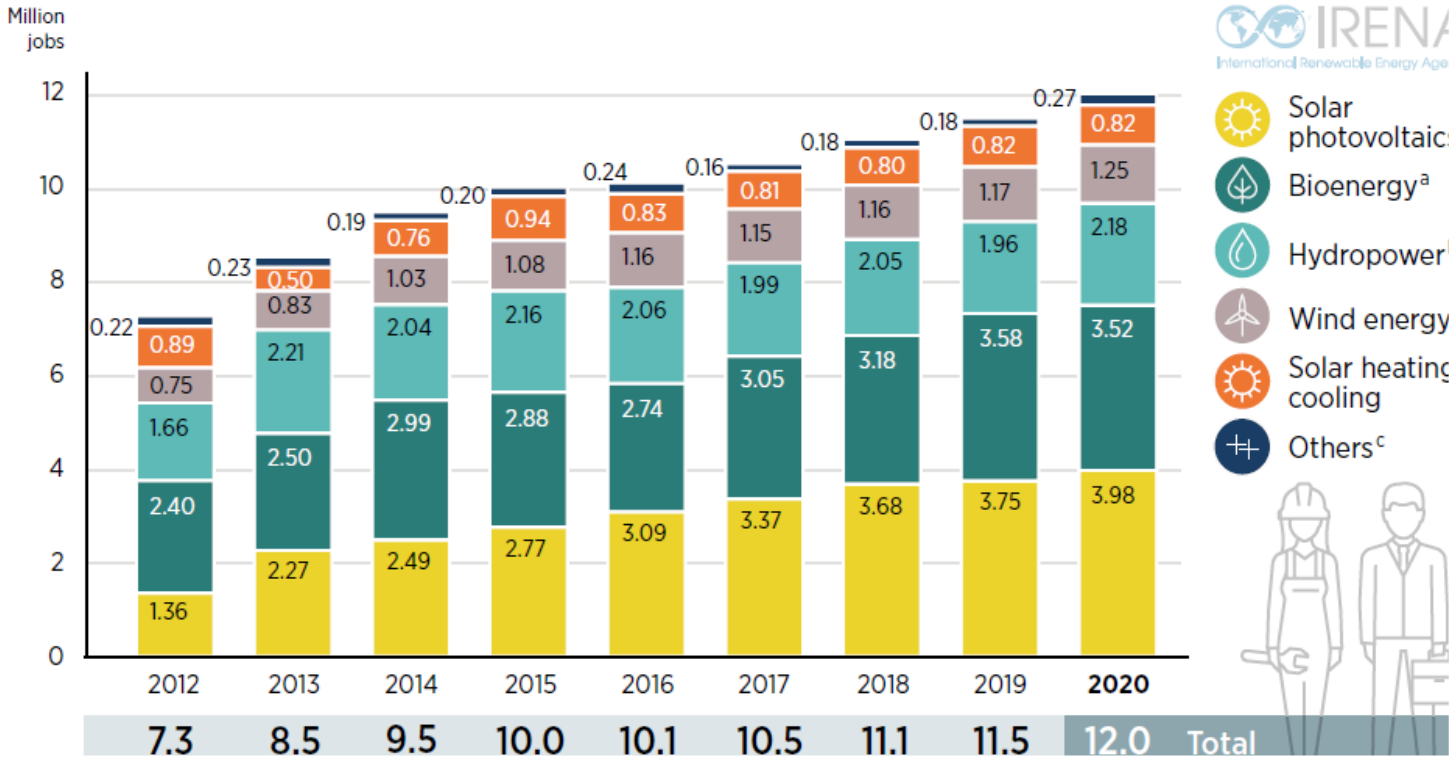
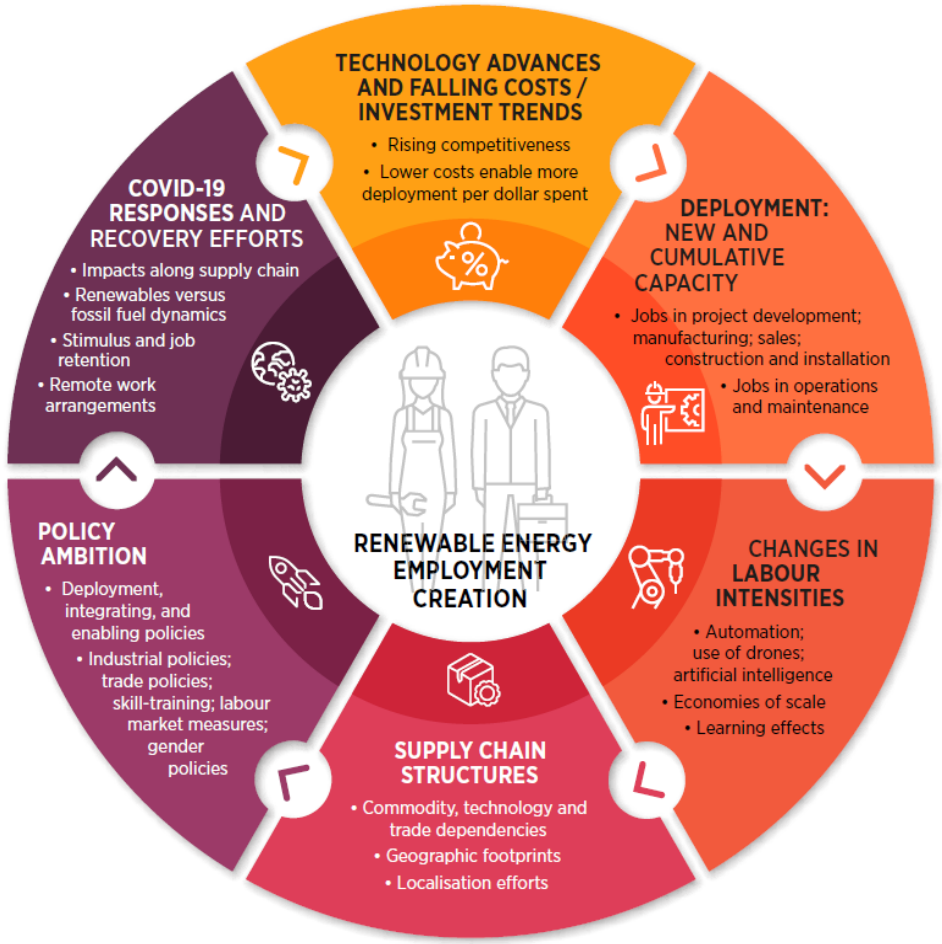


Figure 2. Factors influencing renewable energy employment



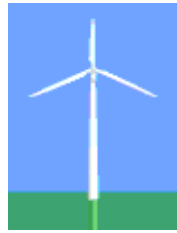
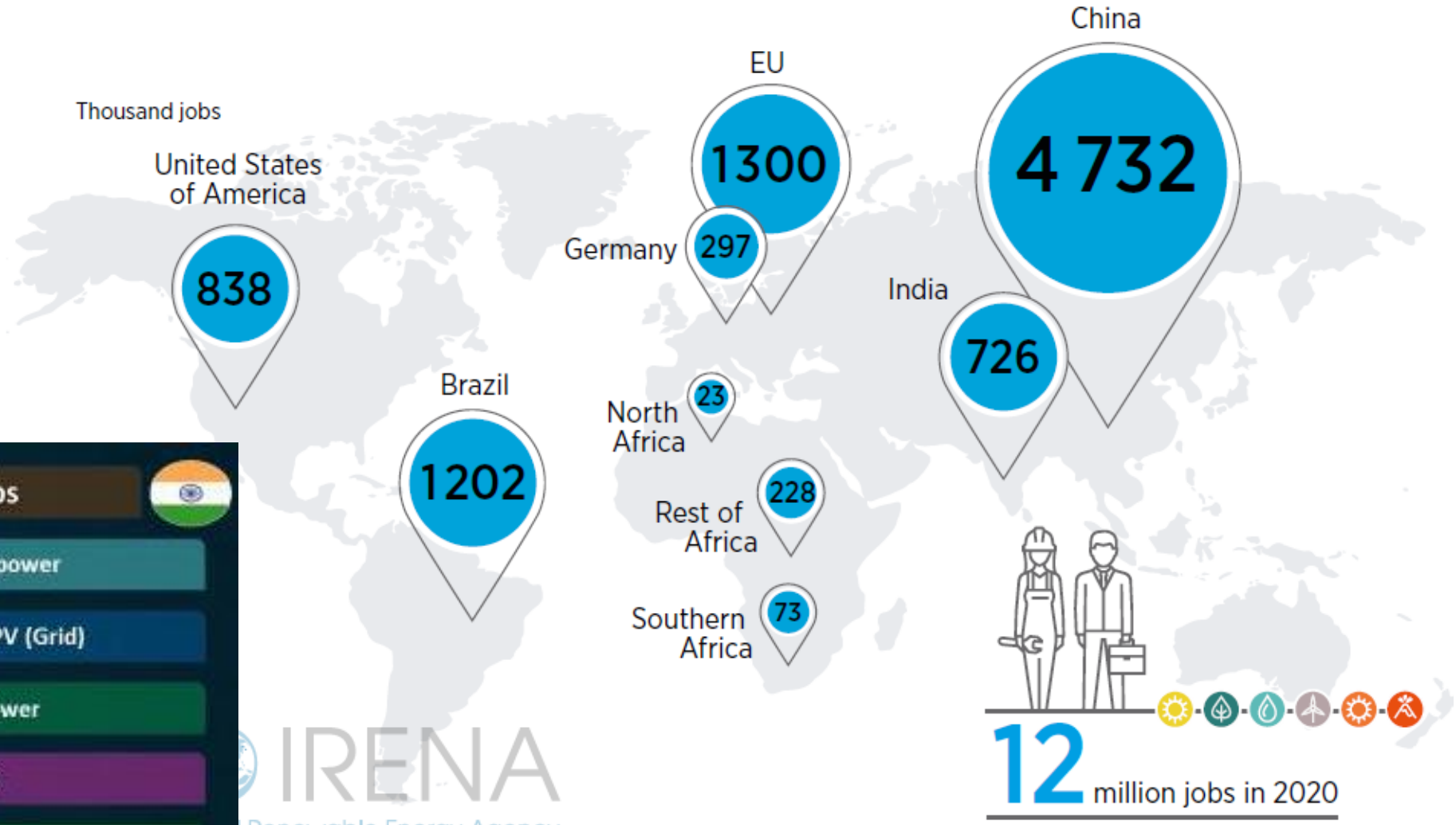
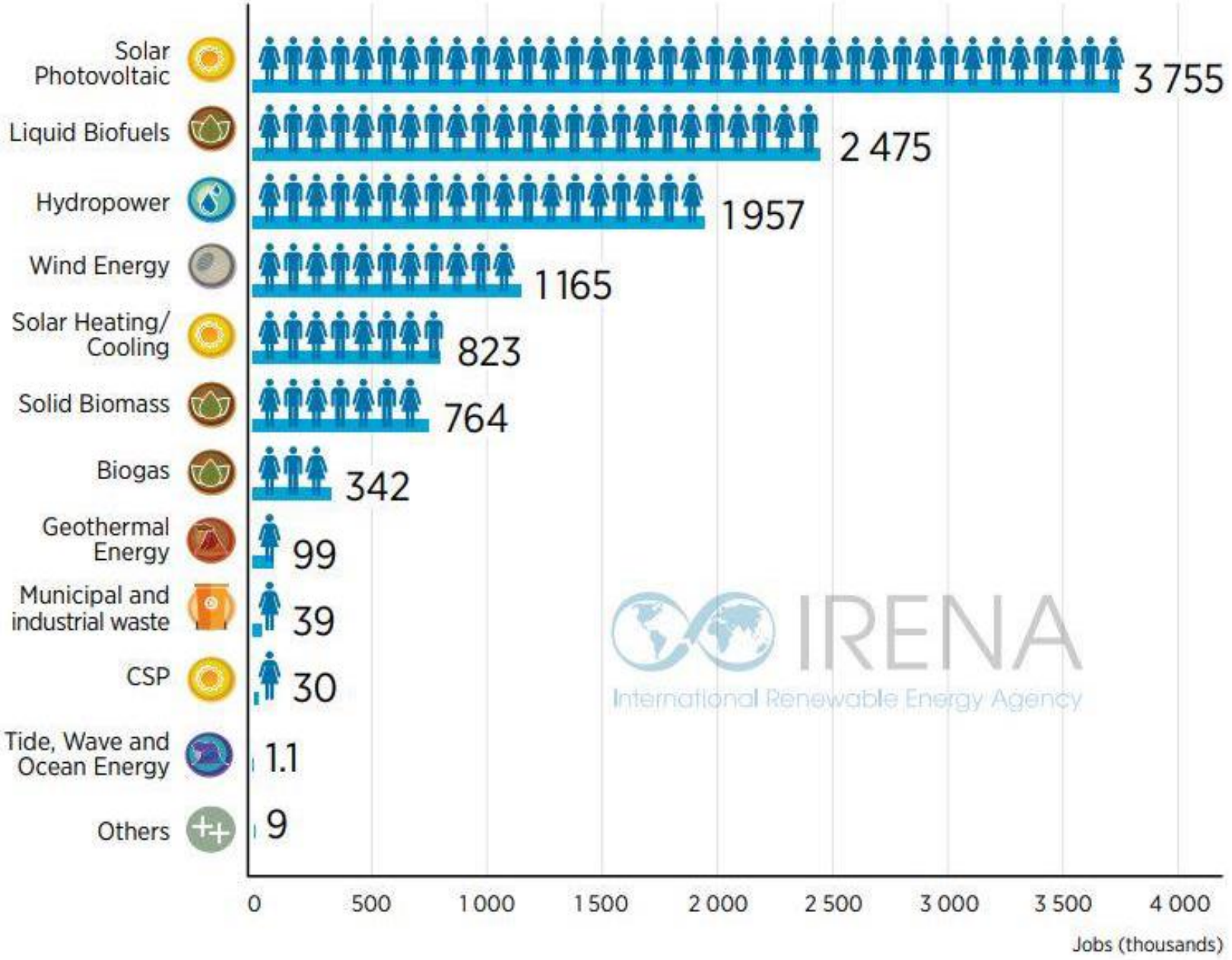
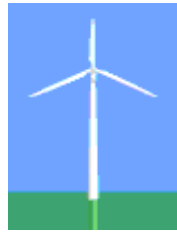


Figure 9: Renewable energy employment in selected countries

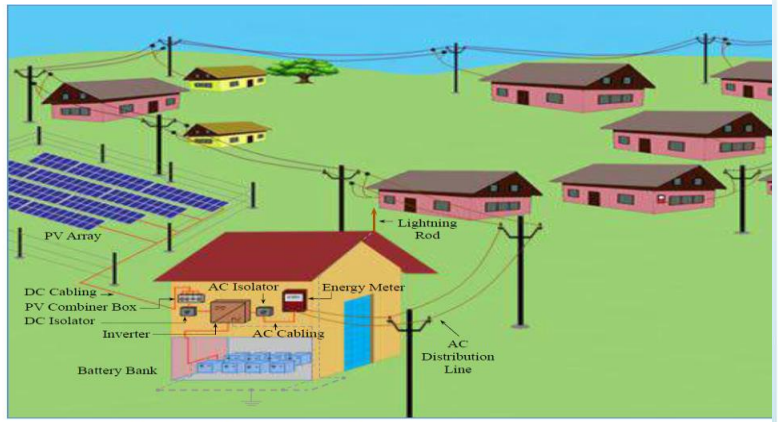



S'GET

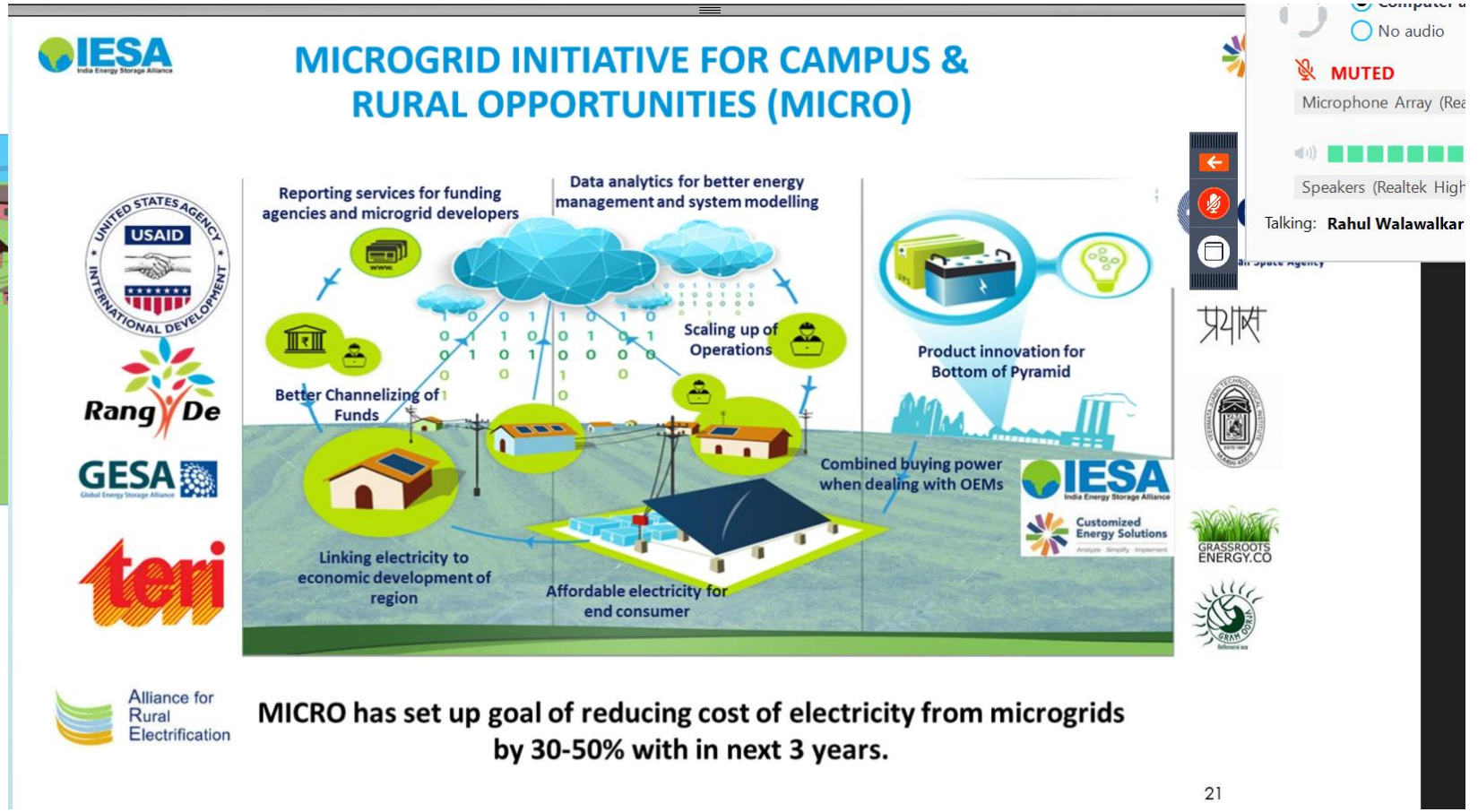

Solar Photovoltaic
3 755
Liquid Biofuels
2 475
Hydropower
1957
Wind Energy
1 165
Solar Heating/ Cooling
823
Solid Biomass
764
Biogas
342
Geothermal Energy
99
Municipal and industrial waste
39
CSP
30
Tide, Wave and Ocean Energy
1.1
Others
9
0
500
1 000
1 500
2 000
2 500
3 000
3 500
4 000
Jobs (thousands)
IRENA
International Renewable Energy Agency



Micro and mini grid development for distributed generation



A conceptual schematic of solar microgrid system



Ack. Source: Webinar Presentation May 26, 2020, Dr.Rahul, President , IESA

Country-Wise Renewable opportunities (Ref. Clean jobs USA, IRENA 2021)

FIG. 1 // U.S. CLEAN ENERGY EMPLOYMENT by sector 2020

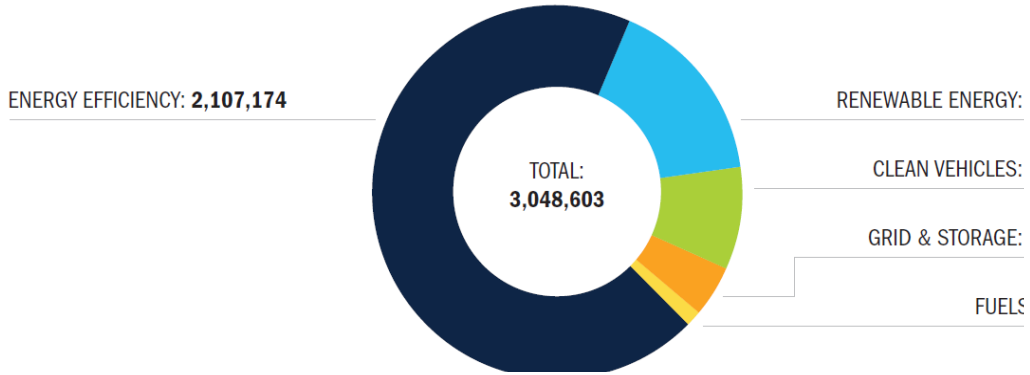
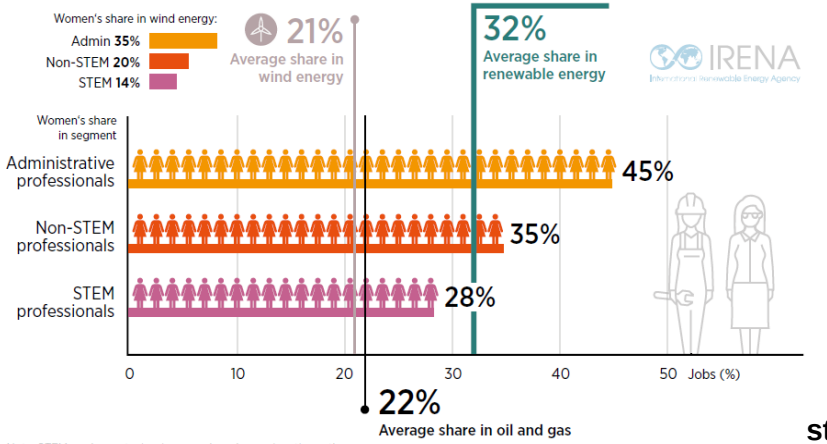


Figure 3: Women's share in the oil and gas, renewables, and wind power workforce, with breakdown by STEM, non-STEM and administrative positions in renewables



Note: STEM = science, technology, engineering and mathematics.
Based on: IRENA, 2019, 2020b.

Table 2: Estimated direct and indirect jobs in renewable energy worldwide, by industry (thousand jobs), 2019-20

	World	China	Brazil	India	United States	European Union (EU27)[o]
Solar PV	3 975[e]	2 300	68	163.5[h]	231.5[i]	194
Liquid biofuels	2 411	51	871[g]	35	271[j]	229
Hydropower[a]	2 182	813.6	175.8	319.5	71[k]	80
Wind power	1 254	550	40	44	116.8	259
Solar heating and cooling	816	670	47.2	21	na	21
Solid biomass[b, c]	765	188		58	44.5[l]	368
Biogas	339	145		85	na	76
Geothermal energy[b, d]	96	3			8[m]	40[d]
CSP	32	11			na	6
Total	**12 018[f]**	**4 732**	**1 202**	**726**	**838.4[n]**	**1 300[f]**

Offshore Wind Power : Is it Wind Onshore migration ???

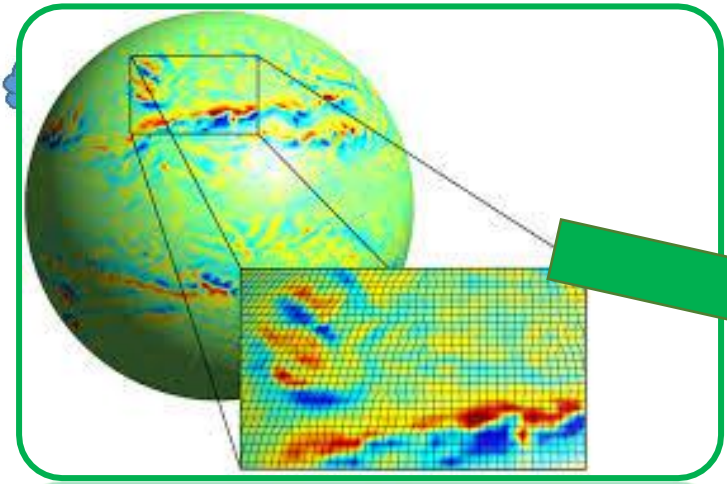
BIOGAS FOR COOKING and Sanitinary Landfill dump yard as biogas plant

2.5 LAKH Biogas Plants set up in LAST 4 YEARS for rural households to empower women by giving them access to clean fuel

Solid waste dump yard stinks but convert that as sanitary land fill and Biogas 0.42g/person/day 10Lakhs People 420kg/day, 153tonnes/year, methane is 50% of Biogas, which can be tapped and CO_2 trapped to Cut 1993tonnes of emission. Waste per capita 450g/day, 0.21g/person methane can avoid 4.41g/per carbon.

Powered by AI, ICT,IoT,IIoT

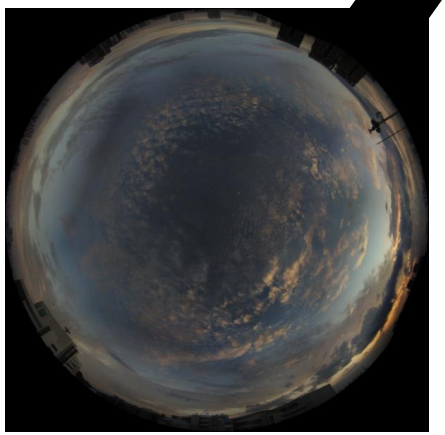
RE Forecasting



METEOROLOGICAL DATA

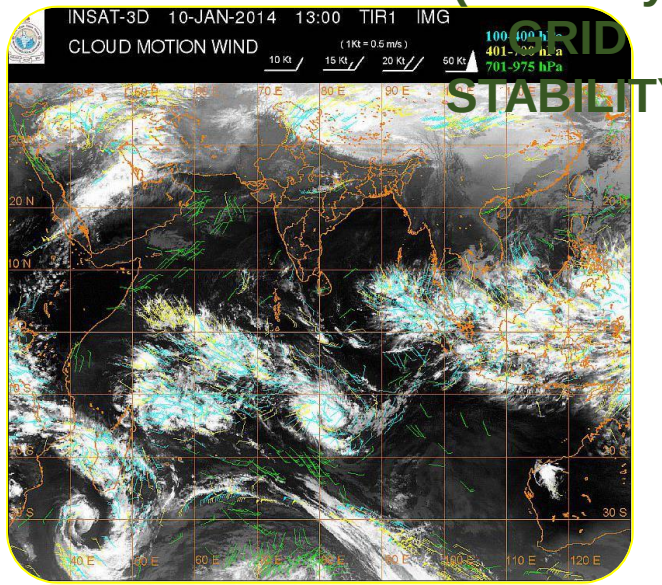
(Day ahead)
POWER SCHEDULE

SKY CAMERA IMAGE
(intra hour)
GRID STABILITY



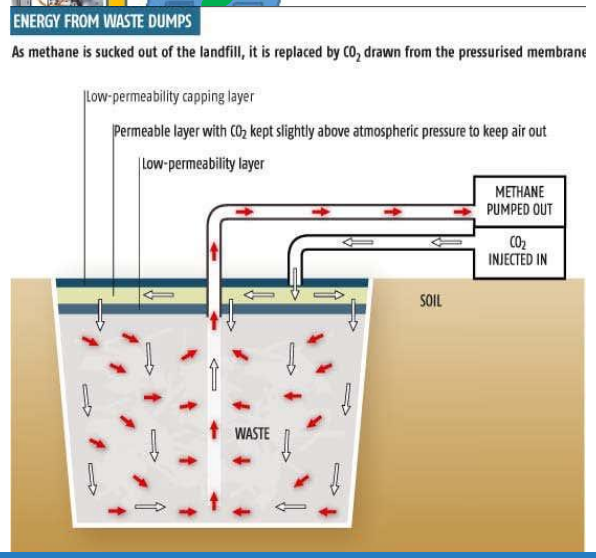
RE POWER PLANT

SCADA
SATELLITE IMAGE
(Intra day)
GRID STABILITY

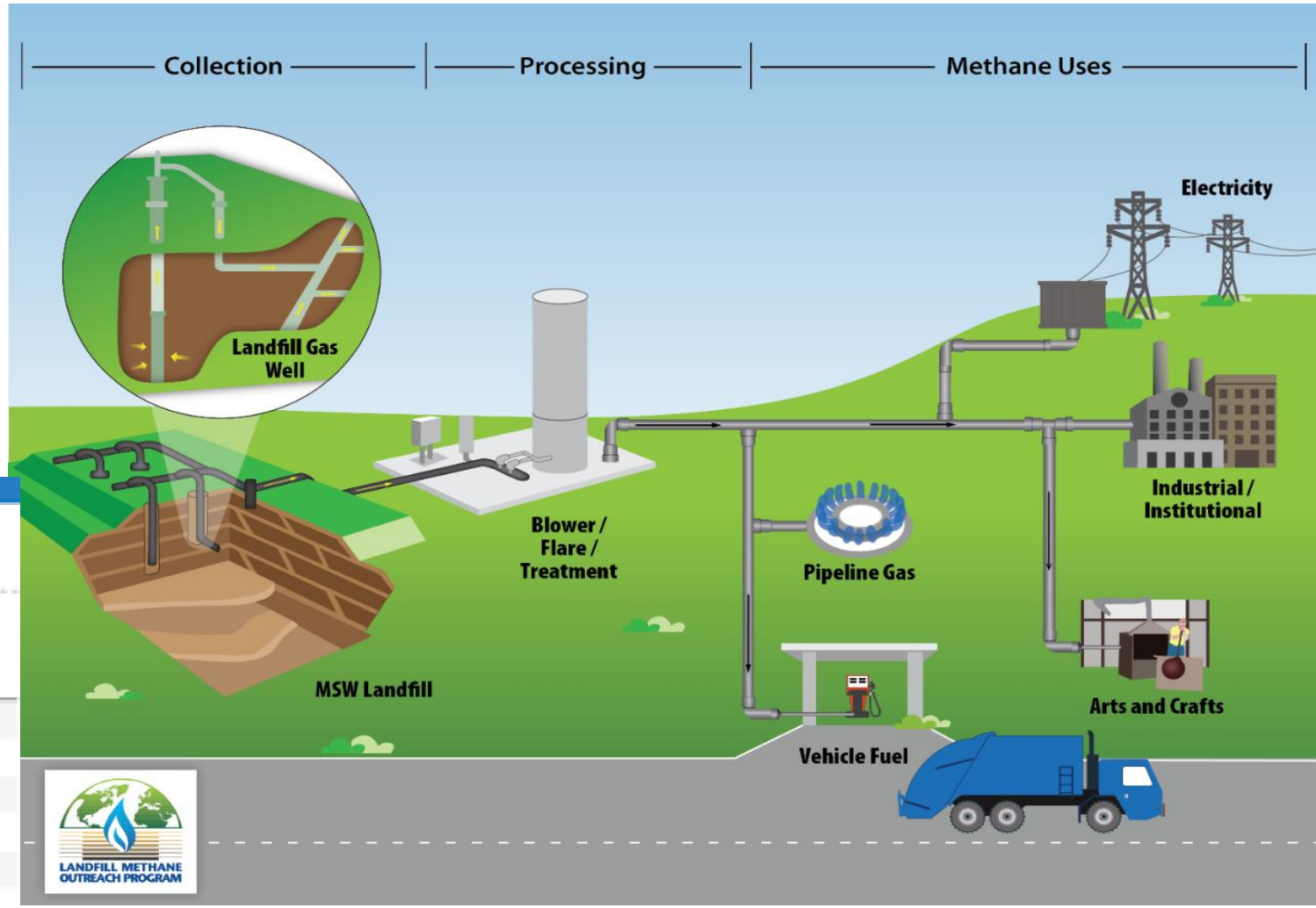


Sustainable Global Energy Transition S'GET
DrGoms Email : sgetgoms@gmail.com

WASTE IS WEALTH, WoW What a Way



W2E



Municipal solid waste in Asia

Country	Waste generated per kg/person/day		
	Current	2025 (projected)	Increase/decrease
Japan	1.71	1.7	▼ 0.5%
South Korea	1.24	1.4	▲ 12.9%
Singapore	**1.49**	**1.8**	▲ **20.8%**
Indonesia	0.52	0.85	▲ 63.5%
China	1.02	1.7	▲ 66.7%
Philippines	0.50	0.9	▲ 80%
India	0.34	0.7	▲ 105.9%

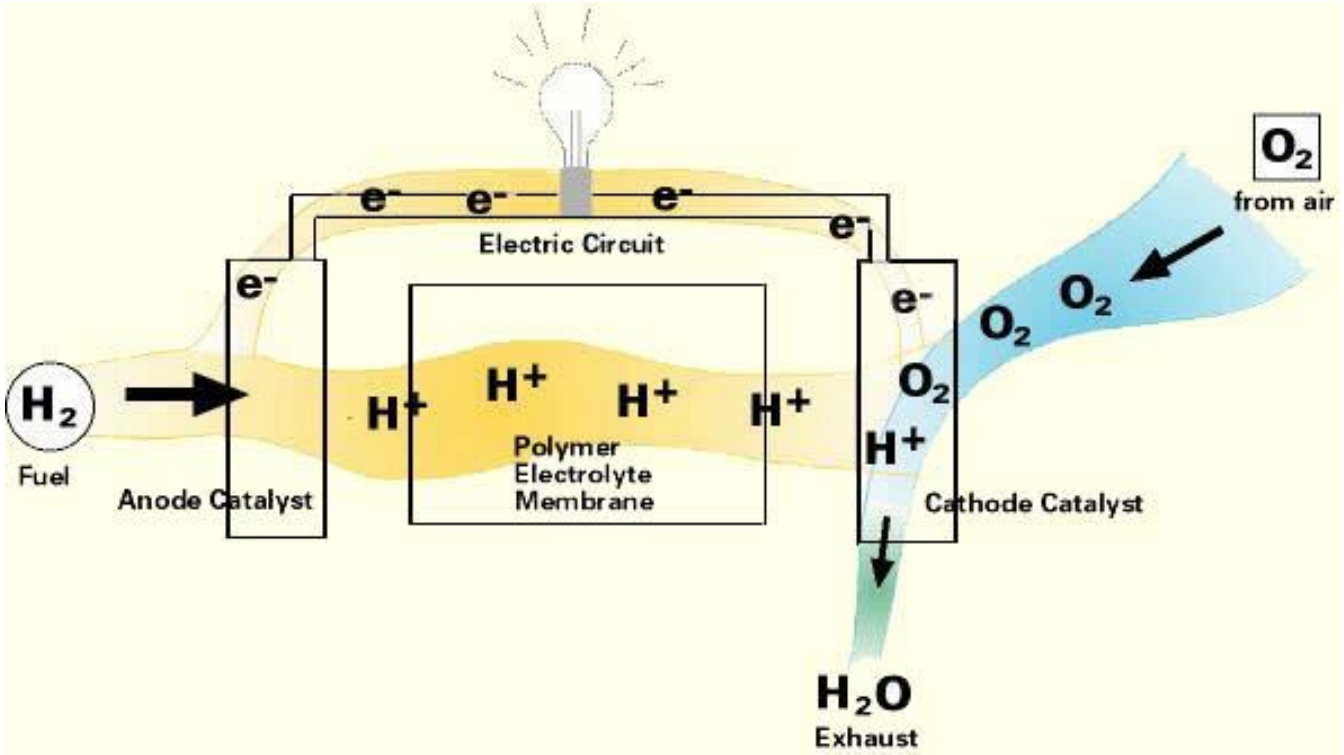
Source: WORLD BANK STRAITS TIMES GRAPHICS

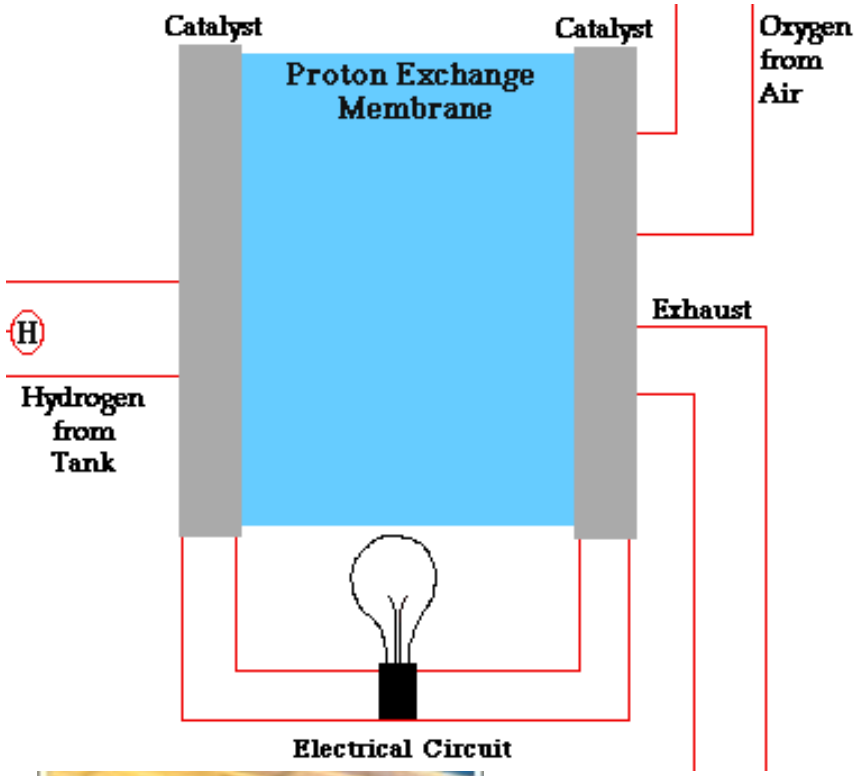
“GOELECTRIC” Launched 2021 , Why ?

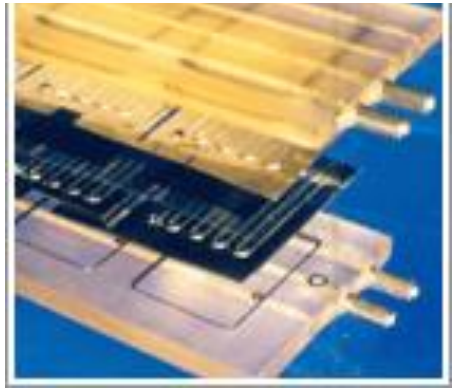
BOV to EOV to EOHV “GOELECTRIC “

மின்சாரகார்	தூரம்/முழுசார்ஜ் (கி.மீ)	வேகசார்ஜ் நேரம் (நிமிடம்)	மெதுசார்ஜ் நேரம் (வீடு) (மணி)	இன்றைய விலை (லட்சம் ரூபாய்)
Hyundai Kona EV	452	60 (80% level)	6-19	23
Tata Nexon EV	312	60 (80% level)	8	14
MG ZS EV	340	60 (80% level)	12-15	20
Tata TIGOR EV	213	120 (80% level)	12	11

www.fuelcells.org







“GOELECTRIC”

Key Technology Trends in E-Mobility Charging

TREND 1
Bigger EV Batteries resolve range anxiety, but also require **Higher DC Charging Power** for long distance travel

HPC · CHAdeMO Version 3.0 · 超级 Chaoji

TREND 2
With **Plug & Charge** charging electric vehicles becomes more convenient than filling up gasoline at a gas station

Home and opportunity charging (e.g. at work, super market, restaurant) will eliminate the need to visit gas stations for most EV drivers

Plug & Charge technology and ACD (automated connecting devices) will simplify charging process. No need for authorization/payment or even plugging the charging connector

ISO ISO 15118-2 · PnC

TREND 3
Intelligent load management and bidirectional charging enables true **Smart Charging**

Advanced charging protocols and HEMS (Home Energy Management Systems) allow intelligent timing of taking or providing energy to the grid. In combination with smart meters and renewable energy sources, the grid can be balanced

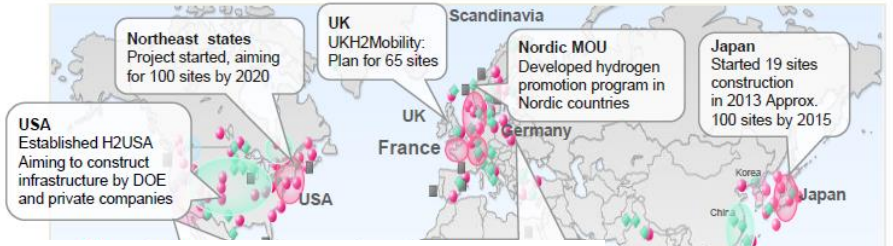
ISO ISO 15118-20 · CHAdeMO V2H/V2L

KEYSIGHT TECHNOLOGIES

Webinar Ref.Sadaf A.Siddiqui

FCV to FCHV

World-wide location of hydrogen stations



Eco-car as easy as conventional car

Areas where infrastructure development can be expected after 2015

hnology deployment

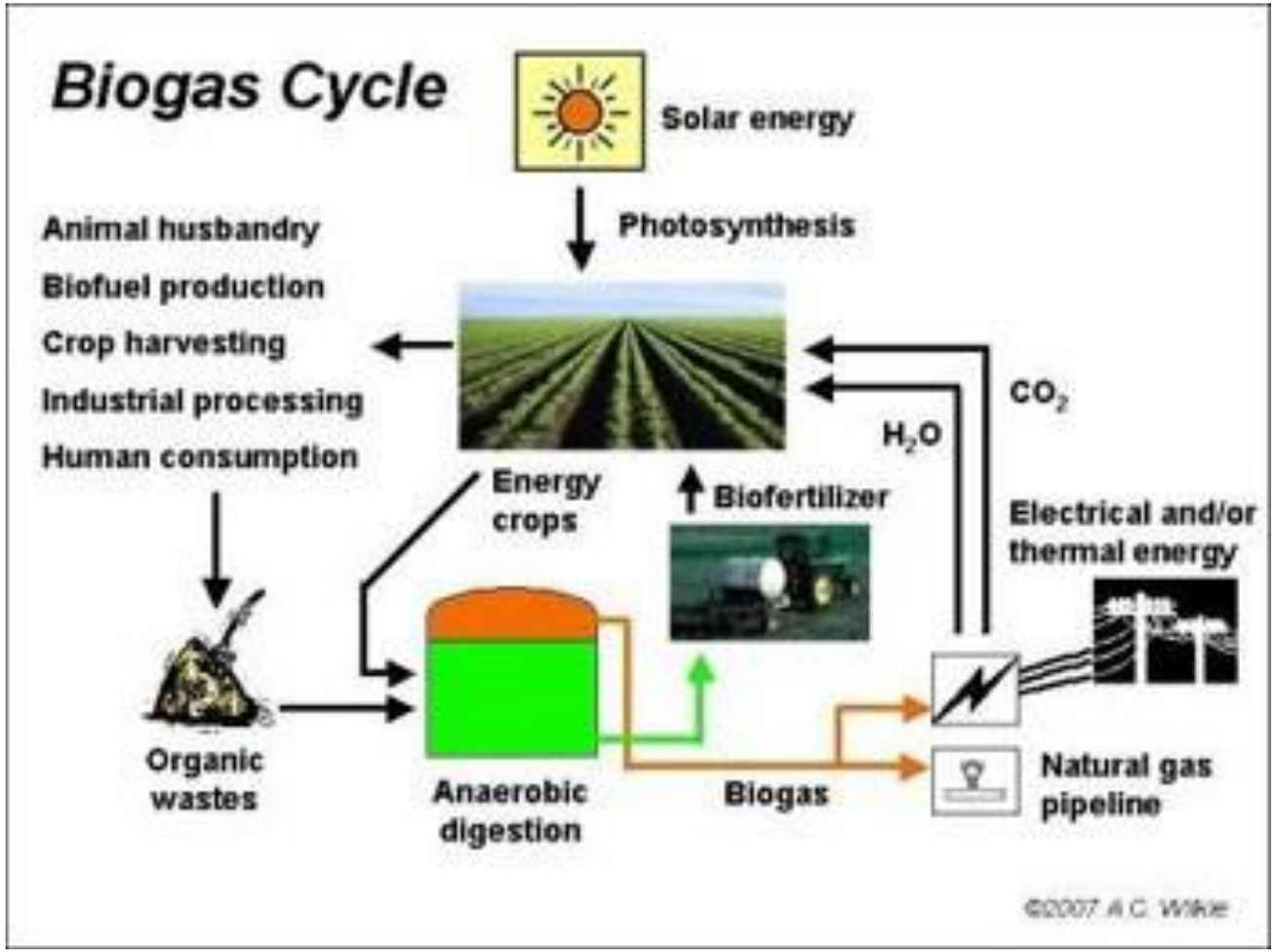
Introduce in Europe in **UK, Dk** and **Germany** follow-up by other countries.
Select regions where we can ensure quick & efficient service with customer follow-up

Fuel cell
Advanced technology fulfilling customer expectations

TOYOTA

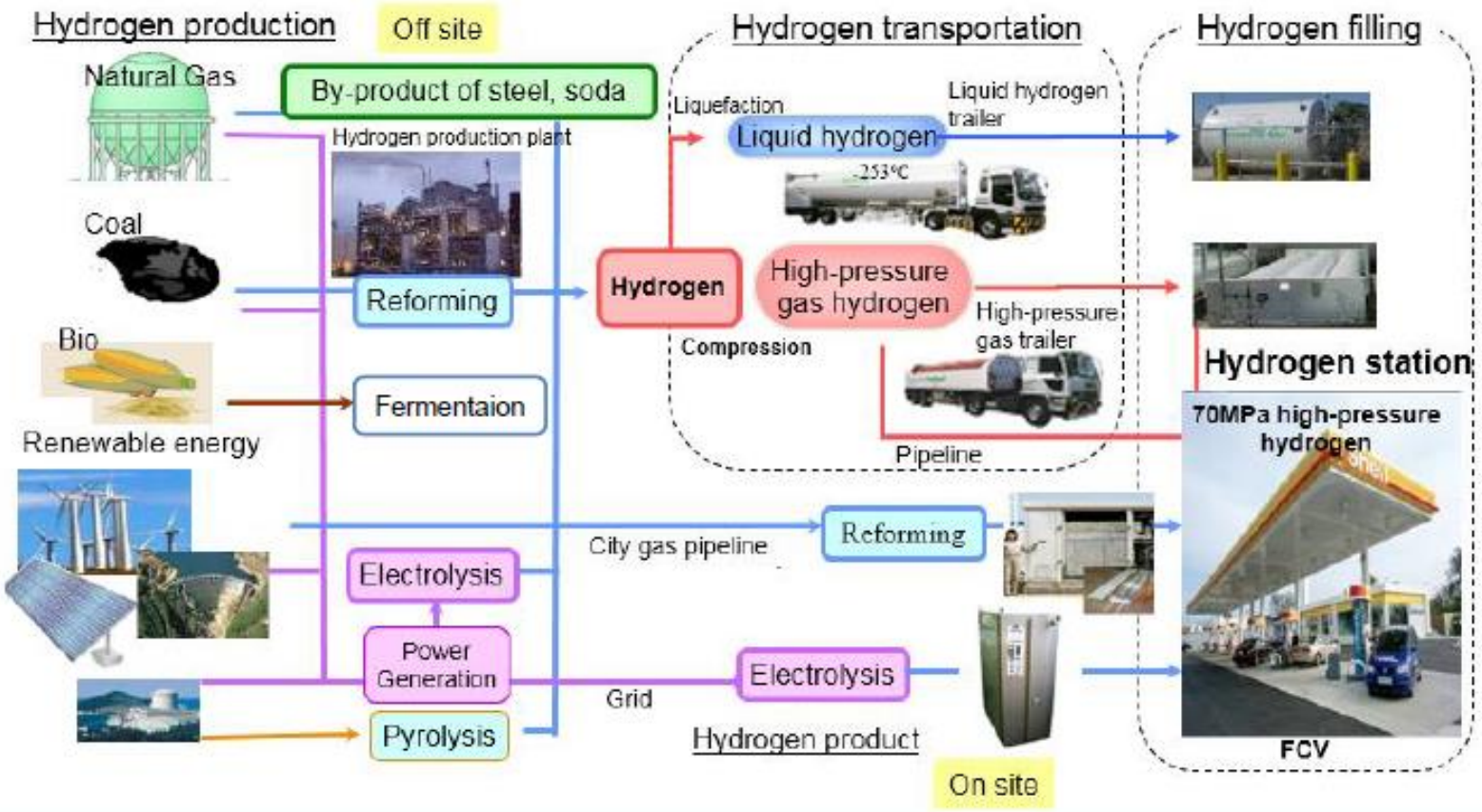
on Mobility

Energiewende 2016 Germany



Hydrogen production and infrastructure

FCV
to
FCHV

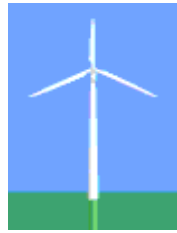


Hydrogen has been already mass-produced for an industrial use.
Hydrogen is able to produce from various primary energy sources.

TOYOTA

	Africa	Asia	Australasia	CIS	Europe	Latin America	Middle East	North America
Averages	**55,021**	**47,694**	**73,493**	**45,237**	**59,607**	**40,601**	**48,255**	**74,708**
Biomass Engineer	46,947	46,842	63,411	35,049	61,386	32,100	43,625	67,895
Business Development Manager	62,186	49,639	76,408	62,118	56,516	42,220	47,602	83,715
Civil/Structural Engineer	61,328	41,485	79,528	42,298	74,624	57,600	46,445	82,529
Commercial Manager	46,350	53,285	108,784	45,177	66,428	61,000	46,752	62,385
Construction Manager	68,256	58,359	83,958	56,471	65,820	46,800	58,427	90,918
Design Engineer	52,136	40,295	62,903	39,730	52,788	55,600	43,204	70,712
Electrical Engineer	60,207	47,454	80,082	47,989	64,224	41,300	51,434	87,901
Energy Engineer	46,494	48,978	65,023	31,318	53,070	30,900	43,149	61,992
HSE Manager	60,370	49,664	80,553	56,471	68,456	39,900	48,086	83,664
Maintenance Engineer	60,156	46,370	71,300	43,530	52,711	38,700	48,971	77,231
Marine Engineer	51,750	42,694	76,490	38,635	59,177	33,400	54,393	67,585
Mechanical Engineer	55,531	43,258	70,653	41,457	59,703	39,900	52,726	77,346
Operations Manager	67,690	52,460	81,243	44,749	68,420	46,700	50,000	83,084
Project Engineer	65,907	54,183	76,105	49,218	64,681	38,900	55,881	87,901
Project Manager	64,919	55,922	82,635	56,471	68,524	44,700	58,378	88,031
QA/QC Manager	62,290	54,558	75,047	53,648	62,551	41,200	52,125	85,477
Renewable Energy Consultant	43,201	49,376	64,300	40,942	60,752	34,500	43,350	66,762
Solar Engineer	38,634	37,511	47,386	28,236	43,076	31,200	35,026	50,653
Wind Farm Project Manager	47,712	45,757	76,674	62,118	47,913	26,800	52,563	66,375
Wind Turbine Technician	38,360	35,792	47,378	29,116	41,328	28,600	32,971	52,000

GETI 2021



What Roles in RE-Jobs @what pay

Table 2. Daily rates of renewable energy sector employees on contract (GETI 2021)

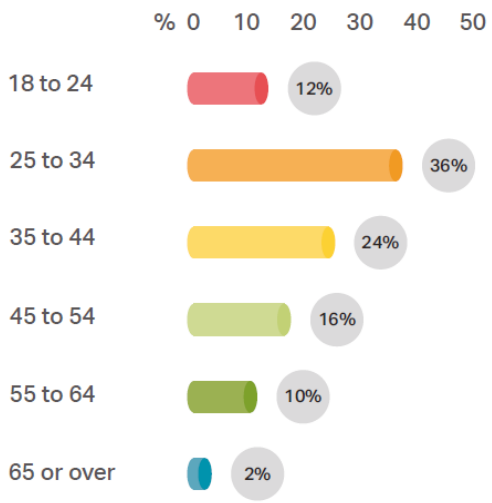
	Africa	Asia	Australasia	CIS	Europe	Latin America	Middle East	North America
Averages	**374**	**414**	**520**	**260**	**526**	**275**	**435**	**546**
Biomass Engineer	294	333	442	224	435	228	313	478
Business Development Manager	435	399	555	259	599	301	369	596
Civil/Structural Engineer	395	331	549	297	500	390	500	581
Commercial Manager	344	615	751	301	471	460	500	470
Construction Manager	455	443	596	264	628	330	575	670
Design Engineer	342	333	448	314	368	390	340	518
Electrical Engineer	379	365	553	297	554	270	500	626
Energy Engineer	298	371	456	220	448	218	312	433
HSE Manager	419	560	567	236	541	213	500	610
Maintenance Engineer	393	371	507	301	536	210	365	569
Marine Engineer	339	465	539	246	603	230	400	492
Mechanical Engineer	382	480	496	278	626	270	500	580
Operations Manager	456	399	567	212	518	330	429	591
Project Engineer	444	423	545	274	451	240	500	624
Project Manager	427	444	589	349	685	312	600	646
QA/QC Manager	424	422	524	224	617	250	500	640
Renewable Energy Consultant	303	520	456	191	401	245	327	486
Solar Engineer	289	325	350	199	479	228	294	407
Wind Farm Project Manager	371	374	551	292	604	185	600	494
Wind Turbine Technician	290	310	353	226	455	203	269	402

GETI 2021

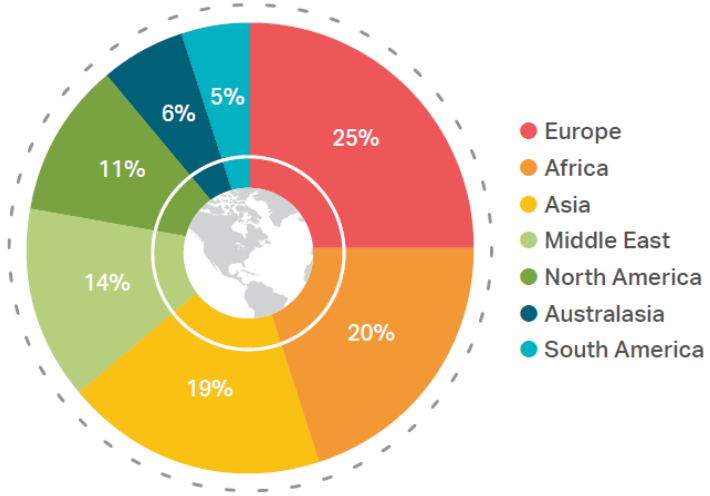
What Contract Roles in RE-Jobs @what daily wages ?

1. DEMOGRAPHICS

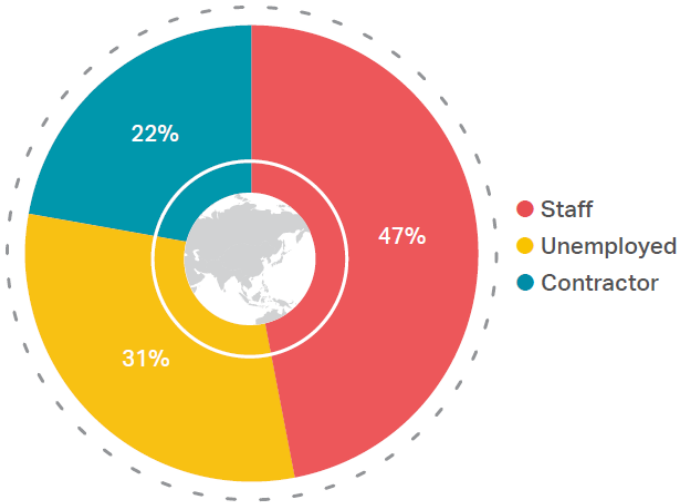
AGE



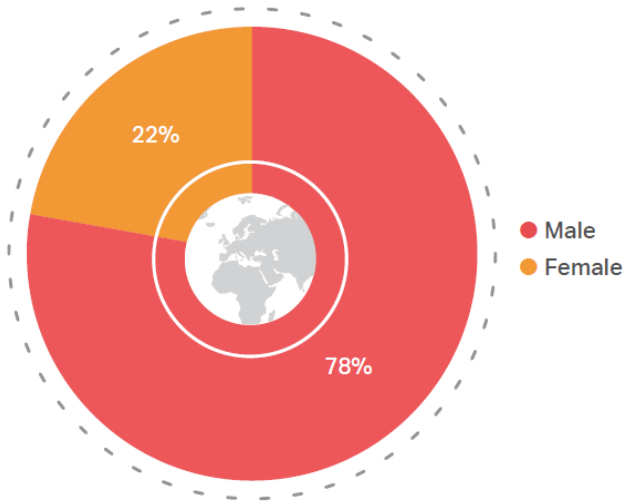
REGION



EMPLOYMENT STATUS

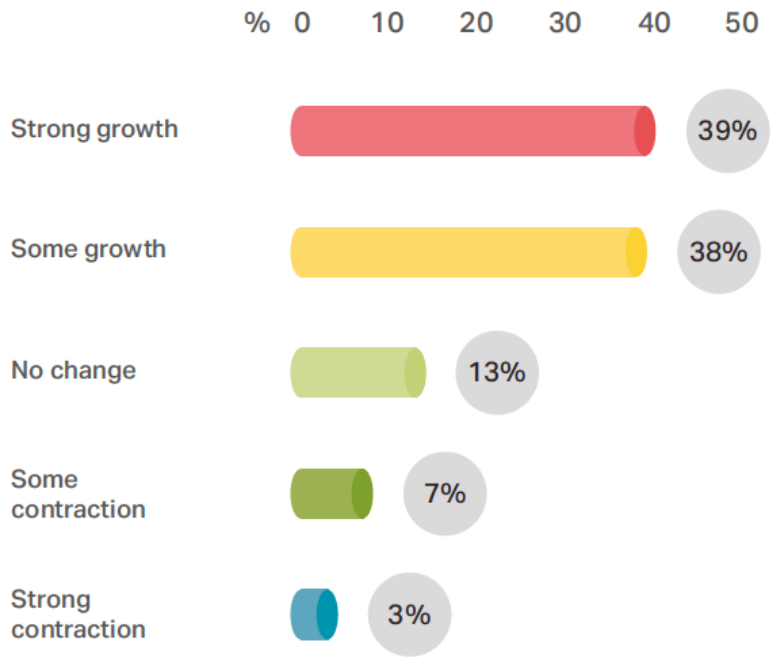


GENDER



GETI 2021

HOW STRONGLY HAS YOUR SECTOR GROWN OR CONTRACTED OVER THE PAST YEAR?



GETI 2021/IRENA

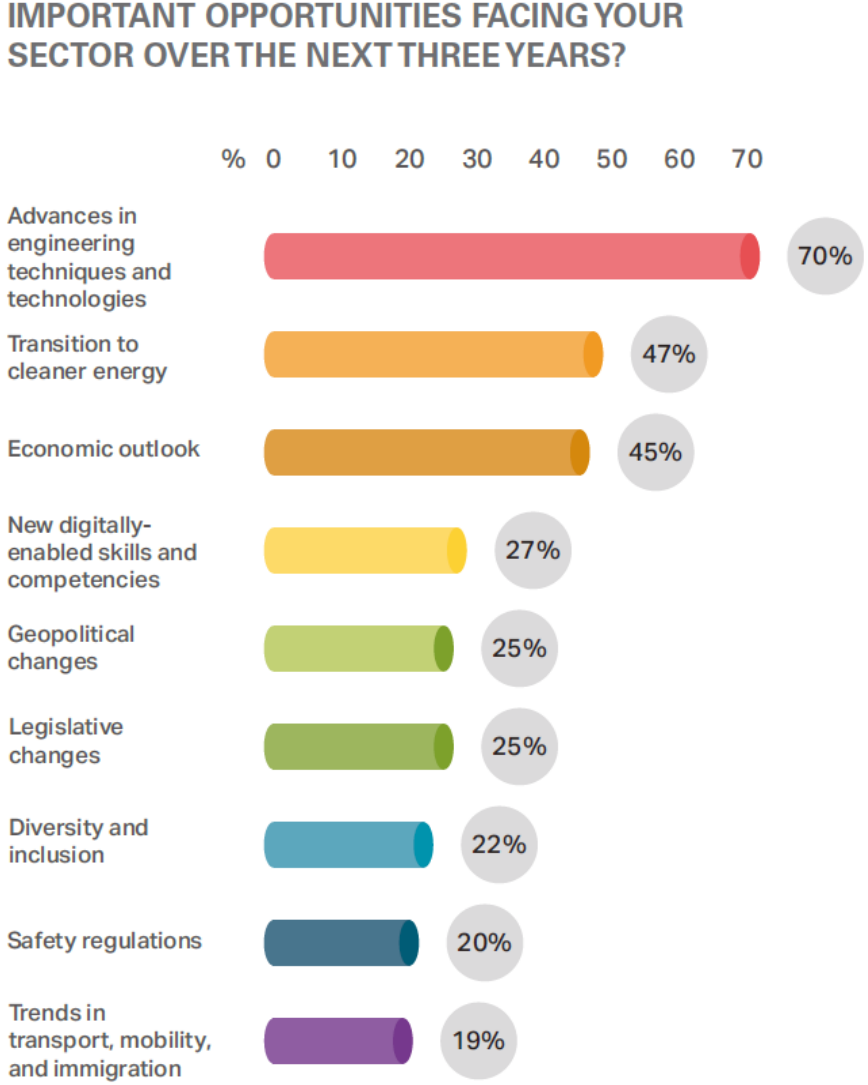


Figure 19: Skill-delivery pathways

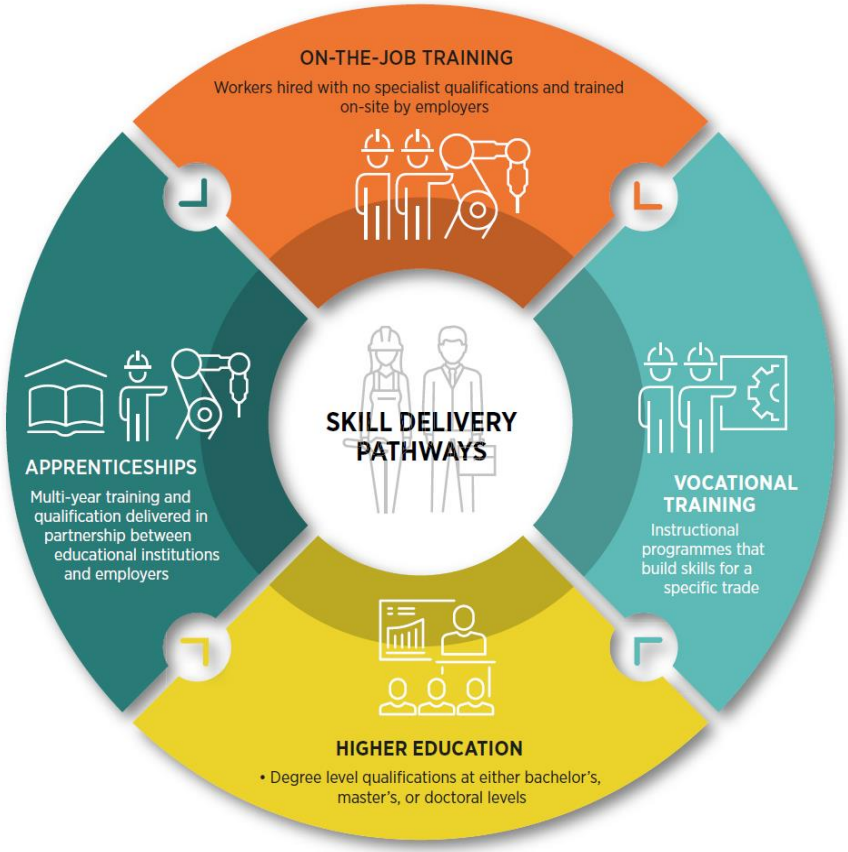
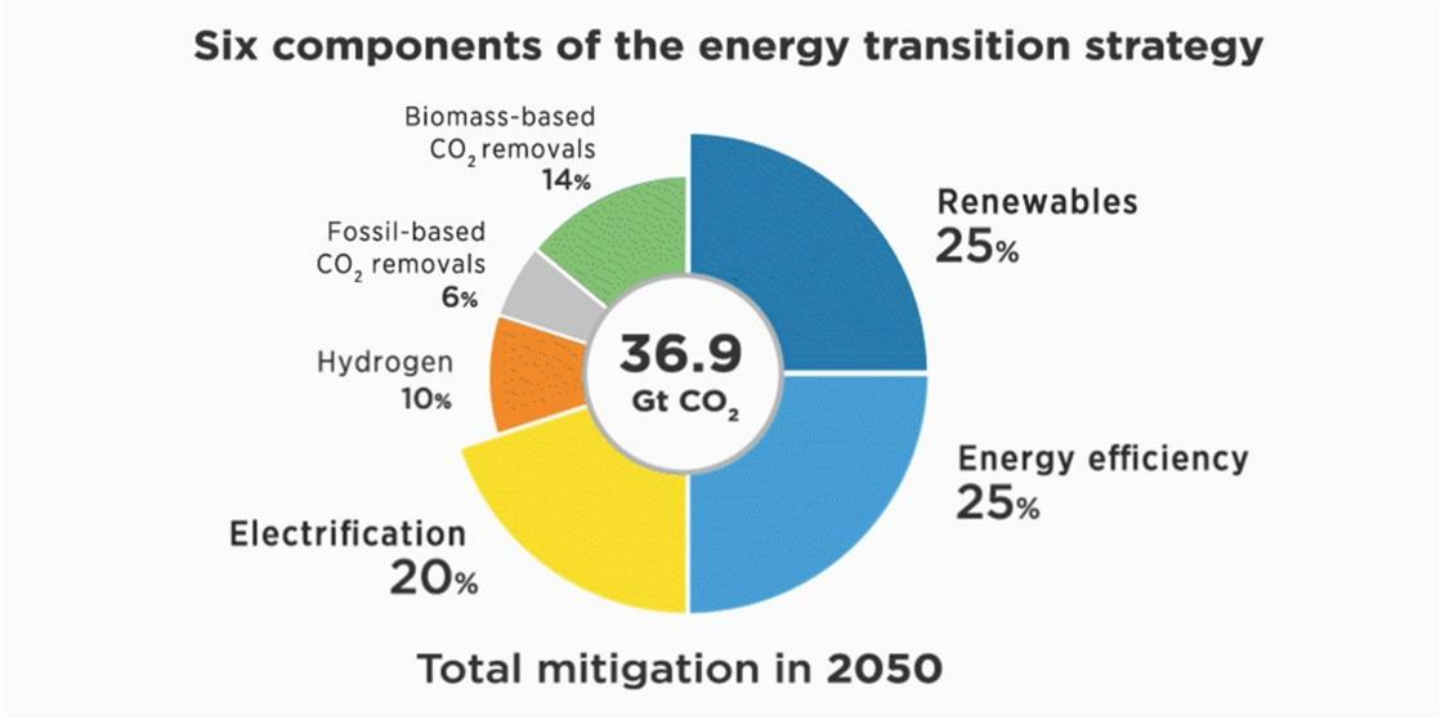
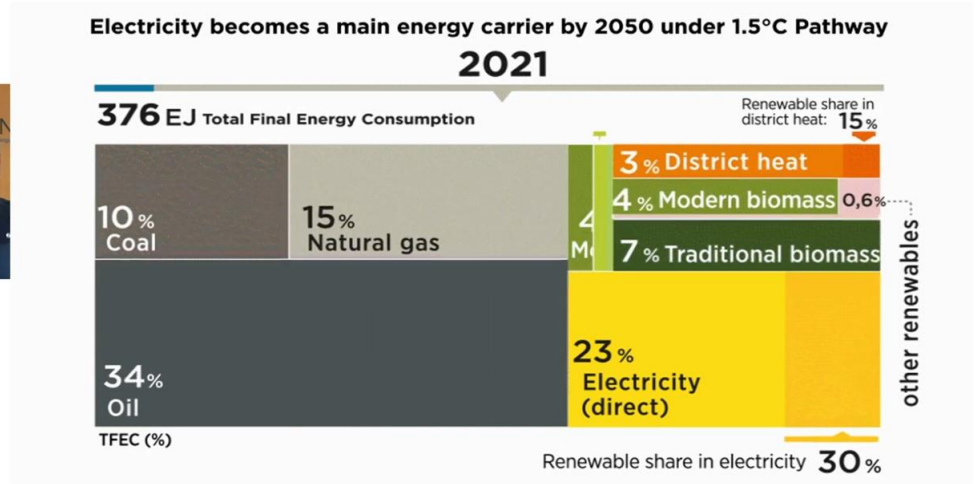


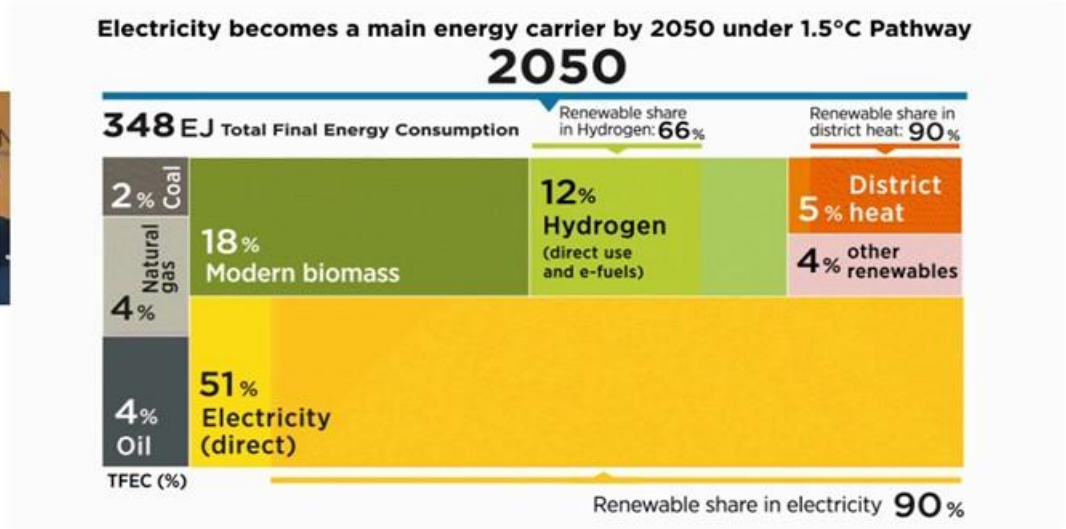
Figure 21: Sectoral focus of India's Skills Council for Green Jobs

Source: SCGJ, 2021.


Six components of the energy transition strategy
Biomass-based CO_2 removals 14%
Fossil-based CO_2 removals 6%
Hydrogen 10%
Electrification 20%
Renewables 25%
Energy efficiency 25%
36.9 Gt CO_2
Total mitigation in 2050

Way forward & RE Jobs PotentialScope





RE-Assure your and Yours' (future Generation, by S'GET)

- You have enjoyed , but CO2 emitted stays over 120-150 years – **S'GET**
- Renewables play a vital role for **S'GET**
- Shine/heat-cool with SOLAR for **S'GET**
- Win with Wind (onshore/Offshore) sea-land breeze too for **S'GET**
- Think Small , Do and get done by the mass for **S'GET**
- Infirm Renewable Energy , Not any more with Smart grids .. **S'GET**
- God has created **No waste,** only **Wealth, …… S'GET**
- Future of Sustainable Mobility is IoT, ICT, IIoT……. for **S'GET**
- WE ARE THE ONLY GENERATION WHICH CAN SAVE FUTURE of MANKIND and MOTHER Earth by **S'GET**

Act
Now
Save
World's
Energy
Resources

மிக்க நன்றி

Thanks for the opportunity and your kind attention

sgetgoms@gmail.com
https://www.consultingoms.org

Reduce
Re-use
Recycle

"Think Global, Act Local" will be the mantra for the future of RE-projects in India, as well as to the rest of the world.