

Opening Editorial

The debate on Critical Infrastructures (CI) in itself is not new. Throughout the industrialized world society depends on a set of systems that supply food, water, public health services, energy, and transport. Other systems are used to manage information and provide communication services as well as to remove and recycle waste. In at least limited ways, these systems have always been dependent on each other. However, recent decades have witnessed a much greater and tighter integration and interdependence between them – effectively the creation of a «system of systems» which has no single owner or operator. While this has often yielded improved service and convenience and promoted greater efficiency, it has also led to increased technological, economic and social vulnerabilities in the face of accidental or intentional disruption. Today, a disruption has much greater impact than was typically the case in the past, and can also propagate to other systems, resulting in further additional disruptions. The benefits of increased interconnectedness and complexity stand in contrast to the heavily increased vulnerability of the system and societies.

The notion of Critical Infrastructure

The term Critical Infrastructure (CI) itself has no overall accepted meaning. Nevertheless, approximations are possible and necessary. For a working definition we refer to those facilities and organizations whose disruptions could cause severe damage on a supra-regional level, e.g. in the energy sector, the communication sector or in the transport sector. These include amongst others the power supply, the drinking water supply, the information and communication technologies (ICT) or waste disposal. Disruptions may have rapid repercussions for the population and the basis of its livelihood and can affect other CI through «domino effects» or «cascading effects», which are due to non-linear and network interactions. Some papers challenge this definition and engage in a necessary discussion on the relativity and normativity of the concept of CI. We have thus deliberately not prescribed a fixed definition for the authors of this special issue.

CI is not a concept traditionally applied in disaster management. The concept first entered modern government with Bill Clinton's establishment of a national program on CI protection (CIP) in 1998. It has only been in recent years that Switzerland coordinated its efforts in the area of CIP and established a CIP Working Group (CIP WG) in which all relevant authorities are represented. On 5 June 2009, the Federal Council approved the Basic CIP Strategy that serves as the baseline for the National CIP strategy¹. Due to the topicality of CI in Switzerland and in order to have insights into the

1 Grundstrategie des Bundesrates zum Schutz Kritischer Infrastrukturen vom 18. Mai 2009 (Basic Strategy for the Protection of Critical Infrastructure of 18 May 2009), download at <www.bevoelkerungsschutz.admin.ch/internet/bs/de/home/themen/ski/publikationen_ski.html> (last accessed on 28 May 2015); Nationale Strategie zum Schutz Kritischer Infrastrukturen vom 27. Juni 2012 (National Strategy for the Protection of Critical Infrastructure of 27 June 2012), BBl 2012, p. 7715 *et seq.*

practice of other countries concerning CI, our symposium was organized in collaboration with the Federal Office for Civil Protection in Bern.

Issues and Problems Arising in the Discussion of CI

Given the critical importance of CI in advanced societies, an in-depth discussion of the concept itself (the normative vs. technocratic understanding of the concept and the role of politics), the role of different actors involved in CI and their respective tasks, and last but not least economic, legal and societal responsibility and legal liability of different actors come to the fore. An understanding of these problems is necessary to be able to design adequate and incentive-compatible structures and laws for the handling of CI.

CI is exposed to risk. The term risk denotes the possibility that an undesirable state of reality (adverse effects) may occur as a result of human activity or natural events. Risk is conventionally defined as the harm of an event (effect) times the probability of this event.² Risks usually refer to hazards which are known and calculable due to past experiences whereas uncertainty refers to hazards where no probability is known.³ Although the term “systemic risk” has lately rather been used in the context of financial markets, it is by no means confined to them.⁴ Systemic risk can be described as a cascading risk triggered by one event that affects the whole system, and not only individual participants of the system.⁵ Since many actors are involved in these, risk allocation is crucial. This leads us to the following problem:

CI with its multiple actors (private and public) is a classical “problem of many hands”.⁶ A multiplicity of actors may lead to the following paradox of shared responsibility: “As the responsibility for any given instance of conduct is scattered among more people, the discrete responsibility of every individual diminishes proportionately.”⁷ Or, and often, the responsibilities are murky and different actors can

2 See Ortwin Renn, *Risk Governance. Coping with Uncertainty in a Complex World* (London: Earthscan 2008), p. 1.

3 See for a discussion in the context of risk governance, Marjolein B.A. van Asselt, Ellen Vos and Bram Rooijackers, “Science, Knowledge and Uncertainty in EU Risk Regulation”, in Michelle Everson and Ellen Vos (eds), *Uncertain Risks Regulated* (Abingdon: Routledge-Cavendish 2009), 359 *et seq.*, at p. 360 *et seq.*

4 OECD, “Emerging Risks in the 21st Century: An OECD International Futures Project”, September 2003, available on the Internet at < <http://www.oecd.org/futures/globalprospects/19134071.pdf> > (last accessed on 28 May 2015), at p. 6 for a broad definition of risk sectors. Marjolein B.A. van Asselt and Ortwin Renn, “Risk Governance”, 14 *Journal of Risk Research* (2011), pp. 431 *et seq.*, at p. 436 *et seq.* describe systemic risks as follows: “The term ‘systemic’ describes the extent to which a risk is embedded in the larger contexts of societal processes. (...) Systemic risks are not confined to national borders or a single sector and do not fit the linear, mono-causal model of risk. They are complex (multi-causal) and surrounded by uncertainty and/or ambiguity. (...) In very general terms, risk refers to the possibility of damage.... or to tolerated or unintended consequences of purposeful human actions which may occur that violate something that humans value. (...) Those assessing or appraising risks pertaining to future events or consequences are necessarily confronted with uncertainty.”

5 For a discussion of definitions although focused on financial markets, see Steven L. Schwarcz, “Systemic Risk”, 97 *Georgetown Law Journal* (2008), pp. 193 *et seq.*, at p. 196 *et seq.* For a development of the notion, see OECD, “Emerging Risks in the 21st Century” *supra*, note 4.

6 Originally developed for public officials, the problem is pervasive. Seminal: Dennis F. Thompson, “Moral Responsibility of Public Officials: The Problem of Many Hands”, 74 *American Political Science Review* (1980), pp. 905 *et seq.*

7 Dennis F. Thompson, “Responsibility for Failures of Government: The Problem of Many Hands”, 44 *American Journal of Public Administration* (2014), pp. 259 *et seq.*

play a blame game.⁸ Only law and contracts can assign tasks and risks in the sector of CI adequately and clearly. These tasks can be of a producing, of a coordinating or of a supervisory and monitoring nature. Each task carries different substantive obligations and thus also has different causes for responsibility and liability. Political science, sociology, managerial science and public administration have considered these issues, but it has been largely neglected in law or legal design literature, although this is definitely crucial for the assignment of responsibilities and liability. Nevertheless, without looking at neighboring science, practice and realities of CI, legal design would be blind when allocating risks, since those would not be well understood.

The idea of the Symposium was thus to put the debate on the protection of CI into a legal context against the background of other relevant disciplines and to focus on issues of risk, responsibility and liability. The goal was to analyze the allocation of responsibility and liability in the protection of CI by looking at the aim and appropriateness of responsibility and of different types of legal liability in various sectors. What are the common themes and emerging risk challenges in the allocation of responsibility and liability? Where are the gaps and challenges? How can these challenges be overcome?

This special issue of European Journal for Risk Regulation addresses many of these questions. In order to do so, we have solicited contributions from several scholars who have been working with or researching on CI issues. When read together, they provide different, yet complementary perspectives that help in designing the legal frame for CI in a way which is not only incentive-compatible for all the actors involved, but also paying tribute to other goals of responsibility and liability such as compensation.

Structure of the Special Issue

The first part deals with general issues, the second part then turns to the division of labor in the provision of CI and its problems. Here, the questions of liability of private and public actors are discussed respectively. In the third part, special problems in CI are tackled, such as IT systems and energy systems.

Let's turn to the first part. *Kristian Cedervall Laut*a addresses the issue of the different definitions of CI arguing that while the definitions are too fuzzy to actually contribute to the identification of CI, they can help altering the responsibility for doing so by reorganizing a political discretion into an administrative decision. *Lauta* relies on insights from risk sociology, criticizing the creation of a dysfunctional governance regime for the protection of CI. *Marjolein B.A. van Asselt*, *Ellen Vos* and *Isabelle Wildhaber* reflect on EU governance of CI risks. In the domain of CI risks, a certain resort to science and expert agencies is visible. The authors suggest that risk assessment should be recog-

8 Christopher Hood, *The Blame Game. Spin, Bureaucracy, and Self-Preservation in Government* (Princeton/Oxford: Princeton University Press, 2011).

nised as one of the elements of regulatory decisions in addition to the 'other legitimate factors' such as social, ethical and political concerns at the national and EU (and WTO) level. How risks are assessed is not a mere technical matter that can be left to institutions, but is a political question. Whereas risk governance can be informed by risk assessments and expert advice, the political responsibility cannot be concealed behind or delegated to scientific experts.

Stefan Brem takes on the conceptional components of national strategies on CIP, using the example of the Swiss CIP program. He points out the close collaboration between public authorities and the CI operators together with an explicit legal foundation as key aspects in a national CIP strategy. This leads to the next contributions since CIP is shaped by "partnerships" between the state and private stakeholders basically everywhere. *Christopher Bovis* focuses on the risk transfer in PPP between the public sector and the private sector and analyses the most efficient risk allocation. The importance of information and how to organize its flows between various public and private stakeholders engaged in CIP is shown by *Heiko Borchert*. He introduces a joint public-private information management agenda to understand the overall context in which CI development occurs.

Part two looks at the division of labor between public and private actors in CIP. State duties to protect security and rights of the population which comprises CIP are the starting point. *Rainer Schweizer* describes the State duties to protect in Switzerland; the country being a benchmark for the creation of those duties. Turning to liability issues, *Michael Faure* addresses the role of private liability in protecting CI and reveals that such rules are not suitable to guarantee sufficient prevention, neither in the context of man-made "technological" disasters nor in the case of natural catastrophes. As a result, *Faure* brings forward the argument that safety regulation is often better suited than liability rules are to protect CI. *Van Aaken* and *Wildhaber* in turn deal with state liability for CI provision and protection. While the duty to protect arises for most of the states from their constitutions as well as international law, the discretion for states how to follow this duty is vast. Furthermore, the state liability regimes vary in their strictness, Switzerland being on the strict end and Germany on the loose end of liability regimes. The respective incentives set by those models for states are critically discussed. *Patricia Wiater* probes the relationship between the public and the private with a focus on the German "National Strategy for Critical Infrastructure Protection" as an example. She suggests binding regulatory contracts on CIP as a promising compromise between a laissez-faire approach and regulation in order to guarantee efficient risk shifting and avoid murky responsibilities.

Some CI sectors are most sensible; those are analyzed in part three. *Eric Luijff* and *Marieke Klaver* take on the information and communication technologies (ICT) in the light of CIP. They criticize that nations, their policy-makers, legislation, and regulators largely overlook and fail to properly govern the full set of ICT elements and services critical to the functioning of the nation. The risks of attacks and accidents regarding CI in the energy sector are the subject of the article from *Peter Burgherr*, *Jennifer Giroux*

and *Matteo Spada*. They explain that the joint analysis of accidents and intentional attacks provides a comprehensive and complementary approach to two types of risks that have rather different properties, but are essential from an energy security perspective.

Conclusions

CIP is a multifaceted problem and one which is at the forefront of the governance challenges states face nowadays. Only interdisciplinary perspectives on that problem can, in our view, rise to the challenge to find holistic problem solving design features and legal structures which mitigate the arising risks from CIP. This Special Issue is one step in hopefully a pursued dialogue of multiple disciplines and all involved stakeholders for solving this societal challenge for the future.

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