

Incentive regulation with imperfect regulators

Do we really know how to apply it in reality?

FSR Annual Conference

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Do we really know how to apply incentive regulation in the power sector?

The assumptions of the textbook model of regulation

- The regulator always has the required powers, resources and abilities to implement any regulatory scheme
- The regulator incentivises a TSO realising one unique task with one unique tool

The reality for regulator

- He does not always have as many powers, resources and abilities as the textbook model assumes
- The regulator applies distinct regulatory tools to the different TSO's tasks

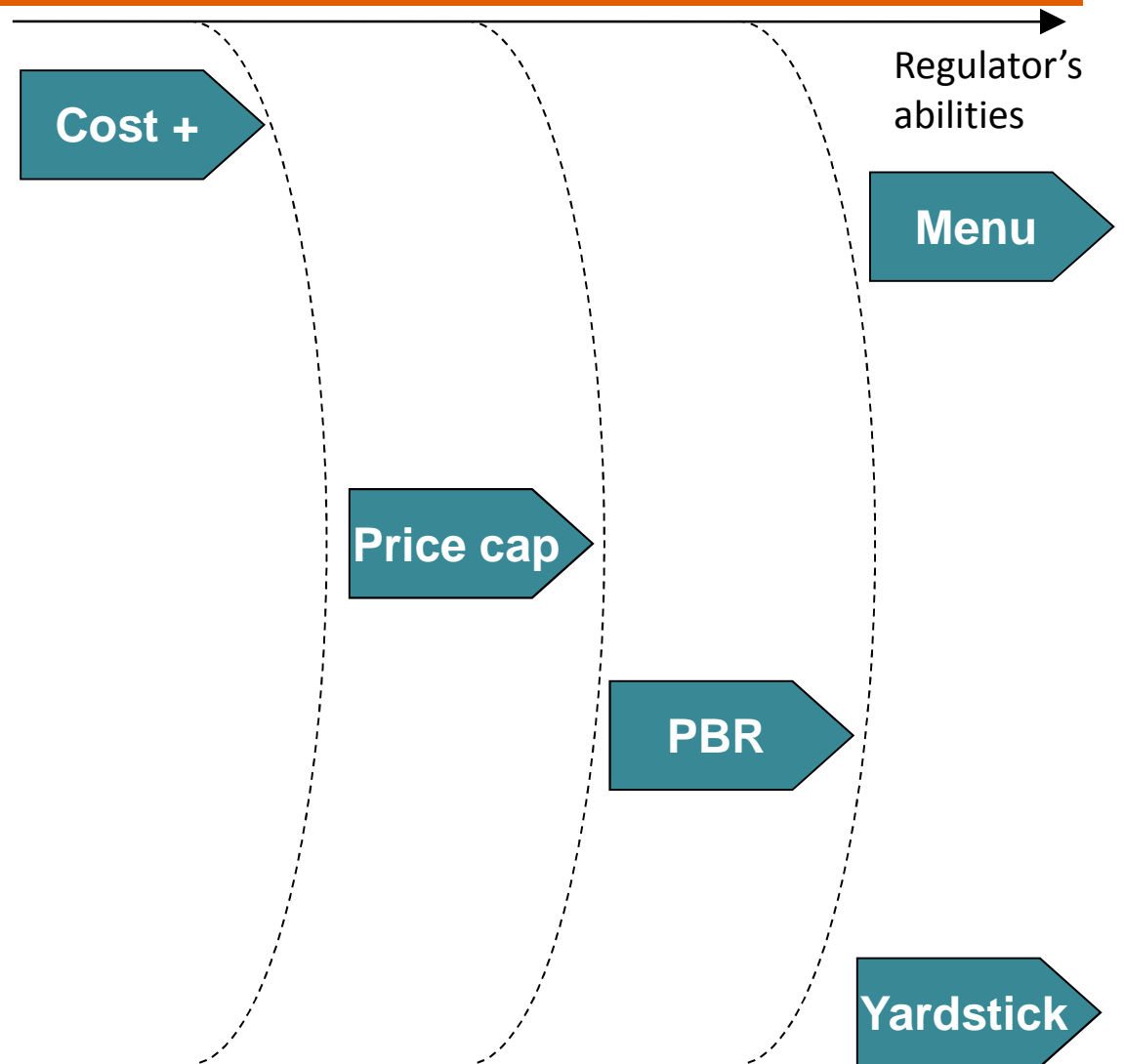
An analytical framework to choose in practice between the incentive regulation tools

- How to align the regulatory tools, the regulator abilities and the targeted costs?
- The textbook model of incentive regulation proposes no solution to choose the regulatory tools considering
 - The regulator's abilities to implement it
 - And the targeted network costs and their characteristics
- We propose one way to choose the regulatory tools in practice, considering and combining
 - The real regulators' abilities
 - And the characteristics of the network operator's tasks

The real regulators are not as able as the textbook one is

- In the economic literature proposing and building regulatory tools, regulator is always thought to have all the desired cognitive and computational abilities to do its job efficiently
 - In particular, he knows *ex nihilo* how to choose the most efficient regulatory tools and he has all the desirable abilities to implement it
- But in reality, the regulators were endowed with tight resources (budget and staff) which are likely to hamper their abilities to do their job efficiently
- And the regulators are still learning with experiences how to use the different regulatory tools provided by theory
 - To reduce their information asymmetry
 - To adapt them to uncertainty and risk
 - To gain computational skills needed to design the regulatory tools

The regulatory tools require minimum abilities to be efficiently implemented



The regulator regulates the network operator on separate tasks not as a whole

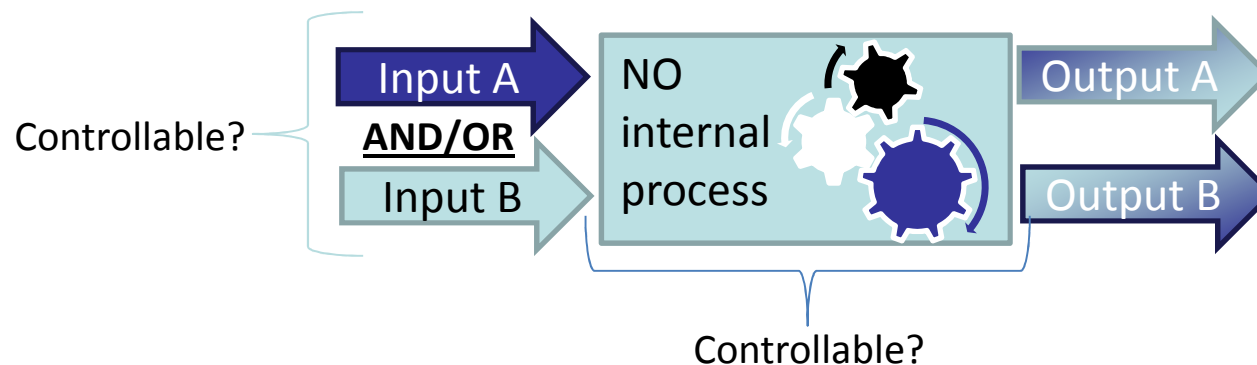
- The textbook regulator controls the TSO's cost as a whole while it is the outcome of different tasks with different characteristics
 - The conventional tasks for a TSO are
 - System operation: Balancing + Reserves + Internal congestion + Losses + Market operation
 - Maintenance
 - Investment and connection: Planning + Construction
 - Customer relationship management
 - The network operator may have to realise new or renewed tasks because of new regulatory objectives from
 - The climate change policy
 - With the integration of renewables mainly in electricity
 - The concerns about security of supply
 - Mainly in gas
 - And the Europeanization of market building with their role of market architects
- + RD&D in infrastructures and services

The controllability, predictability, and observability of a task/cost determines the appropriate regulatory tool

- Considering the diversity of tasks, costs and situations that the different TSOs may encounter, they should be targeted with distinct regulatory tools in a building block approach
- Other things being equal, that is to say with a regulator having all the desired abilities to perform his job, the regulatory tool to choose for a given task/cost depends on its characteristics of
 - Controllability
 - Predictability
 - Observability

1° The regulator incentivises the TSO on tasks/costs that the TSO can control

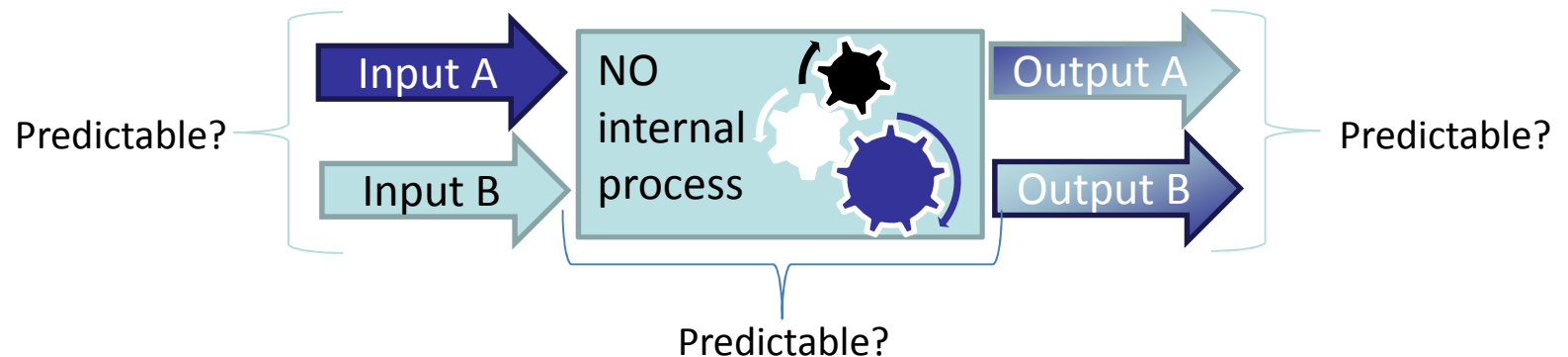
- Controllability measures the TSO's ability to act on a cost/task or a combination of costs/tasks for a given output



- If the task/cost is not controllable, the regulator should implement a cost plus scheme
- If the task/cost is controllable, the regulator could incentivise the TSO
 - Under the constraints relative to predictability and observability

2° The regulator can only incentivise the TSO on tasks/costs that are predictable

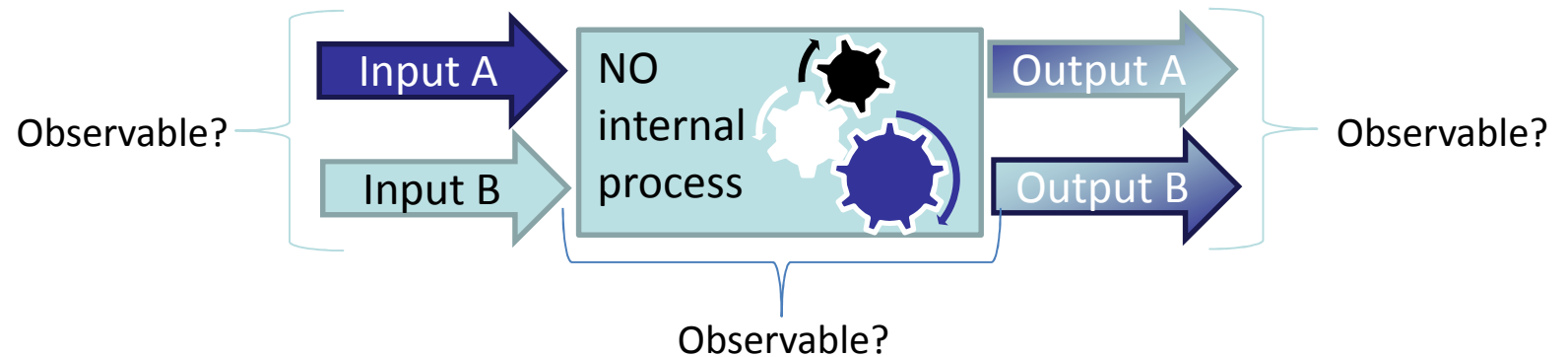
- Predictability measures the possibility to catch the influence of external factors on costs/tasks and the relationship between the costs/tasks and the outputs



- If the task/cost and its relationship with the outputs are not predictable at all, the regulator should implement a cost plus scheme
- Otherwise the regulator can implement an incentive scheme whose risk (for the regulator to build it and to make mistakes and for the network companies to respond it) depends on the degree of predictability
 - Low predictability implies high risk
 - High predictability implies low risk

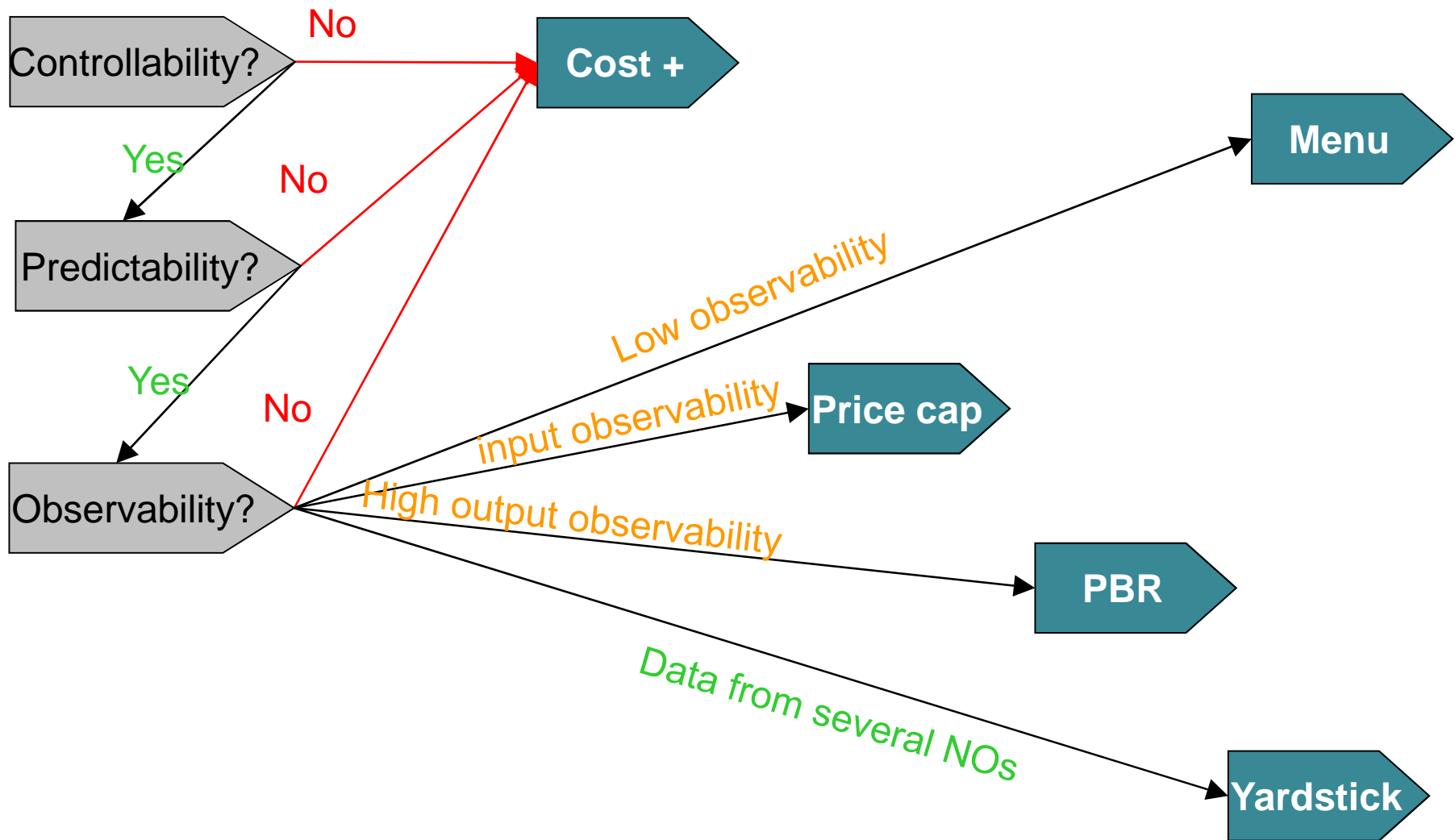
3° The regulator can only incentivise the TSO on tasks/costs that are observable

- Observability measures the quantity of available information to the regulator about efficiency gains on tasks, either in terms of tasks themselves, or inputs or outputs

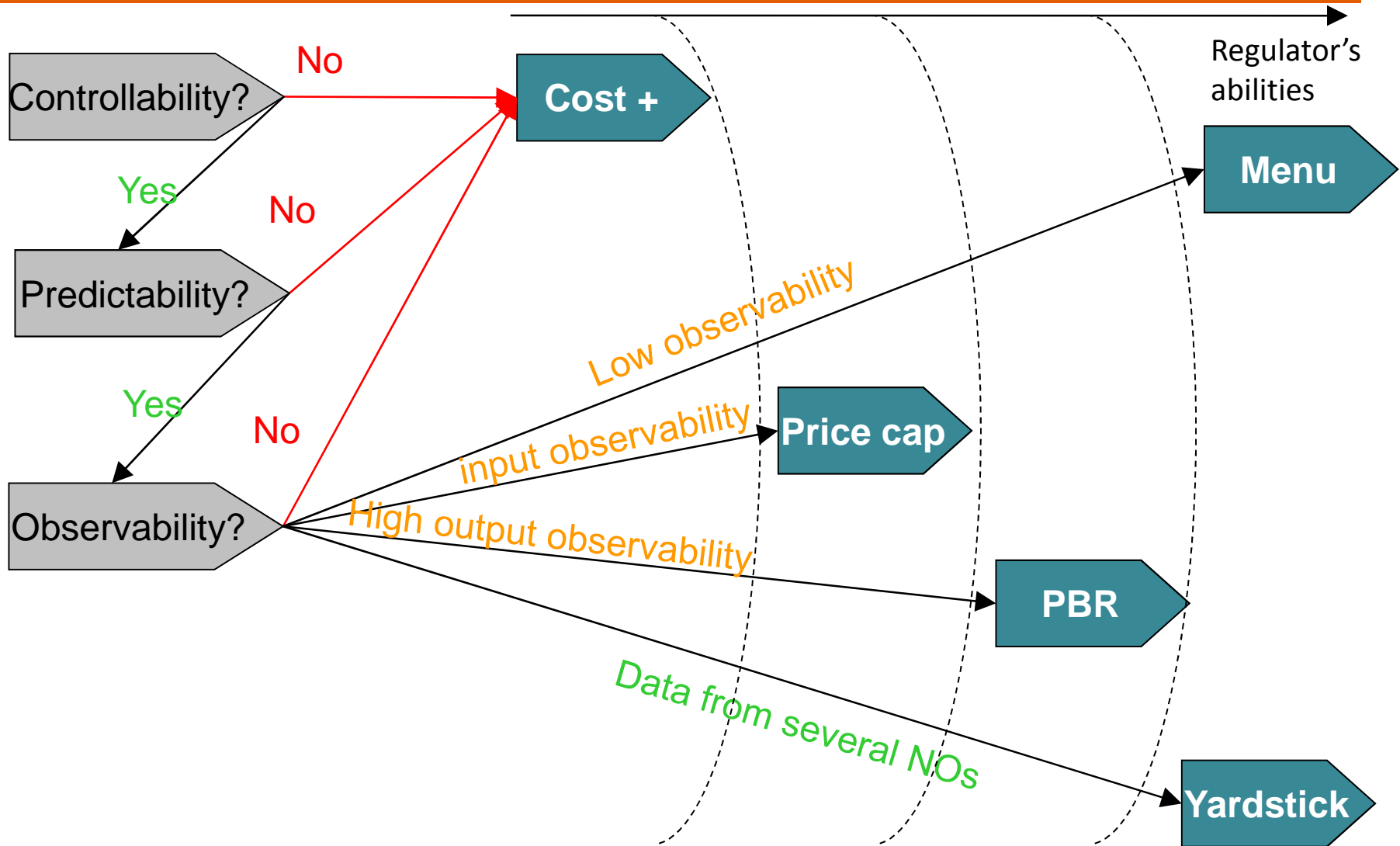


- The regulatory tool should then be chosen depending on the level of observability
 - When there is no observability, cost plus should be implemented
 - When little information is available to the regulator, a menu of contracts should be proposed
 - When input is observable, price cap should be implemented
 - When output is observable, performance based regulation should be implemented
 - When information is available to the regulator from several network operators and can compare them, he should implement yardstick competition

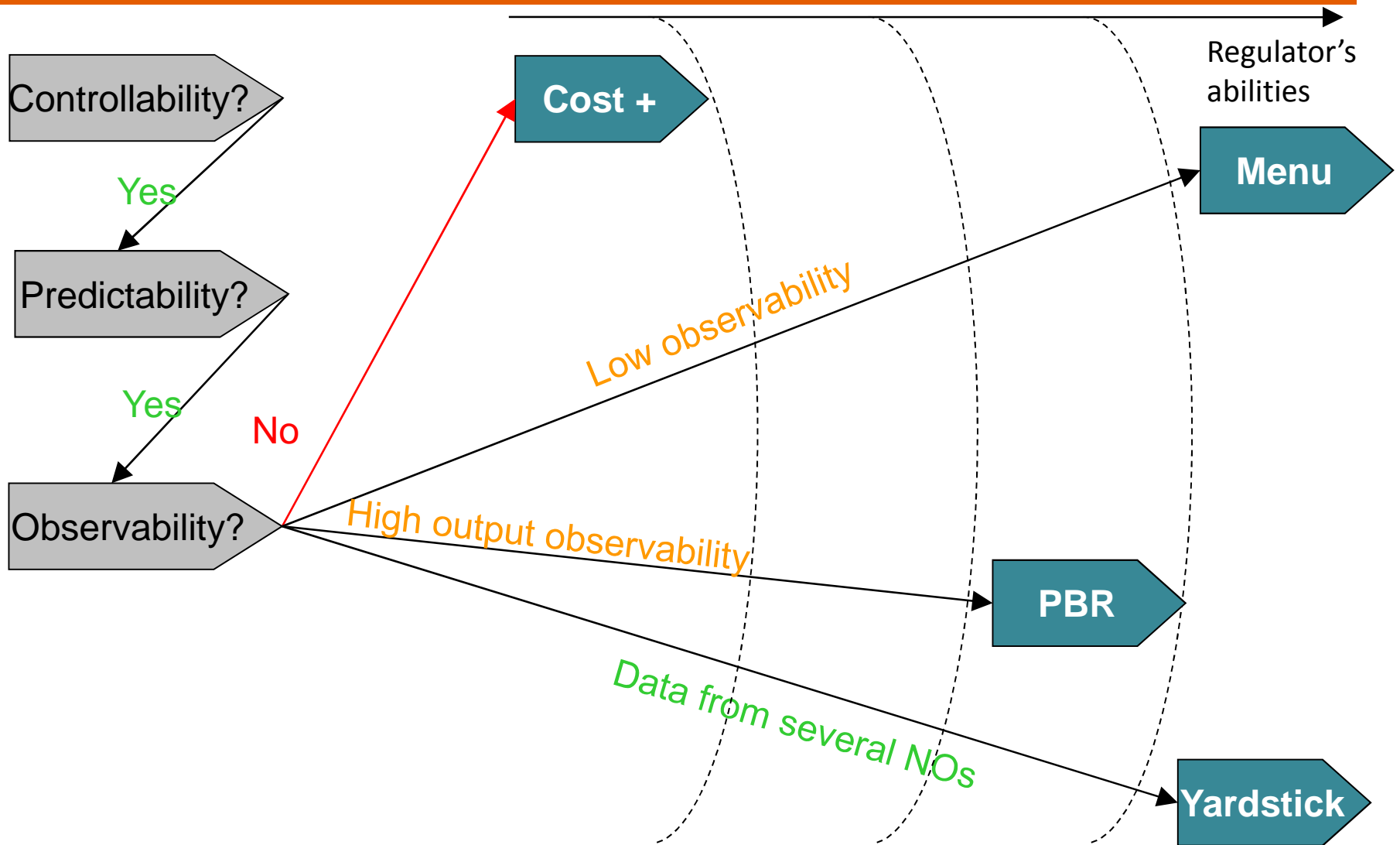
A decision tree to choose your (combination of) regulatory tool



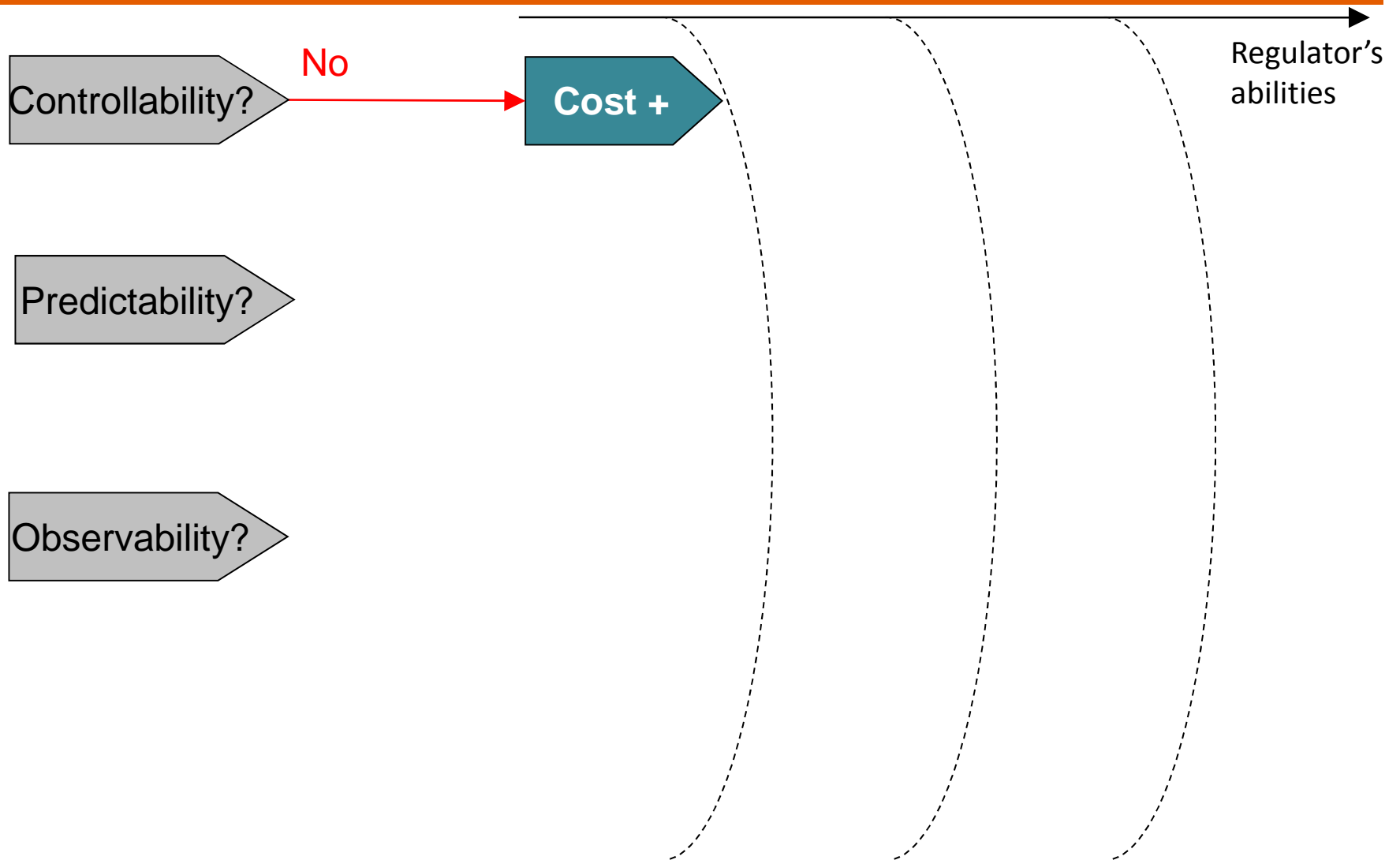
The regulatory tool to implement depends on the characteristics of the targeted cost/task and the regulator's abilities



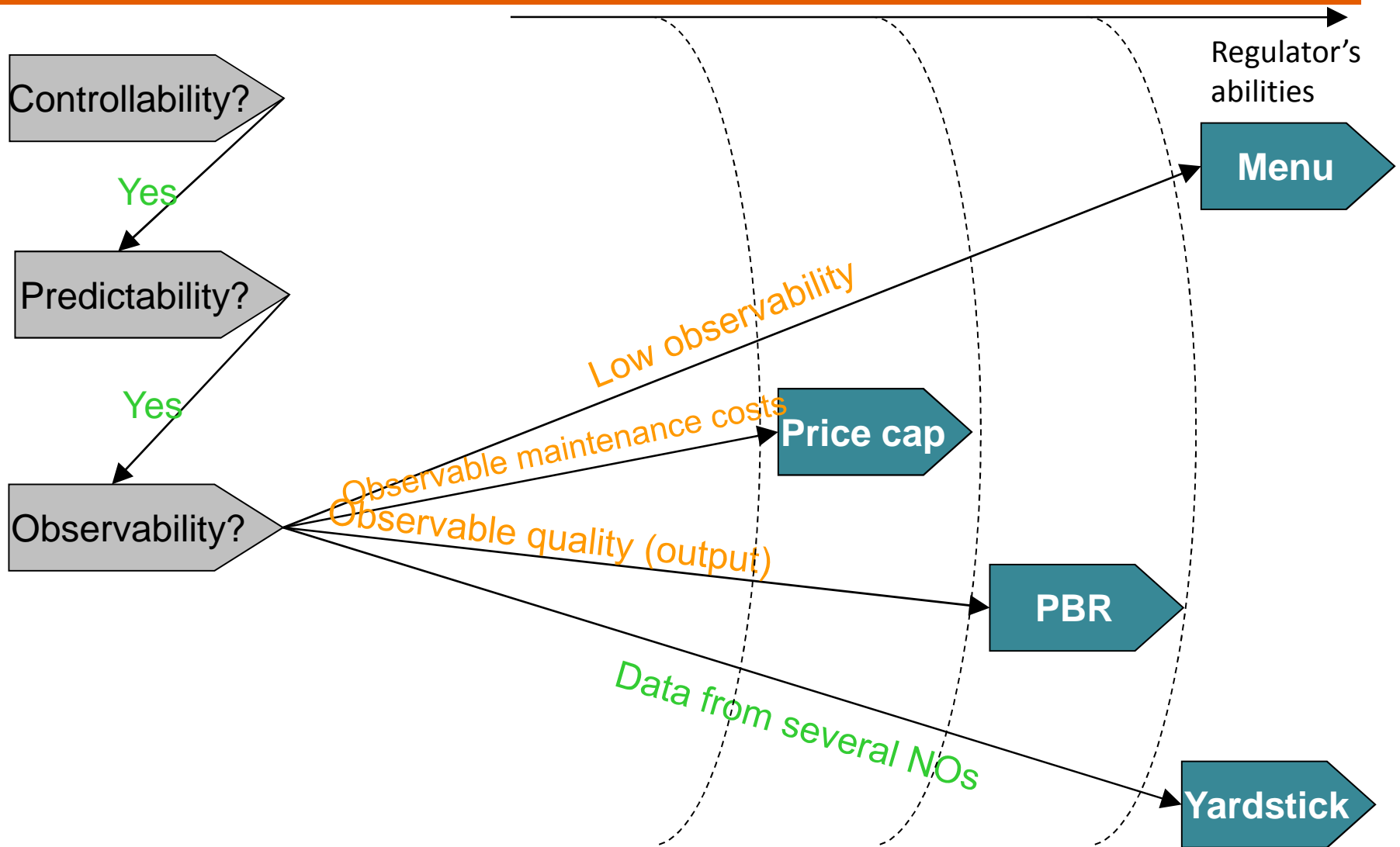
Example #1a Regulatory tool for transmission losses volume in an isolated system



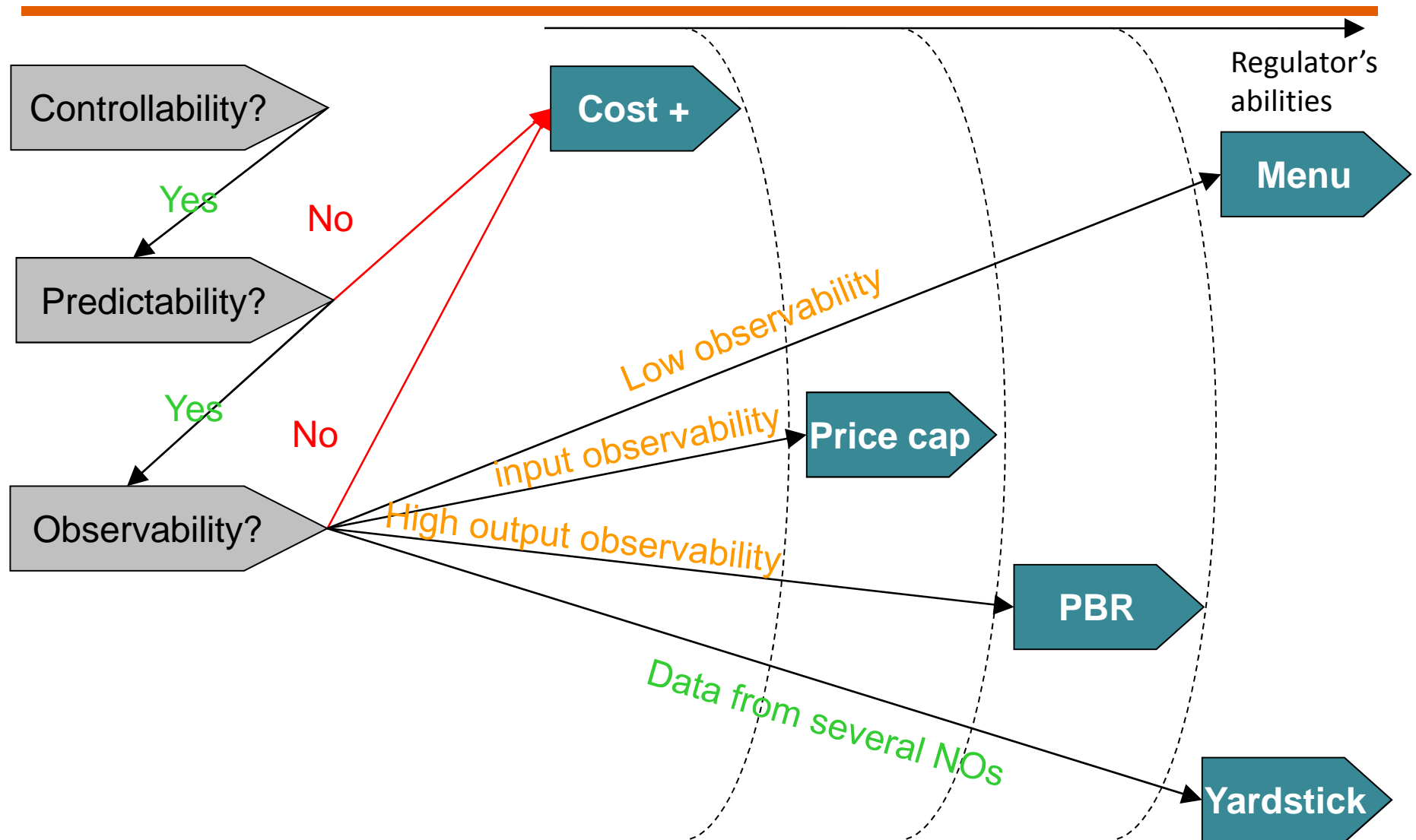
Example #1b Regulatory tool for transmission losses volume in an interconnected system



Example #2 Regulatory tool for transmission maintenance



Example #3 Regulatory tool for RD&D e.g. Meshed DC grid



- Textbook regulation suppose a perfect regulator targeting the total TSO' targeting the total TSO's cost
 - The practical successes of incentive regulation realised when the regulator mimicked his expected theoretical behaviour
- More generally reality is not so perfect
 - Regulator may have tight resources and only limited abilities
 - Distinct regulatory tools are applied to different targeted costs/tasks
- Regulatory tools should be adequately adapted
 - To the characteristics of the targeted costs (controllability, predictability and observability)
 - And the regulator abilities

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Thank you for your attention
Comments welcome
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A reminder of the 5 standard regulatory tools

- Cost +
 - The network operator is then paid based on its cost-of-service
- Price cap
 - The network operator has then a maximum allowed tariff level
- Performance (Output) regulation
 - The network operator has then an efficiency target and is rewarded or penalised depending on its over- or under-performance
- Menu of contracts
 - The regulator proposes different regulatory contracts to the network operator with different degrees of incentives
- Yardstick or benchmarking techniques
 - These techniques can only be applied if the regulator controls the cost of several homogeneous network companies
 - The regulator sets the efficiency target to a network company as a function of its performance relative to the other network companies' performance