Consumer ownership,natural monopolies and Green energy transition

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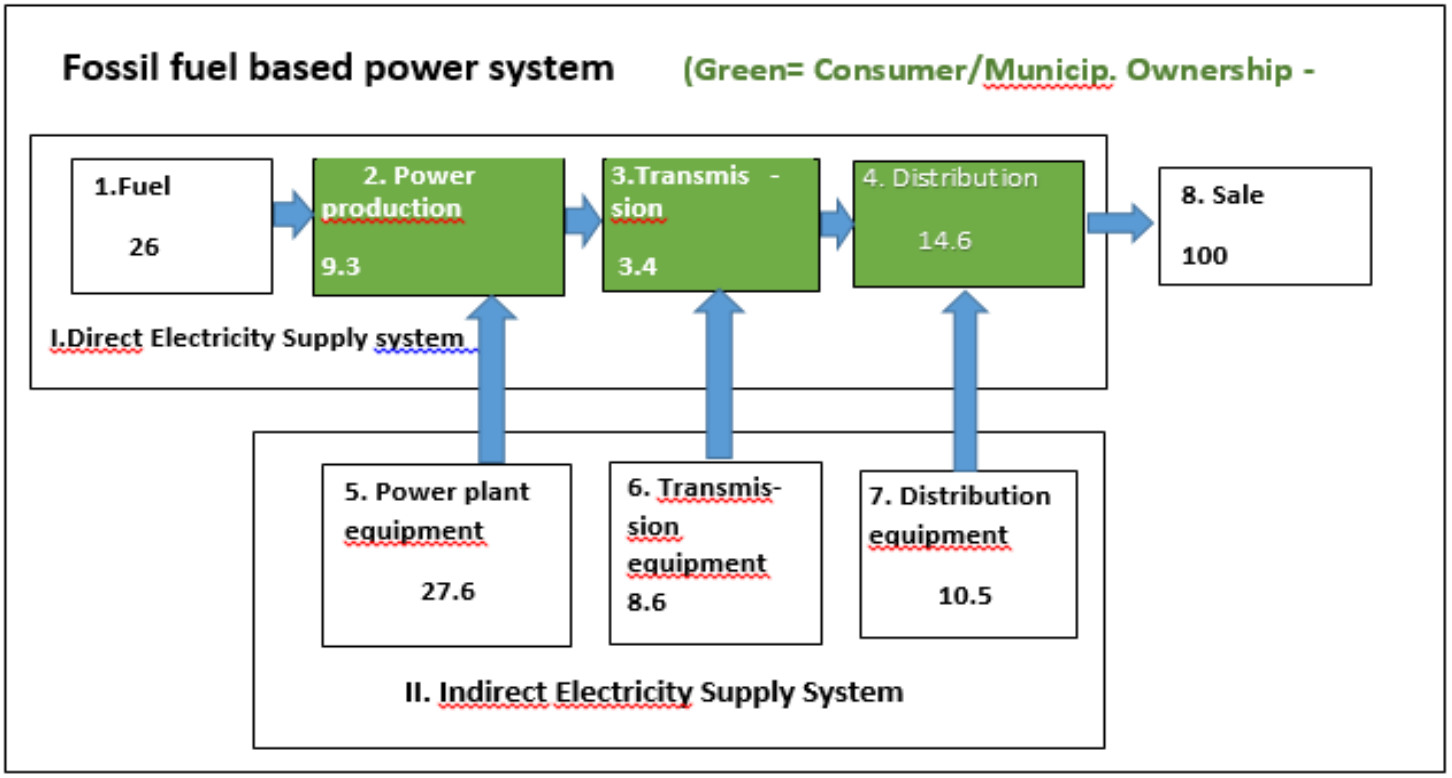
1.Consumer ownership gives economic space for green transition

Historically there has been consumer and municipality ownership of heat and electricity production in Denmark

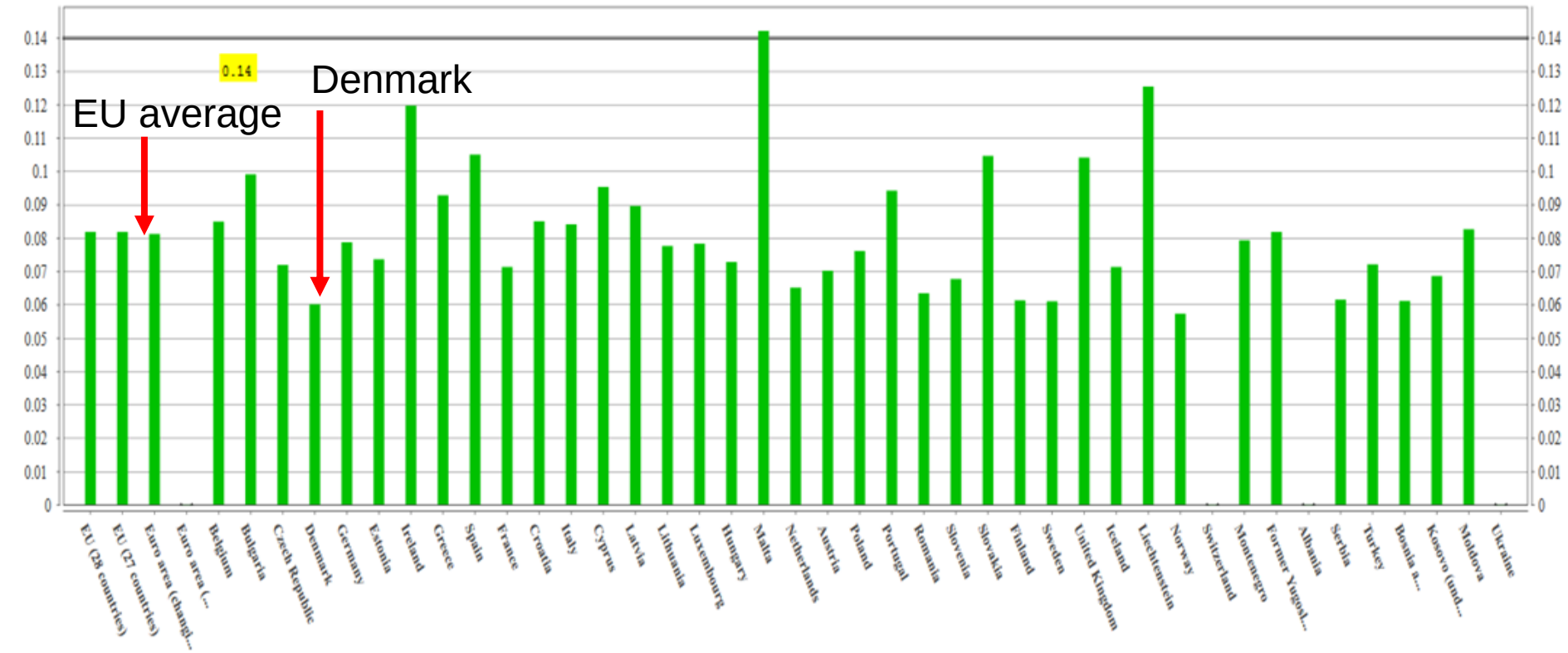
1. 60% of the heat market is district heating, and owned by consumers and municipalities.

2. The whole direct electricity supply system historically has been consumer and municipality owned.

Value-added in the Danish fossil fuel power system



EU electrcity prices for small companies (2017)



Reference:
http://ec.europa.eu/eurostat/tgm/mapToolClosed.do?tab=map&init=1&plugin=1&language=en&pcode=ten00117&toolbox=types

Consumer ownership combined with non profit public regulation

1. A consumer/municipality ownership system combined with a non profit public regulation gives a ”consumer profit” system with low prices and innovation.
2. This makes earlier introduction of renewable energy economically viable.
3. In natural monopolies, consumer/municipality ownership in a ”non profit regime”, therefore economically paves the road for renewable energy. (1975 and onwards)

2. Electricity distribution companies and the transition to green energy

The question is:

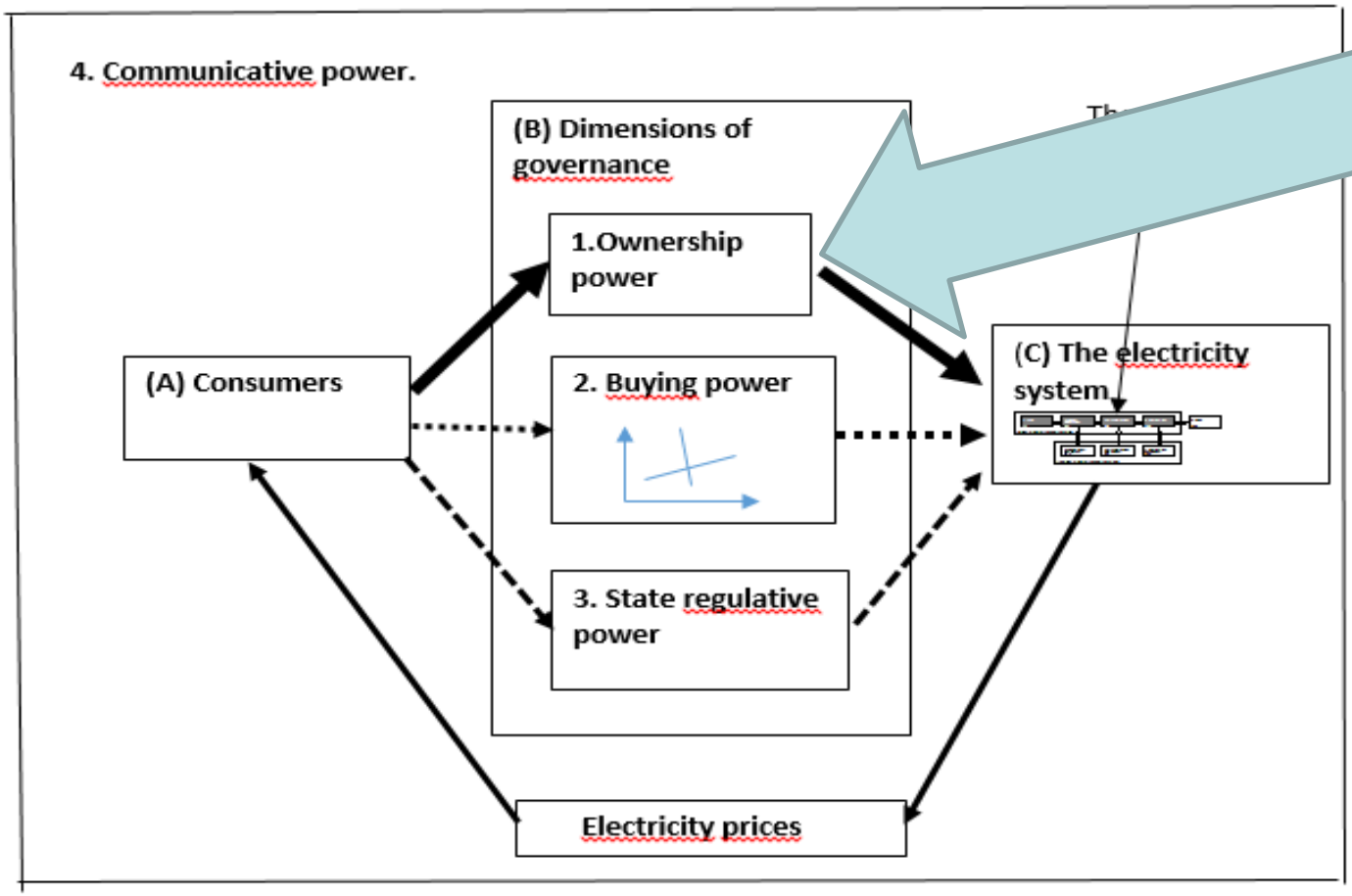
How to make a regulation system

-that produces innovation and low prices

and thus

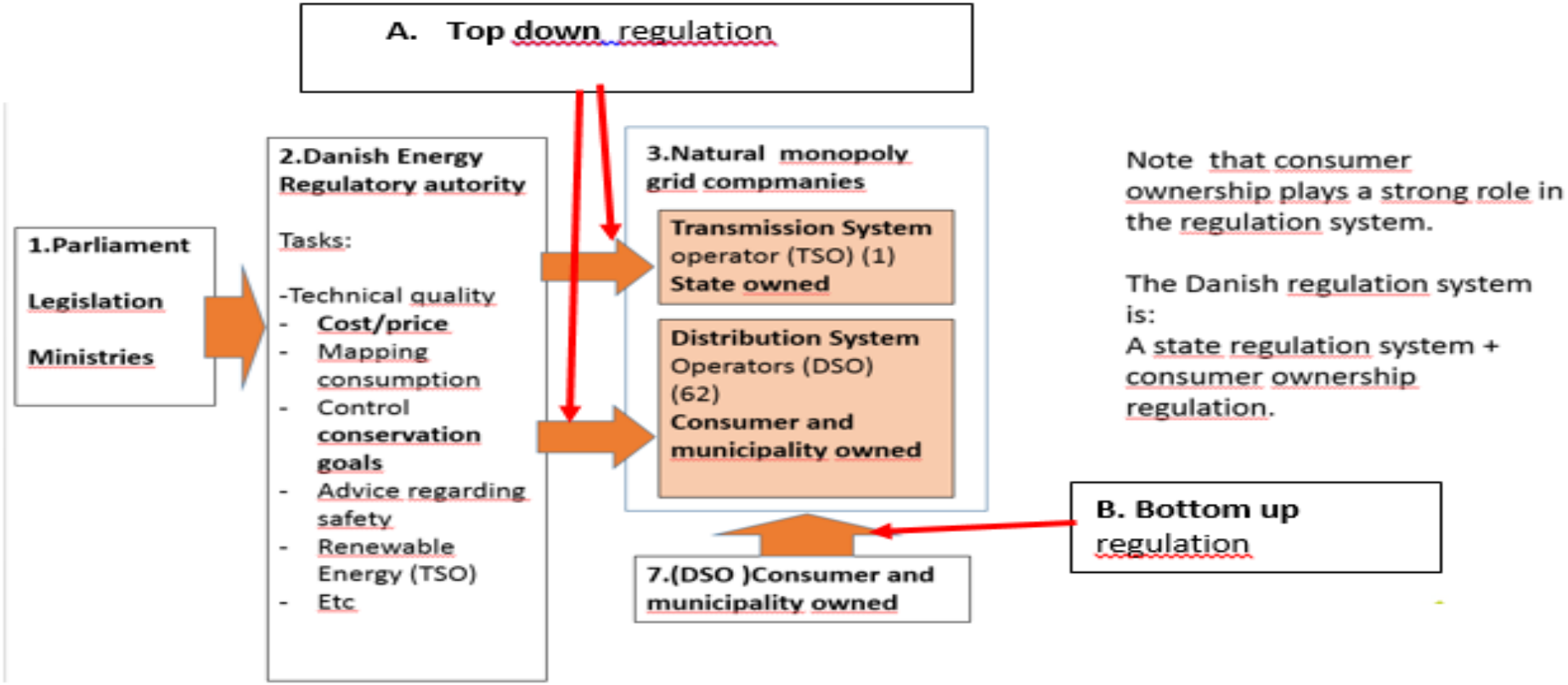
- gives economic space for renewable energy and energy conservation

Governance philosophy and natural monopoly

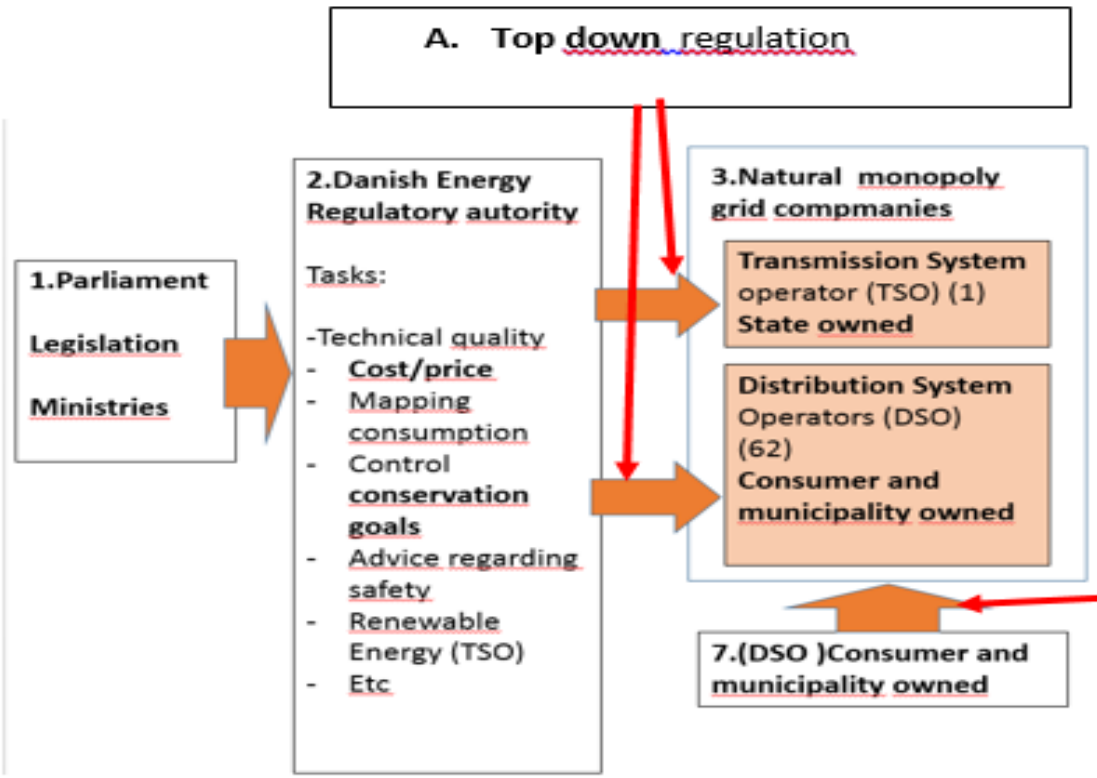


Not in the text books

The distribution system, public regulation and green energy



The distribution system, public regulation and green energy



A (cost cieling) minus B (consumer regulated costs) gives a profit to be used for green activities

Note that consumer ownership plays a strong role in the regulation system.

The Danish regulation system is:
A state regulation system + consumer ownership regulation.

NRGI election procedures

210.000 Consumers/members

100 Consumer representatives

The elects

9 board members

https://nrgi-valg.dk/kandidater/

NRGI Sustainable projects

https://nrgiinfo.dk/nrgiinfo/baeredygtighed/baeredygtig-udvikling/

Consumer ownership, distribution companies and green energy

1. The surplus from A cost cieling minus B consumer costs, ist used for green purposes such as green cities,wind power projects, green trafic, etc.

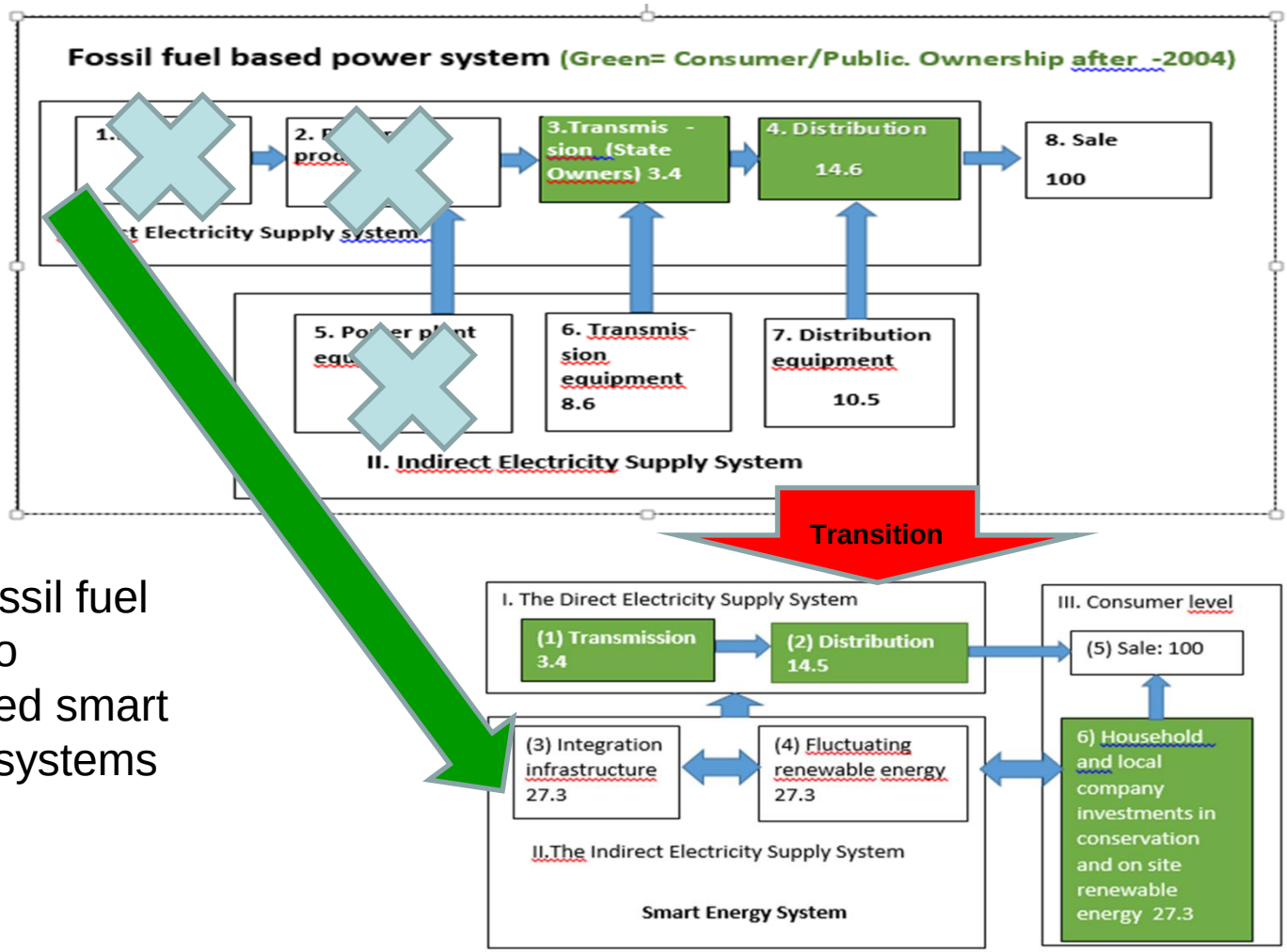
2. But the projects are within the electricity sector, and does not sufficiently deal with the establishment of integrated smart energy systems. Therefore we need new integration policies.

3. Transition to a 100% renewable smart energy system

The Paradigmatic change

1. From stored fossil fuels to fluctuating renewable energy.
2. As a consequence: From sector based fossil fuel systems to integrated smart energy systems based on renewable energy and energy consservation.

Energy transition and the value-added chain



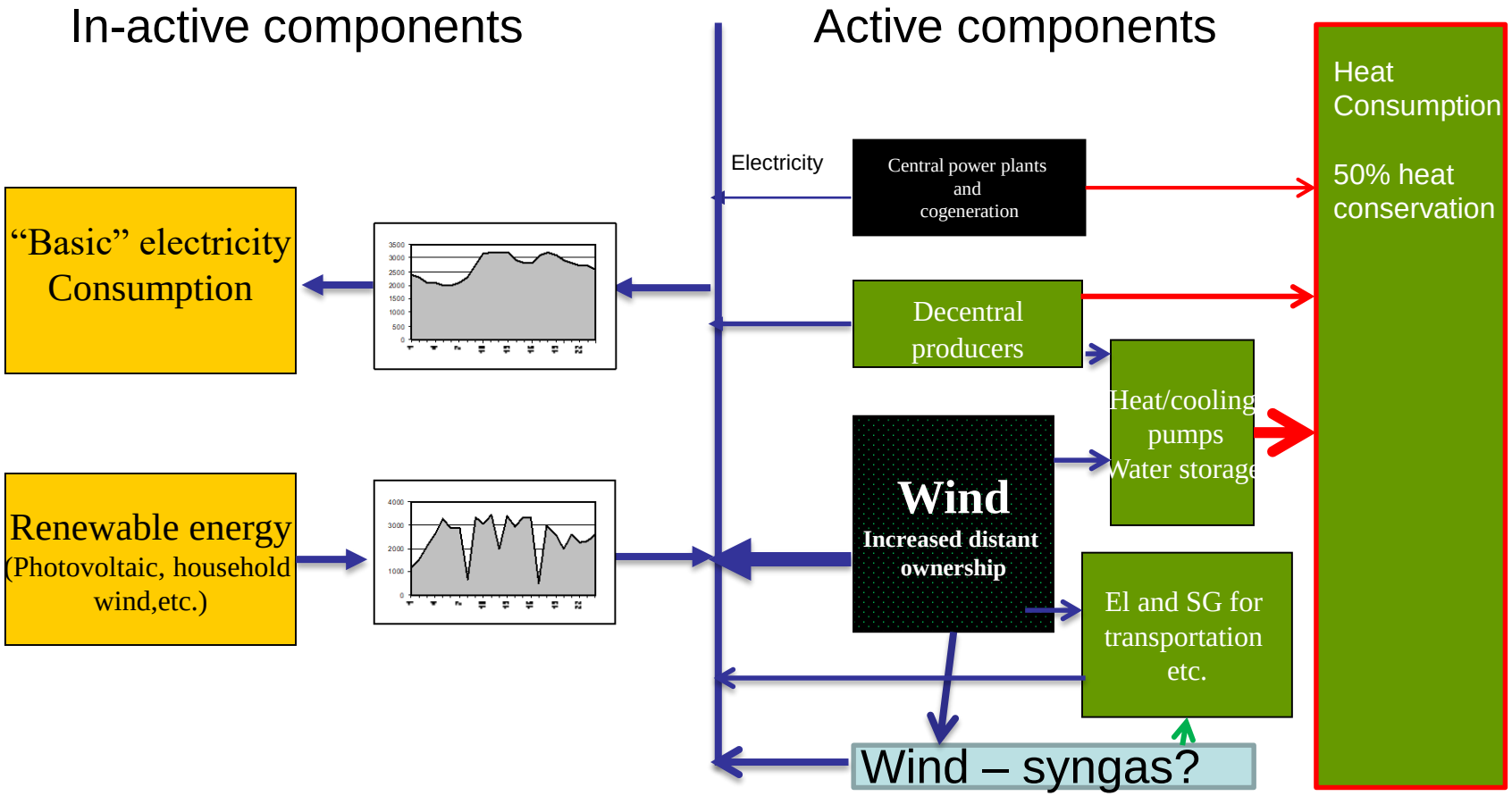
From fossil fuel stored to integrated smart energy systems

The character of the value-added change

1. The fossil fuel part is being reduced/removed
2. The central power plant section is reduced.
3. The indirect part of the power system is increased by energy automatons produced at factories.
4. The value-added share of the old power system is almost disappering, and the old power companies are searching for a centralized interconnector solution with ownership of consumer distant renewable energy systems.

2015- 2050 wind power 50%-100%

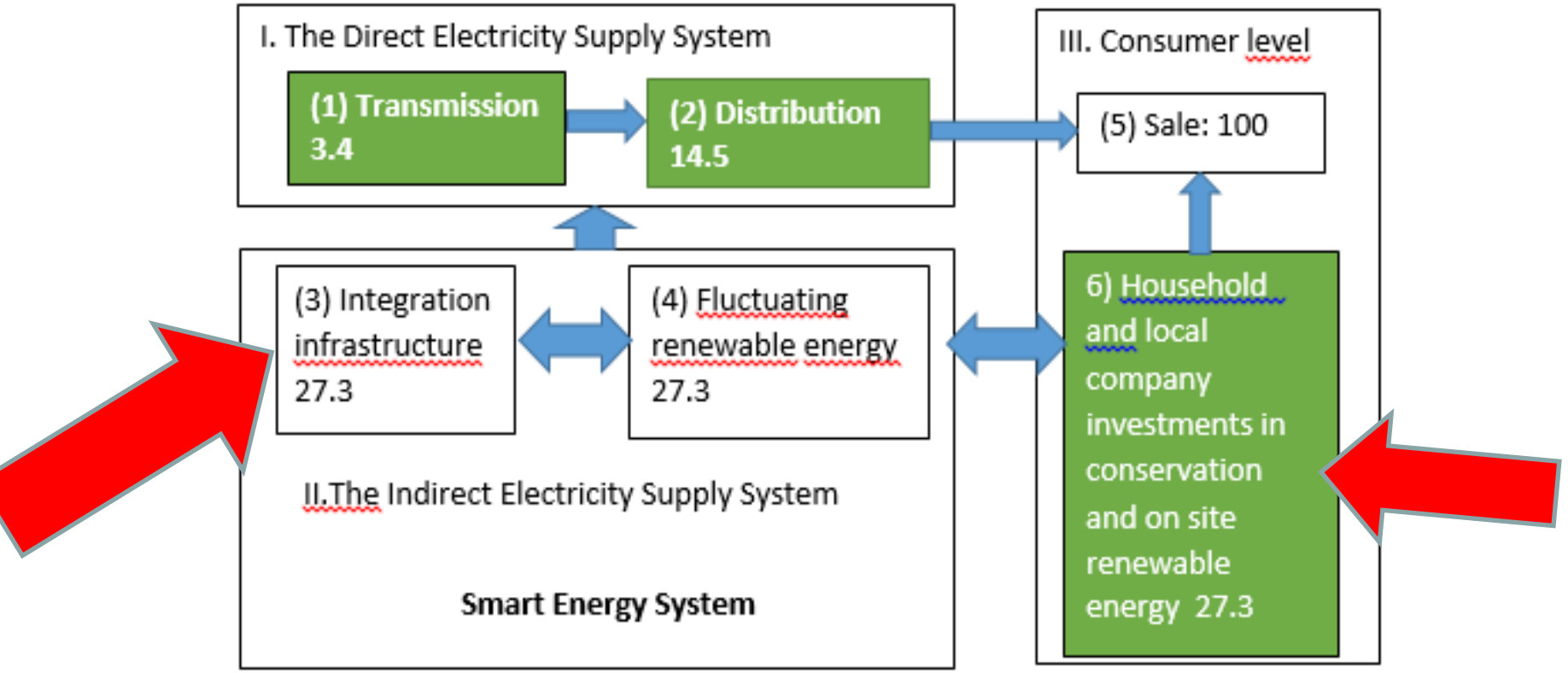
(**Green** means large consumer ownership share.
Black means distant ownership)



INTEGRATION INFRASTRUCTURE TECHNOLOGIES

1. **Base:** A consumer and municipality owned district heating infrastructure.
2. Low temperature district heating.
3. Wind power for district heating in combination with heat pumps and hot water storage.
4. Geothermal energy
5. Solar energy for heat (and cooling) in combination with season storage systems.
6. Low temperature industrial heat.
7. **40% Heat conservation**
8. Wind to gas systems.
9. Wind-transportation infrastructure

Value-added in a 100% renewable + conservation smart energy system



We are dealing with a shift from consumer distant to consumer near integration systems

All these technologies **are much closer to the consumers** than the coal mines–shipping systems-and the central power plants they replace.

4. Who should own the 100% renewable energy smart energy system?

Two ownership and ”integration” roads

1.The smart energy system road:

- Energy system integration between electricity-, heat- transportation and energy conservation.
- Some large grid systems to transport power from RE sites to consumers.
- Local and regional ownership of RE systems + the integration infrastructure.

2.The smart electricity sector road:

- Distant (Power company) ownership of renewable energy plants.
- Large European electricity grid expansion + smart electricity grid systems. (integration solutions mainly within the electricity sector)
- (A ”four track” blind alley not to be discussed today)

Large companies are handicapped by high transactions costs in a transition to smart energy system solutions. :

- **They would probably need to buy the local consumer- and municipality owned district heating systems. This would be very difficult, as these companies are subdued to a nonprofit or consumer profit regime.**

- **They would have to invest in the right size of heat pumps and heat storage systems linked to district heating systems owned by municipalities and consumers, or to make sure that these investments are implemented in time.**

- **A multitude of co-ordination activities should be developed, dimensioning investments in the different technologies so that they supplement each other's, and concurrently establish the right amount of energy conservation "in time" with a conservation level that supports the right low temperature district heating systems.**

- **It is difficult for distant owners to establish nearshore and onshore wind power , as local citizens want influence and benefits from energy plants to counterbalance inconvenience from such plants. And as distant owners like for instance the Swedish power company Vattenfall, pays no local taxes and supplyes no profits to local actors.**
- **Distant owned offshore wind power might also meet resistance from regional actors and from environmentalists. Co-operative owenership with funds for nature could be a need.**

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Local consumer/municipality ownership companies have relatively low transaction costs linked to smart energy systems

- The change **from distant coal extraction and large coal fired power plants** to **consumer near** energy sector integration requires coordination and collaboration between owners of wind turbines, the TSO (Transmission Supply Operator), district heating companies, power distribution companies, and the municipalities and the central legislative authorities.

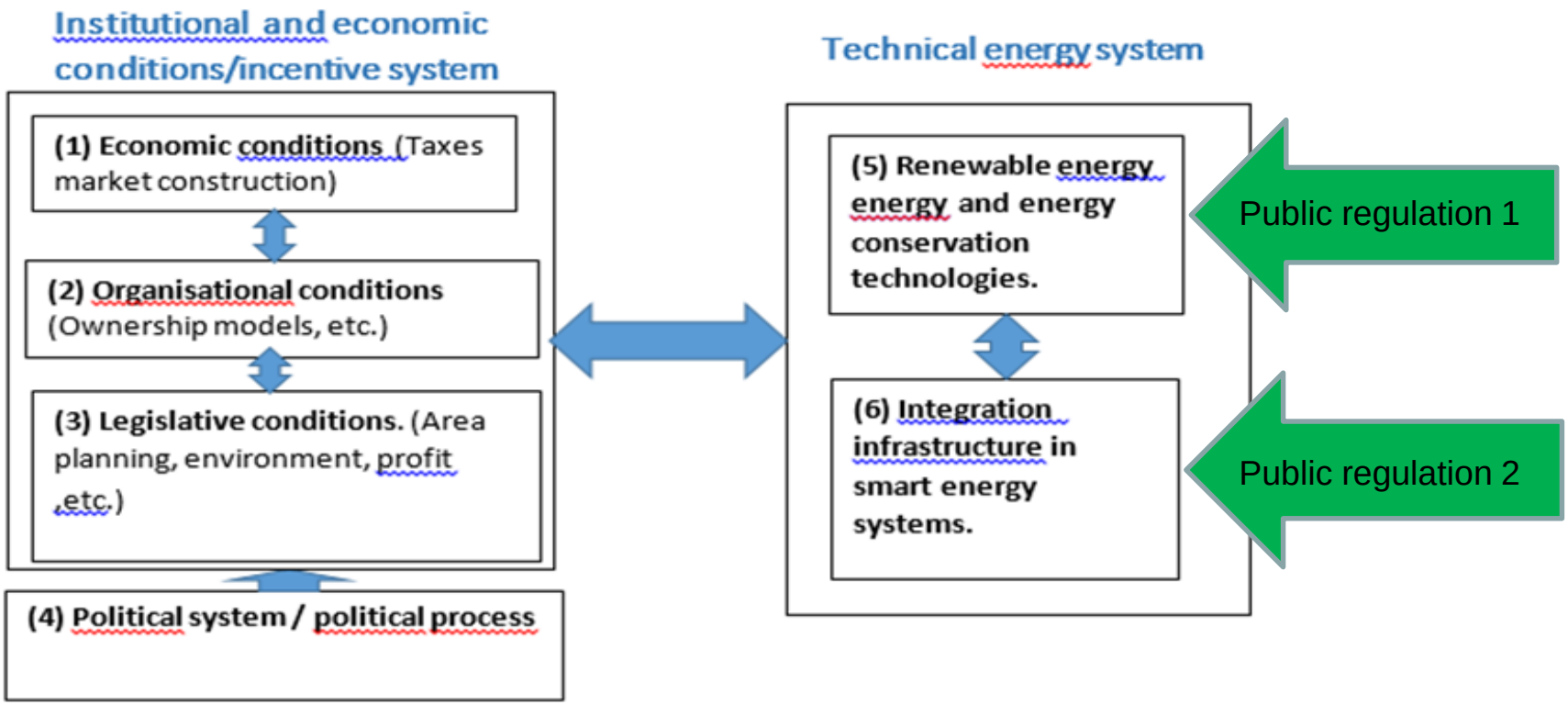
- This coordination is **much more multifaceted than "just to" to import and burn coal, and require new organizational models that can develop, implement, coordinate and manage these many transaction activities both with regard to long term investments and day to day management.** It is difficult to handle this high degree of complexity from a distance.

- It therefore is a valid hypothesis that the complex co-ordination and integration tasks both at the investment and operation and management level in smart energy systems may have lower transaction costs in a decentralized consumer ownership model than in a centralized distant ownership governance model.

5.Policies for local ownership of the smart energy systems

Energy system integration between electricity-, heat- transportation and energy conservation.

Regulation for both renewable energy and the integration infrastructure



Some reasons for a large local ownership share

a. **Keeps integration transaction costs low by** making the present owners of the integration infrastructure (district heat companies , heat consumers, etc) own a majority share of RE plants.

b. **Keeps heat and electricity prices low** as it is a traditional consumer profit model**. (Historical experience/learning)**

c. **Gives increased incomes in windy areas**, which are often hinterland areas with high unemployment rates and low incomes

d. **Reduces local and regional resistance** to wind power, and thus reduces project transaction cost .

Reasons behind an EU energy subsidiarity principle

1. Integration of fluctuating Renewable Energy Sources should be placed as close to the energy consumers as socio-economic feasible/possible.
2. Transmission lines (interconnectors) should only be build after implementing economically feasible local and regional smart energy system integration of fluctuating renewable energy.

(Today interconnectors are build without examining local and regional integration possibilities.

Today there are EU subsidies to interconnectors but not to the local and regional integration infrastructure.)

3. Ownership and management of smart energy systems should be placed as close to the consumers as socio-economic feasible/practical possible. (This will accelerate the implementation of renewable energy systems).

Suggestions for EU policies

1. Implementation of an energy subsidiarity principle.

2. Same level of subsidies to local and regional integration as at present to interconnectors.

3. Clear EU acceptance of policies that supports local and regional ownership of majority shares of renewable energy systems.

Suggestions for Danish policies – a continuation of historical consumer and municipality ownership plus-

1. Same tax on wind energy for heat as on biomass for heat per kWh.
2. A systematic heat conservation policy that aims at 40% reduction of heat consumption in 2050.
3. A requirement of at least 51% local and consumer ownership of wind power (onshore) in plant lifetime.
4. At least 51 % co-operative ownership of offshore plants in their lifetime.
5. Requirement of around 30% of plant surplus to local and regional environmental purposes.
6. Wind turbines ownership preference should be given to actors having invested in wind power integration. For instant district heating companies.
7. The role of the large power companies could be to engage in an ownership collaboration with local consumers and municipalities.

We dont have time for:

- Fundamental mistakes like no local acceptance, no local ownership and project delay.
- Interconnectors delaying energy sector integration.
- Technical analysis without policy suggestions.
- ”one generation” solutions.
- 100% knowledge before action.
- Too expensive corporate ”solutions”
- ”realistic” patience. We need impatience!
- So therefore--------

Thanks for your impatience!