



Innovarpel 2023

## Digitalización y Ciberseguridad en la Industria del Oil&Gas

Hotel Colón | Quito, Ecuador

21 y 22 de noviembre de 2023

ORGANIZA



ASOCIACIÓN DE EMPRESAS DE  
PETRÓLEO, GAS Y ENERGÍA RENOVABLE  
DE AMÉRICA LATINA Y EL CARIBE

REALIZA



# El Sistema Energético Sostenible del Futuro

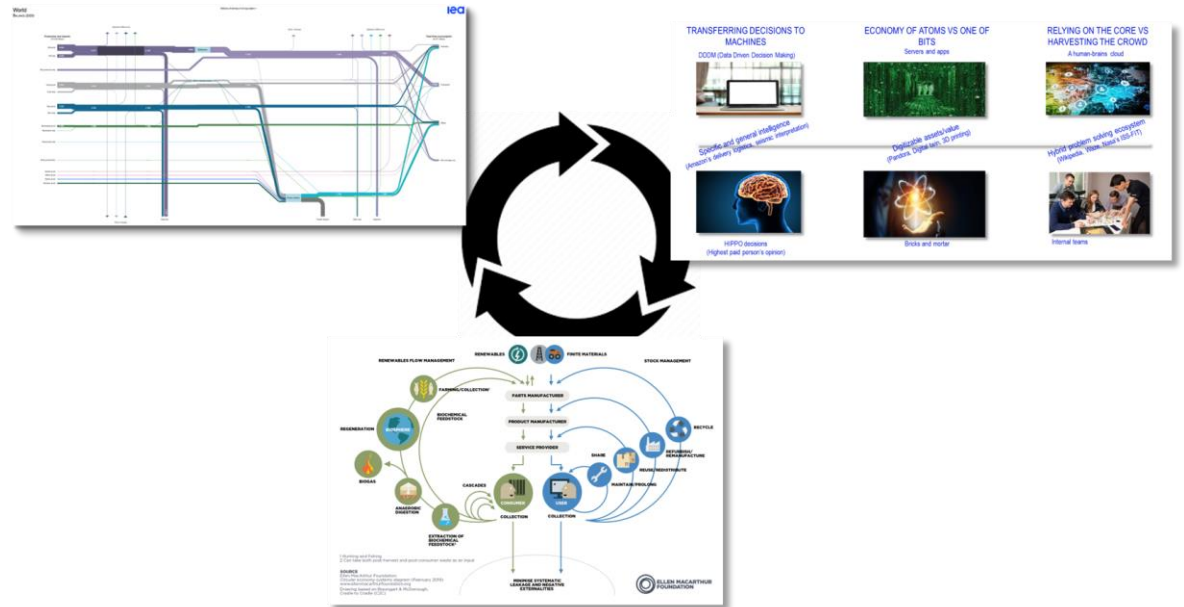
**Javier Lopez**

Consultoría Digital y Nuevas Energías – WH

SLB

# El objetivo de esta charla es ...

- Aclarar conceptos
- Establecer la relación entre Transición Energética, Transformación Digital y Sostenibilidad
- Responder a la pregunta: ¿y por qué una charla como esta en un congreso de ciberseguridad?

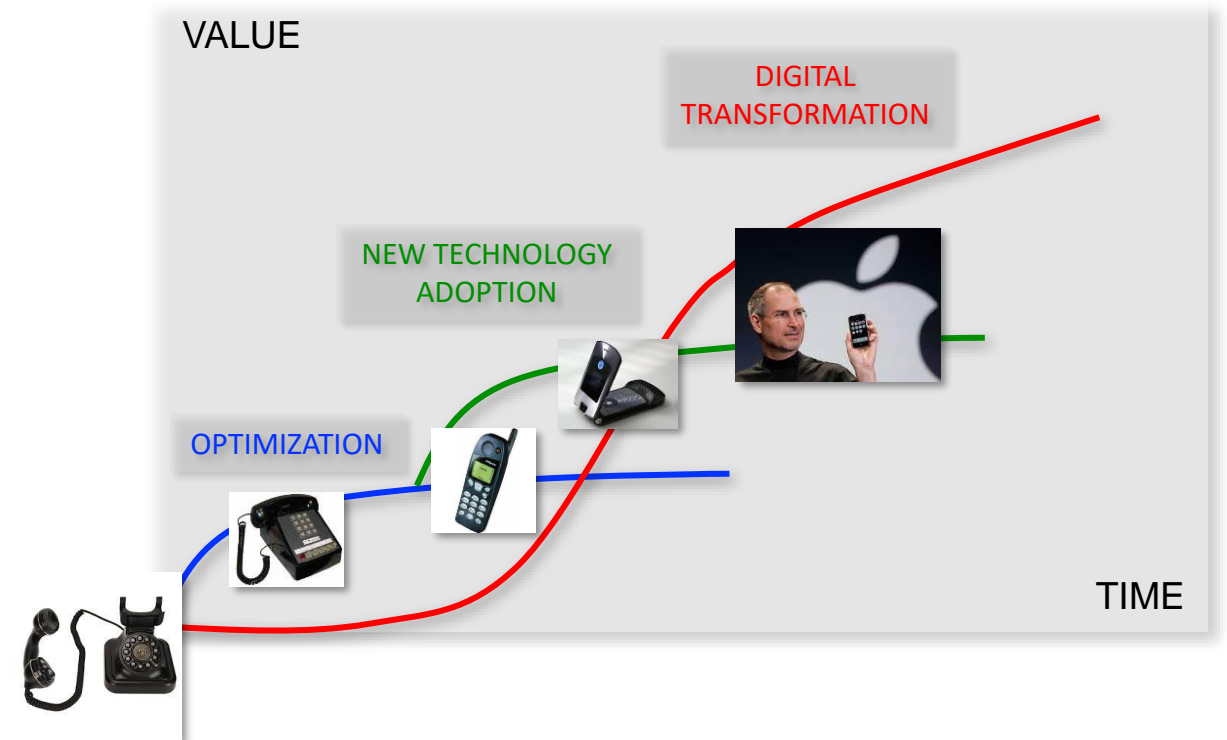




# Digital Transformation

# Digital transformation is ...

A series of **step changes** in **business processes performance** and **value generation models**, enabled by digital technologies (Javier Lopez).



# What is being transformed?

## TRANSFERRING DECISIONS TO MACHINES

DDDM (Data Driven Decision Making)



Specific and general intelligence  
(UBER rates, Amazon's logistics)



HIPPO decisions  
(Highest paid person's opinion)

## ECONOMY OF ATOMS VS ONE OF BITS

Servers and apps



Digitizable assets/value  
(Netflix, Uber, Digital twin, 3D printing)



Bricks and mortar

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## RELYING ON THE CORE VS HARVESTING THE CROWD

A human-brains cloud



Hybrid problem solving ecosystem  
(Wikipedia, Waze, Nasa's ISS-FIT, Chat GPT)



Internal teams

# What does it mean for E&P?

TRANSFERRING DECISIONS TO MACHINES

DDDM (Data Driven Decision Making)



Specific and general intelligence (UBER rates, Amazon's logistics)



HIPPO decisions (Highest paid person's opinion)

La mayor producción y reservas posibles

Acceso a áreas altamente prospectivas

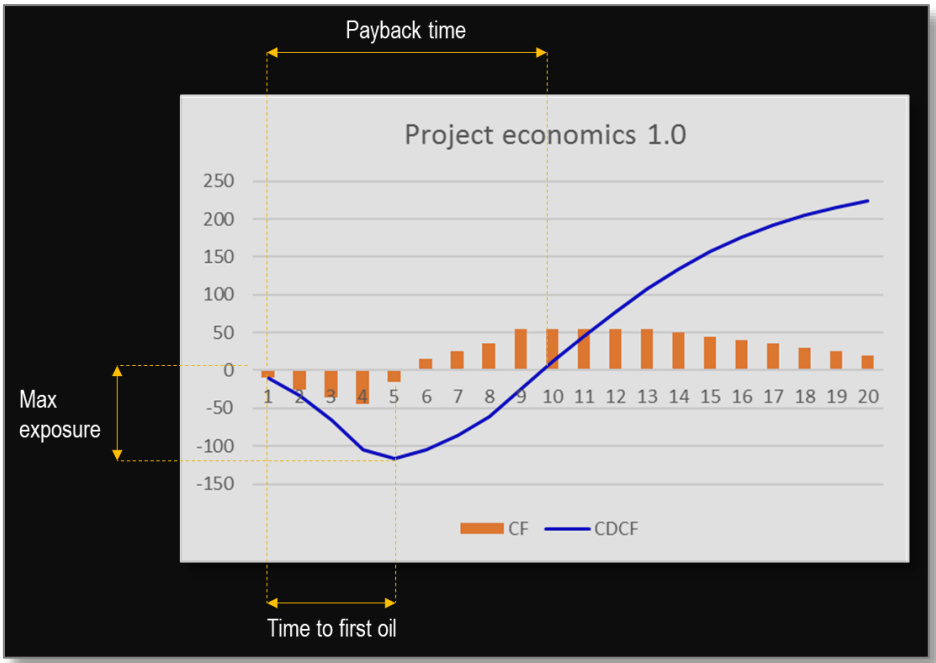
Tasa de éxito exploratorio = 100%

Factor de recobro = 100%

T2FO / Tiempo de recobro = 0

Menor costo / mayor beneficio posibles (>>NI)

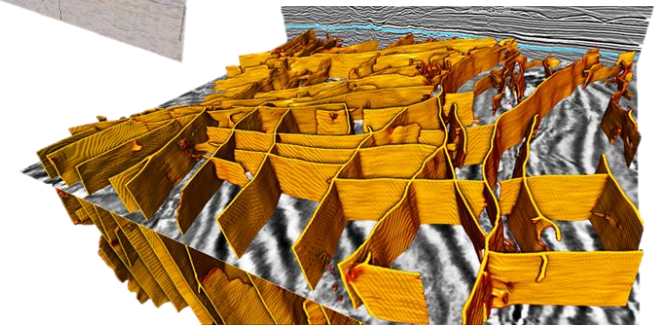
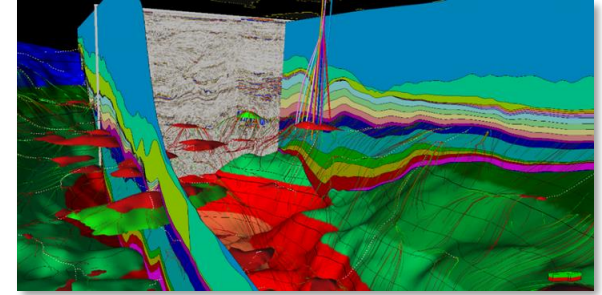
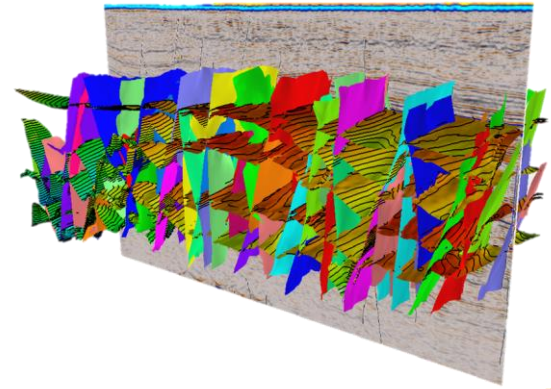
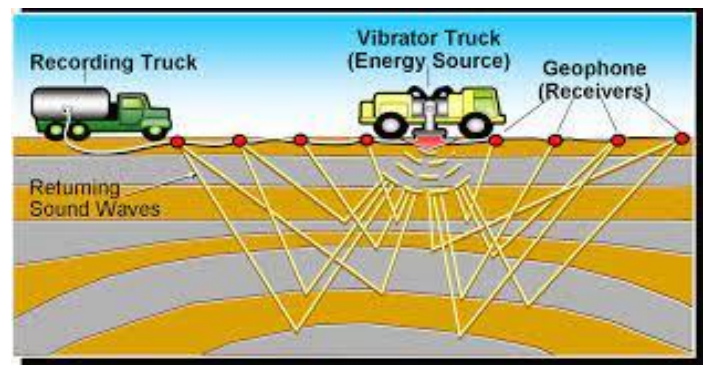
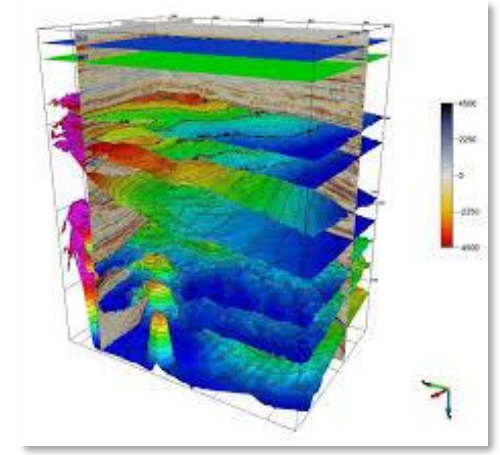
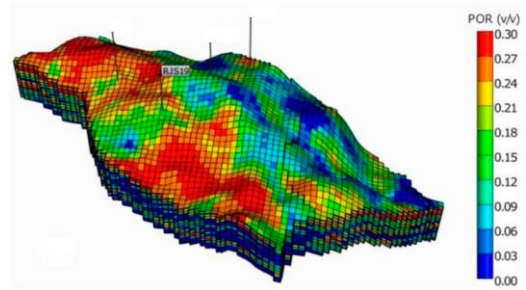
LTIs = 0 / Emisiones Netas = 0



Faster and more accurate decision-making processes → uncertainty reduction

# Cloud computing power for big / long-cycle data

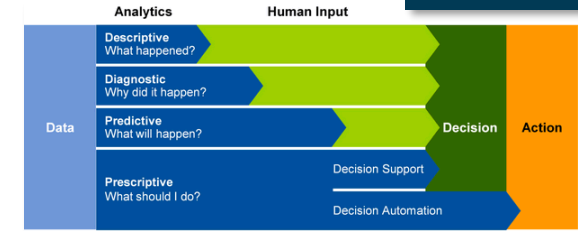
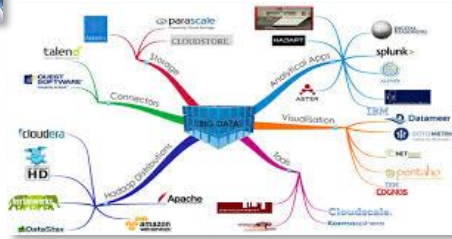
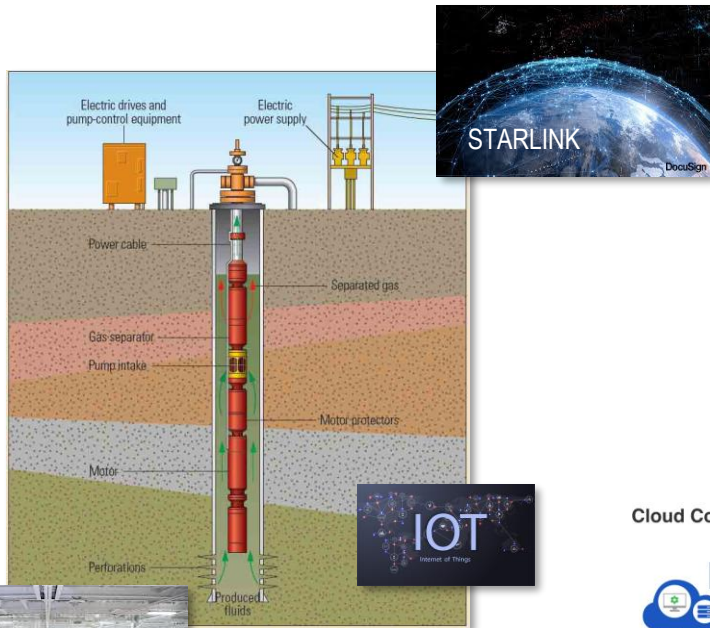
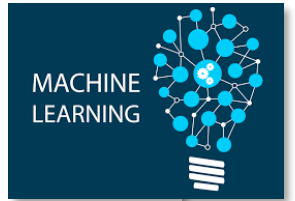
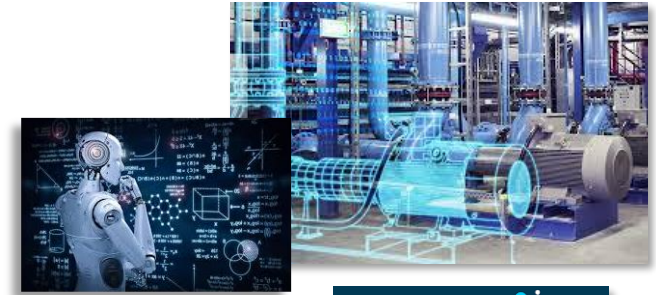
Tasa de éxito exploratorio = 100%



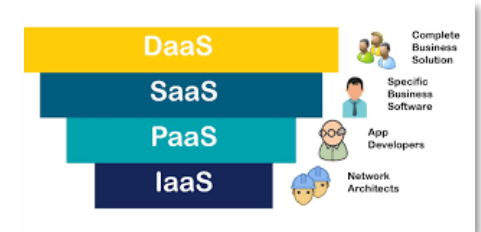
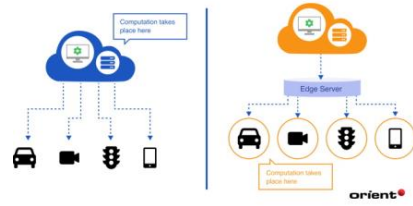
# Artificial lifting optimization – Short cycle data

Factor de recobro = 100%

T2FO / Tiempo de recobro = 0

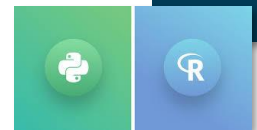


### Cloud Computing vs Edge Computing

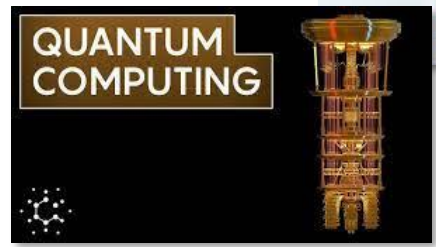




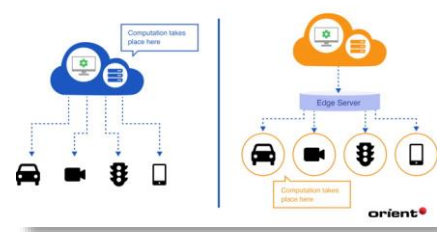
# Logistics optimization – Multiple variables/scenarios analysis



Menor costo / mayor beneficio posibles (>>NI)



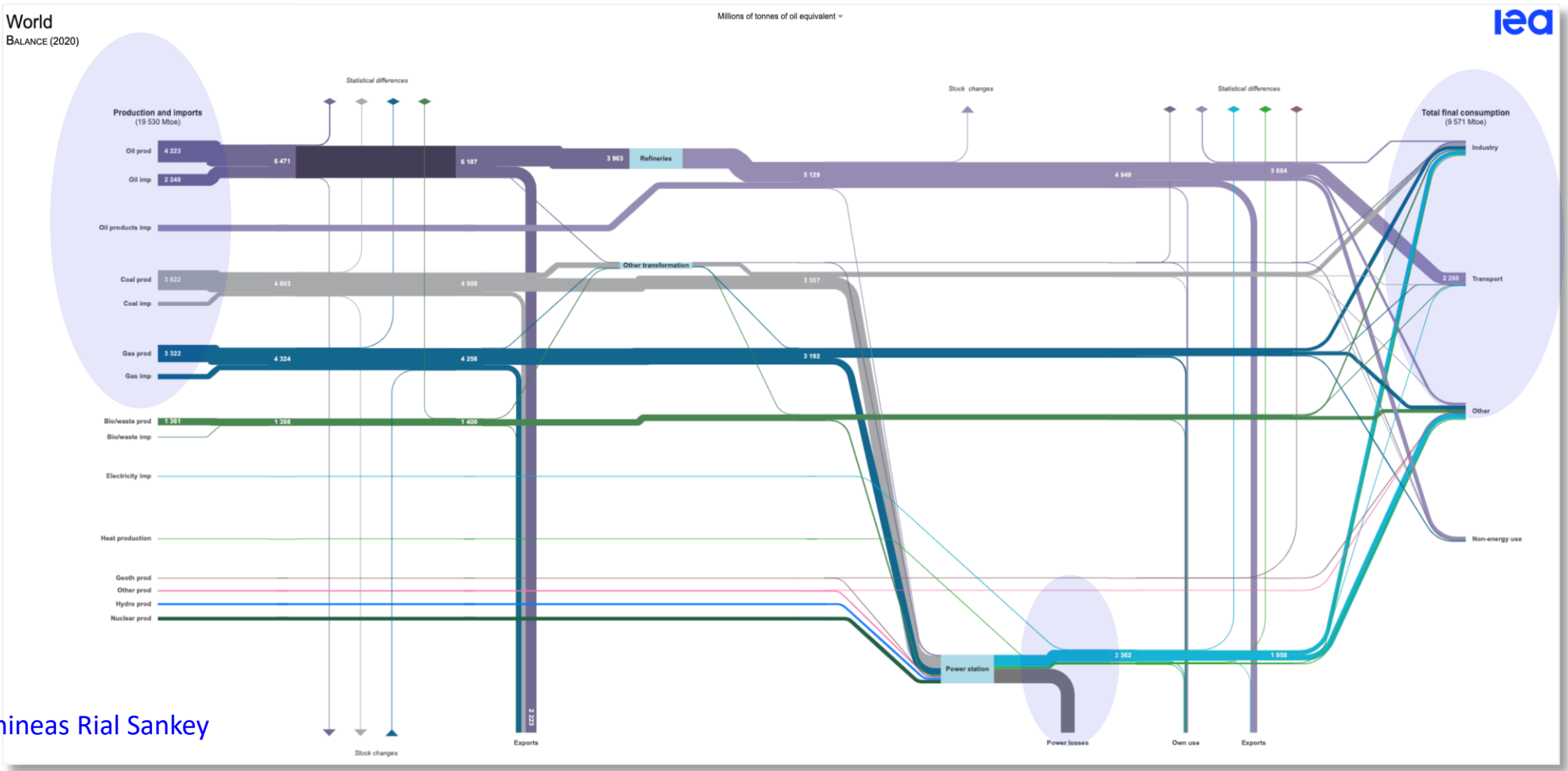
Cloud Computing vs Edge Computing



# Energy Transition

# Energy transition is ...

A series of **incremental or abrupt changes** in the way we **generate, manage and use energy** (Javier Lopez).



Mathew Henry Phineas Rial Sankey

# What needs to transition (The 3DER acronym)



## Electrification



## Decarbonization



## Digitalization

ECONOMY OF ATOMS VS ONE OF BITS  
Servers and apps

Digitizable assets/value  
(Netflix, Digital twin, 3D printing)

Bricks and mortar



## Decentralization

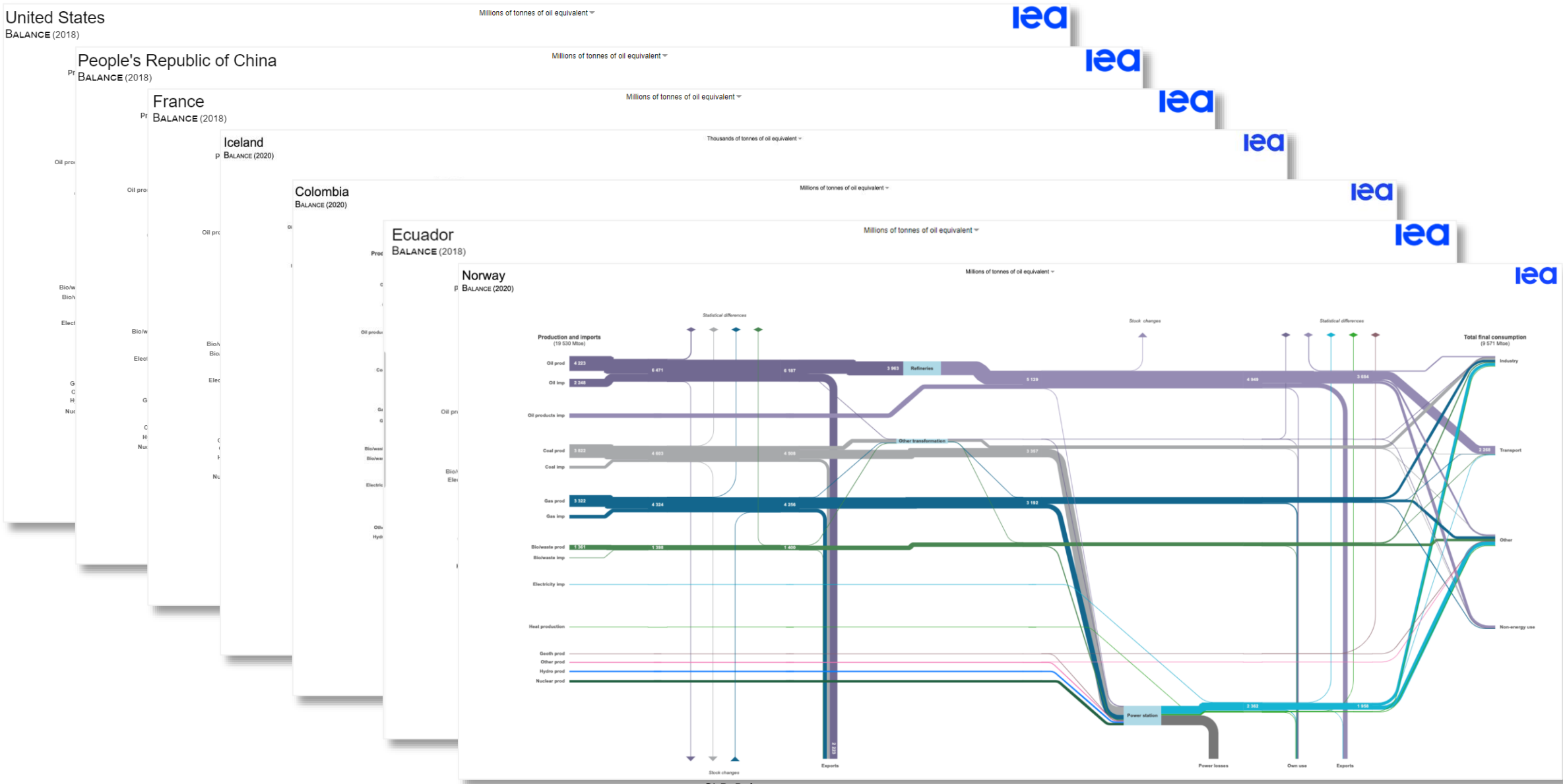
## Resilience



Digital Twins

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# Does it mean the same for every player?

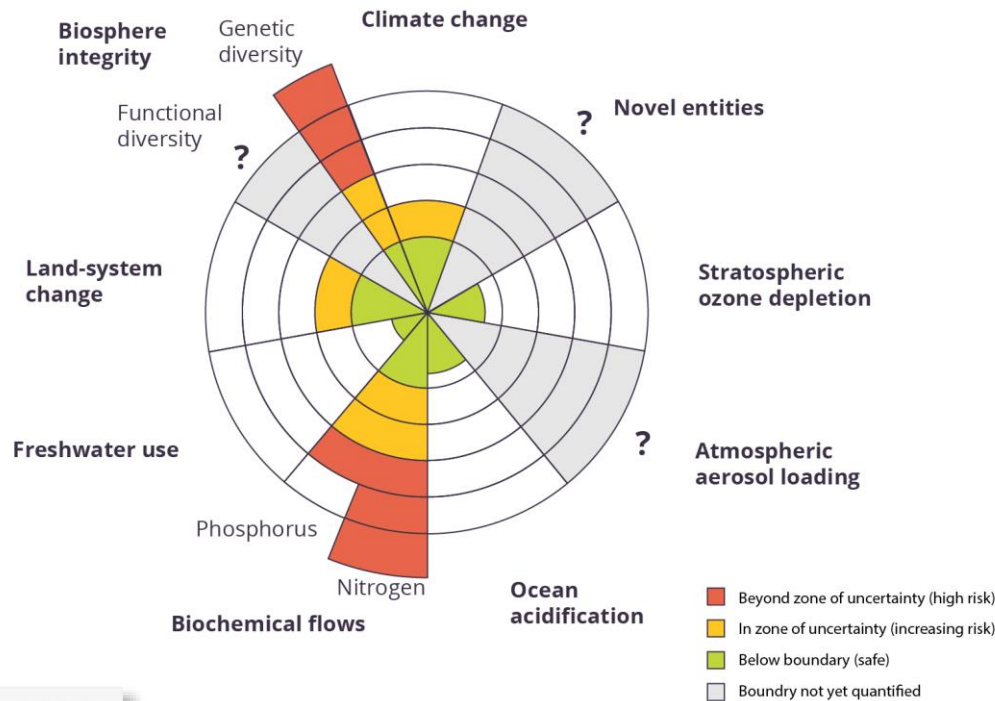




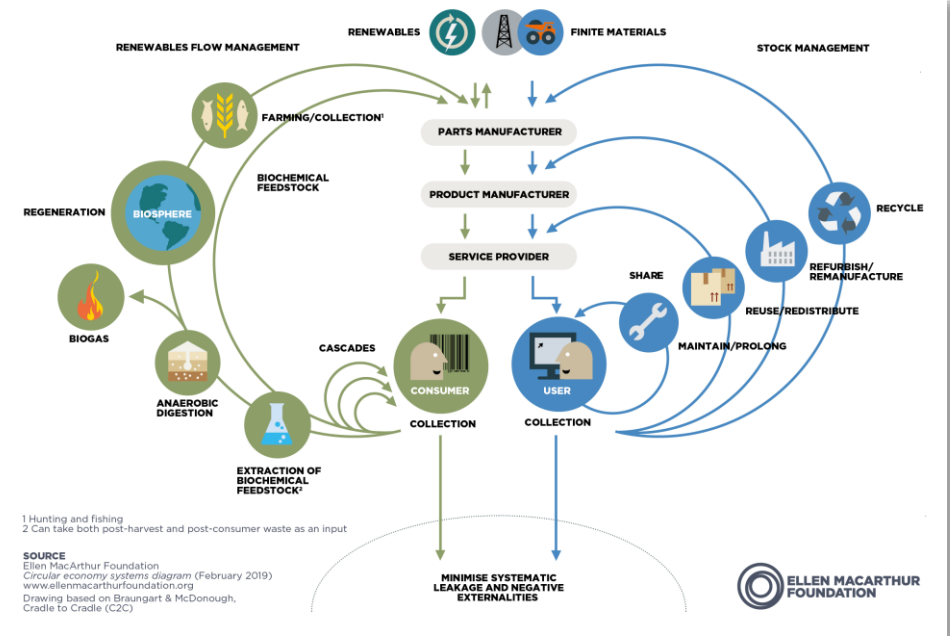
# What is sustainability?

# What is sustainability

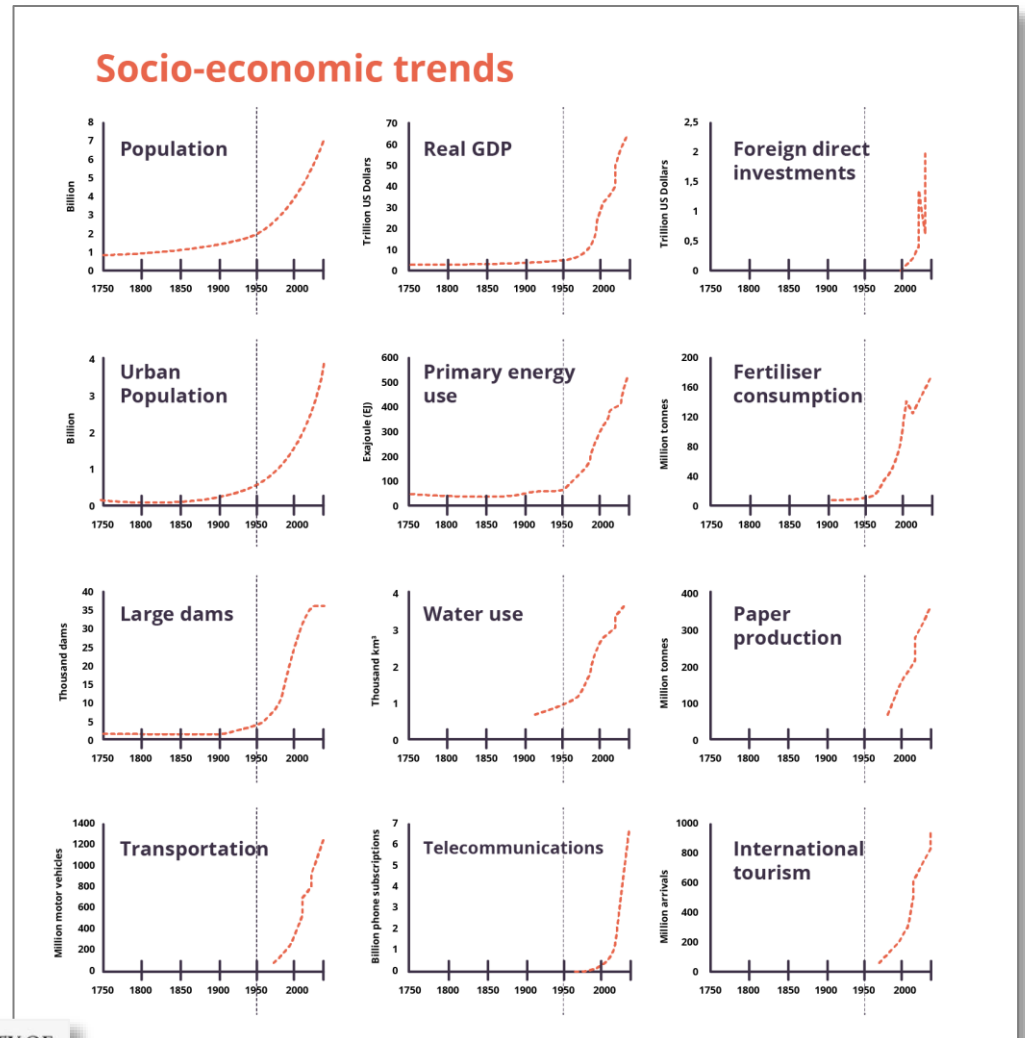
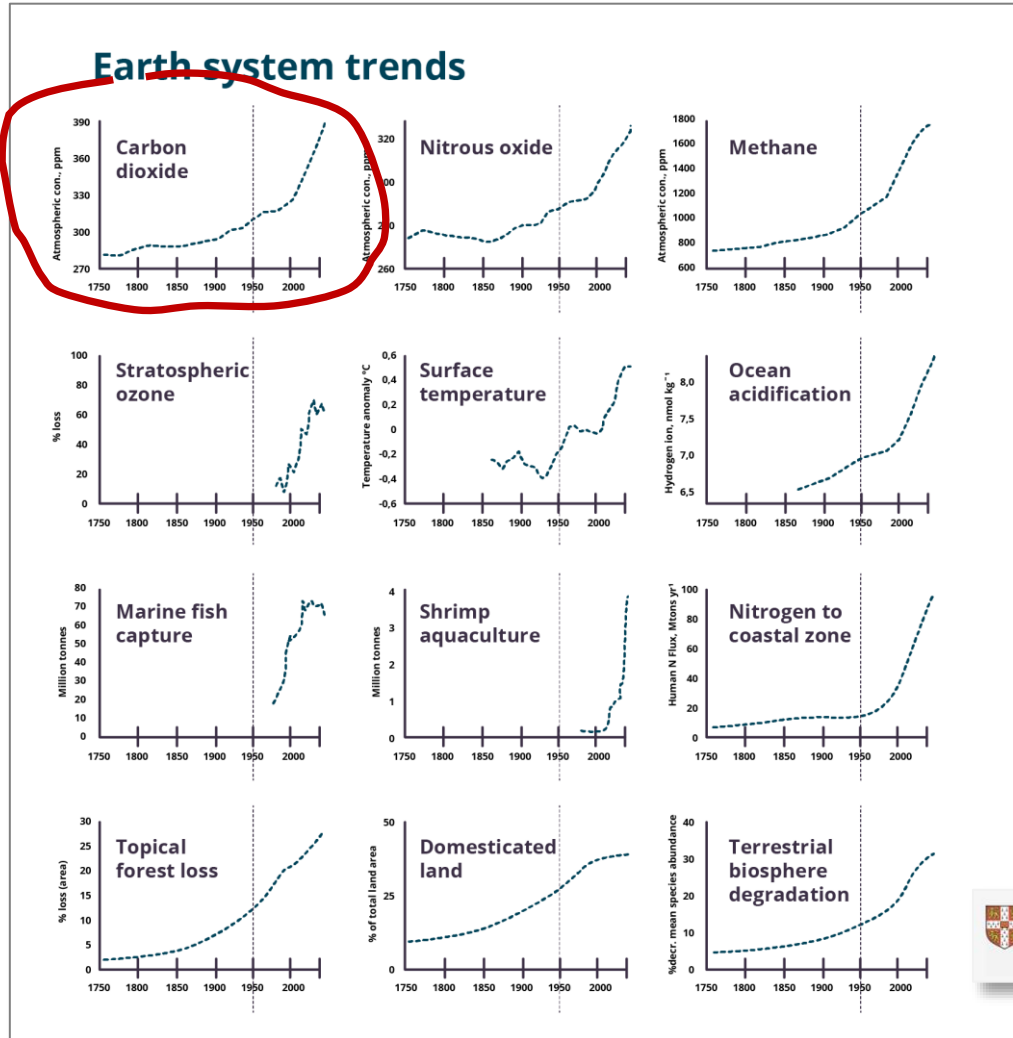
The capacity to maintain or support something over the long term without depleting resources or causing harm to Environment, Society or the Economy (Chat GPT)



ESE (Sustainability dimensions) = ESG (Measurement tool)

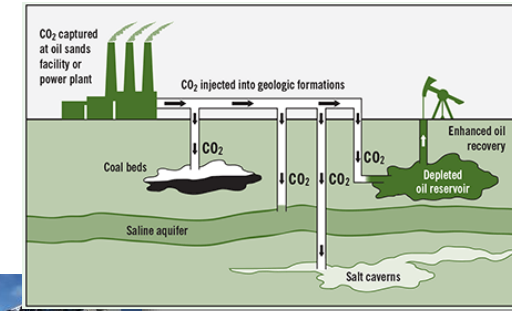
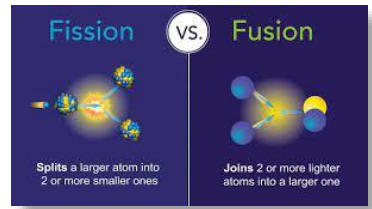
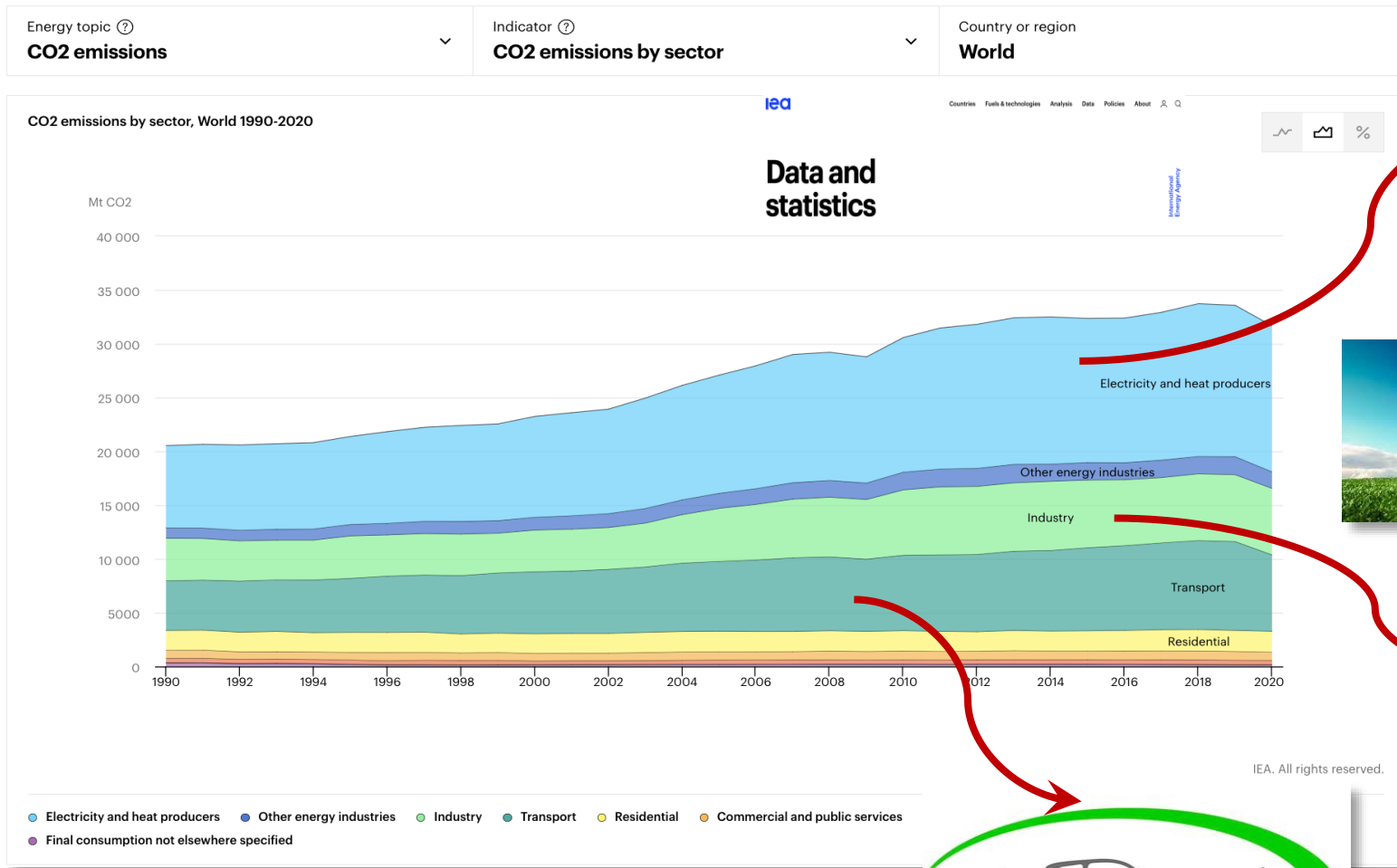


# Earth systems vs human activity, trends



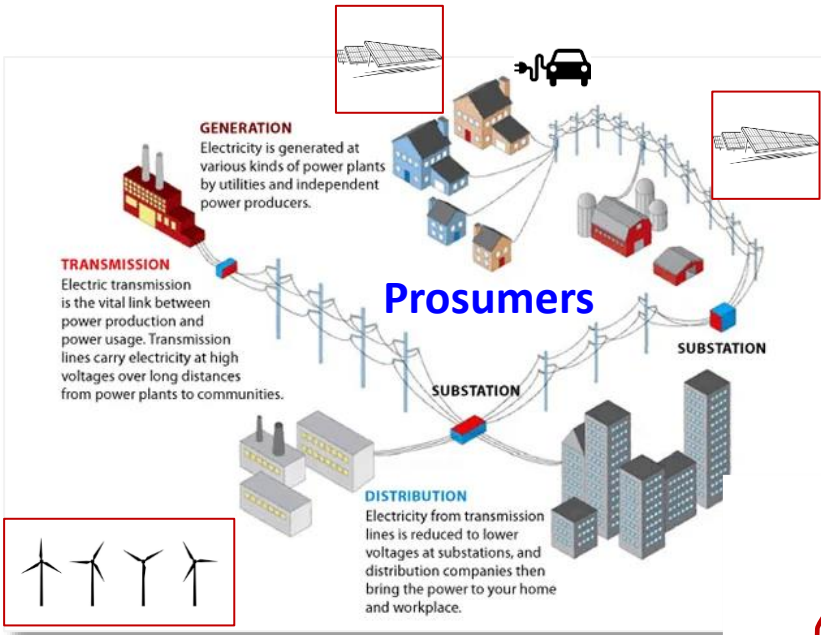


# Our Net Zero 2050 ambition is achievable ... in theory

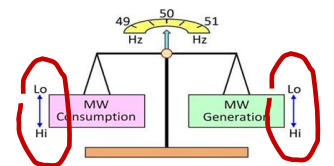


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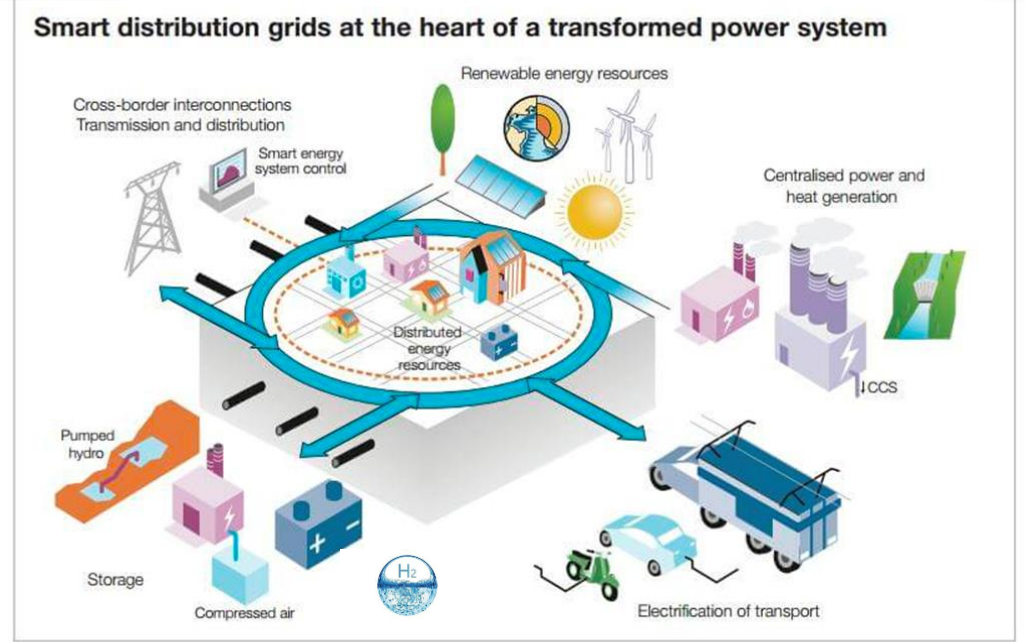
# In real life though ...



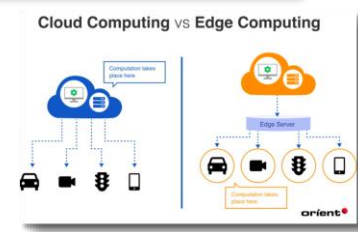
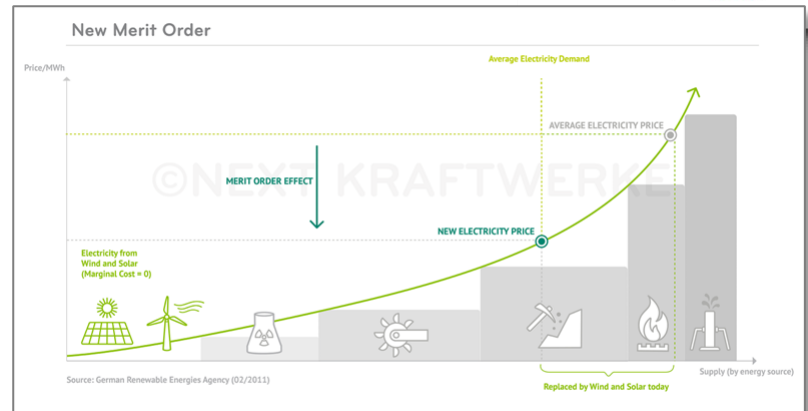
## THE POWER BALANCE



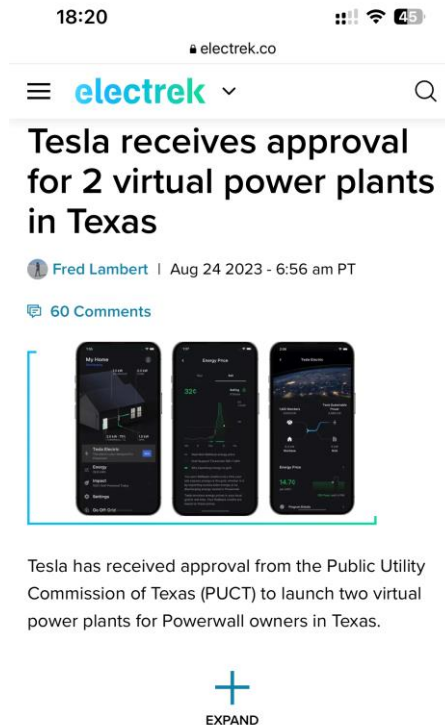
Frequency deviation from the nominal value represents mismatch between the active power (MW) generation and consumption.



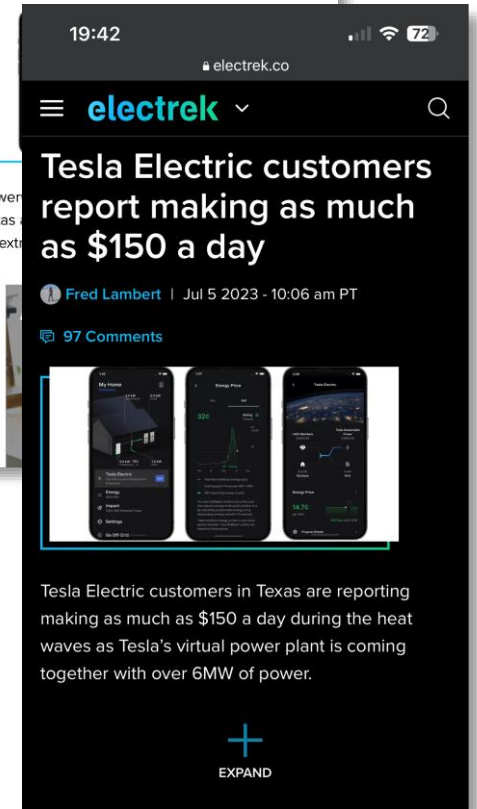
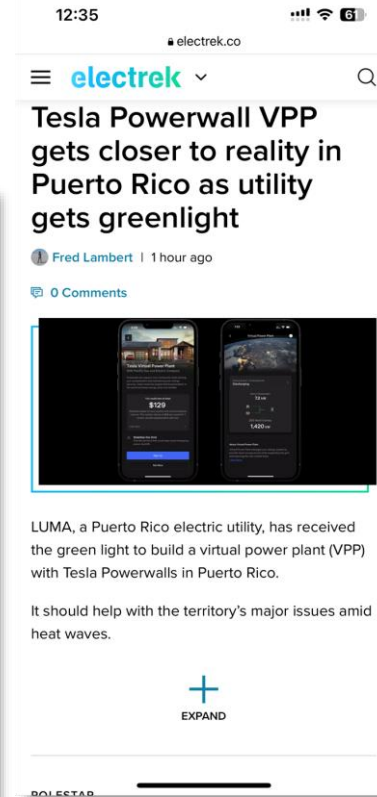
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# Happening as we speak ...

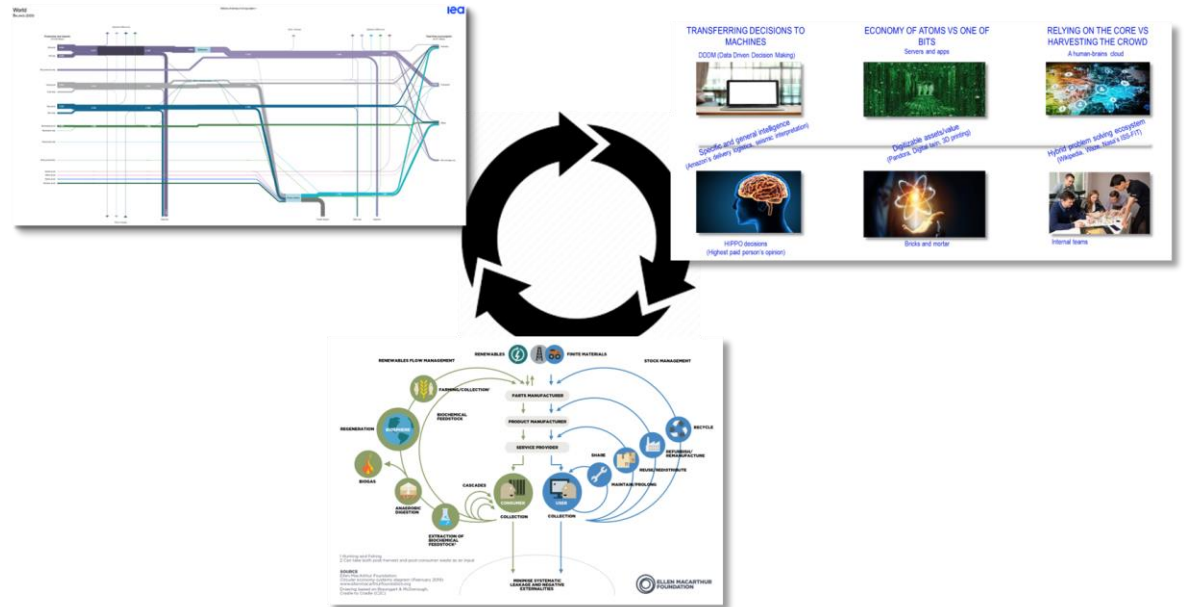


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# Mensajes finales

- La sostenibilidad no es factible sin una Transición Energética profunda
- Una transición energética profunda y eficiente requiere de soluciones digitales
- Las nuevas soluciones energético-digitales deben ser intrínsecamente sostenibles
- Existe una relación simbiótica mutualista entre estas tres tendencias
- El ecosistema sostenible del futuro no es posible sin ciberseguridad





# Relevant and recommended training

- Chief Sustainability Officer (CSO) Certification – MIT, ongoing
- Business sustainability management – Cambridge University, 2023
- Circular economy – TU Delf, ongoing
- Transforming the Grid: AI, ML, Storage, EVs, Prosumers – Stanford University 2021
- The economics of the Energy Transition - TU DELF – 2020/21
  - Energy markets of today
  - The Transition to the Decarbonized Economy of the Future
- Economics of the Clean Energy Transition – Stanford University 2020
- Energy Within Environmental Constraints – Harvard University 2018
- Managing Disruptive Change – RWTHx via EDX - 2017
- Energy Innovation & Emerging Technologies – Stanford University 2015
- Photovoltaic Systems, Theory & Applications – Reading University 1989
- Digital Business Strategy: Harnessing our Digital Future – MIT 2019
- Digital Transformation Strategy – Boston University 2018
- Machine Learning in Business – MIT 2020
- Bitcoin and cryptocurrencies – Berkeley University 2021
- From Poverty to Prosperity – Oxford University 2017

Javier Lopez

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