Section Sciences et Ingénierie de l’environnement  
Design Project 2010 (semestre de printemps)  

Proposition n° 4  

Gouvernance des risques liées au développement des véhicules électriques  
Comparaison des émissions CO2 des voitures électriques et à moteur thermique  
Capacité des réseaux de distribution à fournir l’électricité nécessaire en Suisse  

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Introduction  

- Des contacts entre IRGC, un membre de l’IRGC et un membre du conseil scientifique ont été initiés pour définir l’objectif du Design Project, son cadre d’étude et le plan de travail.  

- IRGC propose de « briefer » l’étudiant sur l’approche IRGC de gouvernance des risques, pour que celui-ci puisse l’appliquer à un domaine d’application précis (par exemple, la gestion de l’eau dans un bassin de rivière, ou la gouvernance des procédés pour la désalinisation de l’eau). En particulier, les outils que IRGC mettra à disposition de l’étudiant sont :  
  Introduction au IRGC Risk Governance Framework  
  Rapport sur : Risk Governance Deficits.  

- En fonction du sujet retenu, IRGC s’efforcerà d’établir une coopération avec un membre du conseil scientifique ou un de ses collaborateurs (http://www.irgc.org/Scientific-Technical-Members.html)  

- A la fin du projet, IRGC souhaiterait recevoir une note d’une vingtaine de pages, rédigée pour répondre aux questions suivantes : 1) liste des risques et opportunités ; 2) état de la gouvernance de ceux-ci ; 3) problèmes actuels, 4) pistes d’amélioration.
Descriptif du projet

The International Risk Governance Council (IRGC) focuses on risk governance of systemic risks. In 2010, it is interested in cooperating with EPFL students in two specific fields related to climate change: energy and the environment. In both cases, it is mainly the assessment and management of the risk, understood in a comprehensive manner ("risk governance") that matters to IRGC, rather than the risk itself. When focus is on the risk, then possible benefits should be part of the research as well.

For more information on IRGC and its work: www.irgc.org

Energy

Climate change and energy are matters of global concern and attention, and the two are closely related. Many organisations are trying to improve the scientific understanding of the complex phenomena and systems that are involved. This work embraces how human activities can, by way of mitigation or adaptation, influence future developments in environmental change, in energy technologies and use, in economic systems, and in societal developments. In short, engineers are trying to build energy systems that provide sufficient energy to sustain economic development and produce as little as possible carbon dioxide and other GHGs over the complete production and consumption chain, so over the complete life-cycle. If policymakers decide to encourage the production and use of low-CO$_2$ energy, the power generation from non fossil-fuels must be encouraged.

● Electrification of transportation

The electrification of transportation (particular of road transport) is a strategy to reduce fossil-fuel use and emissions. Governments are subsidising the research, production and purchase of hybrid vehicles, plug-in hybrids and full electric vehicles. However, there are a range of concerns about the long-term impact of these vehicles as well as about the ability of government policies to be adjusted when/if better solutions become available. Life-cycle risks, costs and benefits need to be properly assessed, and many governance issues need to be addressed to meet challenges such as:

- How to replace the fossil fuels in power generation (to increase environmental sustainability of supply) in order to achieve more significant GHG reductions?
- How to increase electricity supply (to meet the additional demand)?
- How to improve the reliability and security of electricity supply to the end-consumer?
- How to adapt current transportation infrastructures and motor vehicles (and maintain competitiveness with regards to relative costs for rail vs. road building, batteries, etc)?
- How to objectively evaluate the statements by interest groups that try to promote or block the evolution towards electrification of transport?
- How to develop batteries with the necessary power and lifetime performance? How to dispose of the batteries?
- How to ensure adequate investment in other potential means of achieving the same objectives, including advances to conventional automobile and truck engines?
- How to modify consumer acceptability and behaviour, so as to influence on the demand? What would be the future mobility patterns?

The first of these challenges is not directly connected to electrification of transport, but all others are directly connected and meeting them all will be necessary. An IRGC project would include inviting experts from academia, industry, regulators and policymakers to state the facts and discuss and make suggestions for possible solutions to the governance of these questions.