

CHANGING ROLES: BETWEEN MOORE AND MAXWELL

Jorge Vasconcelos

NEWES, New Energy Solutions

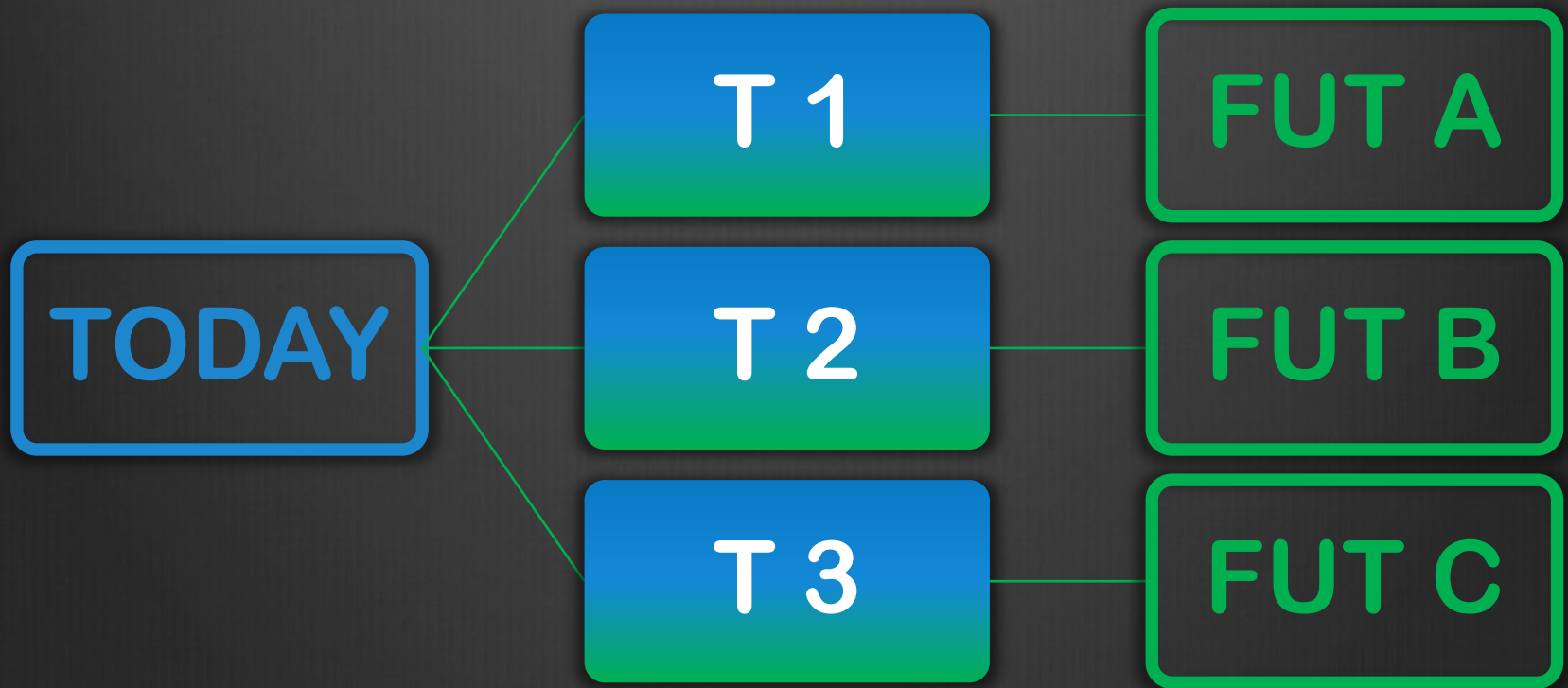
IEA workshop New Roles and Responsibilities in Smart Networks

Paris February 29, 2016

PRESENT

TRANSITIONS

(GREEN)
FUTURES



SEVERAL ALTERNATIVE PATHS MAY LEAD TO 2050

IT IS CRUCIAL TO REALIZE THAT :

A) DIFFERENT PATHS REQUIRE DIFFERENT ROLES BY NETWORK OPERATORS, TRADITIONAL UNDERTAKINGS, DIFFERENT MARKET AGENTS AND REGULATORS.

B) DIFFERENT NATIONAL PATHS MAY COEXIST – FULL HARMONIZATION IS NOT A PRE-CONDITION FOR A WELL-FUNCTIONING IEM.



BUT FULL CONSISTENCY IS !

A PLAY IN 3 ACTS...

I	SETUP	Denial and delay
II	CONFRONTATION	Overenthusiasm Moore
III	RESOLUTION	Realism Maxwell

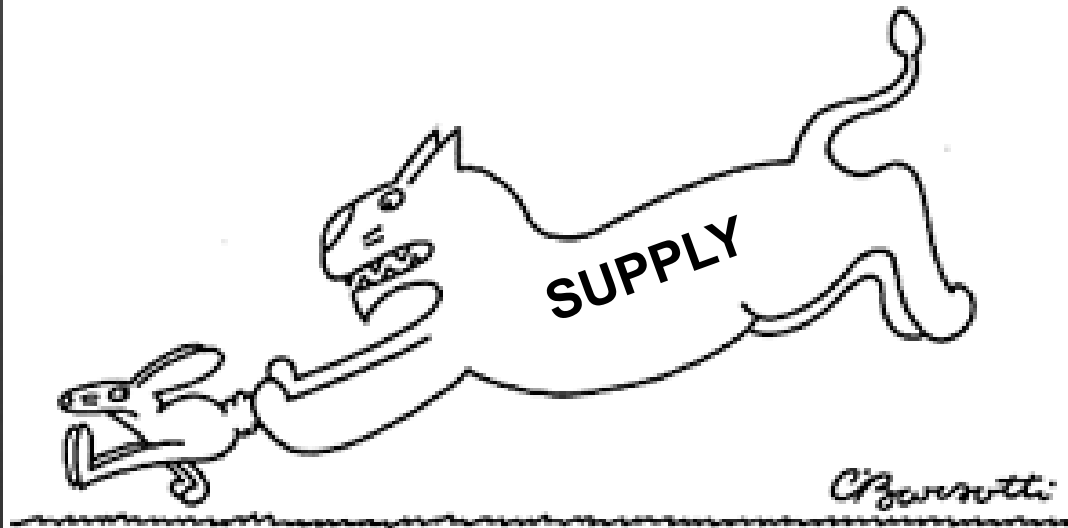
*“ Unless there is an obvious reason to do otherwise,
most of us passively accept decision problems as they
are framed and therefore rarely have an opportunity to
discover the extent to which our preferences are frame-
bound rather than reality-bound ”*

Daniel Kahneman

Nobel Prize in Economics 2002

Thinking, fast and slow 2011

© Cartoonbank.com



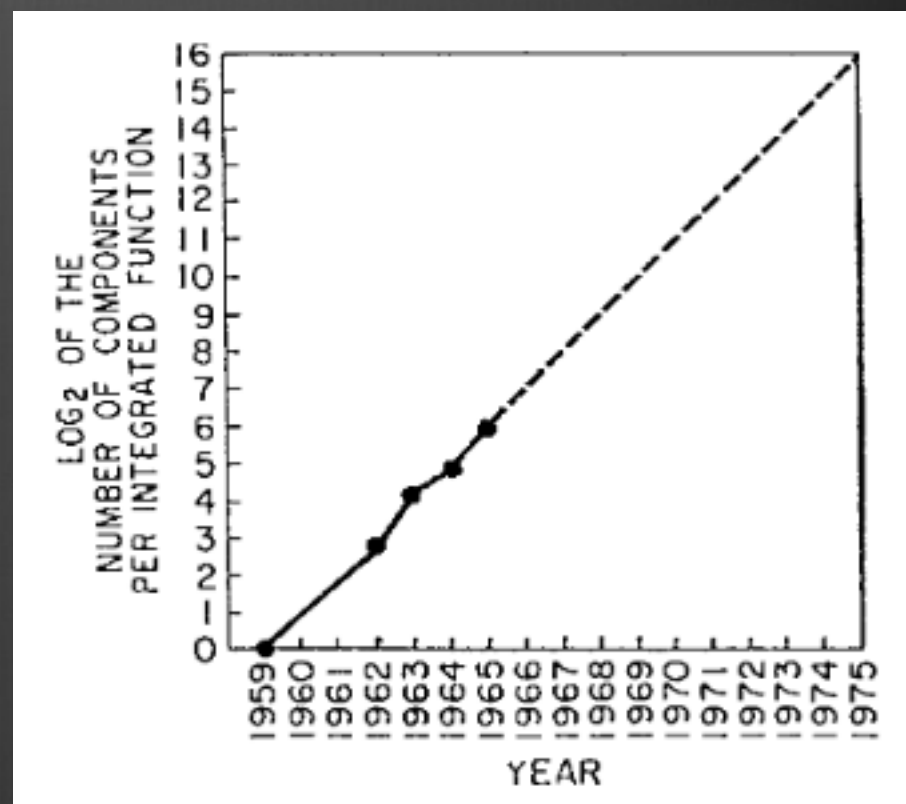
*"What are you complaining about?
It's a level playing field."*

**EPISTEMOLOGICAL
BARRIER**



Gordon Moore, co-founder of Intel.

MOORE



Gordon E. Moore, "Cramming More Components onto Integrated Circuits,"
Electronics, pp. 114–117, April 19, 1965

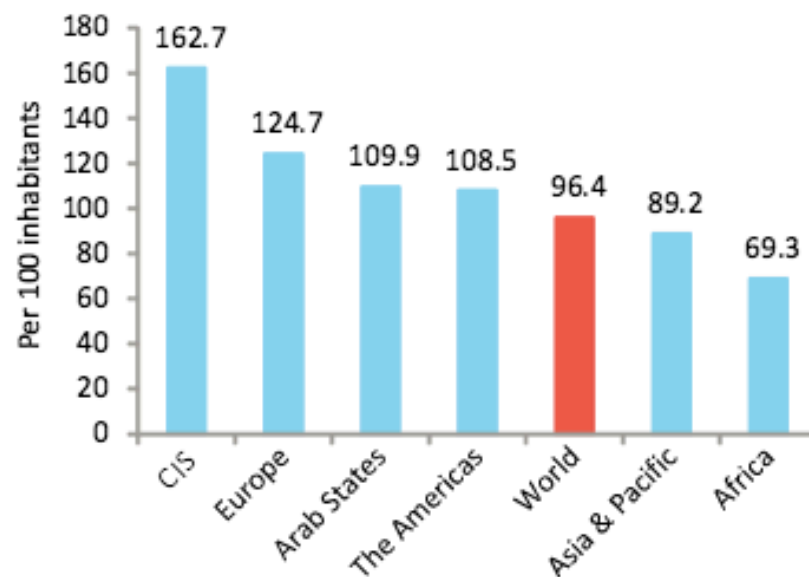
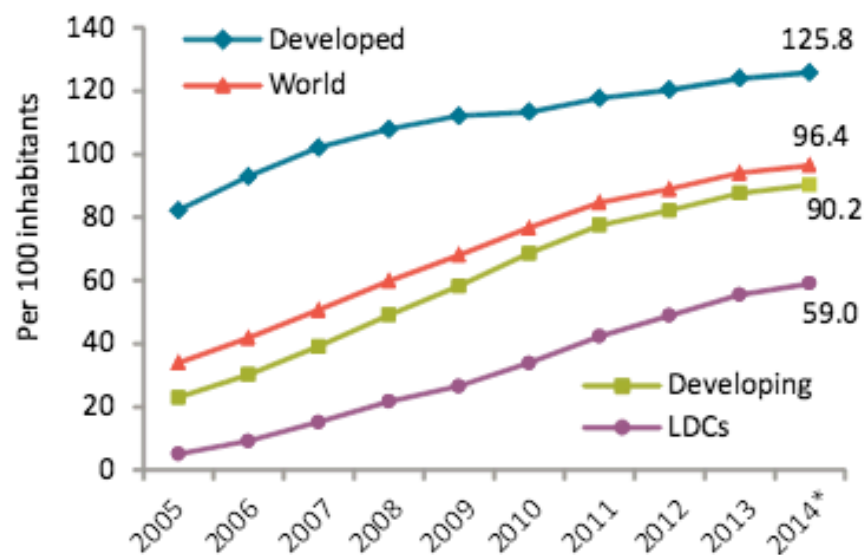


- By end 2015, there are more than 7 billion mobile cellular subscriptions, corresponding to a penetration rate of 97%, up from 738 million in 2000



- The proportion of the population covered by a 2G mobile-cellular network grew from 58% in 2001 to 95% in 2015

Chart 1.2: Mobile-cellular subscriptions by level of development, 2005-2014 (left) and by region, 2014* (right)



Note: *Estimate.

Source: ITU World Telecommunication/ICT Indicators database.

http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2014/MIS2014_without_Annex_4.pdf



- Between 2000-2015, global Internet penetration grew 7 fold from 6.5% to 43%

2000

2015*

400 MILLION INTERNET USERS

3.2 BILLION INTERNET USERS

Developed countries




Developing countries



LDCs



 100 million people
(rounded values)

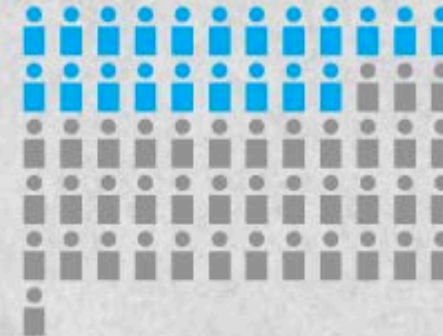
Online

Offline

Developed countries



Developing countries

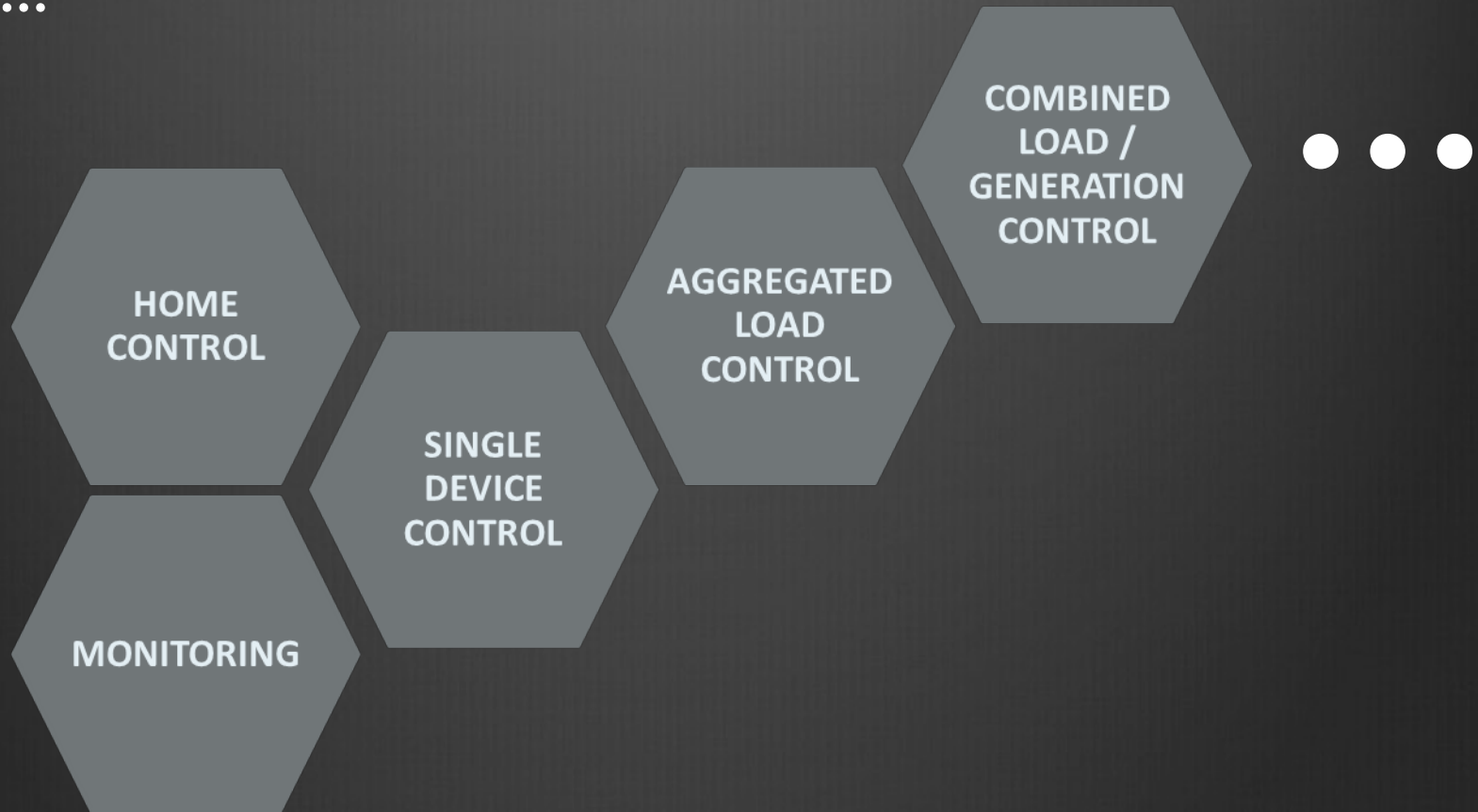


LDCs



Source: ITU.
Note: * Estimates.

IC TECHNOLOGIES ENABLE...



EU interconnected network

National network

HV network

MV network

LV network

LV feeder

Building

Household

Appliance



Thanks to modern ICT full control at any level is possible

“Give me a fixed point and I will move the world.”

Archimedes



“Give me a router and I will move the electricity market.”

Jorge Vasconcelos

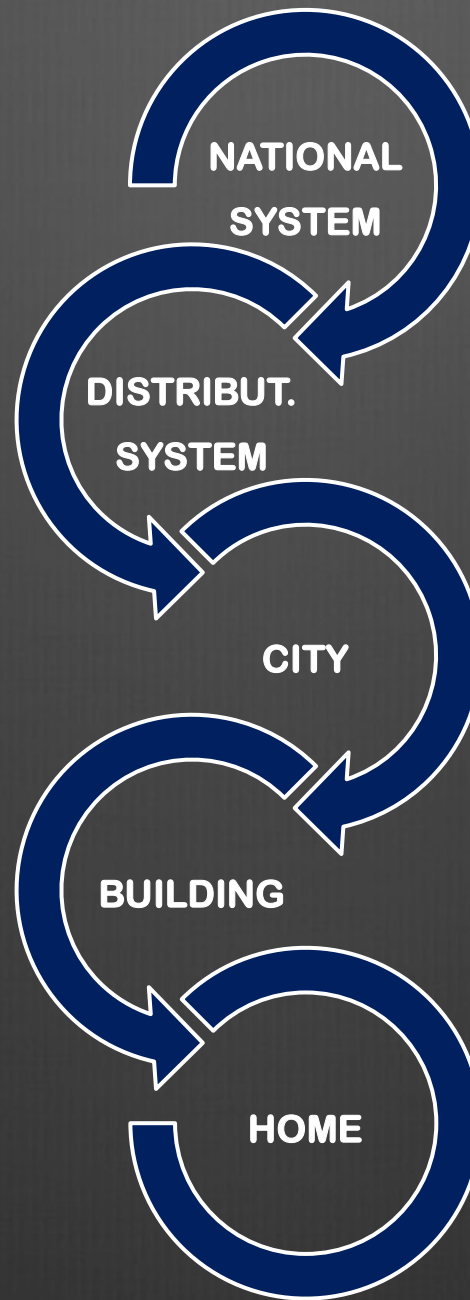


<http://www.biographyonline.net/scientists/james-maxwell.html>

MAXWELL



**IC
TECHNOLOGIES
INTRODUCE
THE
CONTROL
LOOP
PROBLEM**



**THE CONTROL LOOP
PROBLEM:

WHO CONTROLS WHAT
AND
WHO COORDINATES ?**

“the control loop problem” :

1) How to ensure control at each level ?

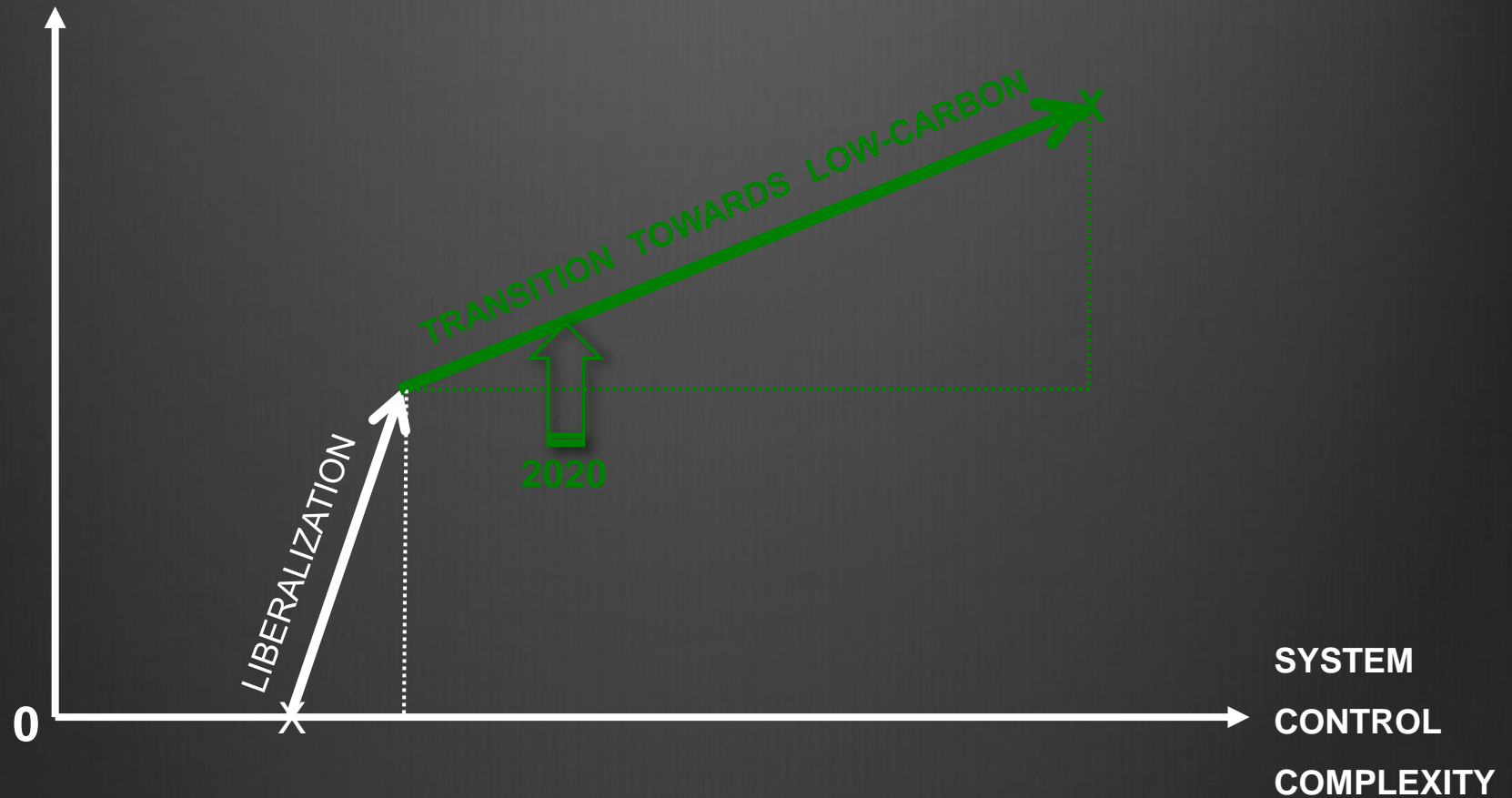
Within each layer, different control policies can be implemented, from a highly centralized approach, more or less replicating at each level the current national master/slave hierarchical structure, down to a fully decentralized structure.

2) How to define the functional interfaces between layers ?

In order to ensure effective coordination of the whole system it is necessary to exchange information between layers and to establish clear communication and control procedures. Protocols must be implemented both for normal and for abnormal operational conditions.

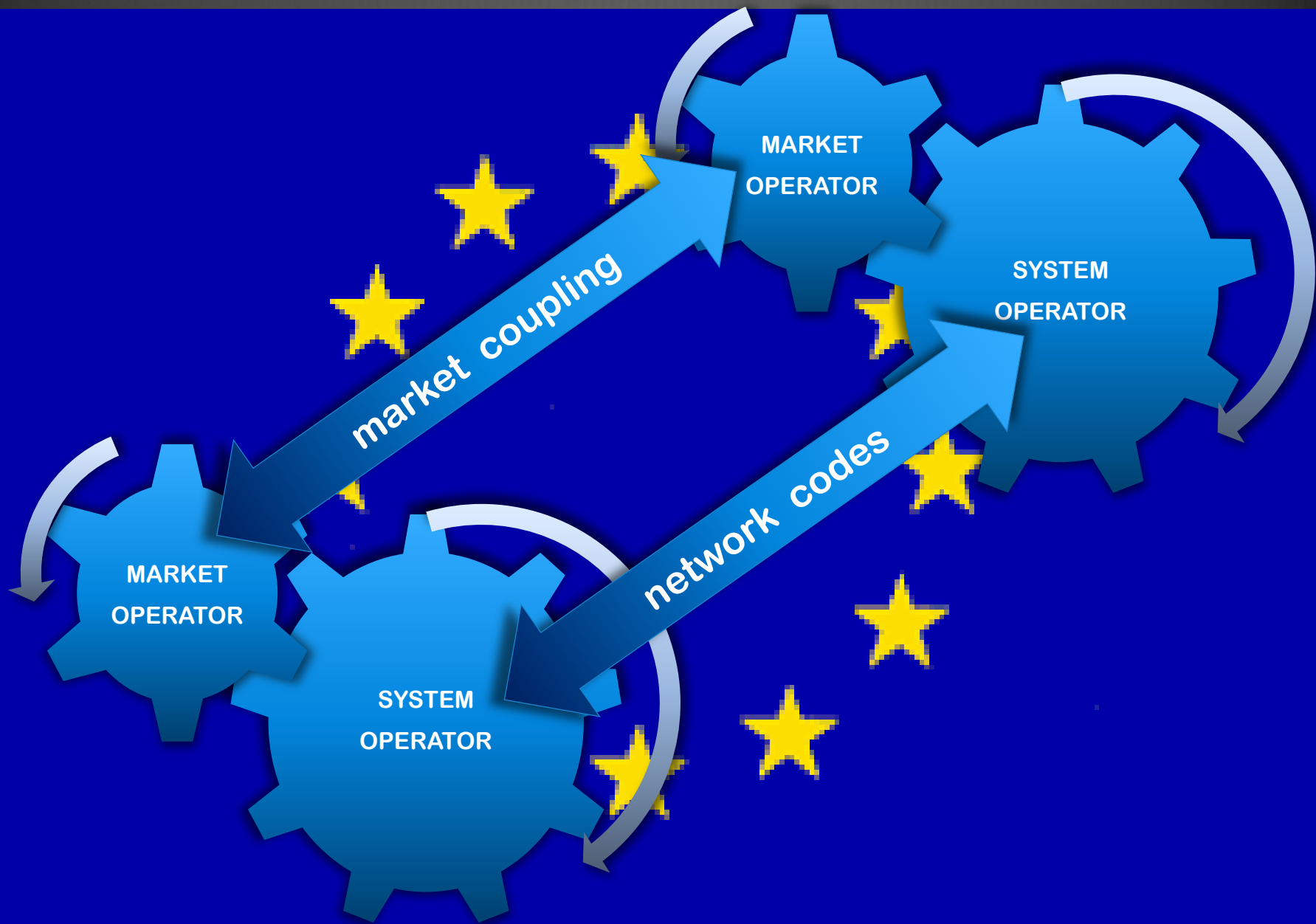
3) Who is the “controller of the controllers” and “controller of last resort” ?

MARKET
COMPLEXITY

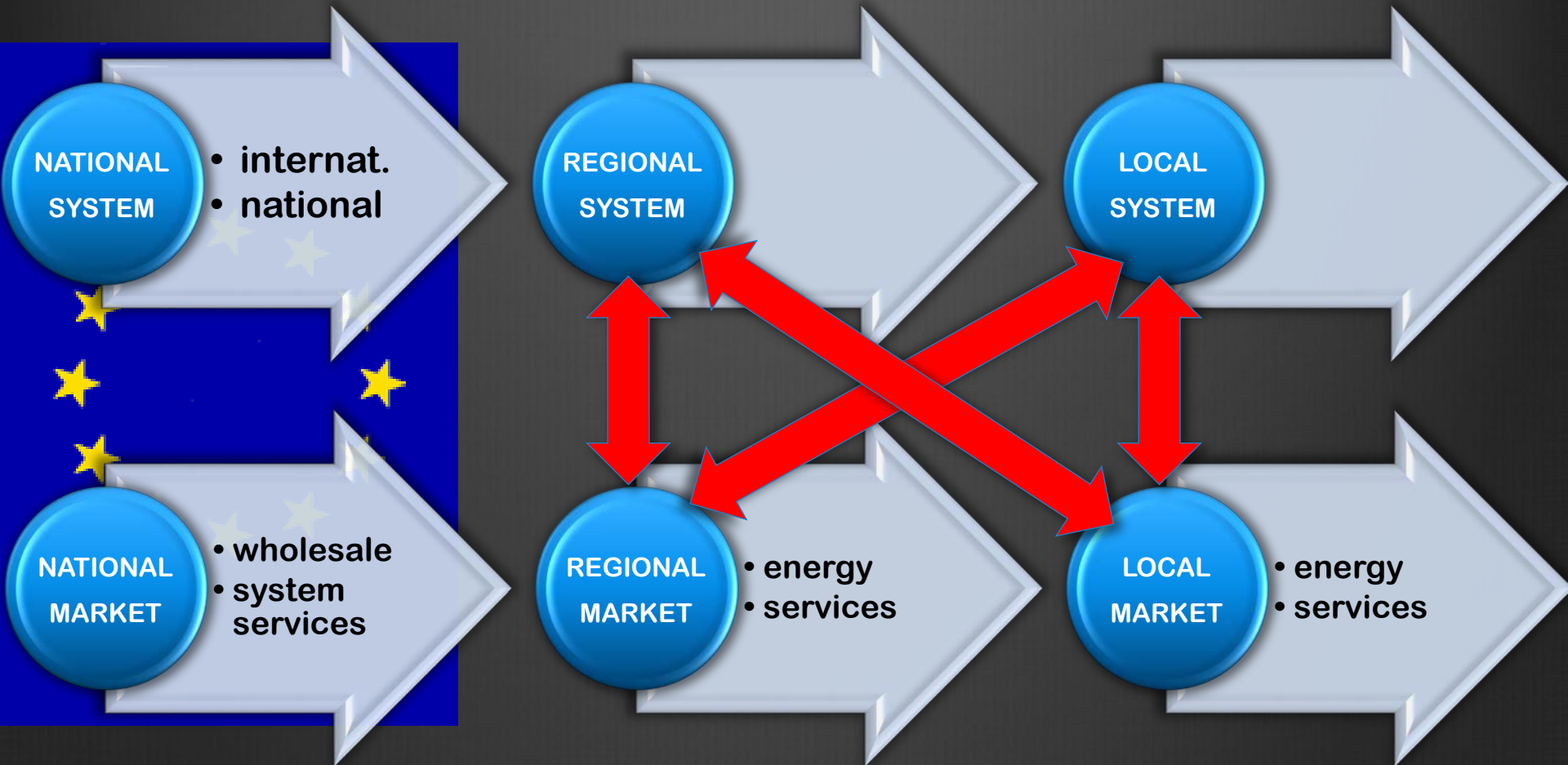


Control complexity, before and more than market complexity, is the problem





SYSTEMS



MARKETS

Energy markets

Thinking
outside
the box





**ACCOUNTING
&
BOOKKEEPING**
1494



**THE
PROBABILISTIC
REVOLUTION**
1800-1930

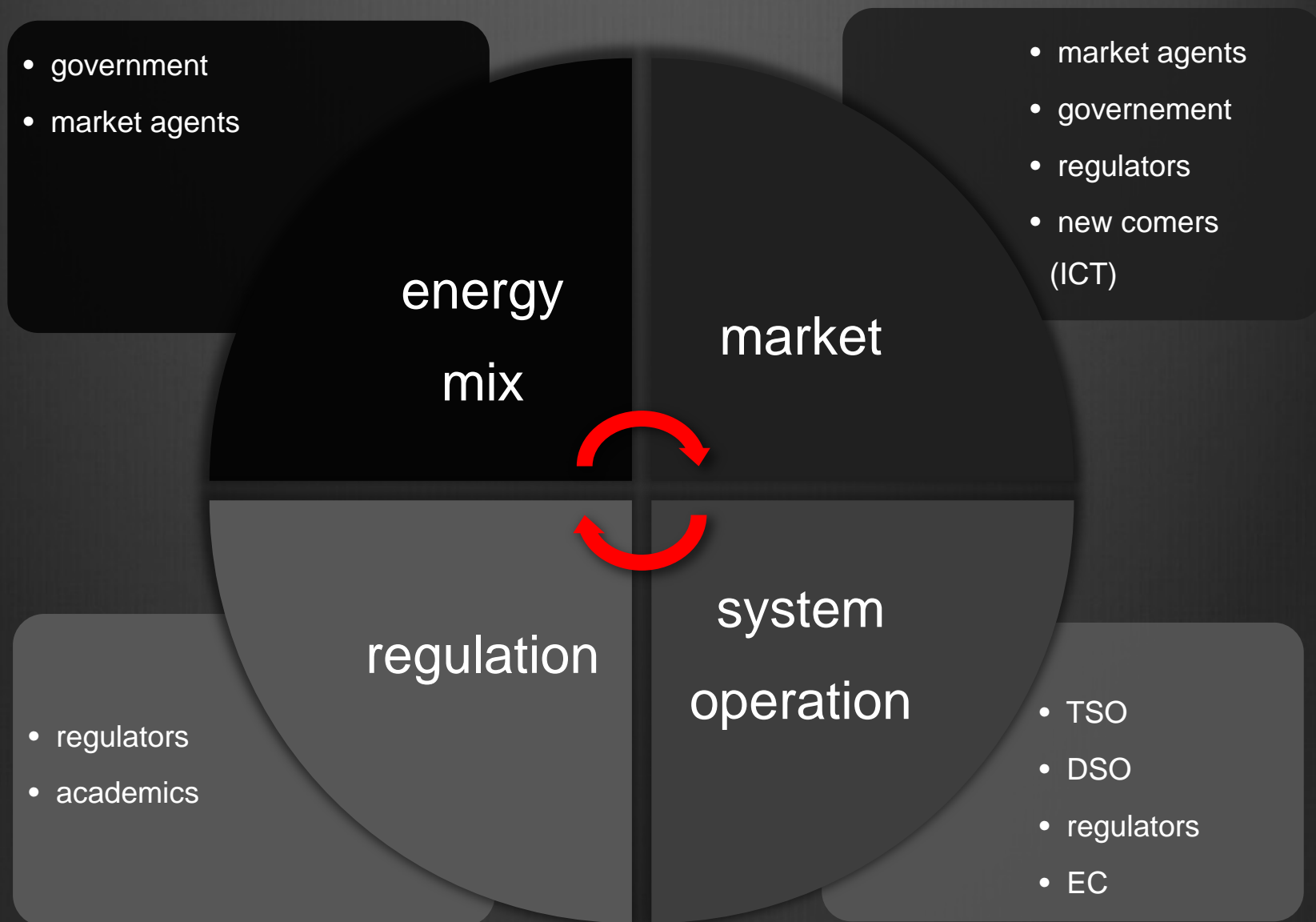


**THE
ACCOUNTING
COUNTER-
REVOLUTION
NOW**

<http://blogs.splunk.com/wp-content/uploads/2014/02/IheartData.png>
<https://bookcrazes.files.wordpress.com/2011/11/1paciol.jpg>
<https://teachbytes.files.wordpress.com/2014/01/probability-dice.jpg>
<https://static1.squarespace.com/static/54652521e4b0045935420a6c/t/548dee03e4b0f1b25cb560d5/1418587652009/Data.jpg?format=1500w>

*“ reducing greenhouse gas emissions by 80-95% by 2050
compared to 1990 as agreed in October 2009 will require a
revolution in energy systems, which must start now ”*

European Council, February 2011



CHANGING ROLES BETWEEN

