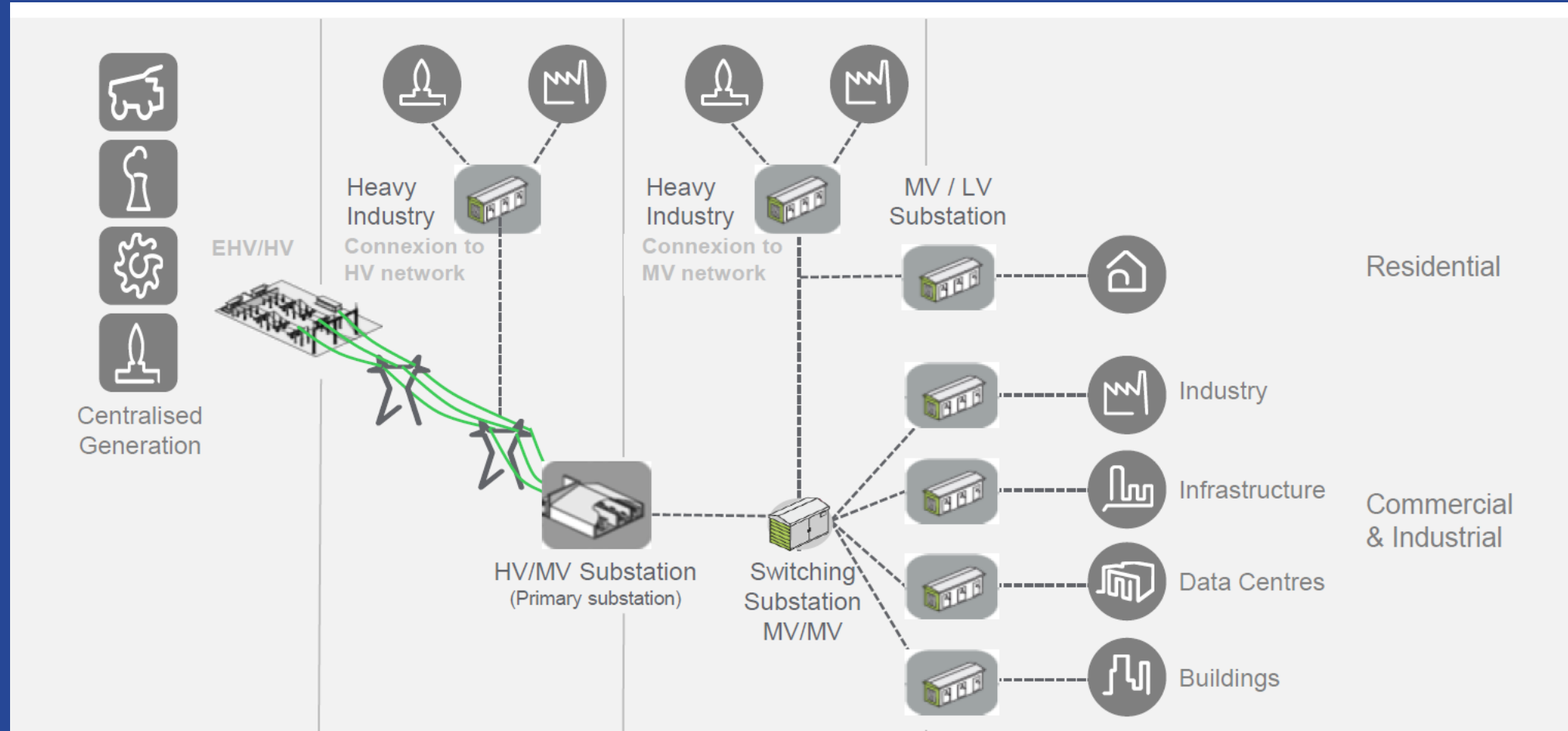


Distributed Solar Power Solutions – Opportunities & Technical Considerations

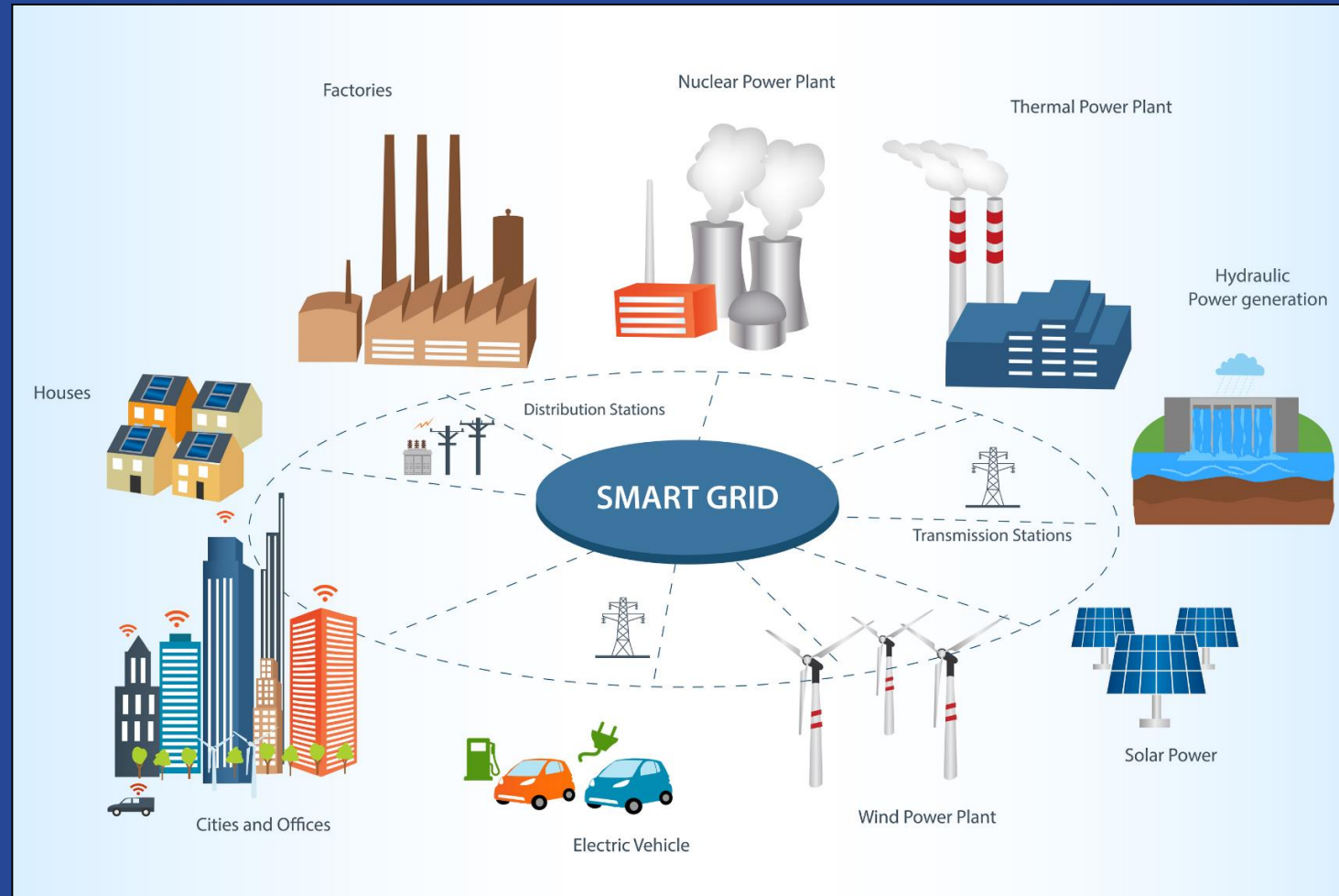
Kannan Tinnium

Aug 22, 2021

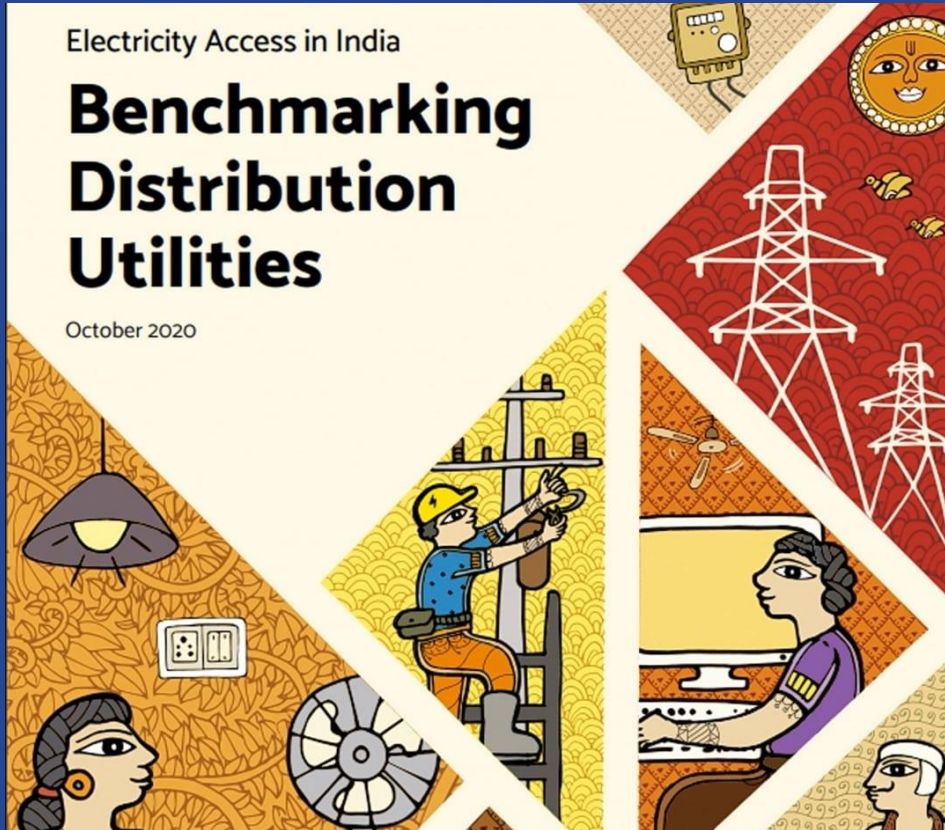
Traditional electricity eco-system... Centralized, One Way



Transforming Electricity Eco System... Distributed & Connected



India Scenario



Key findings of the report:

“92% of customers reported the overall availability of electricity infrastructure within 50 metres of their premises; Not all have connections

Overall, 87% of the surveyed customers have access to grid-based electricity.

The hours of supply across the customer categories is nearly 17 hours per day

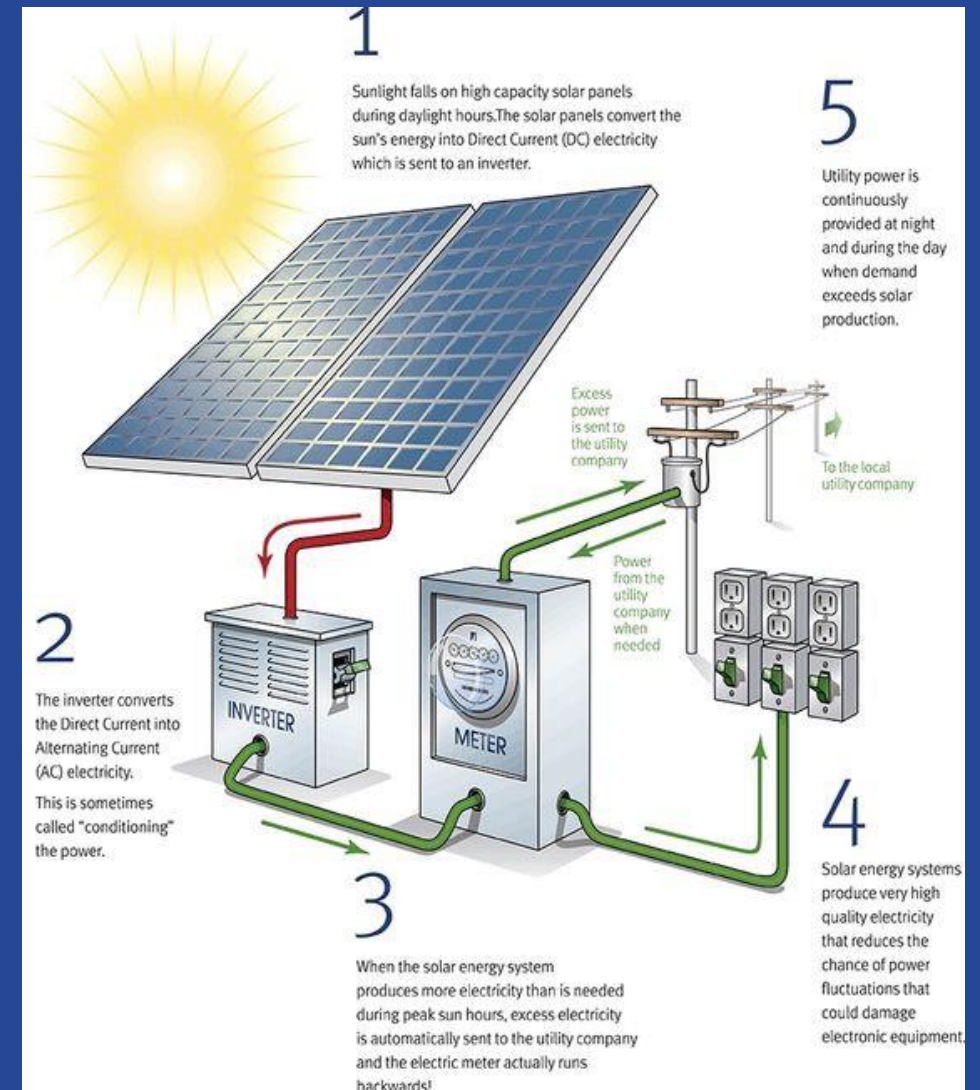
Nearly 85% of customers reported to have a metered electricity connection

Access to electricity is observed in 83% of household customers.

The study suggested that a total of 66% of those surveyed were satisfied—74% of customers in urban areas and 60% in rural areas”

Distributed Solar Power

Electricity that is generated using Solar Systems close to the loads, available when needed and gives user the flexibility to manage and control



<https://medium.com/@solar.dao/how-energy-travels-what-happens-with-pv-solar-power-16a047dbe87e>

LUMINOUS

Key Drivers for Distributed Solar Power

Consumer demands are increasing ... Continuous Power is a necessity now...Environmental awareness is growing

Grid has become complex... Weak Distribution Infrastructure... Consumers are facing significant power outages


Solar Panel and Battery Costs have come down significantly, Efficiencies have increased

Power Electronics & Controls, Energy Storage and Digital Technologies have evolved rapidly

Overall cost of electricity from distributed power is competitive to grid power



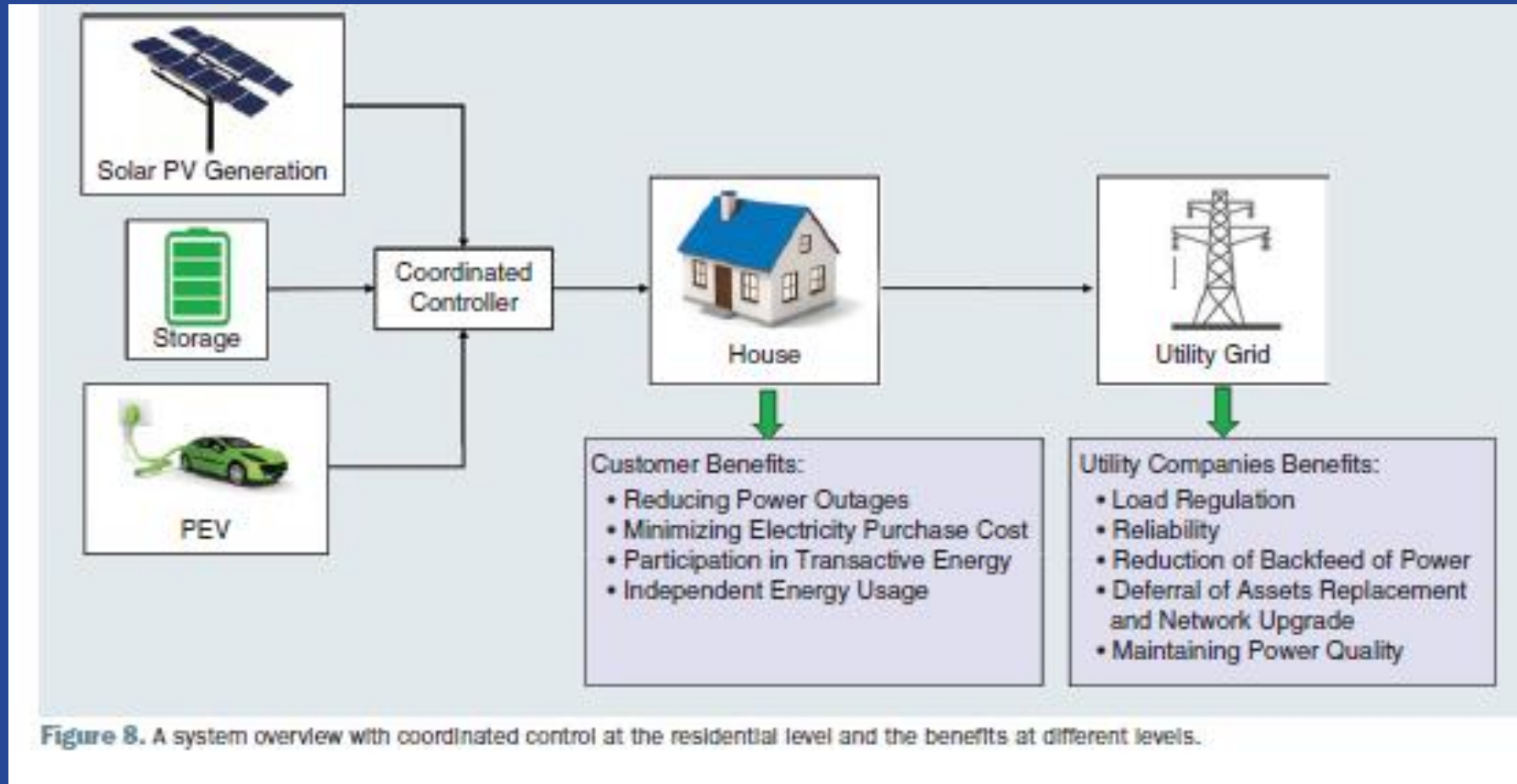
Consumer Applications

	Rural	Power Deficient	Semi Urban	Urban	Commercial/ Industrial
					
Power cut per day	Very High No Grid Power	High >10 hour Power Cut	Medium 2-10 hour Power Cut	Low 0-2 hour Power Cut	DG Backup
Characteristics	Remote locations/Rural Basic need of electricity	Outside urban areas Need of 24/7 electricity Inverter batteries fail	Urban areas Power backup & Savings over normal inverter/battery	Urban/Posh areas Uninterrupted power supply Savings & Social image	24/7 Uninterrupted power for all equipments Reducing DG usage

Now consumers have a choice to become prosumers



Benefits of Distributed Solar Solutions

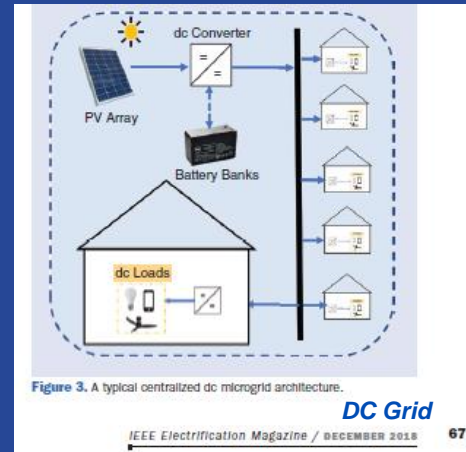
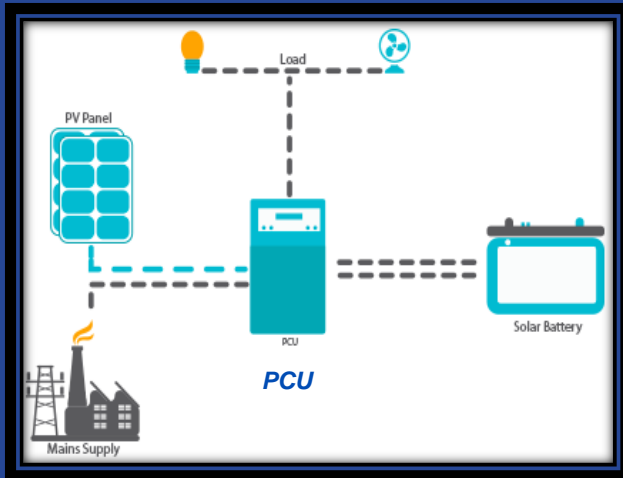
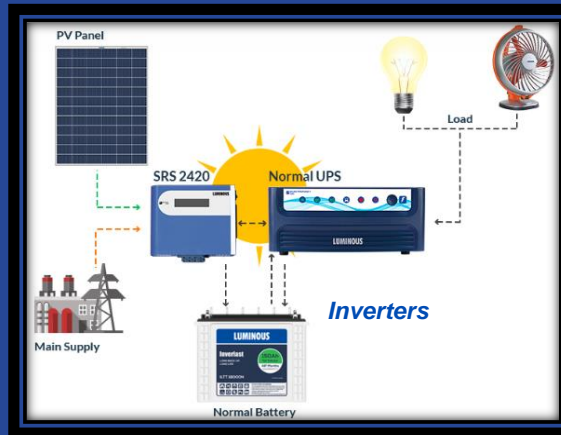
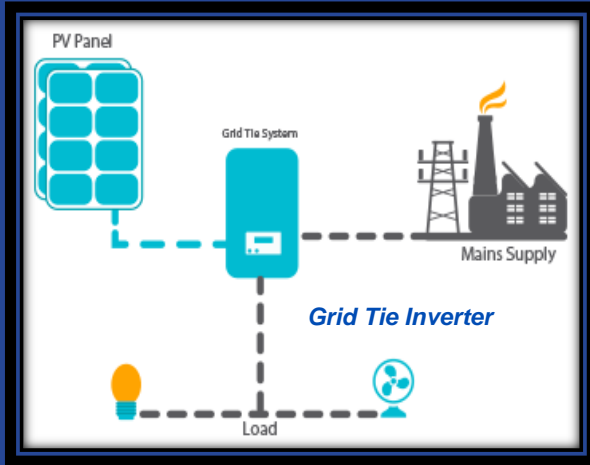


Need to accelerate progress

- Distribution Utilities need to repurpose their business
- Govt, Utilities, Tech providers and Consumers should work hand-in-hand to accelerate
- Consistent Consumer Centric Policies should continue to evolve
- Appropriate Financing models would help drive faster adoption
- Technology and Innovation will continue to play a key role



Solar System Configurations



Technical Considerations

Solar Panels... Poly, Mono, Bifacial, PERC, Thin Film (CIGS, CdTe), Perovskite etc..

Inverters... String, Central, Micro, Connected, High Frequency, Grid Forming etc..

Batteries.. Lead Acid/Li-ion/Solid-State etc..

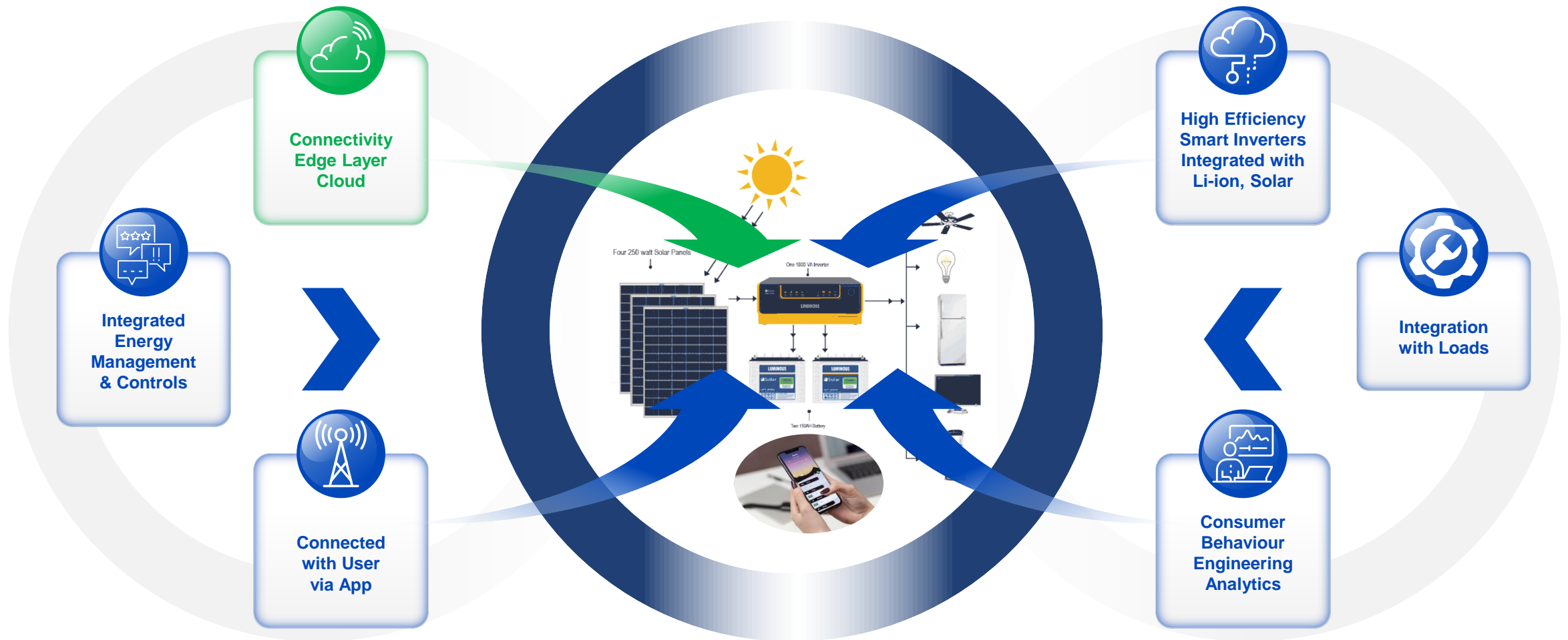
Protection.. DC cables, Junction Boxes, Earthing Requirements, etc..

Integrated Systems & Controls... PWM/MPPT, BMS, Grid resilient, smart load management etc..

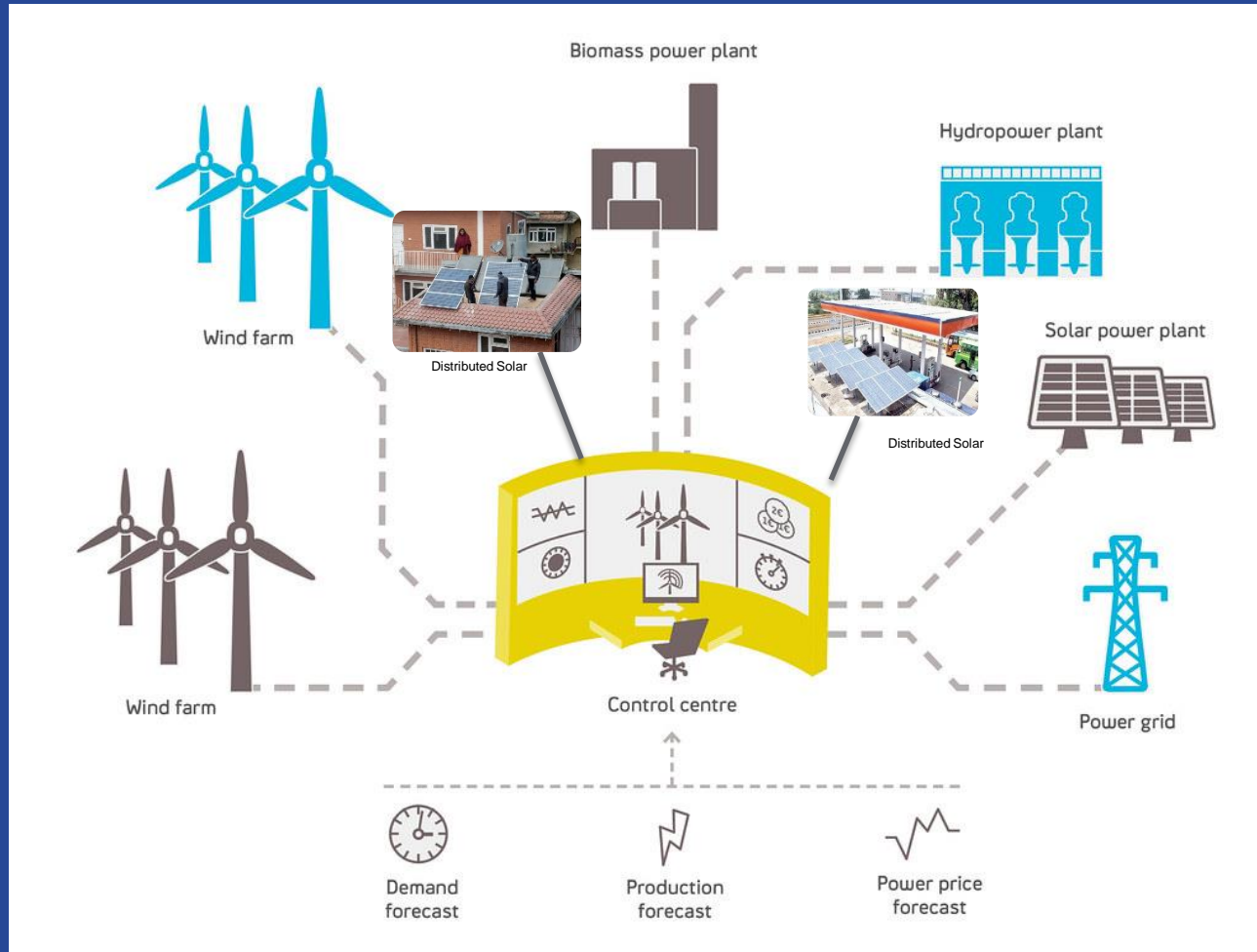
Data Analytics... IOT, Remote Analytics etc..

LUMINOUS

Coupled with Digital Technologies..



Looking into the Future..



Virtual Utility Concepts are emerging globally

Opportunity for Distributed Solar Solutions to participate

Transactive Energy Technologies evolving

In Closing...

Transformation of Electricity Ecosystem is happening at a rapid pace

Consumers have a choice now.. Will pay a key role

Solar Solutions have become viable today

Consumer Centric Policies and Financing models critical

Technical Skill workforce enhancement needed



India is a leader in clean energy transformation... Great opportunity to leapfrog with Distributed Solar Solutions.

LUMINOUS

LUMINOUS

Khushiyon ka ghar