NAVIGATING THE FUTURE OF SUSTAINABLE ENERGY

SKILLS, SYSTEMS & THE YOUTH FACTOR

Presented by: Shaibu Ibrahim PE, PMP, NABCEP PVIP, LEED GA

Focus

- **Sustainable Energy** — 20 mins
- **Skills** — 10 mins
- **Systems** — 10 mins
- **Youth Factor** — 10 mins

Q&A 30 mins

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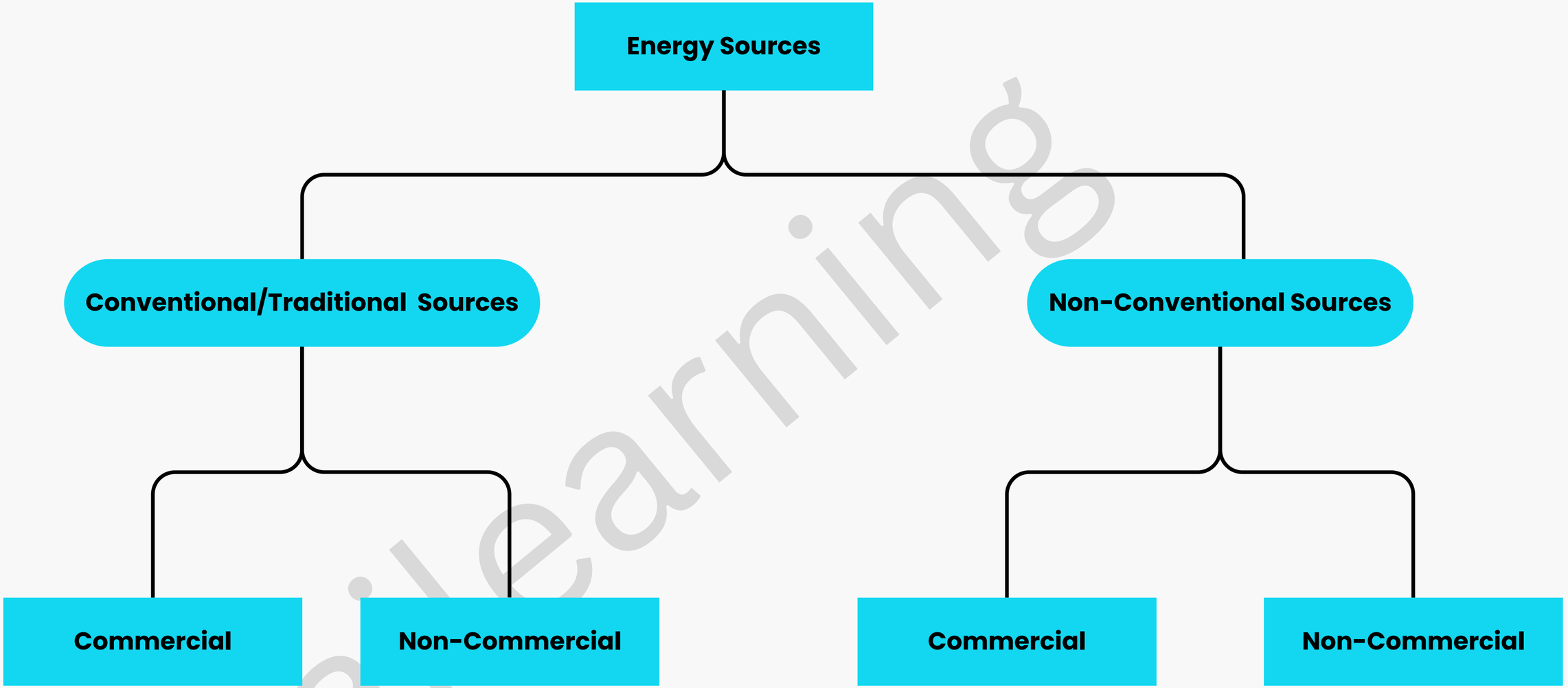
At the end, you

- Understand energy diversity
- Emerging and large-scale REs
- Important drivers or influencers of RE growth
- Challenges and Opportunities
- Emerging skills that will matter most
- How to position yourself to attract opportunities



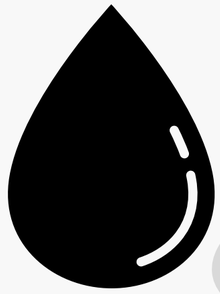
Profits driven

Non profit, typical

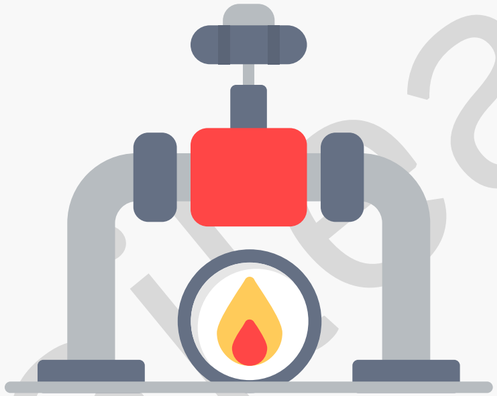
Conventional/Traditional Sources

Commercial

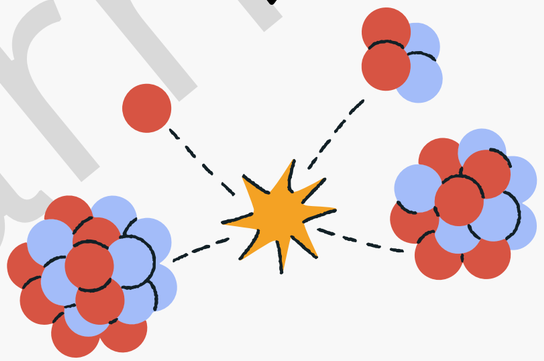
Marine Diesel



Heavy Fuel Oil (HFO)



Natural Gas



Nuclear

Coal

Non-Commercial

Fire wood

Dry dung

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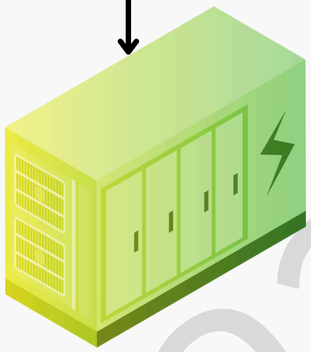
Non-Conventional Sources

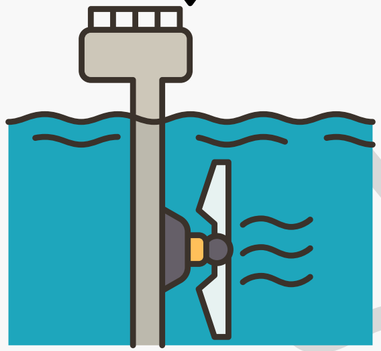
Commercial

Utility-scale solar

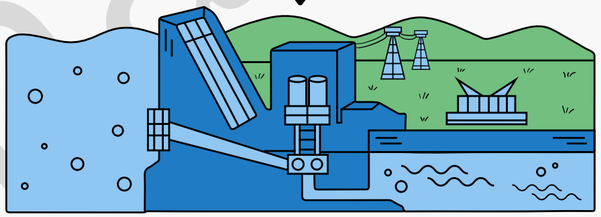


BESS

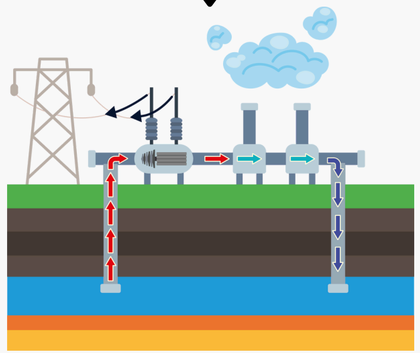
Wind



Tidal wave



Hydro



Geothermal

Non-Commercial

Residential Solar PV

Battery Storage

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1. Sustainable Energy

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Sustainable Energy

What it is

energy produced and

used to meet today's needs

without compromising the ability

to meet future generations need

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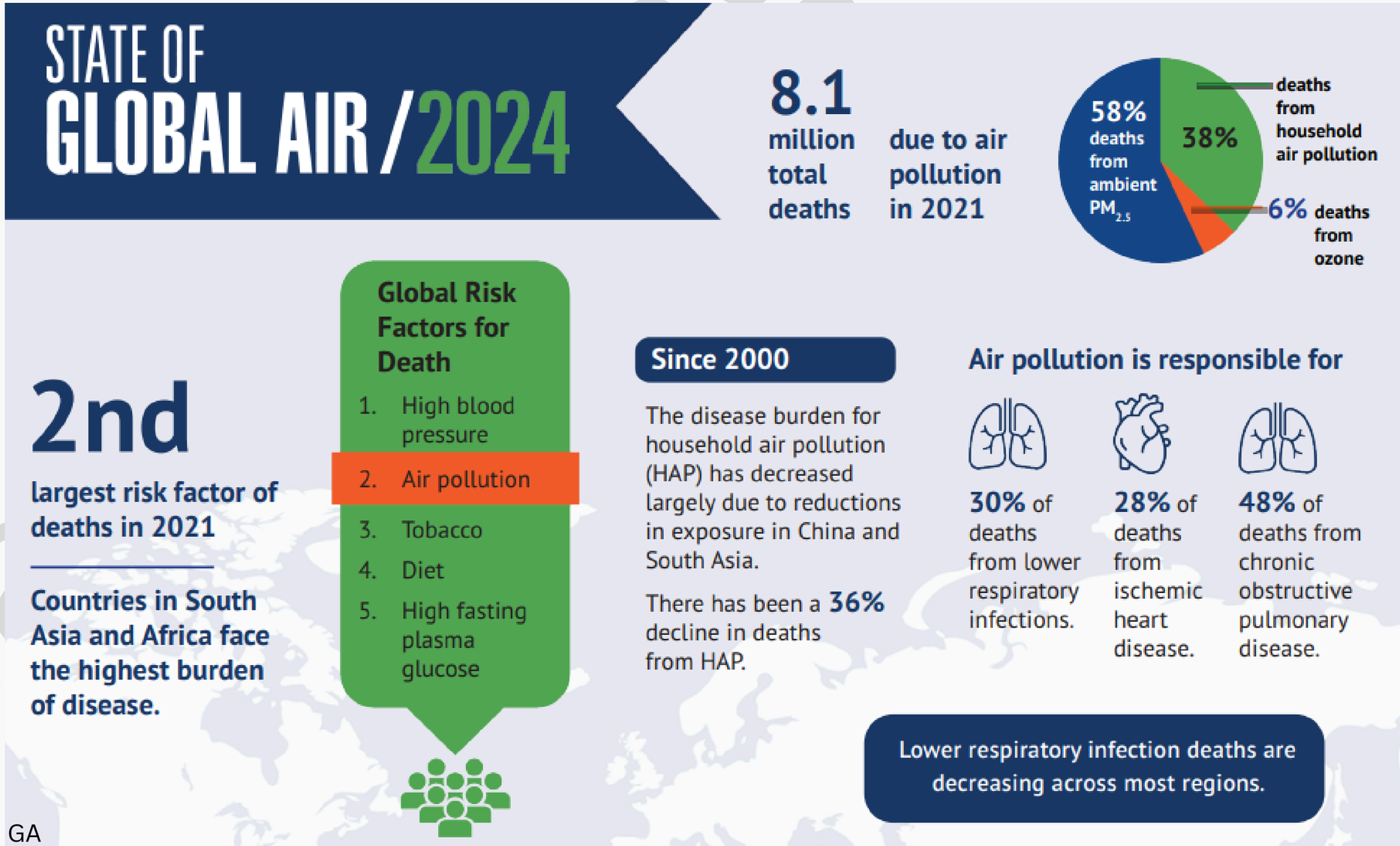
But why sustainable energy

If everything seems ok?

why risk it all if there are alternatives?

~ 6.7 million die annually - World Health Organization

~8.1 million global deaths - State of Global Air, 2024 report



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Promote public health

This is fundamental engineering

Reduce greenhouse gas emissions

Minimize pollution

Conventional sources won’t last forever

Promote accessibility - SDG7

Promote eco-friendly energy

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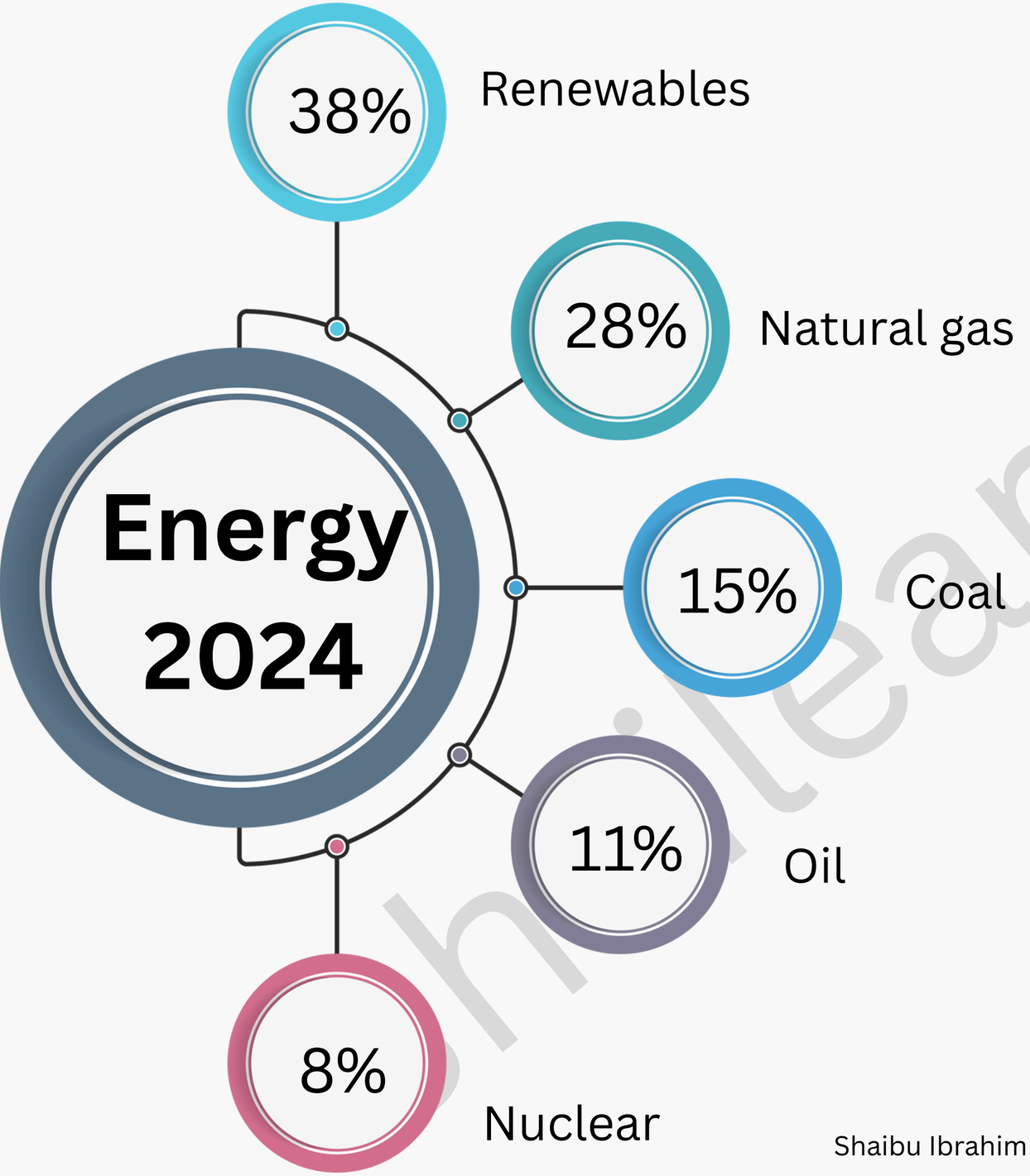

Great news

Exponential deployment of REs

According to IEA's Global Energy Review 2025

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Not without challenges

24/7 energy demand

and the people don’t care.
We just need constant electricity

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Intermittency and variability

Power produced depends on nature

sunset

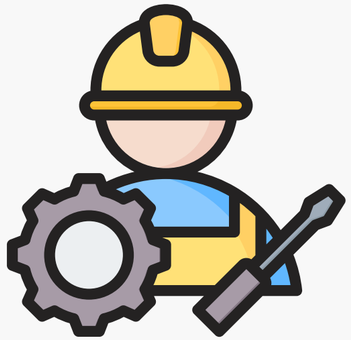
slow wind

dry lake

Technology still growing

grid forming

Policy and Politics



Inadequate **skilled** labor

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Challenges create a path to opportunities

Energy will always be needed
And that will never change, guaranteed

Natural gas and nuclear plants have longer lead times

Renewables are faster to design and build

And complex regulatory processes

Most coals are being retired

HFO banned in many countries

Renewables have a competitive advantage

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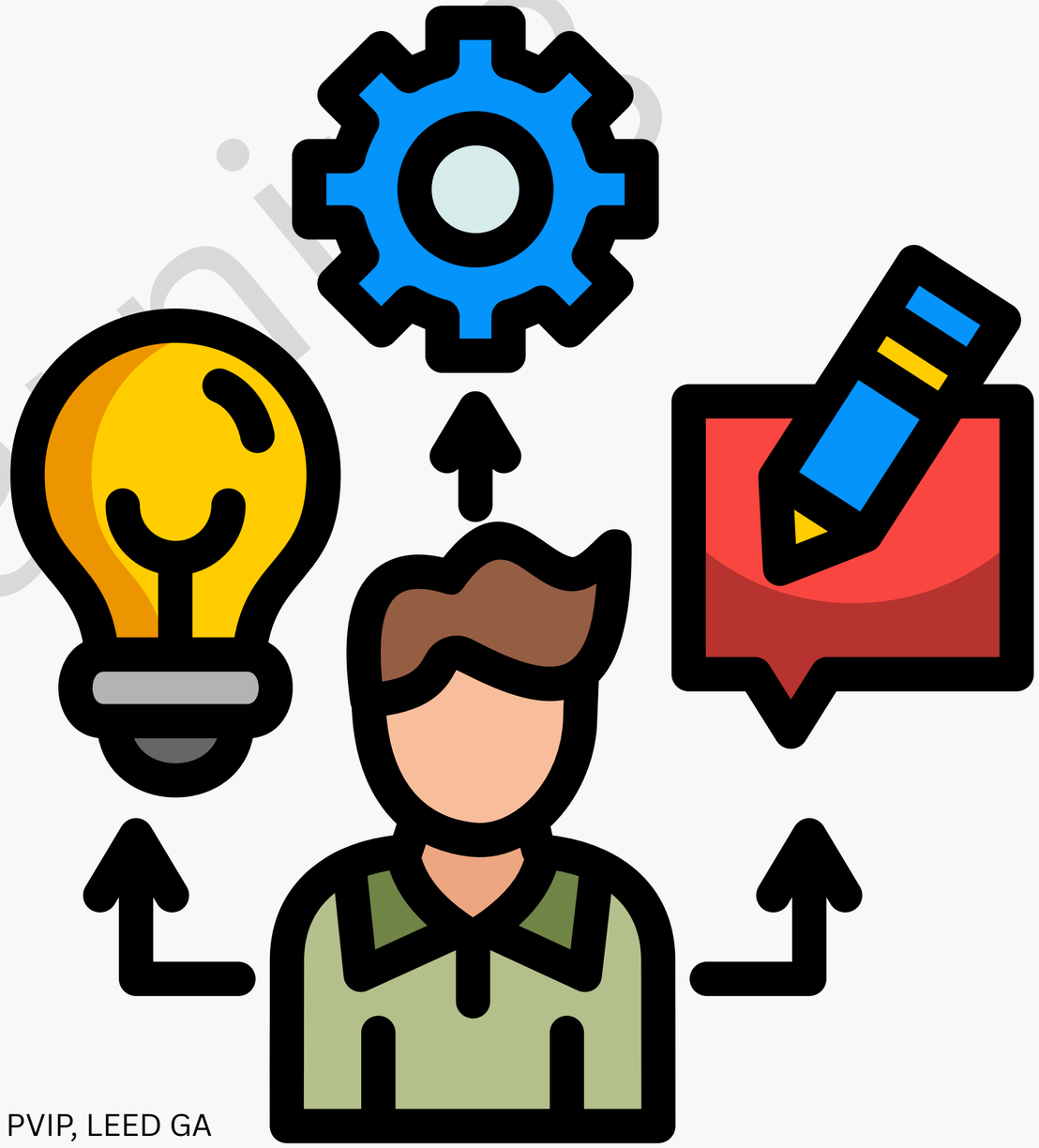
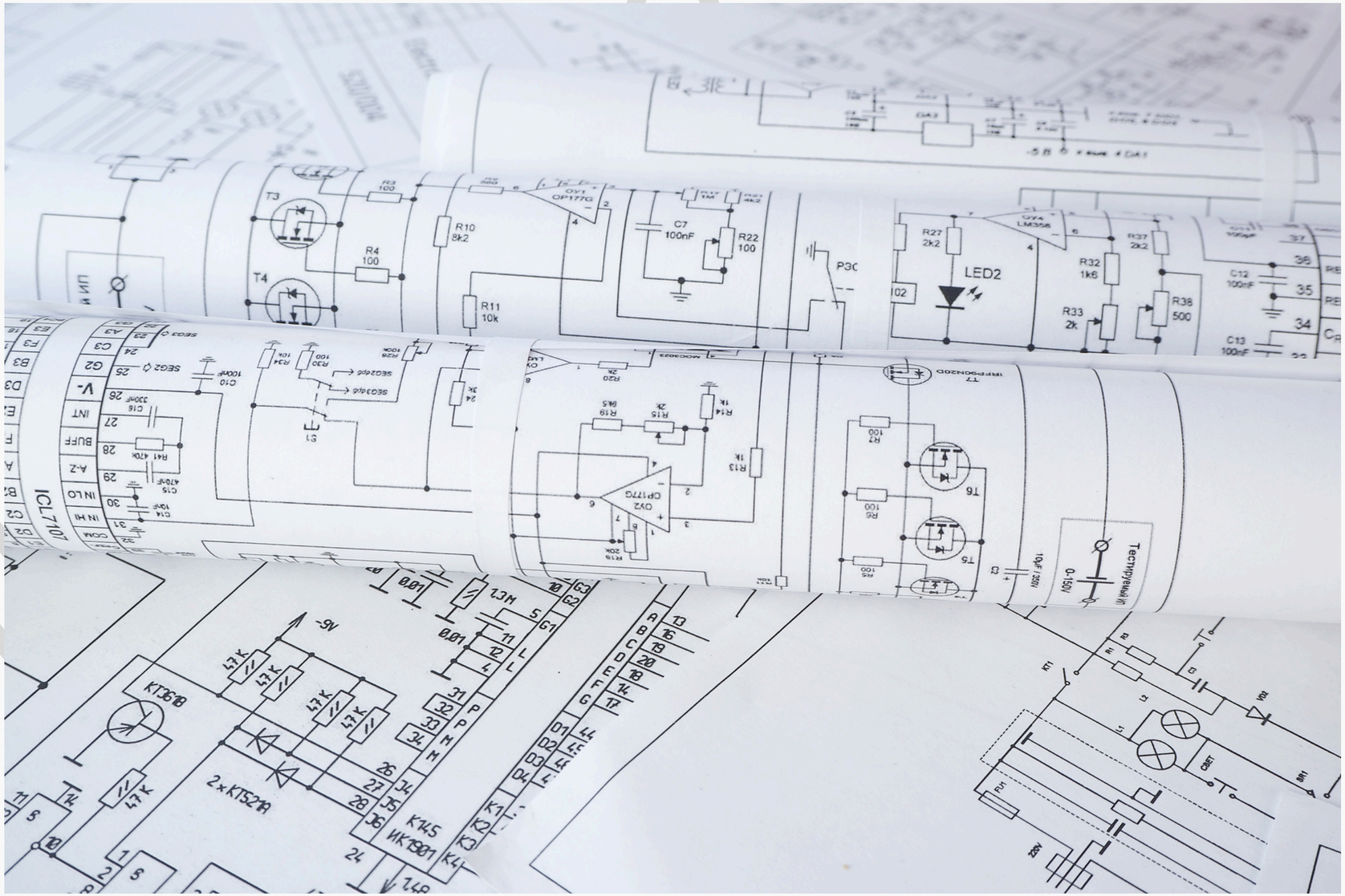
2. Skills



Skill >>> is a differential factor

Electrical design - using advanced tools



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Software and simulation proficiency

Power studies using advanced software like

ETAP PSSE CYME

WinIGS PSCAD NEPLAN

SKM MATLAB PVSyst

PowerFactory - DigSILENT Aspen OneLiner

Start from somewhere ...

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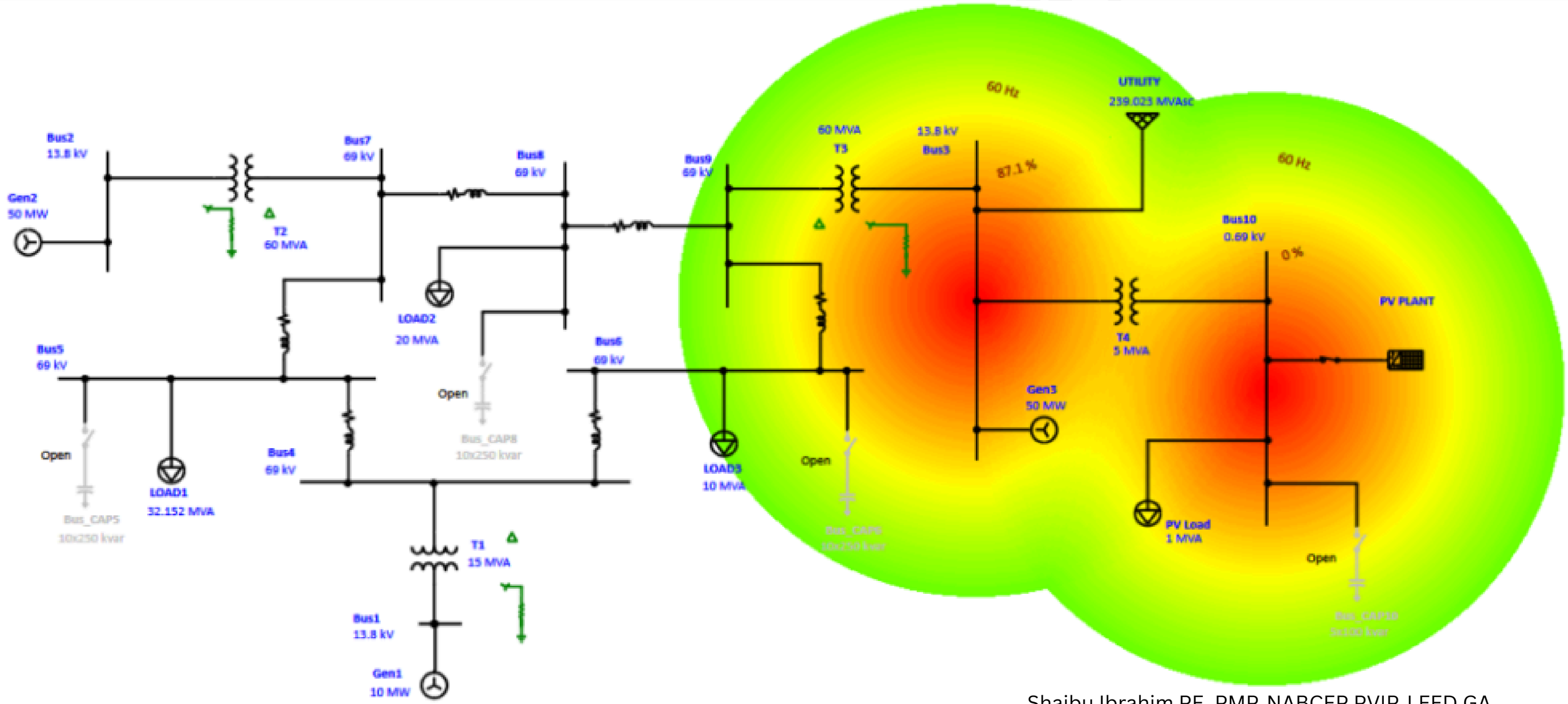
Simple illustration of depressed buses



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Diversify your knowledge

- Energy Policy & Regulation
- Energy law
- Power markets

Electricity cost varies all the time

- Energy finance and economics

Return on investment

Power purchase agreements

Tariffs

Procurement

- Sustainability principles

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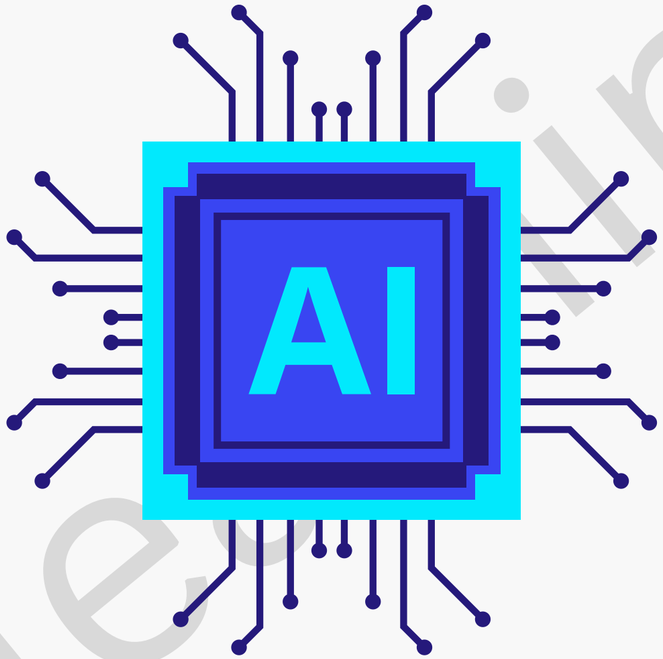
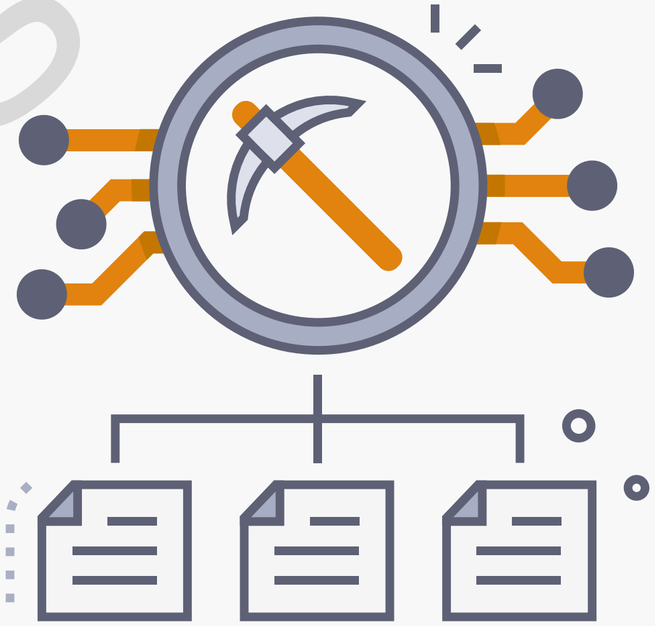
Emerging Tech Skills

Data analysis

Power grid is constant data mine





Recording data 24/7

How will **AI** and **ML** influence energy decisions?

- Grid integration and stability
- Fault detection
- Energy trading - regional, nations, markets

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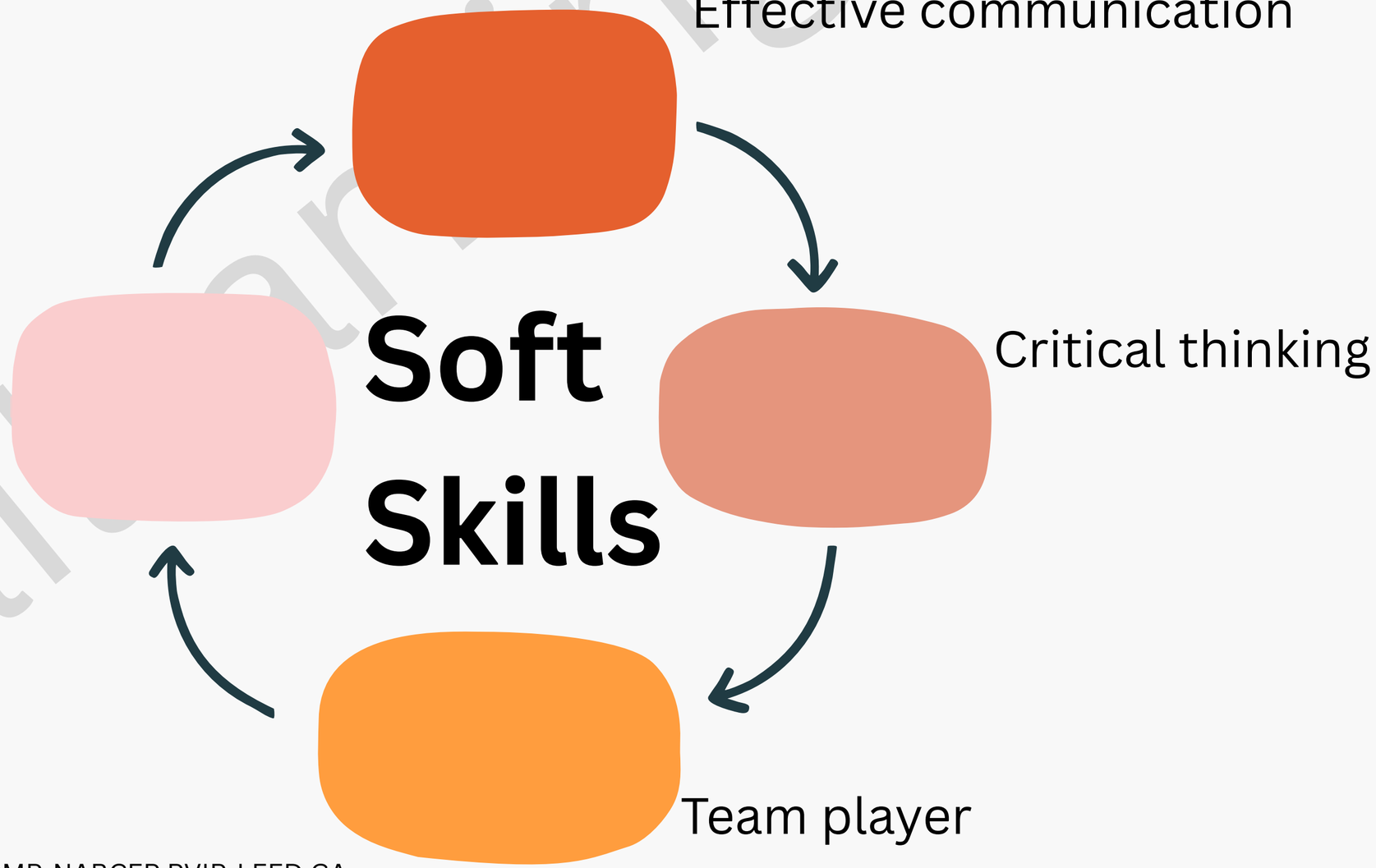
Project management & Soft Skills

Most underestimate the skill that AI and machines can't replace



PMP

Project management skills - scheduling, risk, resource, ...

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3. SYSTEMS

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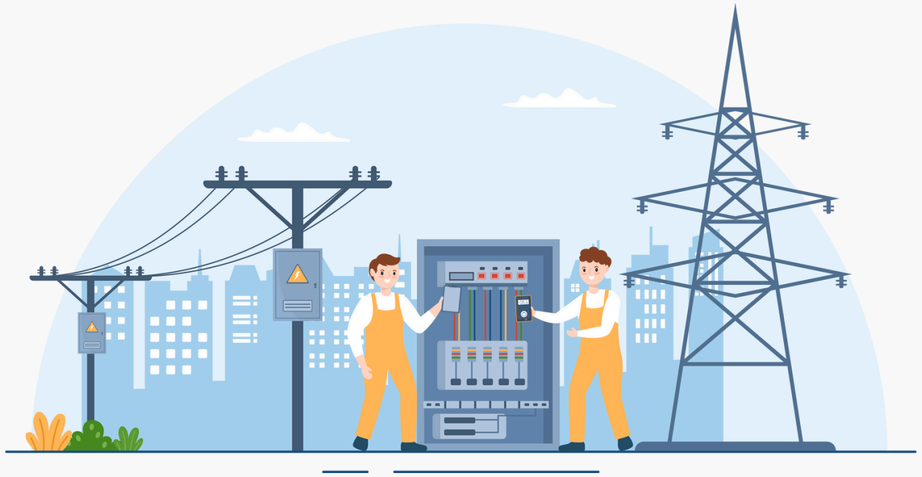
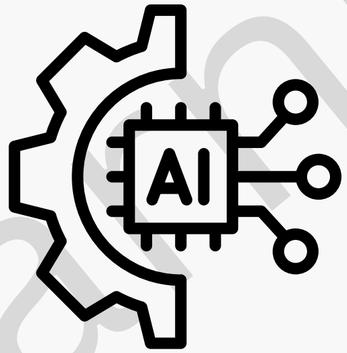
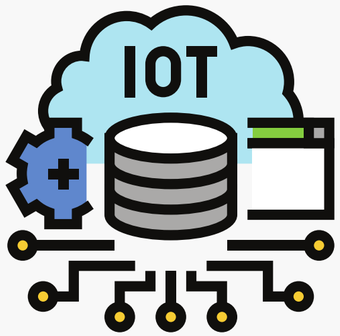
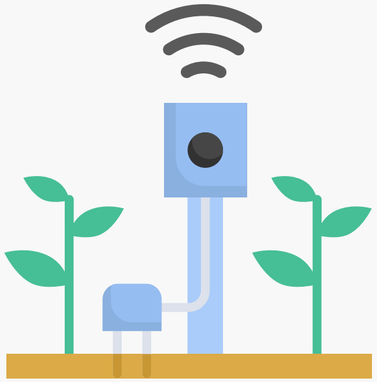
Smart grids







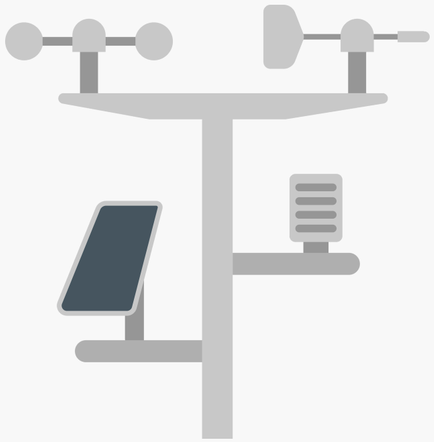


Intelligent load management

demand-side response

Real-time monitoring & automation

To improve grid flexibility & integration



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Utility-Scale Renewables and Microgrids

- Increases access in case one generation is lost
- Local control to users
- Support rural electrification
- Back up in times of disaster

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Battery Energy Storage Systems (BESS)

- will help solve the intermittency in Renewables

- Fast response for frequency regulation
  50 Hz or 60 Hz systems

at your advantage

Learn skills that matter in the new age of AI and Sustainable Energy Resources

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4. The Youth Factor

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Position yourself

- Vast opportunities due to fast-growing demand
- Collaborate through organizations like:

  Student Energy, IEEE, CIGRE

  in defining next-generation infrastructure

  business models and
  technology systems with global impact.
- Take you training courses to fill in gaps
- Go for industry-leading certifications

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it’s us

- The biggest change won’t be just technology

But it’s us

we the people

action >>>

matter small

Let protect what’s for us all, the world

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Remember:

what sustainable energy is

It’s about never forgetting the future generation

Be informed

Collaborate with industry peers

You are in the right place

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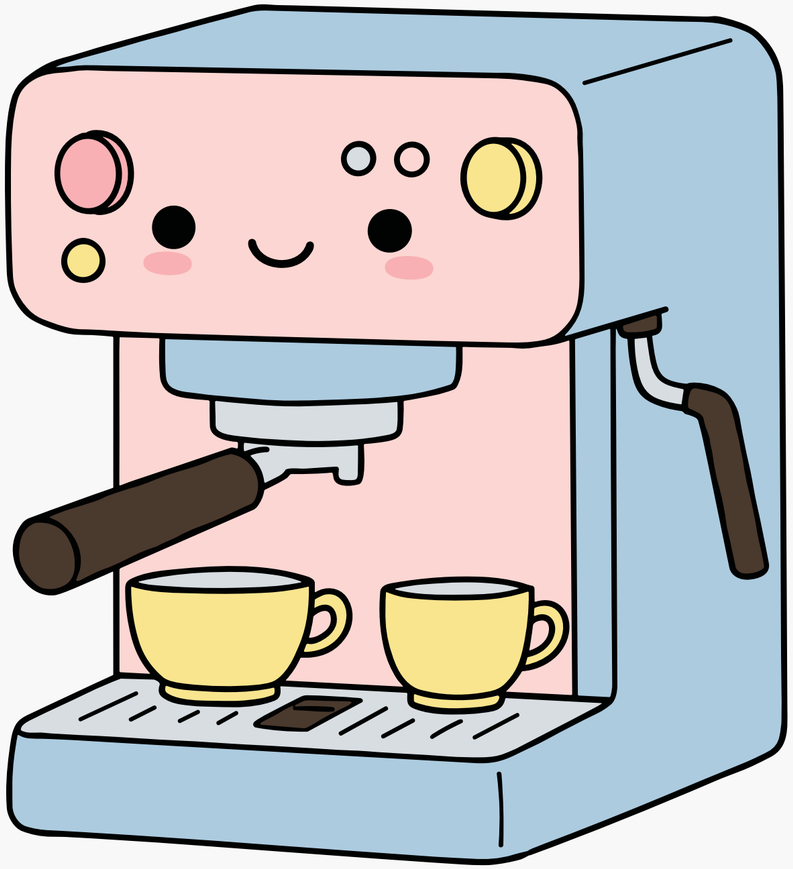
The story of the coffee machine

yum yum

Solve the problems



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Thank You!

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Let’s have it