Is GHG emissions moving the earth towards destruction?

How do we mitigate it

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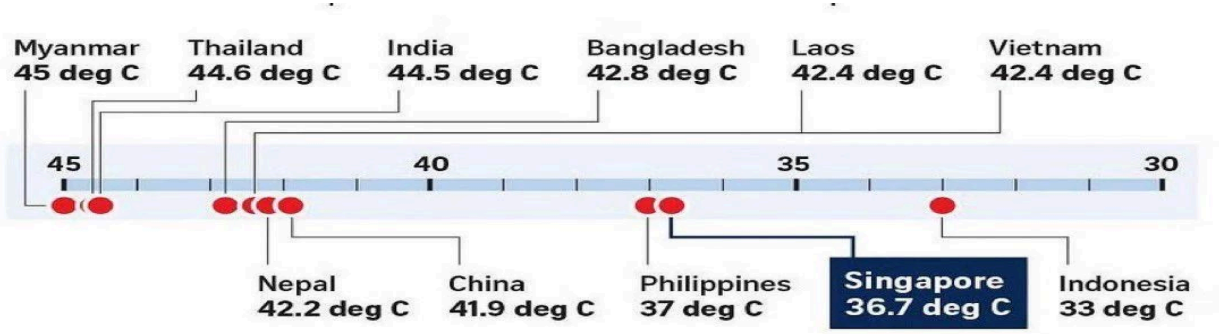
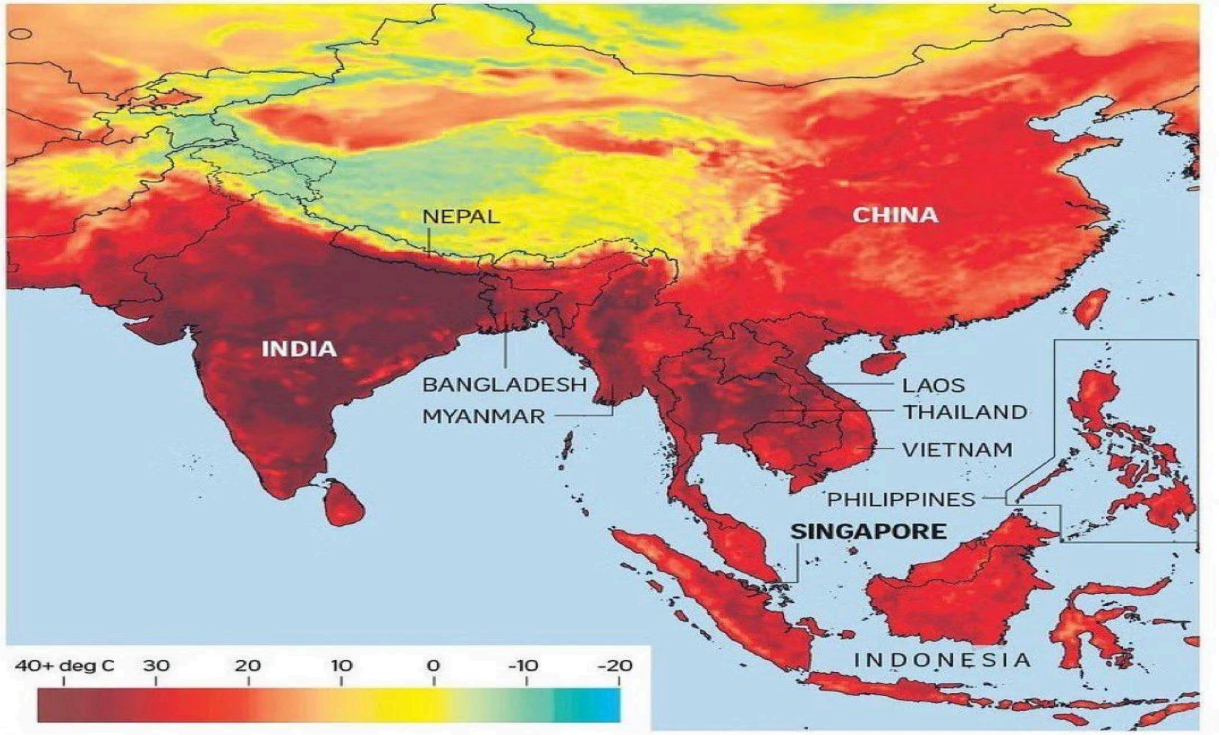


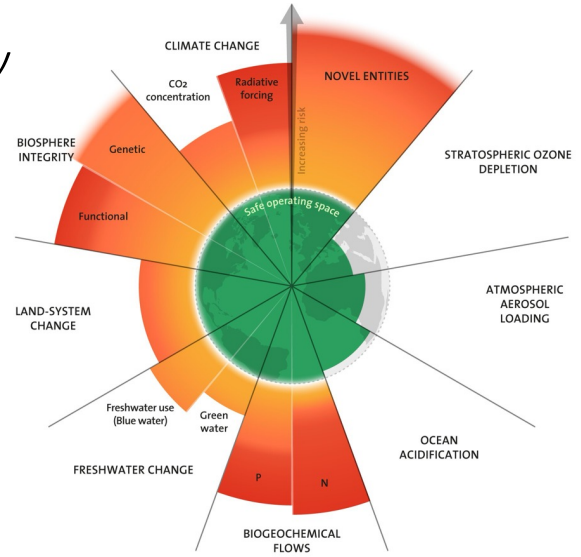


Is प्रलय (Catastrophe) Coming?

Planetary boundaries are the Earth's health indicators

crossing these make the changes irreversible

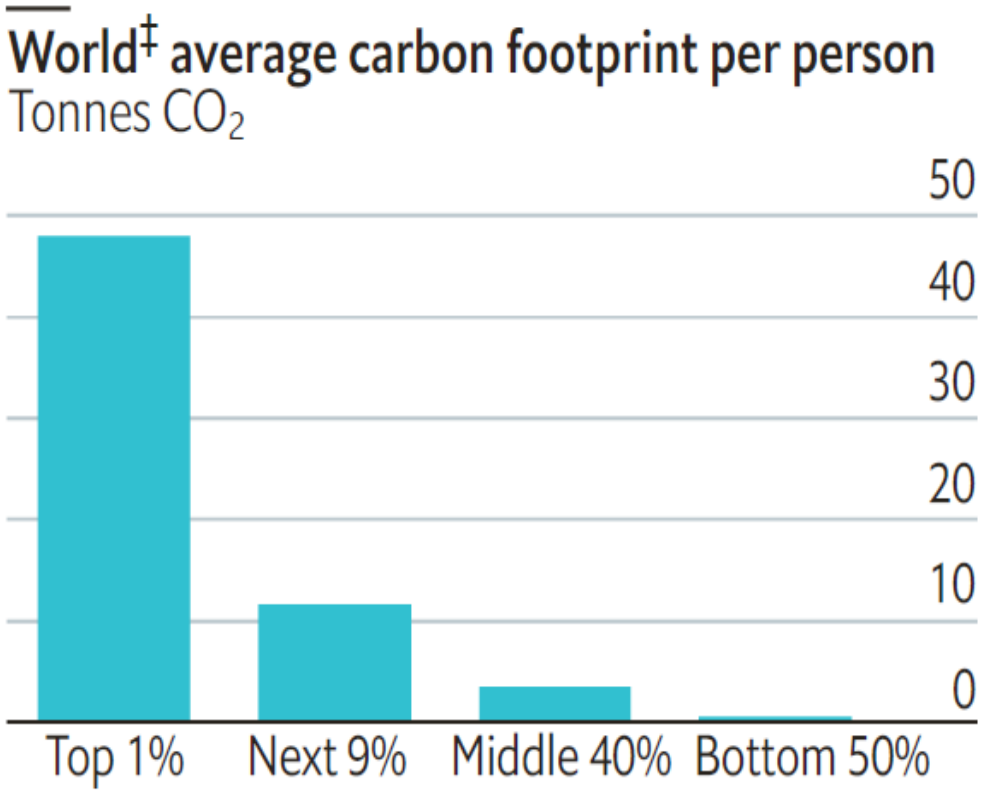
six of nine already crossed



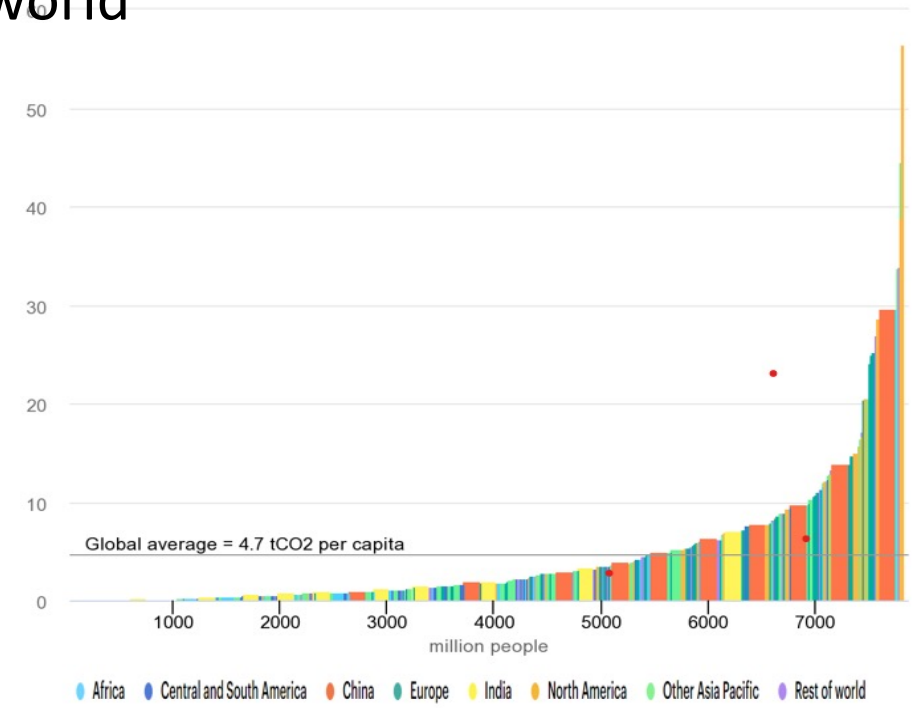
Who contributes and who is most impacted?

The Rich and Poor Divide

Global Warming: Who Contributes?



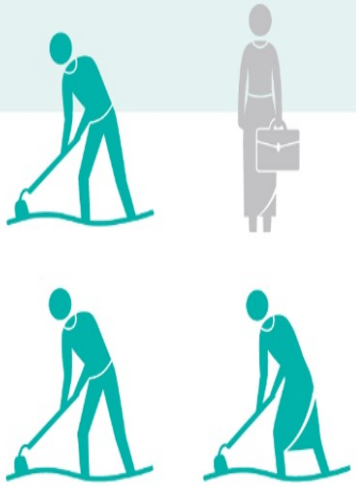
- And in every country, there are people who belong to top 1% emitters in the world



Who is most affected by climate change?

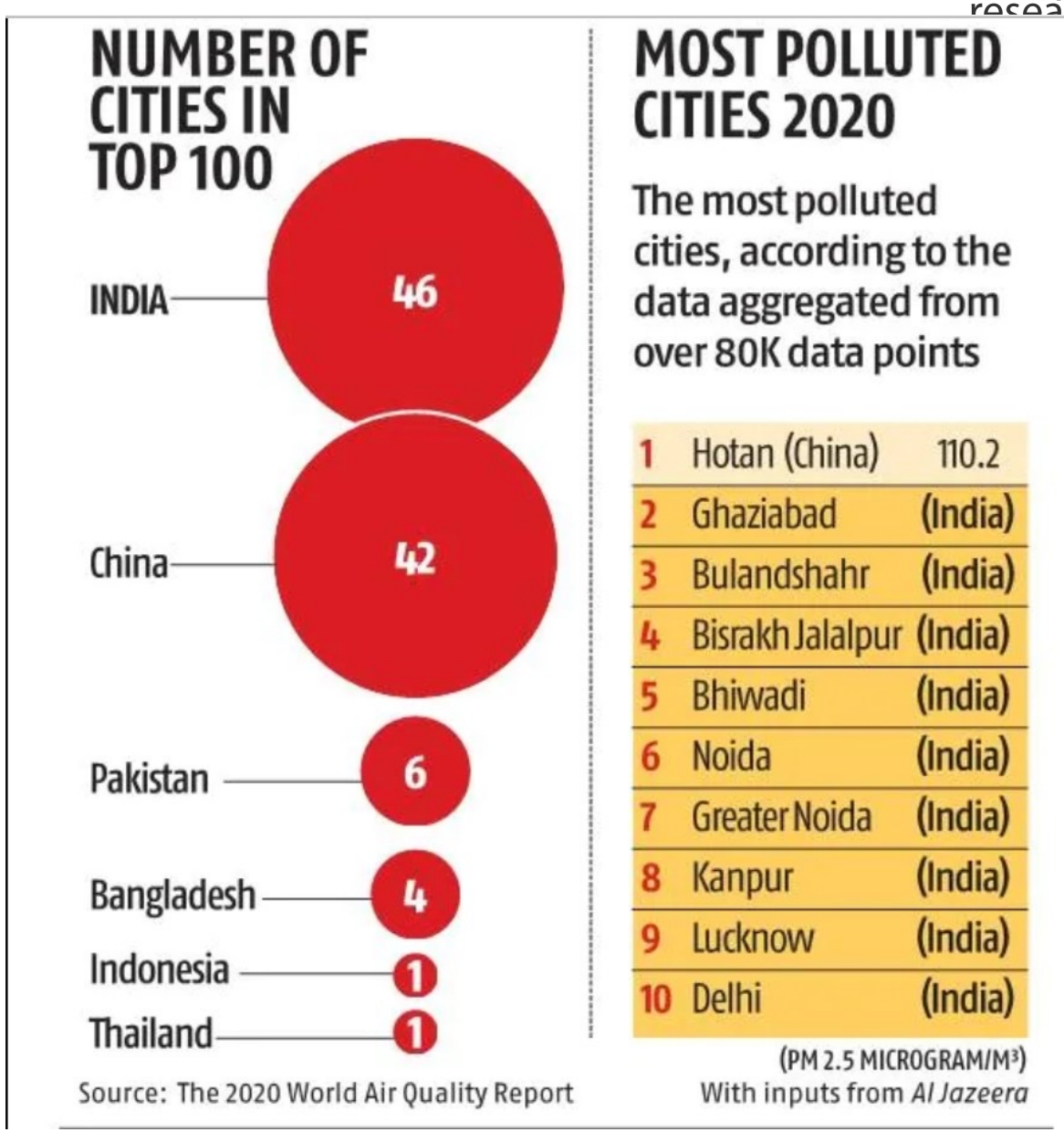
Climate change is a matter of life and death.

3 out of 4 people living in poverty rely on agriculture & natural resources to survive.



And India and the region already most affected by fossil-fuel based transport

Where does Sri Lanka Stand?



Transition Pathways

- Fossil Fuels → Green Energy and Green Electricity
  - Moving all usage to Green Energy (Biofuels, Green Hydrogen as a fuel, Green Electricity via solar, wind, nuclear and bio)
- Using Energy more efficiently
  - Heating and Cooling, Electric Motors and Controllers, Green Buildings, Green Transportation
- Circular Economy
  - Recycling
  - Carbon Capture utilisation and sequestration
- Sustainable lifestyle

Transition Approach

making green technologies scale with commercial viability

over next 5-10-20 years, all technologies required can be made viable

₹1 INR = ₹3.6 LKR

- Green Electricity: Solar, Wind scaling at ₹2 to 3 per unit (kWh) in India
  - Focus on solar panel manufacturing and next gen technologies
  - Wind: 120m → 150m; off-shore wind (larger turbines)
  - Micro-nuclear in tens of thousands to make it economically viable
  - Make bio-electricity viable
- Green Buildings
  - 75% electricity consumed by commercial, industrial & HIG complexes in India
  - Make going Green economically viable
- Energy Storage
  - Batteries: short-term and long-term
  - 40% of electricity in buildings used for cooling: Thermal Storage

- Green Transportation
  - Electric Vehicles already scaling
    - passenger vehicles commercially viable; long distance buses and trucks still far away
  - Urban Mobility: Overcoming 2+ hour home ↔ office commute in Congested Cities - HASHTIC

- Green Hydrogen usage in manufacturing of Ammonia, Cement, Steel, Aluminum, Glass -- commercial viability to be realized
  - Carbon Capture: lots to be done

- Heating and Cooling consumes 50% of energy today with COP of 1.5
  - Driving COP to greater than 6 or more

- Making motors and controllers more energy efficient
  - consuming 46% of world's electricity today

Sri Lanka Energy Strategy

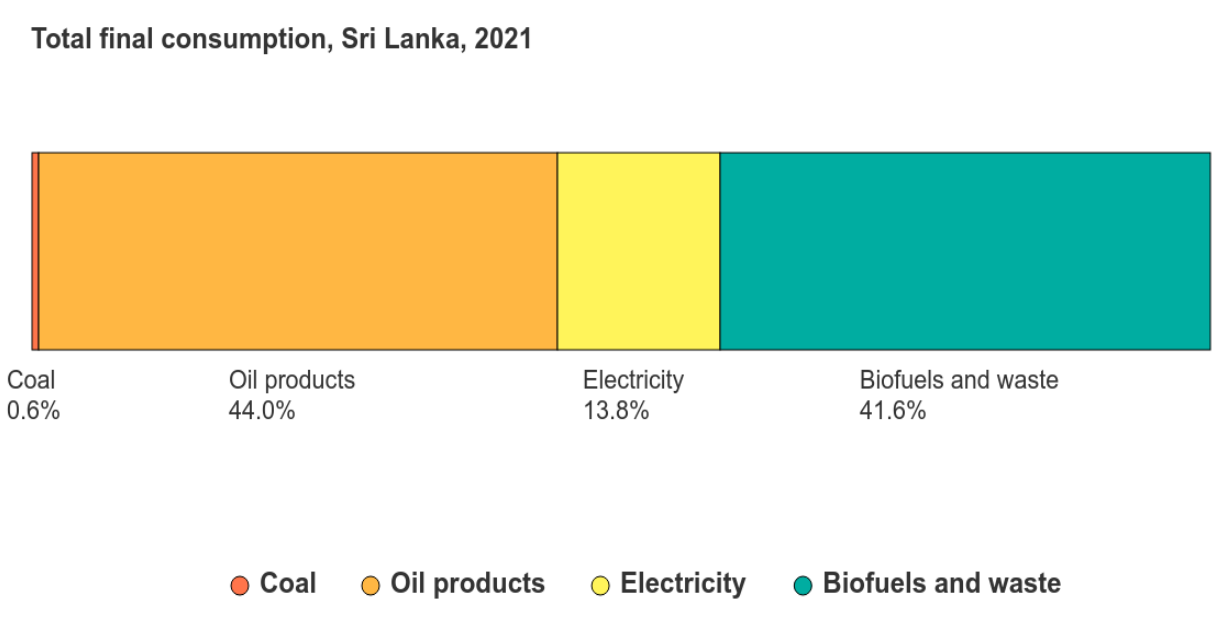
Make a 5 year / 10 year / 20-year plan

1. Convert fossil fuel usage to Electricity
   - Move transport to Electricity
   - Move heating and cooling (industry, commercial and domestic) to electricity and maximise energy efficiency
2. Move Electricity generation to Green
   - Balance Supply and Demand using hydro, Storage and Grid
   - Connect Sri Lankan Grid to Indian Grid
3. Reduce Cost of Energy Generation
4. Recycle Solar, Batteries and everything else
5. Develop / acquire Technology and carry out local manufacturing
6. Nurture Sri Lanka young talent to carry out technology development

Converting fossil-fuel usage to Electricity

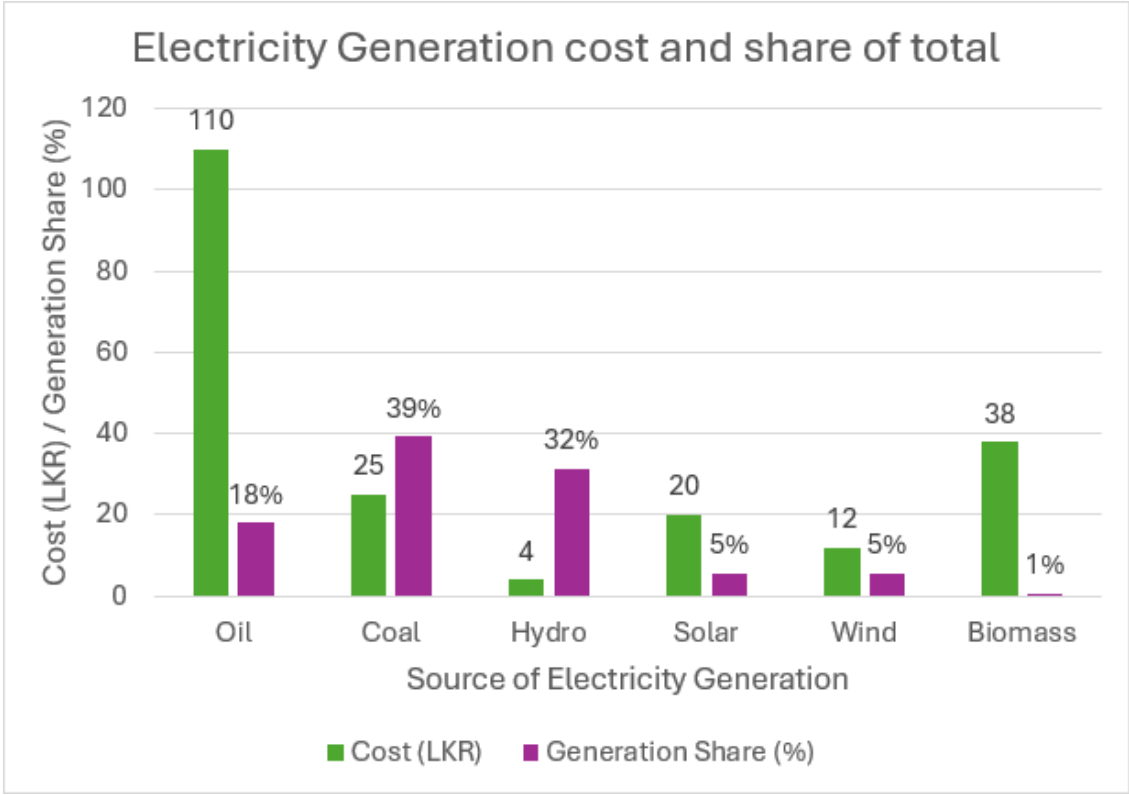
- Sri Lanka consumes 100 TWh of energy per year
  - About 45% from imported oil
  - Contributes significantly to Sri Lankan GHG emissions
  - Hurting Sri Lankan economy badly

- Can Sri Lankan Energy Usage be all converted to electricity?
  - Will this enhance energy efficiency?
  - Will this be economically viable?



Move Electricity generation to Green

- Electricity from Renewable energy in Sri Lanka costs less than that from fossil fuels
  - Fossil fuel increases import bills
  - Has significant GHG emissions
- Demand can be matched to supply by managing hydro electricity generation
  - Can also use pumped hydro as storage
  - Develop Battery based energy storage
- Connect Sri Lanka Grid to India Grid to enhance RE usage



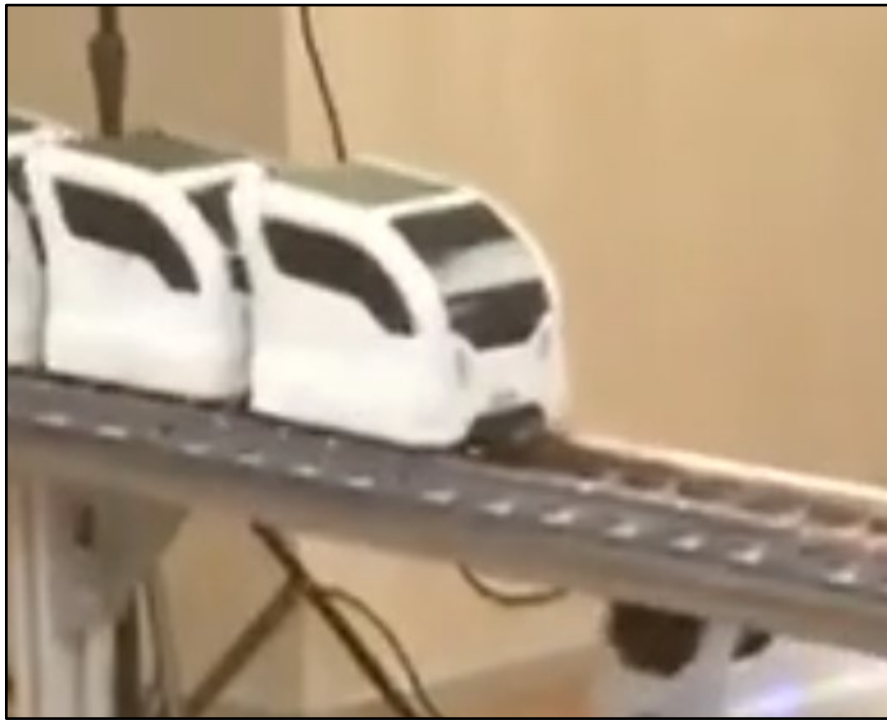
Technology and Talent Development

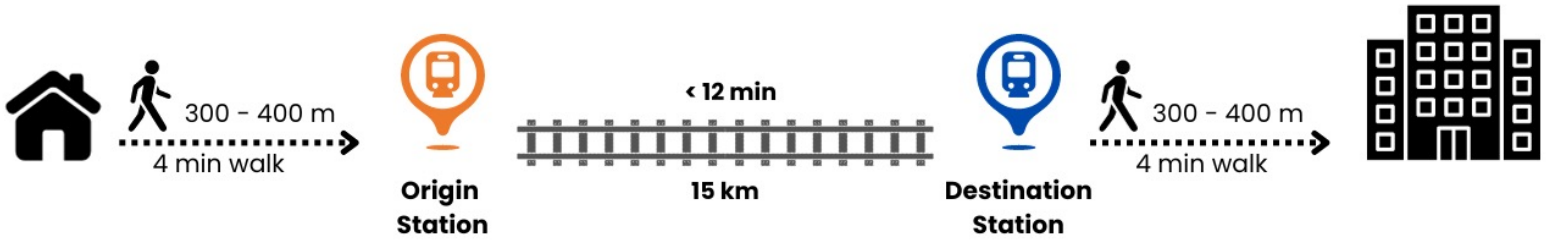
- Develop Technology to Recycle Solar, Batteries and everything else
  - Set up recycling for a Circular Economy
- Develop / acquire Technology and carry out local manufacturing for RE, battery, EVs, heating and cooling
- Nurture Sri Lanka young talent to carry out technology development
  - Especially to mitigate climate change

Some Examples of what is possible

Challenges that youngsters can take up: An Example

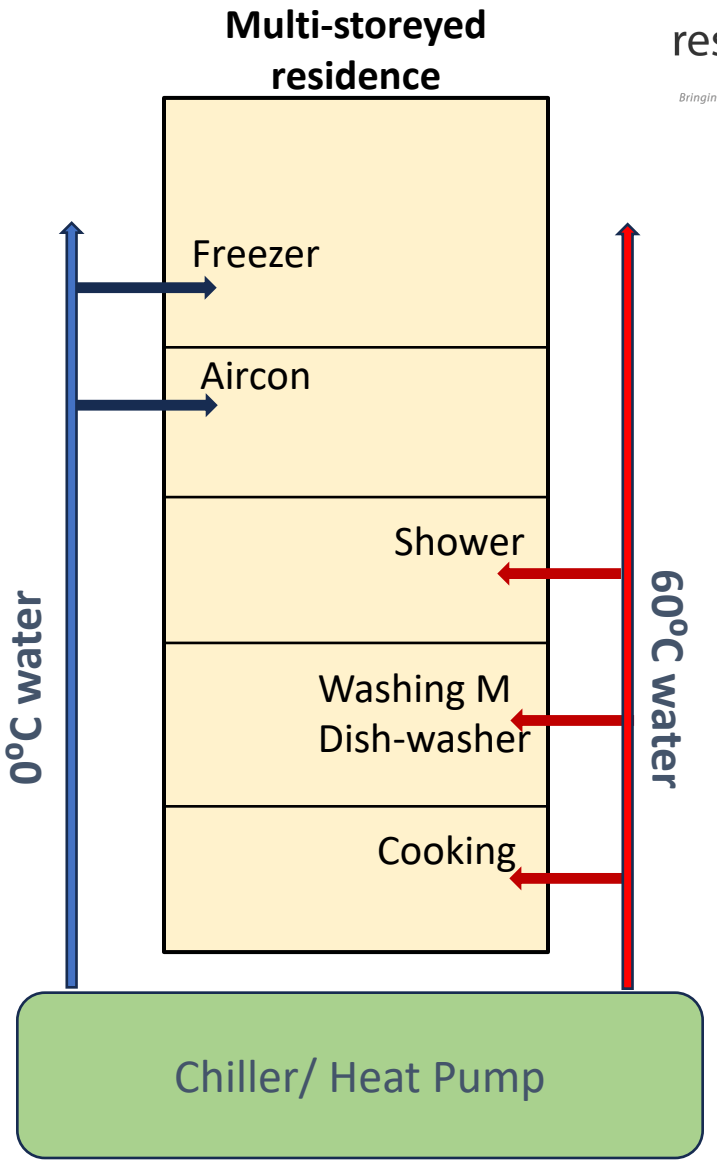
- Office ←→ Home Commute in Chennai often exceed an hour each way
  - Can we reduce travel time from 75 min. today → 20 min.
- Personalized Pod: Comfortable energy-efficient using green electricity
  - Built on existing city-infra, Affordable
- Enter → HASHTIC
  - Autonomous point-to-point public transportation system
  - Unidirectional and no Crossing → avoids congestion
  - Large no of routes: chosen to keep POD moving at 75 kmph average





District Heating and Cooling

- Heating and Cooling consumes 50% or world's energy
  - Fossil fuel based → highly inefficient
- Electric Heating/cooling: heat-pumps/chillers
  - 1 kWh electricity → 4 units of heat + 4 units of cooling (COP= 8)
- Hot and Cold-water pipes can be taken to each flat
  - Cold water for refrigerator, freezer and air-con
  - Hot water for Shower, Washing machine, dish-washer and cooking
    - 60^{o}C water will help reduce cooking energy
    - LPG cooking → induction stove



But can technology alone save us?

- The world has enough for everyone's need, but not enough for everyone's greed — **Mahatma Gandhi**

- Can we be happy with simpler living?