

Energy and Climate Driven Transformation of the Economy

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DAY 1: General Introduction Setting the Scene

- We live in an age of continuous disruption
 - Pandemics (successive waves of COVID... and other pandemics)
 - Climate Change (Fires, flooding, catastrophic...)
 - Economic Recession (acceleration of existing trends...)
 - Biodiversity Collapse (The elephant in the room...)
 - Other shocks... (Arab Spring, Invasion of Ukraine, Taiwan, the new international order...)
- Policies (national, regional, sectoral...)
- Deadlines and targets (2025, 2030, 2040, 2050...)
- Measurement (ESG, CSR, CDP, SBT, Capitals accounting, Ecosystem Accounting...)
- Accountability and Reporting (protocols, audits, experts...)
- Scope 1, 2, 3, 4 CO2 footprint. Green washing, double counting, leakage, border taxes
- The supply chain challenge and implications for international trade

HOMEWORK: What is the state of play in Tunisia, your city, region, sector, or business?

- What is the evidence for climate change in Tunisia?
- What policies or strategies address these?
- What deadlines or targets have been set?
- Who or what are the driving change in Tunisia right now?

Day 2: How these Challenges are being Addressed

Climate change is a result of atmospheric carbon mainly from the way we price and use energy.

The solution is a mixture of the following (IEA...)

- Renewable energy sources
- Energy (and resource) efficiency
- CCUS (Carbon Capture, Use and Storage)

Implementation is a matrix of different approaches. Motivation and incentives are provided by cost savings and co-benefits, financial incentives, market forces, employee activism, youth activism...

- The geographical approach (led by local administration)
 - Nations (EU and national strategies)
 - Towns and Cities (10,000+ commitments under the Covenant of Mayors)
 - Regions (transformation strategies linked to CAP reform and
- The sectoral Approach (led by sectoral and business associations)
 - Energy production, storage, and distribution (prosumers, energy communities...)
 - Construction and real estate (the renovation wave...)

- Food and Agriculture (chaos for the time being...)
- Hotels, Restaurants and Retail (Mom-and-pop stores...)
- Transport (e-vehicles, airlines, shipping...)
- Other Energy (and resource) Intensive Sectors
 - Mining
 - Refining
 - Manufacturing
- Businesses (led by business leaders, and owners, driven by regulation)
 - Banking and finance (does, don'ts, financial innovation, new products...)
 - Public administration (offices, schools, hospitals, clinics, sports facilities...)
 - Large enterprise
 - Small enterprise
 - Family businesses and micro-enterprise
 - Citizens

The background for all of this is provided by the transformation of the national energy system. Traditionally this is a set of monopolies for the production, storage, and distribution of energy. Somehow it has to become an enabler of the new energy transition. This requires a vision for what the system will look like after the transition. It should answer questions like

- How will the role of the old energy companies evolve?
- What new players will emerge and what role will they play?
- How will this create new business and employment opportunities?
- How will it increase the competitiveness of industry?
- How will it increase the comfort and prosperity of citizens?
- Will the transition be fair?

HOMEWORK: What measures are being taken in Tunisia today?

- What are the biggest energy users in Tunisia?
- What activities?
- What sectors?
- What businesses?
- How much electricity, natural gas, liquid fuel, coal, wood, other do they consume.
- What share of the energy used is renewable?
- Do they have a net-zero strategy?
- Do they have deadlines and targets?
- What will happen in 2030 when the EU has reduced its footprint by 55%?
- What will happen in 2050 when the EU has reduced its footprint by 100%?

Does any of this give you thought for

- Your future role as an engineer,
- Projects you can do as a student,
- Organisations you can reach out to and involve in your work?

Day 3: Part 1 (AM)

Renewable Energy: Big projects include wind turbines on land or in the sea, solar farms (PV and solar thermal). These are often undertaken by new energy entrepreneurs, by energy intensive industries, by user-communities including citizen groups. Such projects include project to create, store and distribute energy at wholesale or retail level (B2B, B2C, B2G...). Does current legislation allow this?

Energy Intensive Industries: Examples of mining of phosphate, making of cement, making of concrete, quarrying of stone for construction, bottling and canning... example of aluminium in Iceland ...

Construction and Real Estate: The big issues here is to generate energy, reduce the use of energy or the cost of energy used for heating, cooling, and lighting. Increase comfort. This can take place at the level of a single building, a building complex, or an entire district. It is made up of projects such as can involve projects such as...

Transport and Mobility: What are the big fleet owners? Hauliers, buses, taxis, trains, airplanes ships and boats, company vehicles, construction, and farm machinery etc. How many vehicles in each fleet? What fuels do they use on? What are the option for sustainability? What about electrification, charging infrastructure, the retrofitting of old vehicles?

Circular Economy: This include waste to biofuel or more broadly, waste to wealth projects. What biofuels can be produced? Biodiesel, natural gas, ethanol, methanol, ammonia, hydrogen... What feedstocks are available? Waste from agriculture, forestry, fishing, food and beverage, pulp and paper, water treatment and land remediation, packaging, HORECA, commercial and domestic kitchens, plastic waste...

Financial Innovation: To make all of this happen, there is a need for new financial products. How are these products different from traditional financial products? What challenges do they present? What progress has been made? What role is played by engineers and technicians In financing and facilitating the transition?

Day 3: Part 2 (PM)

In the afternoon, you will work on the conception of mini projects that you can carry out on day 4, based on the discussions so far.

The main task is to major assignment is to choose a sector, a region or a company and sketch out what needs to be done to transform that entity over a period of time. This means working in a small group to

- Develop a 'vision' for what the transformation will look like and by what date.
- This might be qualified by numerical targets to be achieved by given dates.
- Describe the actions needed to achieve that vision.
- Describe how it will be financed.
- Consider the availability of skills, services, and legislation to make it work.
- Description the kind of partnerships and collaboration needed to succeed.

Ideally, most of these ideas will be validated by meeting with relevant organizations involved, getting their initial feedback on the idea, and seeing their willingness or availability to work with you on such projects in the future.

IN this session, you will dive into small groups and after some brainstorming together, each group will present its idea and get feedback from the class.

You are invited to meet again the evening and get a head start on the follow days work.

Day 4: Project work

We all meet in class.

The groups work on their project ideas.

The lecturer is available for discussions.

Groups or individual can leave from meetings outside with actors if they want.

They should come back and share their stories to encourage your peers.

Once more, everyone is invited to meet again the evening and plan their presentation for day 5.

Day 5 Presentation of the mini-project work

Each group presents the results of their work so far. Each group is expected to provide a short PPT presentation and present a one-page summary of the overall concept.

The project ideas and work done will be rated by the lecturer.

The project ideas and work done will also be rated anonymously by each individual taking part in the exercise.