

SECONOMICS – Model Validation



Socio-Economic Aspects of Security: Policy and Regulatory Aspects of Electricity Transmission

SECONOMICS – Security Economics

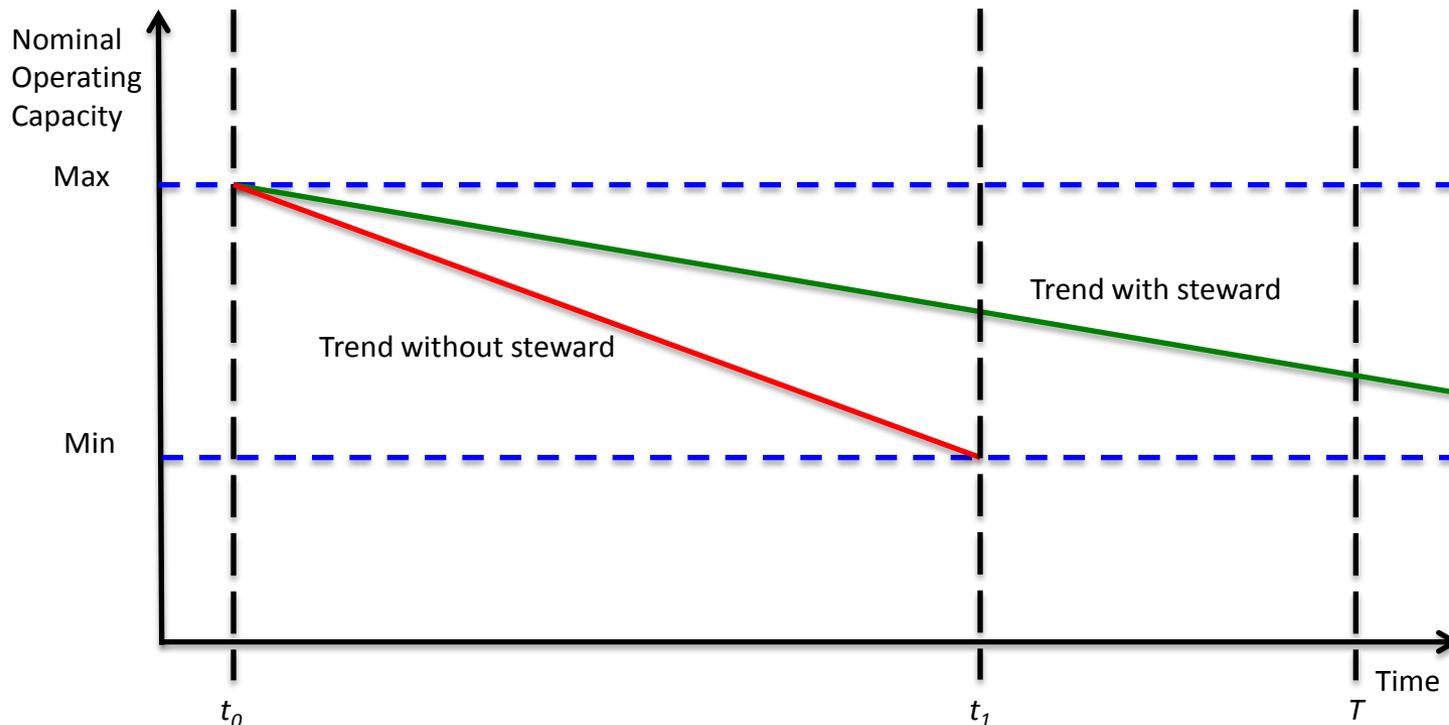
- Overall Aim: To develop security policy papers to inform regulators and stakeholders across Europe, in the relevant industries, on how best to regulate those industries.
- National Grid forms the CNI strand of the project using the example of Electricity Transmission.
- Focused Aim: To assess which type of regulatory structure (risk-based or rules-based) best incentivises CNI operators to be secure in the
 - Current state
 - Future state.

Assessing Regulation

- How do we assess how well each type of regulatory system achieves this?
- We look at the effectiveness of each regulatory system at ensuring that the CNI operator has the commensurate level of security.
- This is done by modelling the environment of a CNI operator in the different regulatory structures.
 - An Economic based model that takes a holistic view of sustainability and resilience of the ecosystem i.e. Electricity Transmission from a security perspective.
 - A Systems model which looks at how a CNI operator reacts to new vulnerabilities and attacks within different regulatory structures.

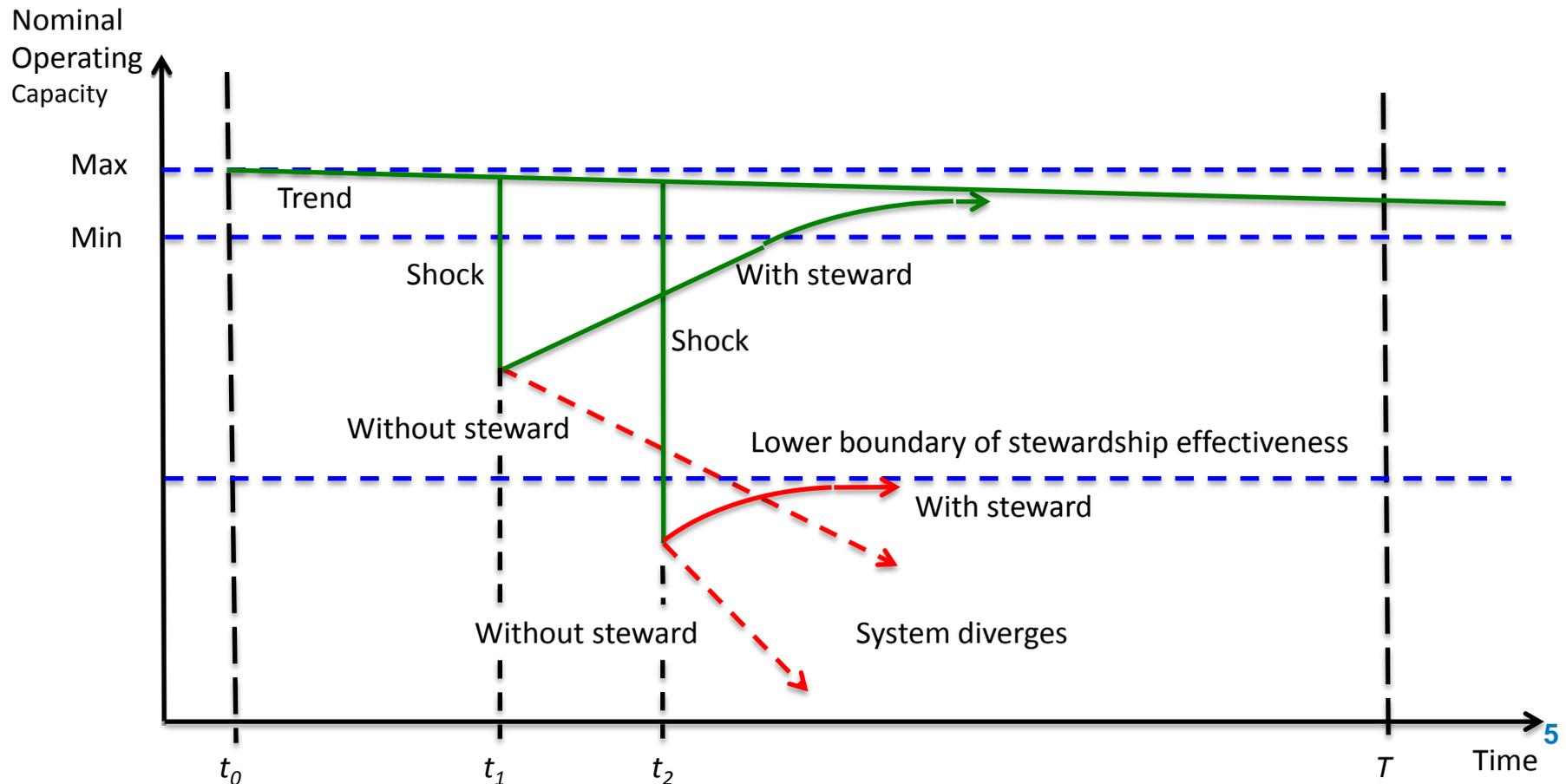
Economic Model - Sustainability

- This model looks at the stewardship of the organisation.
- It models how the CNI operator ensures normal operation in the current regulatory environment.



Economic Model - Resilience

- The model also takes into account of the effects of shocks to the CNI operator and how it deals with them.
- Shocks are unanticipatable events that may/may not be manageable.



Economic Model - Calibration

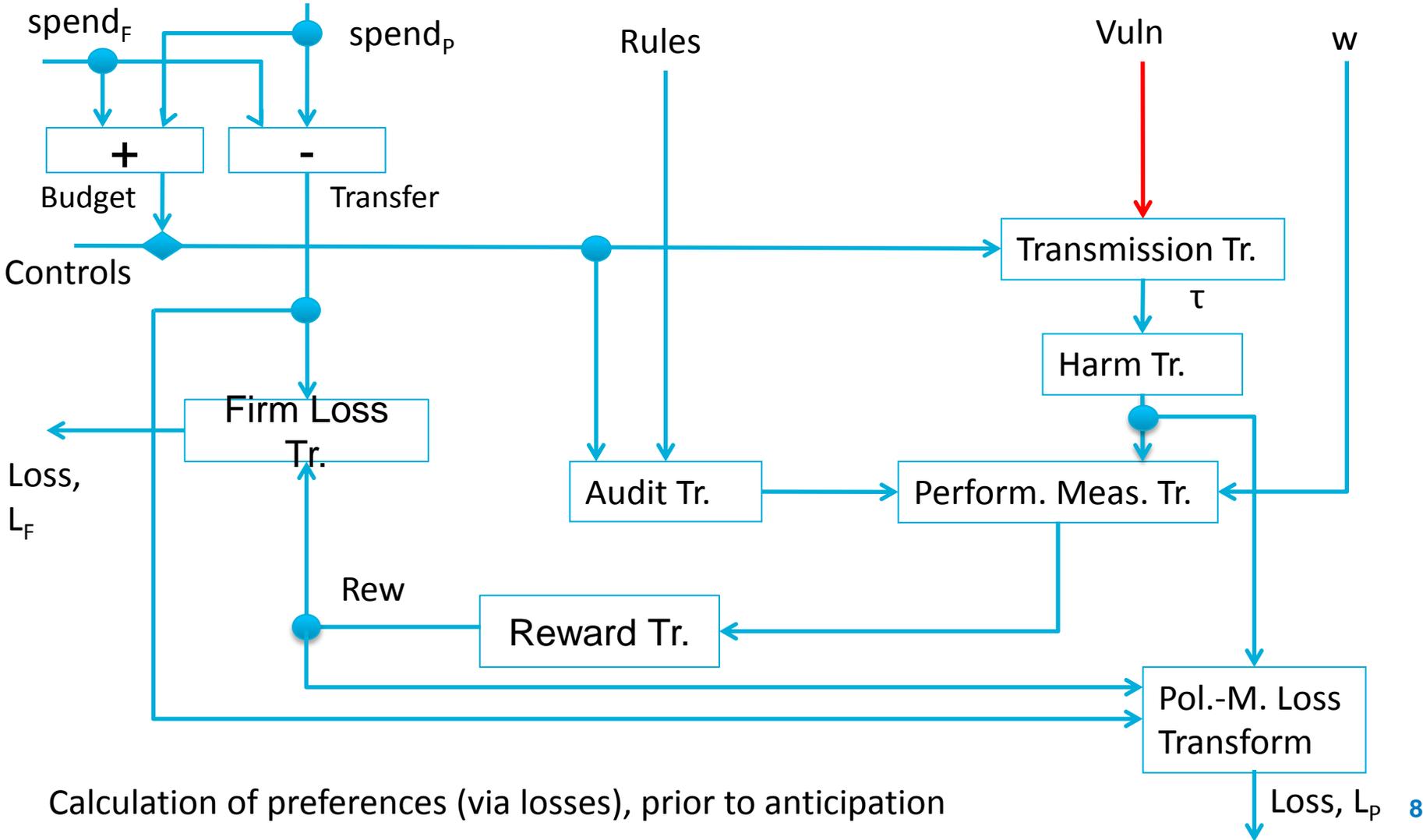
- For accurate outcomes we need to calibrate the model.
- Discount rate: NG may aim to deal with different types of potential risks now or later
 - Which types of risks are most important that we want to deal with now?
 - Which types of risks are we less worried about at the moment?
- Investment plan: Why do we choose to invest first in certain controls than others?
 - How do we value the length of time a set of controls is effective enough?
- Shocks: How often have unmanageable shocks occurred that have the potential to affect
 - NG?
 - Other organisations in general?

Systems Model - Agility

- This model looks in more detail at the security investments and choices that the CNI Operator makes in reaction to different regulatory environments and vulnerabilities/attacks.

- Specifically:
 1. The regulator chooses a policy regime (by choosing whether it rewards attention to risk or compliance with rules), a set of rules, and an allocation of funds
 2. The CNI operator reacts by choosing its own budget and set of security controls applied
 3. The CNI operator's choices has an effect (subject to random fluctuations relating to the arrival of 'new' vulnerabilities) on **transmission performance** and compliance
 4. The Regulator should anticipate reaction of the CNI operator, and set the policy accordingly.

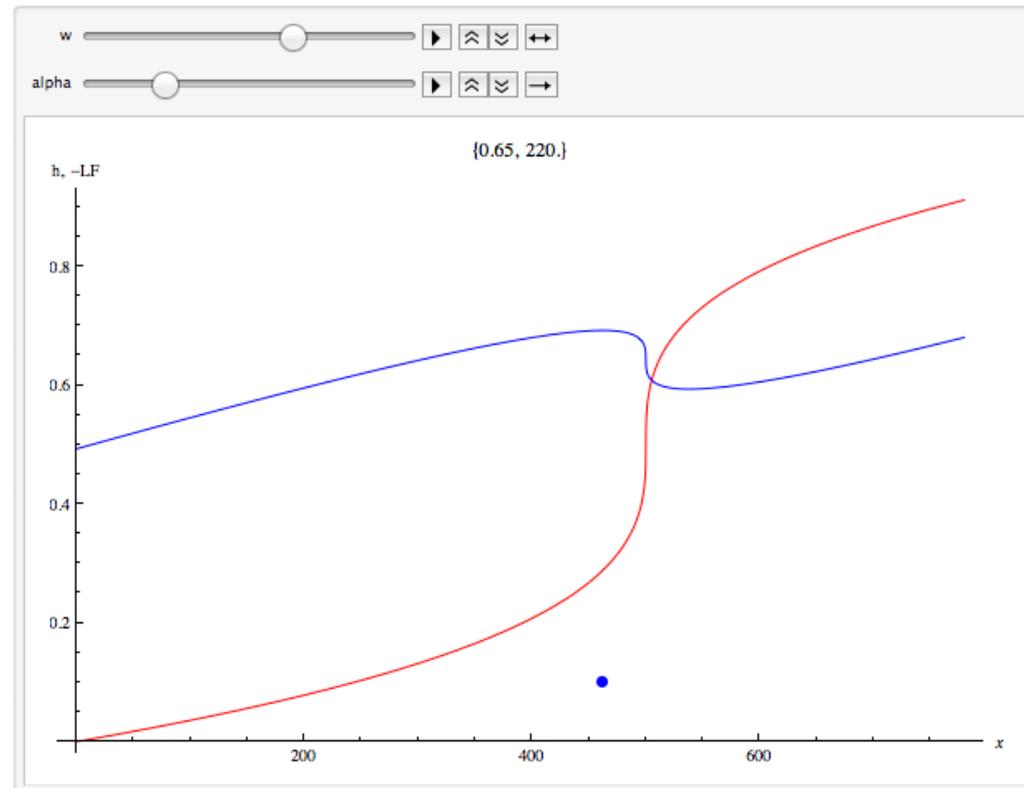
Systems Model



Calculation of preferences (via losses), prior to anticipation

Systems Model – Example output

- A key part of the model is the Performance Measure Transform.
- Performance is measured against the regulatory regime in place. Thus there is an inherent tradeoff between the audit requirements and the measure of harm.
- Blue curve is ‘Security Gain’ to the CNI Operator ($-L_F$)
- Red curve is the ‘harm’ to society ($-L_P$)
- x-axis is configuration of security controls chosen by the CNI Operator.
- x-coordinate of blue dot is the CNI Operator’s reaction (max).
- Regulator should never choose a policy regime, w , that pushes the blue dot to the right of the red cliff.



Systems Model – Calibration

- To make the systems model accurate we need to calibrate it.
 - How much effort does NG put into complying to regulation vs. actually mitigating risk?
 - NG has a security investment plan, how was this generated? In response to the regulatory environment or threats/risks?
 - How do rewards/punishments (by the regulator) really affect what is done in security?
 - Without specific rules what would the regulator really care about? Is it our security maturity?
 - What do we think are our alternative measures of security are?
 - How best can we utilise economic models of this type to structure debate with the regulator? What would help make it more valuable?

Thank you
Any Questions?

Rules vs. Principles

