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SCHUMAN
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STUDIES

Florence
School
of
Regulation

***Regulation...
Challenges & Tools...***

Washington, IADB, 27th September 2018

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To stay young... for ever!





Regulation: a Lego to play...

- **1st Layer: Social Welfare with natural monopolies**
 - 1- Monopoly of essential facility: as a bridge on a river.
 - 2- Utility for society is usage, then pricing. Monopoly price not good for society.
 - 3- Society will price better: fair price for owner & fair price for users.
Average Price? Marginal Price? Recovery of Fixed costs?



Regulation: a Lego to play...

- **2nd Layer: Political Economy of Universal Service**

1- Investments: where to put bridges? > *Universal Service*

2- Price discrimination: why to discriminate? > *Postal Stamp*

3- Postal stamp is average pricing > *Social tariffs*

4- Quality of service: why to discriminate? > *Universal Service*

5- Technology choice & innovation > *How compatible with Universal Service & Postal Stamp?*



Regulation: a Lego to play...

- **3rd Layer: Coordinating (Unbundled Grids) & (Market Design)**
 - 1- Unbundling “*Infrastructure facility*” from “*Final services*”:
Unbundled grids; Independent Market
 - 2- Unbundling “*Regulation*” from “*Political economy*”: Independent regulators
 - 3- Then you can go to “*Incentive Regulation*”, and face its “*seams*”



Regulation: a Lego to play...

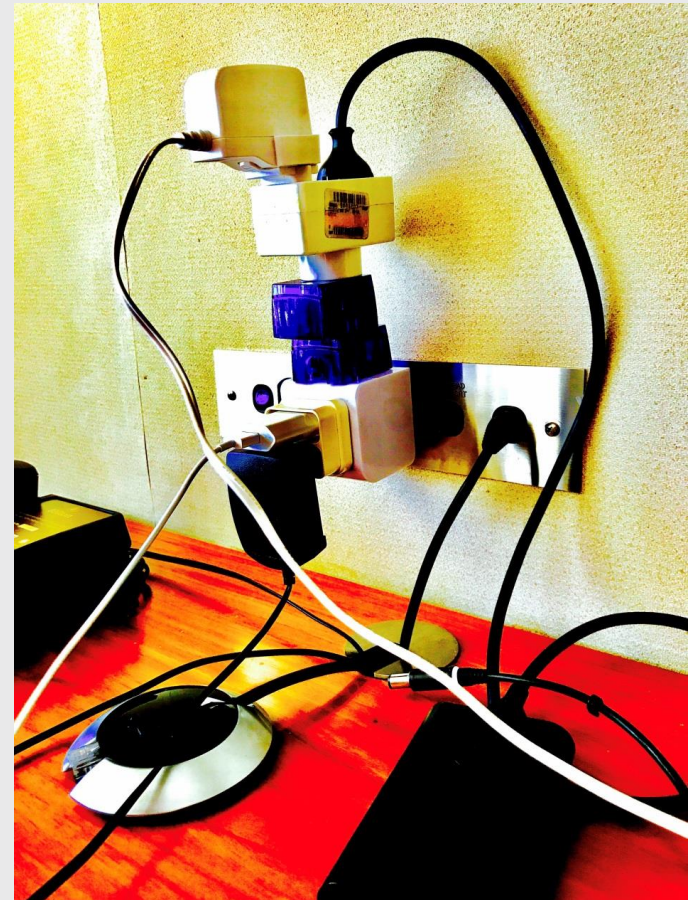
- **3rd Layer: Coordinating (Unbundled Grids) & (Market Design)**
 - 3- Then you can go to *“Incentive Regulation”*, and face its *“seams”*
 - 4- Rules for Infrastructures interact with *“Market final services”* via *“System Operation”* > *Grid Codes (Capacity, Congestion, Balancing)*
 - 5- *“System operation neutrality”* is *“market design”* sensitive
 - 6- Revenge of Ronald Coase & Oliver Williamson: markets need *“infrastructures for transaction”*- Market Transaction <calls for> Industry Coordination
 - 7- Still Regulation needed BUT very far from *‘Natural Monopoly Pricing’* + *‘Universal Service’*



What's “*Essential facility / Final service*” coordination issue?

My hotel room in Australia: Access is not only pricing > *Transaction Costs!*

Lovely 😊 Aussie 😊 plugs... seen by a continental EU visitor





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NorteAmericana 😊
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Regulation: a Lego to play...

- **4th Layer: Innovating with (Decentralization) + (Digitalization)**

1- **Decentralizing**, say Power Industry, is “Big Bang”.

French nuclear plant 1,700MW - Coal Plant 500/1,000MW - CCGT 400MW – Wind mills by MW - PV Panels by KW

It can be pushed by decarbonisation (new public policy > new kind of Regulation).
State of Maryland, of California. Or not: State of Texas.

2- **Digitalization** is another “Big Bang”

3- Let's see both...



1/ Decentralization changes size & scope of assets, operation, & decision making

New Ownership <:> New Operation <:> New Governance

2/ Digitalization changes operation of assets, services, & decision making:

New Technology <:> New Operation & Services <:> New Governance

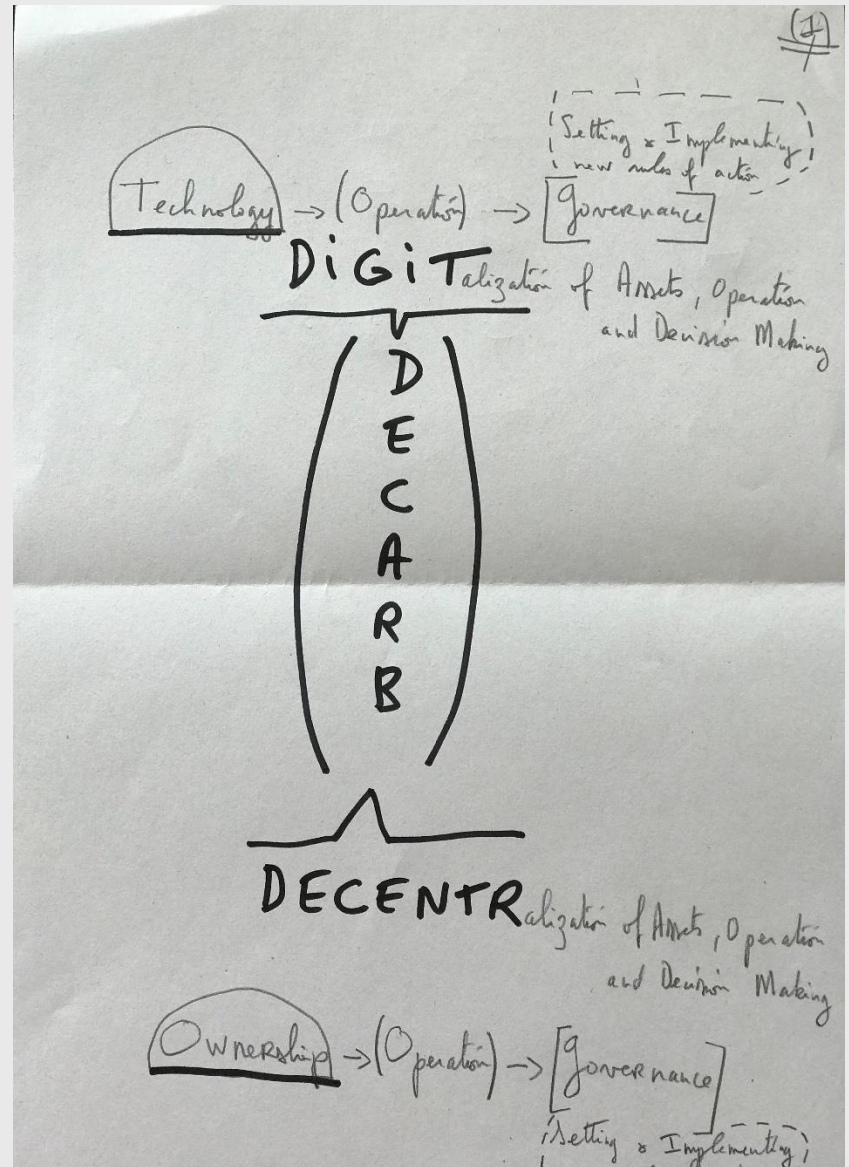


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Ownership <:> Operation <:> Governance

Digitalization changes operation of assets, services, & decision making:

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1/ **Decentralization** has two focal points

*Ending centralized Utilities

**Ending centralized System Operation

2/ **Digitalization** has two focal points

*Setting rules outside the Electricity Sector regulation

**Coordinating digital tasks with Electricity Delivery Loop (the Amazon “Delivery Loop” = the “Distribution Grid Platform”)



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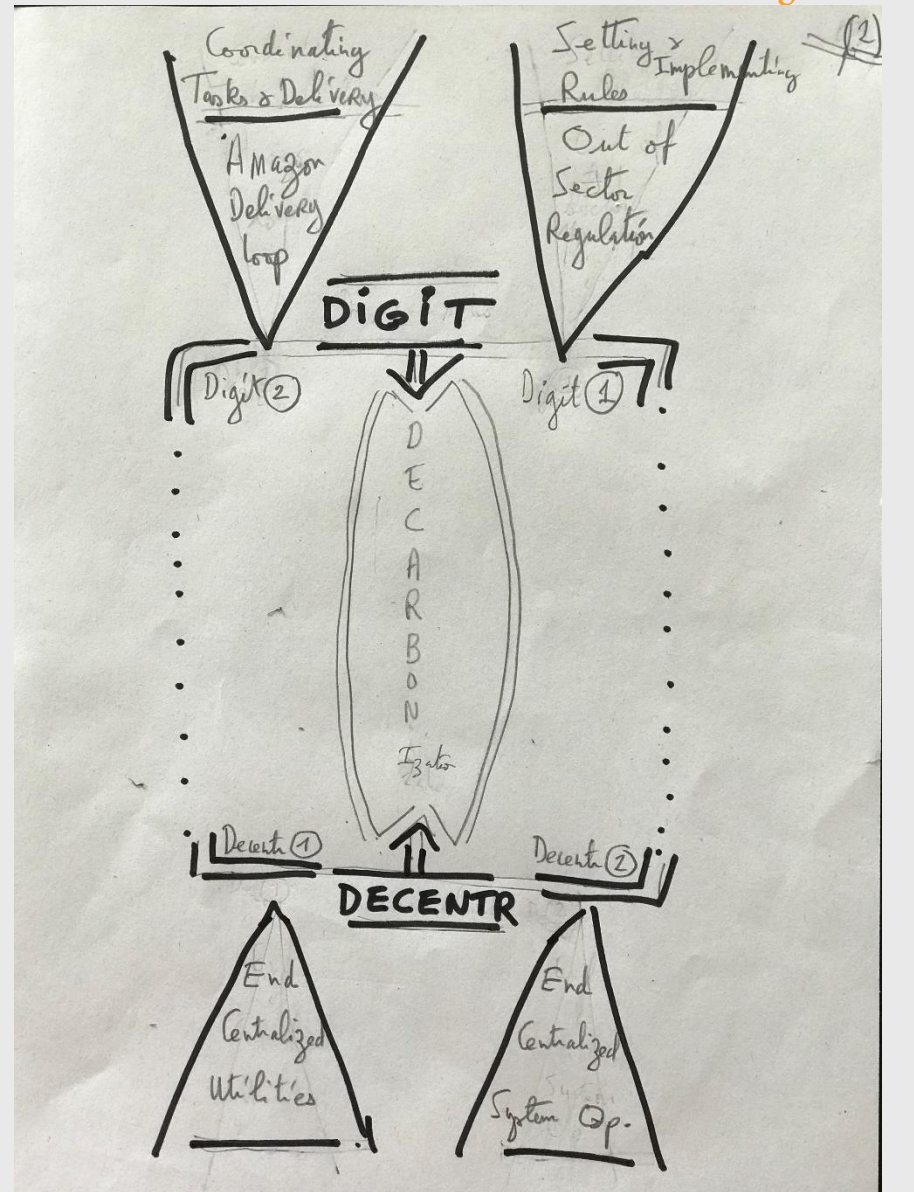
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Interactions Decentralization - Digitalization



Decentralization supports two streams of changes

1* **Distributed Generation** expands to distributed **Prosumers** (PV or Wind PPAs), **Prosumagers** (Storage), & more “**Behind the Meter**” (electric Cars; smart buildings)

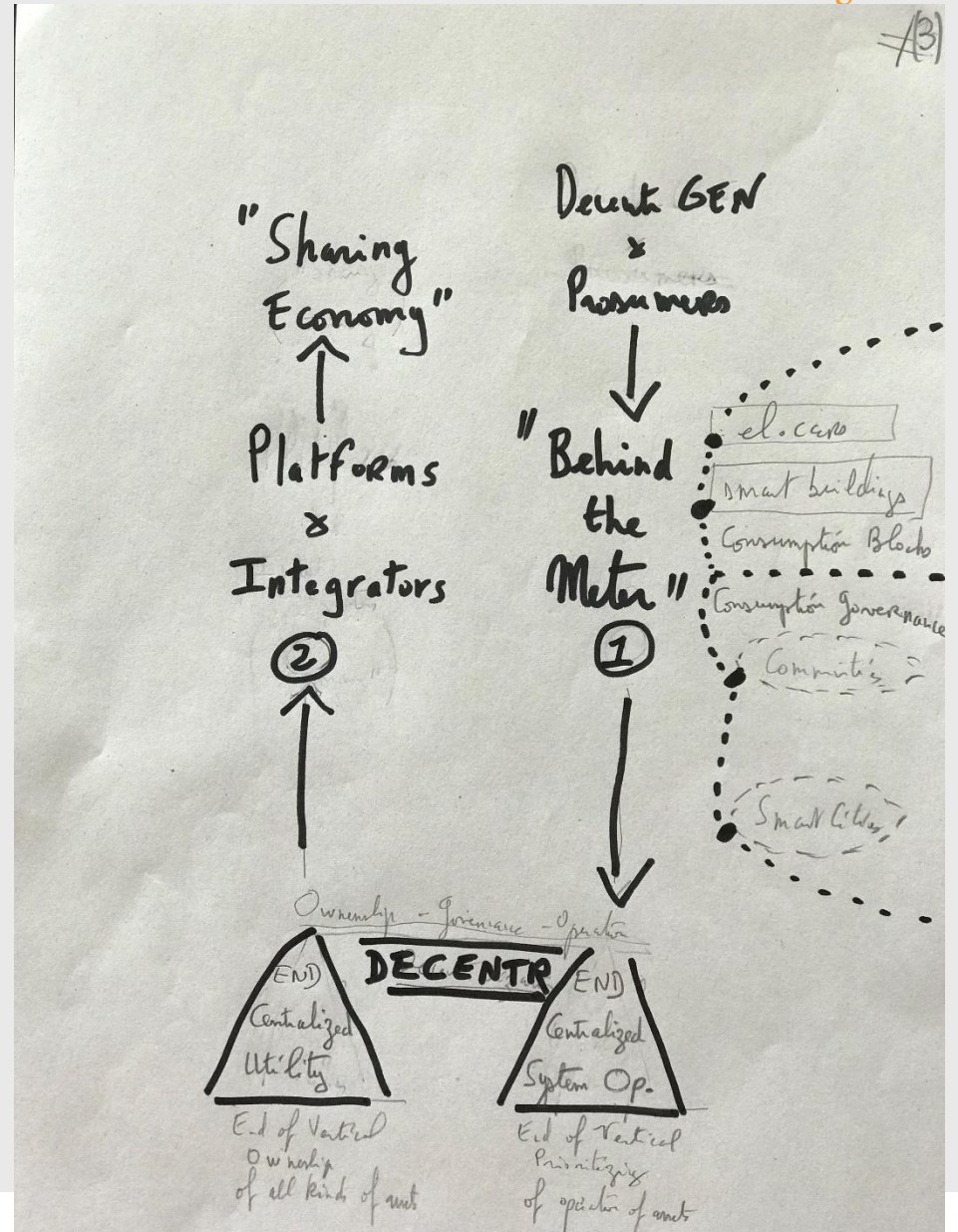
2* **Platforms & Integrators** offer new ways of coordinating the decentralized units, Up to “**Sharing Economy**” Platforms



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Digitalization favors two streams of changes

1/ **Out of Sector** gathering of “Behind the Meter devices” to manage them as smart assets (think electric car fleets)

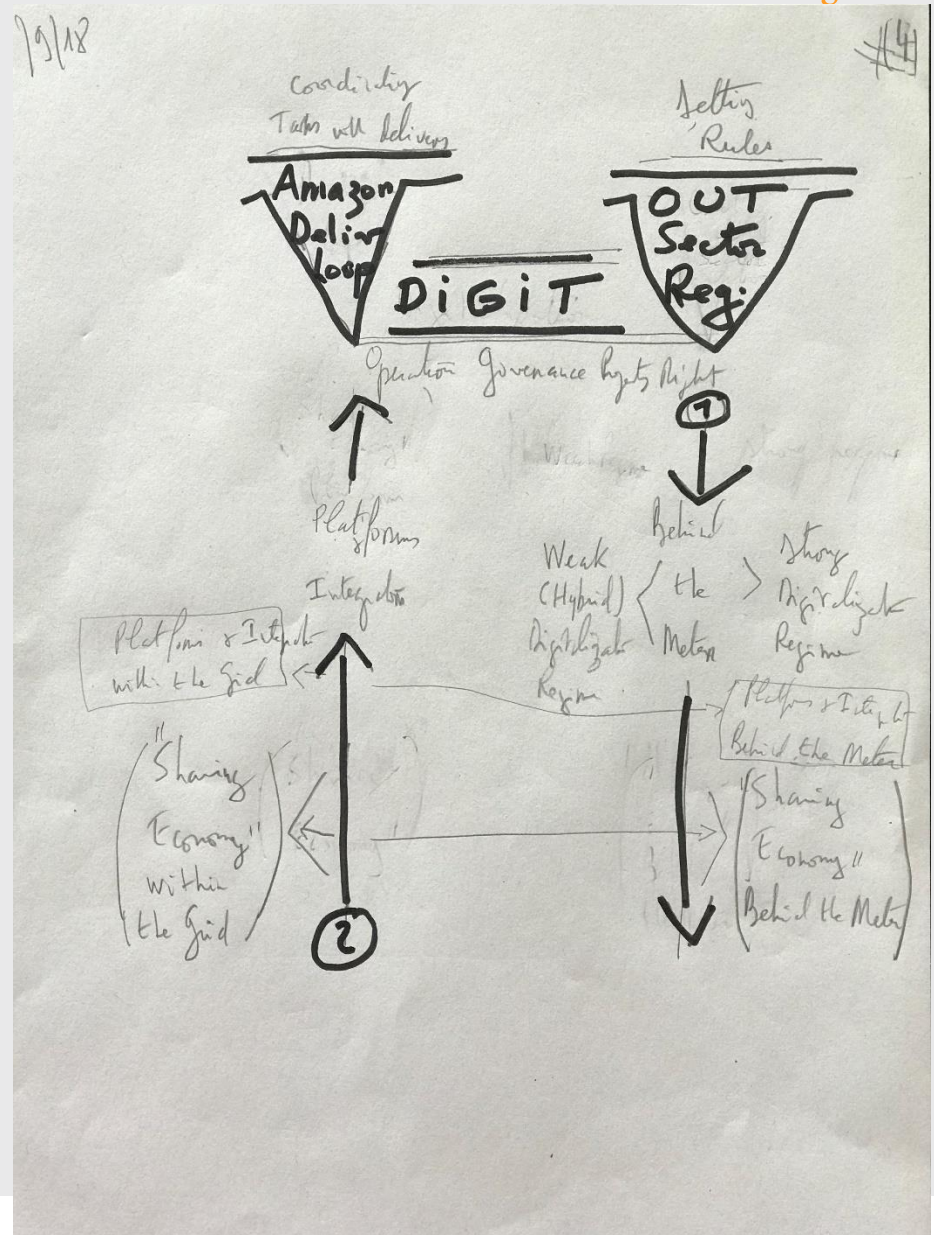
2/ Platforms & Integrators offering new ways of coordinating the decentralized units, Up to **Blockchain** networks (a Blockchain network has NO intermediary, NO UBER in between).
>> Up to “**Amazon Delivery Loop**” constraint (Distribution Grid Platform)



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***Out of Sector** gathering the “Behind the Meter devices” to manage them as smart assets (think electric car fleets)

Platforms & Integrators offer new ways of coordinating the decentralized, Up to Blockchain networks (with NO intermediary, NO UBER in between) Up to “Amazon Delivery Loop**” (Distribution Grid Platform) constraint





1/ Decentralization & Digitalization strongly interact
Because they have two similar streams of changes

*The “**Behind the Meter**” target of smart assets

Platforms & Integrators facing the “EI. Amazon Loop**” delivery constraint

2/ They touch upon tasks, assets, operation, apps, integrators, platforms > > **Up to Governance**

*Communities of Peers

**Clubs of Partners

***Smart Local Authorities



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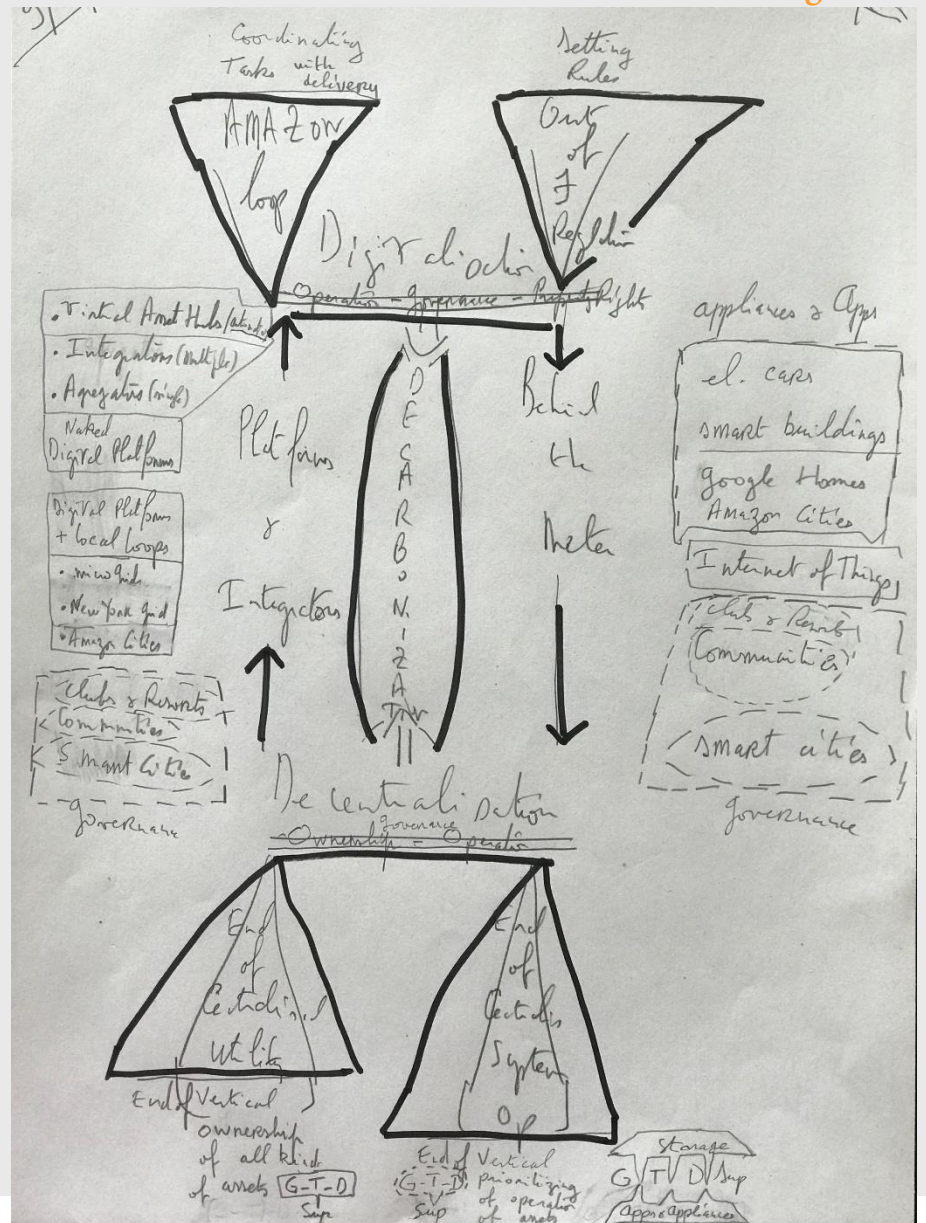
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> Up to Governance:

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3/ Conclusions: a lot of challenges for regulators

Beyond “Utility regulation”

+ “Behind the Meter” activities

+ Innovation –Business Models –Regulatory Frames



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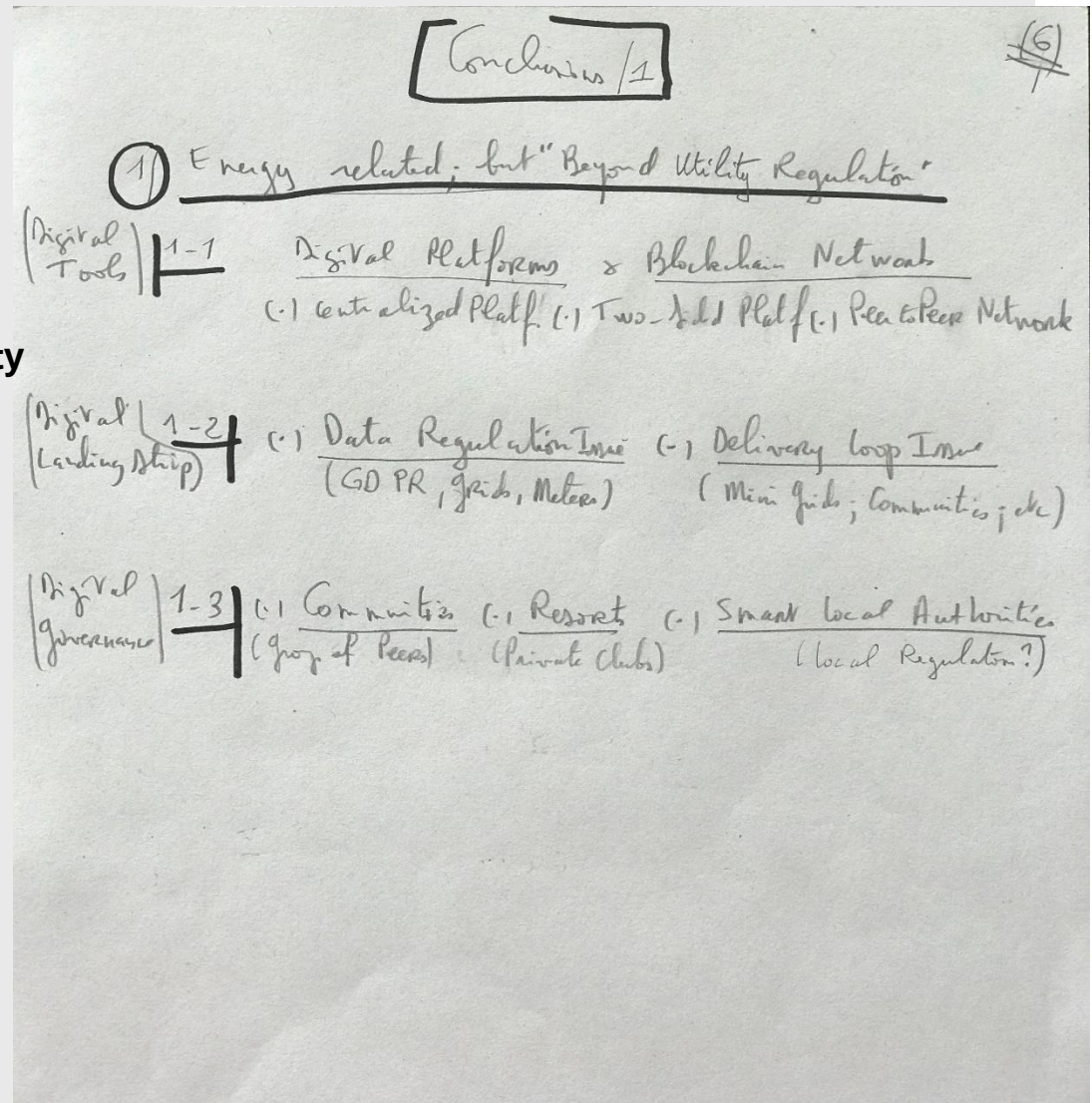


Yes Energy Related but: **"Beyond Utility Regulation"**

*Digital Tools employed (Platforms; Blockchain networks)

**But Digital Landing Strip needed (Data Regulation; Delivery loop)

*** New Forms of Governance (Communities, Resorts, Smart L. Auth)



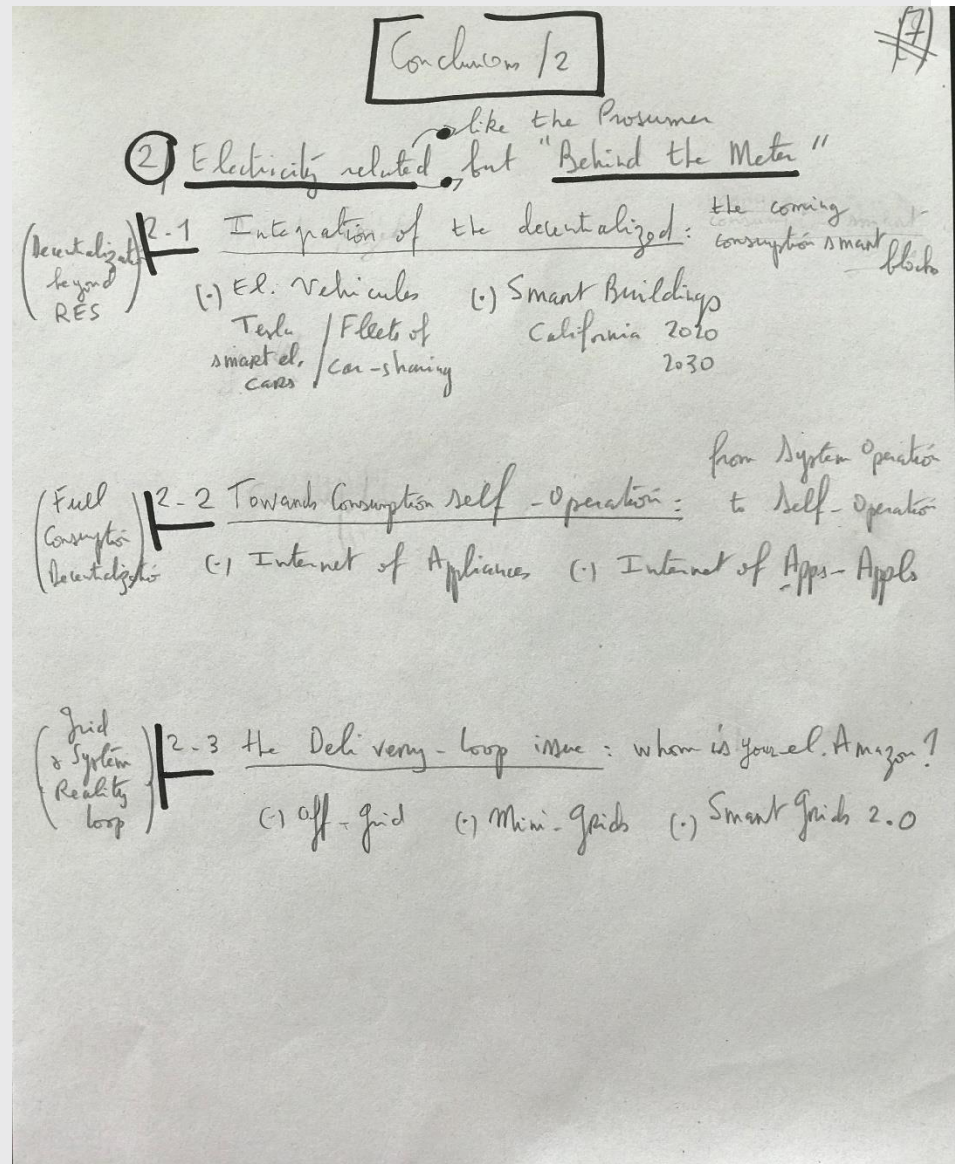


Yes Electricity Related but: "Behind The Meter"

1* Decentralized assets to integrate beyond RES & Storage (El. Vehicles; Smart Buildings)

2* All consumption could self-operate (Internet of Things; Internet of self-Op)

3* New Delivery Loops (Off-grids; mini grids; smart grids 2.0)



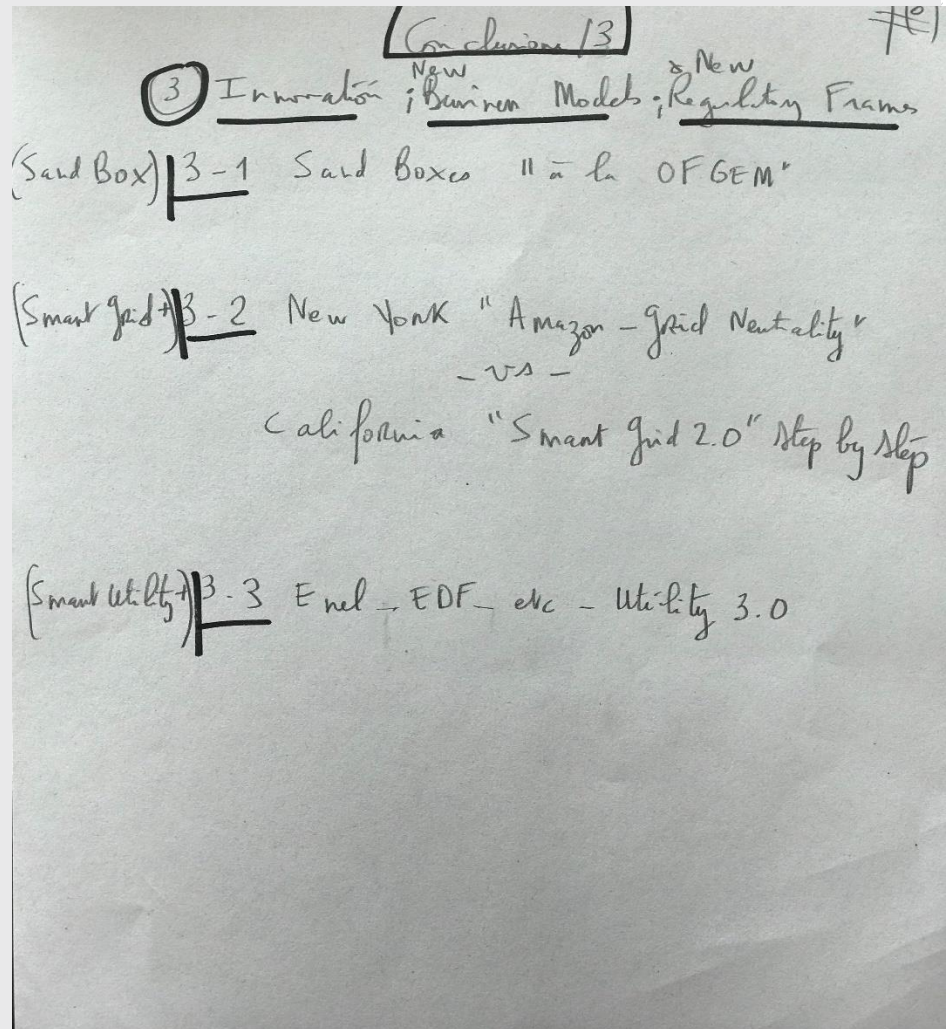


Yes Energy & Electricity related but: **interactions**
"Innovation" <:;> "Regulation"

* Sand Box
(How to scale it up outside?)

** Smart++ Grids
(New York Big Bang...
or California Step by Step?)

*** Smart++ Utilities
(EDF?
Enel?
Eon?
... Or still to come?)





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Lot of challenges

#Lot of work # Lot of luck to succeed





Muito obrigado!

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