Report from

The IRGC Peer Review Group

Presented to
Federal State Secretary for Education and Research (SER),
Berne, March 24, 2011

Dr. Stephan Bieri, Peer Leader
Dr. Christoph Eymann
Prof. Dr. Laurent Vulliet
Prof. Dr. Heike Walles

Hans Rudolf Hagmann, Secretary

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Zusammenfassung

Der vorliegende Bericht stellt die Ergebnisse einer vom 20. bis 23. März 2011 durchgeführten Evaluation des International Risk Governance Council (IRGC) vor. Auftraggeber war der Staatssekretär für Bildung und Forschung (SBF) der Eidgenossenschaft. Dieser setzte im Herbst 2010 ein vierköpfiges Panel ein. Die Vorbereitungen des IRGC wurden im Dezember mit einem Selbst-Assessment abgeschlossen. Kurz vor Beginn der Evaluation orientierte der IRGC das Panel mit einer zusätzlichen umfangreichen Dokumentation über eine neue Strategie der Institution, deren Organe kurz vorher teilweise neu bestellt worden waren.

Der vom SBF formulierte Evaluationsauftrag, die sogenannten Terms of Reference (TOR), umfasst grundsätzlich drei Elemente:

- *die Beurteilung der Qualität und der eingeschlagenen Richtung von Forschung und Beratung des IRGC;*
- *eine Abschätzung der entsprechenden Zukunftschance, insbesondere der internationalen Wettbewerbsfähigkeit;*
- *Hinweise zur Organisation des IRGC und zu dessen Beziehungen zur wissenschaftlichen Gemeinschaft.*

Diese Abklärungen hängen mit der grundsätzlichen Frage zusammen, ob der Bund eine weitere Finanzierung aufgrund von Art. 16 des Forschungs- und Innovationsförderungsgesetzes (FIFG) vorsehen soll. Das Panel war sich der wissenschafts- und finanzpolitischen Bedeutung seines Mandates bewusst.

Die Evaluationsarbeiten in Lausanne und Genf verliefen effizient und in guter Stimmung. Intensive Hearings und Diskussionen ermöglichten dem Panel eine vertiefte Einsicht in Stärken und Schwächen der Institution. Die durchgeführte Analyse der sorgfältig gemachten Dokumentation und zusätzlich vorgenommene Überprüfungen, so etwa im Bereich der Publikationen, ergeben im Ganzen ein günstiges Bild:

- *Profil und Portfolio des IRGC sind attraktiv, doch wurden bisher ungenügend Drittmittel eingeworben.*
- *Gegenüber dem wissenschaftlichen Niveau bestehen grundsätzlich keine Vorbehalte.*
- *IRGC ist international präsent und verfügt über prominent zusammengesetzte Gremien mit guten Beziehungen zu Wissenschaft, Wirtschaft und Politik.*
- *Die vom Panel vorgetragene Kritik zur Organisation und zum Verhältnis der einzelnen Gremien untereinander wurde vom IRGC positiv aufgenommen.*
- *Die präsentierte neue Strategie setzt hier an und versucht, ein neues Geschäftsmodell umzusetzen, das auch eine breitere geographische und nutzerseitige Abstützung der Institution vorsieht.*
- *Das Panel betrachtet das eingeleitete Reengineering als zweckmässig und erwartet, dass ein neuer mehrjähriger Finanzplan sowie die Darstellung einer sachgerechten Stärkung der operativen Funktionen vorgelegt werden.*

Das Panel empfiehlt dem SBF, die bisherige Finanzierung des IRGC weiterzuführen, wobei dem neuen Leistungsauftrag und dem Reporting besonderes Gewicht zu geben wäre. Das Interesse weiterer Departemente des Bundes sollte gewonnen werden; allenfalls könnte auch die Form der Unterstützung kompetitiver gestaltet werden. Als eine wichtige offene Frage erwähnt das Panel schliesslich die bessere Einbindung des IRGC in die schweizerische Hochschullandschaft.

1. Introduction

In summer 2010, the Federal Secretary of State for Education and Science (SES), Dr. Mauro Dell'Ambrogio, asked Dr. Stephan Bieri to chair a Peer Review of the International Risk Governance Council (IRGC). After 6 years of operation, the institute's output should be evaluated. Federal Government has to decide, if its funding will be continued.

A Panel of four experts was recruited by SER (see 2.2). Hans Rudolf Hagmann, dipl. El. Ing ETH, a former member of management of a large utility and well known to the Peer Leader was appointed as secretary and his company, HRH Consulting GmbH, was charged to provide administrative assistance. In October 2010, the SER and the Peer Leader approved the concept of the evaluation and the documentation to be provided to the Panel. From October to December 2010, the evaluation was prepared jointly between the Peer Leader, the Secretary, and IRGC's representation.

One part of the Panel's preparation was developing a common view of the IRGC portfolio. For us, risk management is a practical function as well as a scientific object. In its most general sense risk assessment and risk management (mostly seen as one holistic process) consists of two core elements[1]:

- the probability of an undesirable consequence of an event,
- the seriousness of that consequence.

So uncertainty and risk are not identical[2]. Risk governance is an even broader concept that "includes the totality of actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analyzed and communicated and management decisions are taken"[3].

Several kinds and types of risk may be distinguished: business risk, financial risk, and natural hazards are just some of them. A great deal of models and point of views have been developed during the last twenty years. Questions of complexity, resilience or social-economic impacts are discussed by researchers and politicians. The theory of risk management has got a new impulse after the last financial crisis when risk models of the banking sector did not work correctly. "Systemic risk is a negative externality that arises when financial market participants fail to price into their investment activities the full costs associated with their risky behavior", K. Alexander and K. Lorez claimed in a recent article[4].

IRGC's scope is very broad and principally includes all kinds of risk. But special attention is given to *risk governance*: planning, decision-making, and controlling of governments, firms, NGO or social groups related to risk. The Panel acknowledges how relevant and, in the same time, how difficult IRGC's task is.

[1] See K.W. Hipel & J. Shortreed, 2007, *Risk assessment and management*, McGraw-Hill Encyclopaedia of Science & technology, 10 ed., New York, p. 580-583
[2] See F. Knight, 1964, *Risk, uncertainty and profit*, reprint, New York
[3] IRGC definition (*documentation*)
[4] K. Alexander & K. Lorez, *Universal Banks: The Risks and Alternatives*, Schweizerische Zeitschrift für Wirtschaftsrecht, vol. , p. 459-468

2. Terms of Reference and Peer Group

2.1 Terms of Reference

This Panel is asked to review IRGC according to the Terms of Reference (TOR, see Appendix 1). There are three main points:

- *the quality and direction of the research and advising carried out to date*;
- *the proposed future direction of scientific research and political advice for the institute and an assessment of the institute's ability to compete internationally;*
- *the organizational structure of the institute as it relates to the broader scientific community.*

In addition, the SER requests our opinion on specific organizational questions that had been stressed during preparation. Finally, a set of eight questions is presented to the Panel; they have been discussed several times with leading members of IRGC (see IRGC's answers in Appendix 4).

First of all, the evaluation should provide a realistic assessment of the current and future position that justifies *further* Federal funding. The evaluation is not intended to assess the scientific and advising work of IRGC as a single institution, but to explore its international network and environment. The Panel is well aware of IRGC's specific function as a science-based transfer institution. We will discuss that later in extenso.

2.2 Peer Group

The following experts formed the Panel for the Peer Evaluation of IRGC:

- **Dr. Stephan Bieri, Peer Leader**
  CEO of Bieri IP Partner GmbH, Aarau
  swbieri@postmail.ch
- **Dr. Christoph Eymann**
  Member of Government, Erziehungsdepartement Basel-Stadt
  christoph.eymann@bs.ch
- **Prof. Dr. Laurent Vulliet**
  Full Professor EPFL
  CEO BG Consulting Engineers, Lausanne
  laurent.vulliet@bg-21.com
- **Prof. Dr. Heike Walles**
  Full Professor, Chair Tissue Engineering & Regenerative Medicine, Würzburg
  Head of Department Cell and Tissue Engineering, Fraunhofer Institute, Stuttgart
  heike.walles@igb.fraunhofer.de

They were assisted by:

- **Hans Rudolf Hagmann, Secretary**
  CEO of HRH Consulting GmbH, Riniken
  hag@sunrise.ch
- **Joakim Rüegger**
  Division Head, Erziehungsdepartement Basel-Stadt
  joakim.ruegger@bs.ch

The Peer Group (from left to right): Dr. Eymann, Dr. Bieri (Leader), Prof. Walles, Prof. Vulliet

3. Proceeding

As mentioned before, evaluations such as ours fundamentally deal with the effectiveness, efficiency, and possible synergies of an institution. The Panel did not try to evaluate single outputs or persons; we planned no formal benchmark of IRGC against other leading institutes in the field of risk assessment and management. However, some qualitative comparisons are made related to publications (see 4.2).

The Panel acted as a **group** and is collectively responsible for the Report. Before, during and after the site-visit, we worked and communicated on good terms.

Our practical experience during the visit was very good; we felt welcome and were well looked after. The following points reflect the general assessment of our **interaction** with IRGC:

- We observed competent and active preparations by IRGC; after the self-assessment (December 10, 2010) we got an additional documentation (February 14, 2011) covering a "new strategy".
- The paper-work was of excellent quality, focused on our needs; the self-assessment as such was clear and precise, but quite a part of it consisted of explanations and declarations.
- IRGC presented a publication overview, but not a formal publication analysis with additional comments; the Panel took note of it (last version see Appendix 3).
- The Panel enjoyed compact and enlightening presentations with hand-outs ready at the beginnig of the site-visit.
- IRGC gave quick and positive responses to all additional requests from the Panel. The visit to the Geneva headquarter was well organized.

The Panel was privileged to have the active and skilled support of its secretary, H.R. Hagmann; it made profit of his experiences as manager. Special support was given by J. Rüegger, a professional of Swiss higher education and science-policy. Last but not least, we would like to express our appreciation to D. Urbach, IRGC Senior Advisor, for his excellent documentation and the daily assistance.

4. Starting Point

4.1 Summary of Self-Assessment of IRGC

IRGC has provided extensive self-assessment documents on December 10, 2010 – as scheduled in the terms of reference. The self-assessment documents therefore cover primarily the period before the strategic decisions taken by the Board on November 12, 2010, and January 29, 2011.

IRGC sees its **mission** in developing concepts of risk governance, anticipating major risk issues and providing policy recommendations to key decision makers in governments and in the private sector. IRGC wants to help the understanding and management of global risks with impact on human health and safety, the environment, the economy, and the society at large. IRGC aims to occupy a niche in the risk governance landscape. It does not conduct scientific research by itself. It provides a neutral platform in developing science-based recommendations under the assumption that even political decision-making benefits from science. The recommendations promote a multi-stakeholder approach, bringing together leading researchers across different fields. They take into account multiple perspectives from the cultural, social and institutional segments. IRGC believes they are highly valued for their quality. IRGC acts as a transfer institution. It transfers the best available science-based knowledge into policy recommendations. IRGC sees itself as unique.

IRGC's science **portfolio** comprises core concepts of risk governance, operational tools, and specific risk issues. IRGC plans to shift its activity towards practical tools and applications and recommendations based on research. It will foster collaborative international activities on risk-related issues. It will participate in organizing forums. The self-assessment document contains the self-evaluation of 5 different IRGC projects: Carbon Capture and Storage, Bioenergy, Emerging Risks, Risk Governance Deficits, and Governmental Forum.

IRGC's **communication** to its customers consists mainly of distributing their publications in the form of printed documents or as files. There are 5 categories of documents: concept notes, reports, policy briefs, white papers and opinion pieces; in addition, a book has been edited. They differ in their in-depth treatment of the scientific approach. IRGC has produced 50 different publications since 2005, whereof 23 referred to the risk governance framework. IRGC's publications have a distinctive corporate design and are therefore easily recognizable. Additional alternatives for dissemination of IRGC's work are presentations and special sessions in various international conferences for academics and for practitioners. IRGC claims that the publications are very well received by the customers based on the evaluation of the feedback from customers and on citations in scientific publications. IRGC did not provide a publication analysis based on impact factors. IRGC plans to develop a bidirectional communication strategy and to make use of the new media.

IRGC does not have a set of permanent **partners**. It has mainly operated as an international network of individuals from different disciplines and sectors. The major part of the work was done by the engagement of members of the Scientific & Technical Council (S&TC). IRGC has decided to adopt a new strategy with an international network. To enhance its impact, IRGC must get closer to policymakers at the national level, rely on national expertise, develop collaborations, and ameliorate its financial situation. IRGC has built up a strong base of contacts in various countries. Its publications and workshops generate interest from key organizations.

IRGC's **governance** was not very stringent in the past because the roles of the S&TC members were ambiguous. They brought up the themes for new projects, they did the project work in their organizations and they provided a good part of the quality assurance. Several measures have now been taken to separate the responsibilities for the project activities from setting the priorities and from the quality assurance. An action plan is set up to renew the Foundation Board, the S&TC, and the Advisory Committee.

IRGC's **financial balance** is rather a weak point. IRGC was able to maintain a more or less stable balance due to strong core funding by the Swiss government. For the last years the absolute values of funding and expenditures have decreased steadily. Due to deficits during the past two years, the accumulated surplus diminished by almost 50% to CHF 275'000.-. IRGC has lost major partners who provided third-party money during the first years. It did not succeed to get new sponsors and gain new third-party money although the management undertook many efforts. The Swiss government is the main contributor to IRGC's budget.
The expenditures of ca. CHF 1.2 Mio in 2010 are mainly used to finance a staff of ca. 5 people in the secretariat. The amounts used to develop core concepts and to do project work are minimal. IRGC's workshops and trainings – especially the governmental forum – provide a neutral financial result.
IRGC sees 2011 as a turning point. It will shift to a new funding logic which will add 3 other core partners from governments or the private sector and also 4 project partners. These contributions should make the self-funding of two topical studies realistic. The base funding from the Swiss government is still considered a key requirement for success.

According to its own **SWOT analysis**, IRGC has the following

- Strengths: neutral platform, recognized authoritative information, transferring the best available science-based thinking into policy- and decision-making, public nature.
- Weaknesses: limited to publications, relaying on engaged members of S&TC, difficulty reaching out to national policymakers, weak relations to sponsors.
- Opportunities: risk governance as promising field, interest by many users and potential partners, training and decision-making support to extend the value chain.
- Threats: difficulty to find the demand, diverging demands, funding with lack of long-term sponsors.

The Panel will comment these points later, especially its methodological relevance (see 5.3).

4.2 Publications

In general, the scientific-based process of risk assessment could be split into the following four parts:

- identification of the hazard,
- description of the hazard,
- estimation of the exposure,
- description of the resulting risk.

In addition, according to IRGC's mission, risk management and risk governance issues should be further addressed.

This **broad range** of aspects is not easy to handle in one short document or publication, and a clear discrimination between relevant scientific data and underlying assumptions and uncertainties should be made. To solve these problems it is common to publish two different types of documents addressing a specific topic (e.g. nanotechnology): guidance documents (e.g. white paper) addressing all process-related issues and scientific publications based on the outline of methods and results of science-related issues. IRGC is offering not two but five different types of publications, what can be seen as confusing. Written with various scientific depths, these publications are easy to read, and aimed to inform policy makers. They are published after an internal review process including a careful redaction, and decent design.

The role of our Review was not to evaluate the IRGC publications with great details and we have thus restricted our analysis to **four documents** as commented below.

The *"White paper on Nanotechnology Risk Governance"* is an excellent example for a publication of the Guidance Document group which "aimed to develop a conceptual framework for the global governance of risks associated with those technical areas and applications of nanotechnology" (White paper p. 64]. The paper was published as white paper in June 2006 and is *also* available in the Journal of Nanoparticle Research (2006) 8: 153–191 as a scientific peer reviewed article of the S&TC members O. Renn and M. Rocco; it was received on December 15, 2005, and accepted in the revised form on February 12, 2006. In the acknowledgments of the white paper one can reed that this "paper is a product of collaborative effort. Substantial input was provided by an initial workshop held in Geneva, Switzerland in May 2005"; an additional workshop and four stakeholder surveys are mentioned. The scientific publication of the S&TC members is not mentioned or cited in the references part of the white paper. Other fundamental European activities in the area of risk assessment for nanotechnology like the "Das Dialogprojekt CONANO"(www.oeko.de/oekodoc/673/2007-181-de.pdf), which was started in December 2004 in Switzerland cannot be found.

The Concept note *"Synthetic Biology"* summarises the state of the art of one of the most dynamic new fields of biology very shortly. Synthetic Biology has the potential to revolutionize the production technologies in biotechnology, by applying the toolbox of engineering disciplines to biology. The note consists of a very short implementation of the chapter intro-

duction, background, definitions, and description of scientific developments and likely applications (7 pages in the note). This lack of depth could lead to wrong conclusions by non-scientific persons that could be important multipliers. One example is the fact that applications such as Biosensors are not outlined as future but as existing applications. It is not explained in the note, that this new field is more or less the same as genetic engineering, an emerging field with extensive discussions and evaluations regarding the safety, security and ethical concerns. So this note gives not a comprehensive overview on relevant societal issues of synthetic biology; it can not set the scene for further important discussions within the stakeholders and between the scientific community and the civil society.

The Opinion Piece *"Cooling the Earth Through Solar Radiation Management"* (SRM), published in 2010, addresses a climate change–related controversial technique for increasing the fraction of sunlight reflected by the earth and thus cooling the planet: adding reflective particles (aerosol) to the stratosphere. This paper consists of a brief (and thus incomplete) description of the problem and focuses on a specific technique. The selection of literature references is incomplete (e.g. Keith 2001 in Nature is not mentioned), but this is bound to the conciseness of the paper. It should be also noted that most of the presented material can be found elsewhere, including on Wikipedia. IRGC somehow claims to have started the process of "informing leaders … about the issue of SRM" (Chapter 5). It is also implicitly stated, that IRGC initiated the thought process among the Royal Society; unfortunately, not a single reference to IRGC is made in the Royal Society documents (see www.royalsociety.org/srm). The oversimplified presentation of a decision process (Chapter 7) does not include any serious risk analysis. The conclusion of the paper is quite simplistic: at first an international scientific research programme should be launched and secondly the foreign policy community should engage in discourse for the future global governance of SRM. Finally, we do not find much new ideas or strong links towards governance issues in this Opinion Piece.

The Policy Brief "*Regulation of Carbon Capture and Storage"* (CCS) published in 2008 focuses on the needs of regulation in that CCS context. This is a neat and well-written presentation of the problematic, relying extensively on the work done by the (UN) IPCC. Here again, references to other works are selective (e.g. Carbon Sequestration Leadership Forum, see www.cslforum.net, is not mentioned) and previous older works on risk issues are not cited (Benson 2002, Bowden 2004, Damen 2003, etc.). This is fine - not all references can be given here - but gives the impression IRGC attempts to "force" the idea that it is at the forefront (e.g. cslf already launched a taskforce on risk already in November 2006 in London).

This being said, this Policy Brief is a serious piece of knowledge and ideas focussing clearly on the various regulative initiatives worldwide and proposing ways toward comprehensive CCS regulation.

As a final remark, we do consider conferences, workshops, and publications as **interdependent instruments**, in which the process of bringing people together can be seen as more im-

portant than the published work itself. The publications would gain referring more completely to other important existing reviews and international networks, avoiding lack of depth that could lead to wrong conclusions, and being more systematically analysed (feedback and impact assessment).

4.3 Result of the Strategy Session

2010 was a very decisive year for IRGC; first of all, there were important personal changes – especially at the Board level, at the level of the S&TC and, last but not least, at the Secretariat. A new chairman of the Board was elected, and the position of IRGC's Secretary General was transformed; the former Secretary General resigned and a younger person became managing director. This all happened in late Fall 2010. The Peer Leader had its first contact with leading Board and S&TC members on November 12, 2010, just after those elections took place.

On January 29, 2011, members of the Board and the Founding Rector "met to reflect themes of strategic importance to IRGC". The Panel was informed on the main result with a special binder, sent first electronically on February 14, 2011 (called *additional documentation* here). This document had a major impact on the evaluation-process. A classical evaluation alone - meaning measuring the documented performance – did not seem adequate anymore. In spite of the difficult timing, the Panel decided to use this information and to compare it with the self-assessment. Additional insights have been given during the site-visit. Thus, the Panel became a dialogue-partner within IRGC's ongoing process of strategy-modelling. So - compared to the share of backward analysis – this evaluation-report shows an unusually great part of reflections and comments on possible future developments.

IRGC's *additional documentation* shows smooth, but important **strategic changes**. Without being a complete strategic plan the new agenda clarifies fundamental goals and some necessary measures to take:

- focusing IRGC's mission,
- reengineering starting from January 1, 2011,
- partly renewing the Board and the S&TC,
- designing a so called "new business model" consisting of "network founding partners", "network members", and "sponsors".

Financially the strategic sketch defines a main topic: "In order to strengthen its base and reduce its reliance on the support from the Swiss Government". The new financial architecture is roughly defined but no updated financial model or business plan does exist so far. The

Panel has been informed that the historical data of the self-assessment are still correct but the financial forecast is under revision.

Our **hearings** clearly showed that there is - explicitly and implicitly – a deep discussion on the roles of the main players: Board, Executive Committee, S&TC, and Managing Director. Few words only are addressed to the Advisory Board and its function. Monday's presentations and the visit to the Geneva site showed at least four things:

- The Board wants to play its strategic role.
- There is some kind of "overload" of the S&TC. It is driven by a handful of high-ranking academic personalities; some of them are realizing projects covering risk governance (in a broad sense) under their names respectively these of their universities or within separate academic partnerships.
- The Secretariat has limited capacities, especially scientifically, but is highly motivated. There is – so far – no reporting culture because of lacks of strategic planning and quality assurance.
- The role of the Advisory Board is unclear; it seems to be a redundant body.

The Panel questioned IRGC's specific mission in the past („Not a research institute…"). Then an enlightening presentation by the Chairman of the S&TC sharpened the strategic view and gave an interpretation of the institution's profile and portfolio. Its main conclusion and several open issues were discussed in length by the Panel. One direct result of that was a check of some IRGC publications.

Finally, the *additional documentation* concretely describes two new major projects ("Global Food Security" and "Rebound Effects for Energy Efficient Consumer Technologies") and two "Signature Events" events in 2011, focused on IRGC's international knowledge transfer.

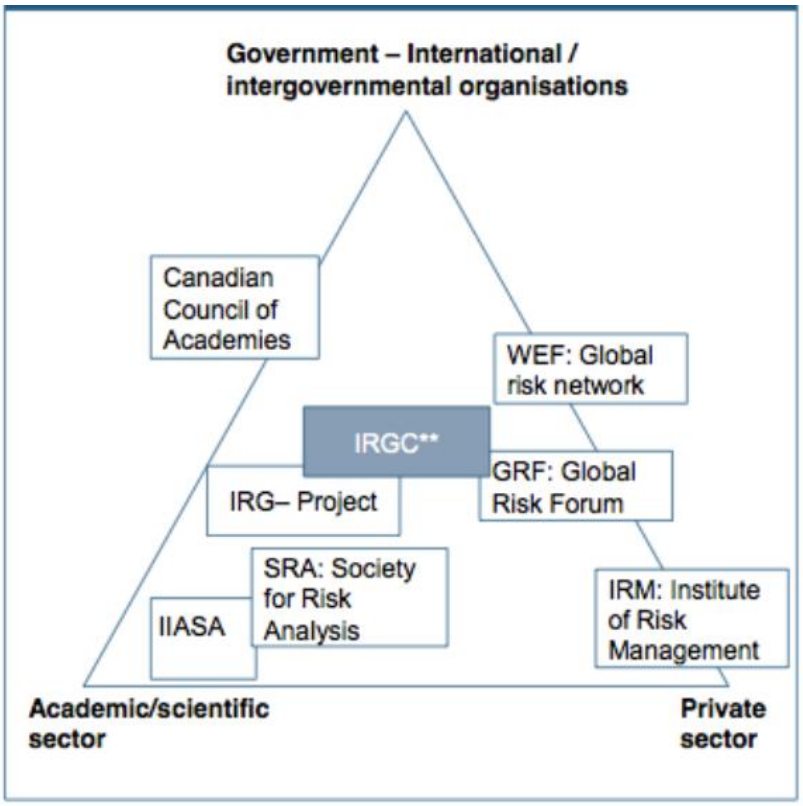
As mentioned above the new strategy has to be completed; after the discussion with the Board three major elements of the **follow-up** could be identified:

- preparing a formal strategic plan;
- evaluating a realistic financial model: minimal scale CHF 3 Mio p.a., core budget of CHF 1.5 Mio;
- balancing centralized and decentralized activities (according to the "new business model").

5. Analysis

5.1 Competitors

IRGC is working in a broad field, in which many other academic or non-academic institutions participate. A segment of it is shown in IRGC's self-assessment:



Picture 1: Platforms (slide produced by IRGC)

Some of them are top-edge contributors with a slightly different portfolio (e.g. technology assessment, financial risks, public health, and natural hazard). Others may be in a better position because of higher funding or greater visibility. Many competitors tackle one subject, but more in depth, others treat a variety of them, just like IRGC. In any case, IRGC does not stand alone, it is – may be – not unique, but at the end of the day other factors (e.g. effective bridging) could be more important to Federal government as principal stakeholder. Of course, the Panel does not underestimate IRGC's commitment for risk governance. However, governance problems may not be solved without digging deeper and deeper – IRGC's latest publications and two new projects presented to the Panel confirm this trend.

The landscape of competitors also includes **potential partners**. On one hand there are entities of International organizations (e.g. UNO, OECD) or large global players like WEF. On the other hand there are academic institutions alone or within networks (e.g. ETH Zürich, University of Michigan, Royal Society or partly Global Risk Forum).

Many universities and research institutes deal with questions of risk governance. They do not only analyze and publish (some in renown scientific journals with great impact), but they seek contact to policy makers either in their own country or abroad. Then differences in public funding may affect the comparative advantage of the competitors – a factor that will influence attraction, research capability (PhD students) and visibility.

The Panel was informed on the case of the Swiss Institute of Tropical and Public Health (Swiss TPH), an institution also partly funded by the Federal Government on the base of FIFG, § 16. Swiss TPH is specialized on global health issues, a field that IRGC also thinks of going into. On the one hand Swiss TPH produces genuine knowledge in its field (e.g. on Malaria and HIV), on the other hand it spreads its knowledge via tuition and congresses as well as in scientific and other journals. Policy makers are addressed in Switzerland as well as in the target countries, where regular contacts are held with science and health authorities.

A similar case is CLISP (Climate Change Adaption by Spatial Planning In the Alpine Space), a European project funded by the Alpine Space Program under the European Territorial Cooperation 2007-2013. CLISP was approved by the Program in 2008 and will run until 2011. Lead Partner is the Umweltbundesamt GmbH (Federal Environment Agency of Austria). The partnership consists of 14 projects from Austria (6), Italy (3), Germany (1), Slovenia (1), Switzerland (2), and the Principality of Liechtenstein (1). It includes international organizations, national and regional government authorities, national agencies, regions, research institutions, and institutes of applied sciences. CLISP is focused on spatial planning in the phase of climate change; it should contribute to climate change adaptation by providing climate-proof spatial planning solutions. Risk governance is one important topic.

So there are quite **many ways** of bridging the gap between science and policy-makers. IRGC has to look for intellectual uniqueness, yes, but at the same time Federal government is interested that funded institutions do cooperate. The Panel believes that there are important opportunities within the “arc lémanique” or with other qualified Swiss universities. In the long-run this is probably the most effective approach to joint production, as we will discuss later.

5.2 Profile and Portfolio

IRGC's documentation defines **vision and goal** as follows:

"The International Risk Governance Council (IRGC) is an independent organization whose purpose is to help the understanding and management of emerging global risks that have impacts on human health and safety, the environment, the economy and society at large. IRGC's work includes developing concepts of risk governance, anticipating major risk issues and providing risk governance policy recommendations for key decision makers. IRGC focuses on emerging, systemic risks for which governance deficits exist and aims to provide recommendations for how policy makers can correct them".

A broad catalog, indeed. In general, the goal of IRGC is timely, appropriate and rightly focused on "emerging" risks and "risk governance".

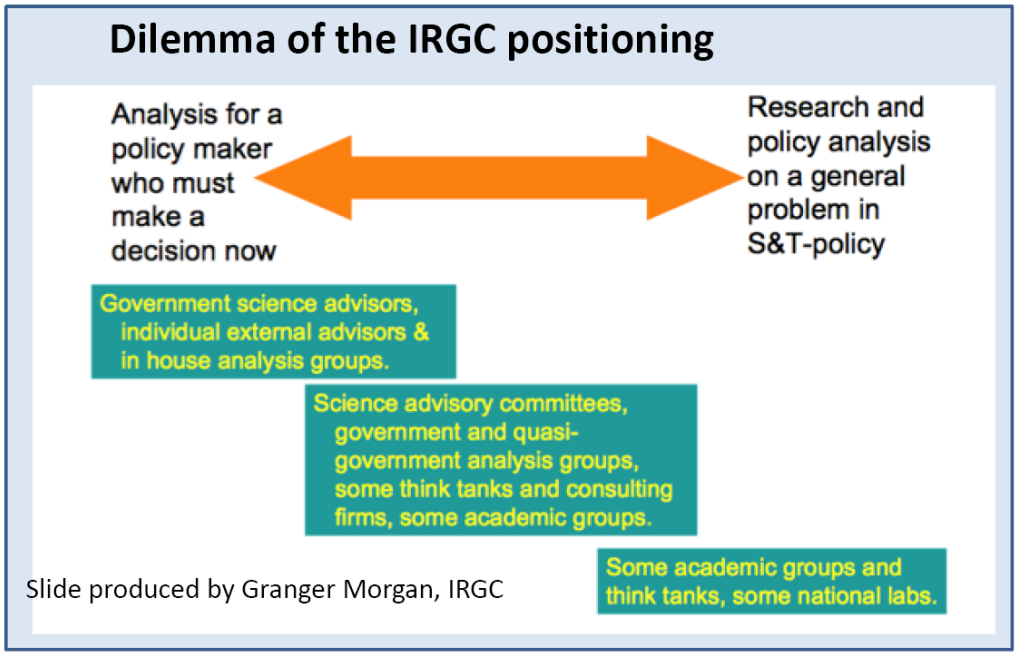
Emerging risks are in fact important to handle by the scientific and the policy making communities, as they pose a potential threat of unknown amplitude. They require attention, so as to better understand their nature and see how regulations might be adapted to appropriately mitigate them. It has to be noted though, that the quality of being "emerging" can be a question of definition, having different meanings as a function of time (what is emerging now will not be so tomorrow) and space (varies among countries as a function of local culture and stage of development). As a matter of fact, "emerging risks" in developing countries might concern well known hazards in industrial countries (e.g. water pollution) but with a lack of locally appropriate management capabilities and/or legal framework. This opens a large field of possible involvements of IRGC in developing or emerging countries. So the implementation strategy is not limited to "high tech" related risks.

There are many **risk types**. So far, activities of IRGC have been mainly concentrated on natural science- and technology-related risks. Recent discussions among IRGC show a growing interest for other issues such as health-related and financial risks.

It is the opinion of the Panel that the question of risk type should be addressed as a strategic issue and as a function of the available human and financial resources. When concentrating the effort on the risk *governance*, it might be inferred that some level of generalisation of the methodologies can be developed independently of the hazard type. But it is more likely that the very scientific understanding of the nature of the phenomenon will strongly affect the way governance strategies are to be put in place.

What is IRGC all about? In conducting our review, we came across a variety of **definitions** of what IRGC is. Some of them are complementary, but the result is a certain lack of clear contours. Is IRGC for example a catalyst, a conveyor, a think tank, an outreach institution, a club, a publisher, a bridging organization between policy makers and scientists? Is it really neither a research- nor a consulting-institution? The Panel is aware that there are strong internal movements to get the necessary **positioning**.

As was clearly pointed out during the hearing of the Chairman of the S&TC, IRGC sits between two worlds: the one of policy makers and the one of researchers (see figure below).



Picture 2: IRGC's Dilemma

We find this positioning appropriate and see the competitive advantage of being a link between the two worlds: a bridging institution, strongly based on science and closely collaborating with policy makers to mitigate risks by enforcing the appropriate risk governance tools.

IRGC aims at targeting **audiences** (customers) composed of policy makers and practitioners. This aspect is a clear part of the positioning of the Institution (see above). We however note that the stakeholders representing the target audience could be better represented among the bodies of IRGC, and in S&TC in particular.

The actual **portfolio** contains a list of very interesting subjects belonging to a large range of following themes:

- Risk Theories: Risk governance Framework, Risk Governance Deficits,
- Infrastructures: Critical Infrastructures, Maritime Global Critical Infrastructure
- Health: Influenza Pandemic,
- Nanotechnologies: Nanotechnology in Food and Cosmetics,
- Climate issues: Carbon Capture and Storage, Geoengineering, Power Plant CO2 Capture Technologies,
- Biology: Synthetic Biology, Pollination Services,
- Energy: Governance of Bioenergy, Energy Technology Scenarios, Energy Security.

The Panel noted the somehow random nature of the subjects and identified their strong correlation with the knowledge accumulated among the S&TC members. This is not a problem as such but shows that the selection of the members of the S&TC is a crucial strategic decision. One could see that a **development** of the activities in different other fields – if wanted and feasible in regard to the resources – could either result in:

- a further enlargement of the – already large – size of the S&TC or
- in a change of the function of the S&TC, moving from a "we-choose-what-we-then-do-ourselves" to a "we-select-what-other-will-do"; a change of the function and a reduction of the size of the S&TC would be the result.

We further considered that not all of the studied subjects are new (even not at the time of project start) or emerging. This might do, but would require clarification in the communication. (There was a discussion how far IRGC could have identified, as an example, the recent financial crisis worldwide). To portray IRGC as an institution for generally identifying "emerging risks where risk governance deficit exists" could turn to be counterproductive.

Finally, due to the intrinsic nature of the actual selection process, the portfolio follows a **"push" strategy**. We could only encourage IRGC to redefine product-lines and to add some "pull" effects to the portfolio definition. The Panel comes back to this point later (see 5.4 and 7).

5.3 Methods

Harmonised and transparent approaches of risk assessment (and management) are a prerequisite for studies on risk governance as well. But often comprehensive and reliable human or animal exposure-effect data are not or only rarely available. Therefore, risk assessment often is confronted with incomplete data generated in experimental systems including laboratory animals, in vitro and in situ approaches or data from case reports and epidemiological studies in human beings and animals. The information generated in this manner has to be combined with available human or animal exposure data in order to estimate the risk. Inherent to such an assessment is the involvement of varying degrees of uncertainty, for example uncertainties related to extrapolation from test animals to human beings, variability in the human population, exposure duration, gaps and deficiencies in the database.

Therefore, it is important that the strengths and limitations of the data used and the subsequent conclusions are well explained. In addition, the risk assessment should describe the underlying assumptions and uncertainties. Established methods in different branches of industry, e.g. the tabular methods HAZOP (Hazard an Operability Study) and FMEA (Failure Modes and Effects Analysis), Boolean modelling in Fault Tree Analysis, and Scenario Analysis

disregard **complex component and system interactions**. These methods are designed only for systems screenings or simple system-modelling. The experiences with stochastic Petri Nets in the framework of the entire risk analysis have shown their usefulness and practicability in system modelling; complex and networked systems are represented, and risk is assessed (i.e. frequencies of accidents and their consequences).

The Panel thinks that IRGC is too optimistic and maybe too self-conscious in its self-assessment, claiming that IRGC "… provides a neutral platform to develop science-based recommendations that take into account multiple cultural, social and institutional perspectives, and to promote a multi-stakeholder approach. It is highly valued in particular for the rigour and the quality of its products." There are still quite a lot of theoretical and empirical problems to solve. Furthermore, such a claim demands more resources, than are available to IRGC at the moment.

IRGC's activity in the past has been set in the areas of interest and expertise of single members of the S&TC. These persons contribute experience in carrying out scientific risk analysis or providing scientific advice in the fields of their specific interest. Only some of the S&TC and Board members have a broad experience in peer reviewing scientific work and publications. IRGC´s **selection of upcoming topics** is thus based on very diverse methods. On the one hand, IRGC staffs is reviewing journals (e.g. *Nature* and *Science*), on the other hand a complex discussion and decision-making at the S&TC and Board takes place. The Panel was not in a situation to fully understand the entire process and the underlying criteria. In the past, thematically corresponding workshops followed the decision. This is a very important check in a multi-stakeholder and interdisciplinary environment. So "almost all workshops have received very positive attention" (*Self-assessment*). Nevertheless, methods chosen to **evaluate the output** of workshops and conferences (and by that: of projects) stay relatively unclear. The Panel believes that the development of such instruments could not only rationalize the choice but also promote a better transfer of future results. The set of product-lines and marketing measures would profit by it.

The **conclusions** of all workshops and conferences are summarised in publications. As mentioned, five different types of these publications are available at IRGC. The ultimate objective is to develop and use a harmonised, holistic set of methods (see white paper: *Risk Governance, Towards An Integrative Approach*). Many publications do not reflect concrete empirical findings; they just give a description of the underlying assumptions and possible uncertainties. Explaining the inclusion criteria as well as exclusion-criteria for specific data sets (e.g. the use of human or animal data for the identification of the most sensitive endpoint as point of departure) is very important for the understanding of the level of certainty or uncertainty of the outcome. It is a prerequisite for advancing on the IRGC aim: "… IRGC has the possibility to further grow into the value chain, getting closer to implementation of its recommendations, notably by 'translating' general recommendations into specific action potentials in collaboration with local partners or developing capacity building and training activi-

ties. This can only be done within a strong network of affiliates and partner institutions in various countries or regions (op zit)". The Panel agrees.

To ensure quality and relevance of IRGC products, every document should pass a peer review process with standard academic procedures and – if necessary – additional ex ante criteria set by the S&TC or eventually the board.

5.4 Governance

Governance issues (here understood as problems directly related to IRGC as an organization) are to be treated on the political level and on the level of IRGC.

The actual funding of IRGC by the **Federal government** is based on FIFG § 16. In a political sense this delivers a somewhat shaky but sufficient foundation so far. For the future, government's role and expectations must however be cleared and – for all Ministries – consolidated.

From the perspective of IRGC it is very positive to be anchored in Switzerland. Besides the funding this enables to keep the neutrality as important ground for its work. But there is a public interest too. Policy-makers and the business world can make profit of IRGC's presence in Switzerland. It benefits the image of Switzerland to be the host of IRGC and thus contribute to the worldwide solution seeking on risk-governance themes.

There are three problems to be solved:

- The motivation behind the federal funding should be rethought. Besides EDI/SER there are other stakeholders within the federal government that are to be addressed. This means in first hand EDA/DEZA, but also other government-units dealing with national risk governance and international safety. Their expectations towards IRGC are not expressed up till now.
- A performance mandate is missing, as well as a controlling that implies a regular dialogue between the funding Ministries as well as between the involved government officials and IRGC.
- The role of IRGC in the Swiss university landscape is undefined; it could and should collaborate within one or two specific networks.

We are turning now to **internal management and organizational topics** of IRGC. A striking fact is the multitude and size of boards and advising bodies for such a small institution:

- the Foundation Board (11 members from 6 countries),
- the Executive Committee of the Foundation Board (4 delegates from the Board, the S&TC and the Secretariat),
- the Scientific & Technical Council, S&TC (18 members from 11 countries),
- the Advisory Board (12 members from 5 countries),
- the Secretariat (8 employees, working 4.65 FTE, all based in Geneva).

There are too many "generals" for the number of "soldiers". And the Panel got the impression, that roles and interfaces between the different players are not well defined. A great part of the secretariat's working-force is spent for administrative and support functions. May be that the highly devoted and skillful team of the secretariat is not optimally validated. Because of the budget constraints there is no short-time flexibility, but by downsizing the overhead.

The Panel believes that the new strategy can solve most of these problems (see 6.3). The operational follow-up must first focus on topic-setting (defining and steering projects), the fundraising, and the quality management. Then the product-line can be rationalized and combined with a systematic marketing and regular contact to stakeholders. The different customer-categories necessitate different acquisition strategies.

5.5 Reputation and Relevance

IRGC is an institutional newcomer and an organization that mainly covers **interfaces**:

- the transfer between R&D and application (see 5.2 and 6.1);
- dealing with (holistic) interdependencies between assessment, analysis, and decision-making.

Institutionally, the foundation may be seen just as a practical instrument; there is neither a large fortune nor intellectual property to defend. But as shown earlier, there were and still are important persons in the driver-seat; they directly and indirectly contribute to the reputation of IRGC. The early organization was some kind of inverse pyramid (see 5.4). With the new strategy a more stable structure may be found: the platform and the acting individuals are only different sides of the same coin.

Nevertheless, IRGC had a remarkable output in the past. The strongest reputation may be seen in its function as **multinational and interdisciplinary institution**. The Swiss home base and the support of Federal government are of great value in this context. However, contacts

with the Swiss university landscape are still selective, but here too, new initiatives have been taken during the last months. The Board and the Managing Director know that branding and visibility must be enhanced.

The inability to acquire the planned **third-party money** during the period 2007 to 2011 is essentially due to the described strategic deficit and not to an unsatisfactory outcome as such. As the Panel understood the S&TC and the Managing Director currently try to redefine IRGC's position toward competitive R&D projects, e.g. within the 7th or 8th EU Framework Program.

This also would be important for the entire process of **quality management** within projects and publications (see 4.2 and 5.3). Actually, the S&TC does not seem to feel a general responsibility for standard academic procedures (quality assurance with adequate documentation).

The Panel wishes to point out, that the idea of a **multi-stakeholder institution** is very demanding. It has at least two limitations – capacities and communication. The commitment of motivated persons and institutions, firms, and NGO depends on internal resources and external recognition. We are aware that the second takes time; additional opportunities could be created by engaging additional persons with a regulatory background at the S&TC. Finally, an adequate, culturally respectful adaption of IRGC's basic model is by far not an easy undertaking. Identifying different types of risk is one thing, dealing with it under different political, economic, and cultural conditions the other[5]. In Economics there is an ongoing discussion on "merit goods": how far should government develop the precaution principle? How autonomous is the single consumer – for instance – in the field of food security?

[5] In a fundamental sense the question arises if one general theory of risk assessment and management can exist. See Yakov Y. Haimes, 2001, *Risk Analysis, Systems Analysis, and Covey's Seven Habits*, Risk Analysis, vol. 21, p. 217 – 224.

6. Assessment

6.1 IRGC as a Transfer Institution

As described in section 5.3 S&TC and Board members have the ability and competence in carrying out scientific risk assessment and/or providing scientific advice. **Members of the S&TC** – and not IRGC itself – have the scientific knowledge to analyse complex information and dossiers - often from a broad range of scientific disciplines and sources - to publish scientific reports, and the experience in peer reviewing scientific work and publications. The members of the S&TC and the Board are sufficiently embedded within the scientific community and have established reasonable synergies with important research programmes (in particular in the US). In future, activities and involvement in existing programs in Europe and Asia should be enforced by IRGC. So far IRGC does not act as a research institution, but has scientifically well acknowledged S&TC members conducting research and transferring the results on their own.

IRGC produces publications describing the **scientific risk assessment** and science-based recommendations derived from the professional expertise and experience of the S&TC members in a multidisciplinary environment (board) and preferably in an international context to promote a multi-stakeholder approach. This entails that the quality of IRGC products depends on the input and the skills of the S&TC. The existing research capacity sufficiently reflects current and future trends of promising research in the health, life science and technology area. IRGC serves as a transfer institution with a proven success in horizontal transfer (i.e. inside the IRGC community) of the principles of "Risk Governance".

In this context IRGC has an appropriate understanding of **current and future R&D opportunities** and first documented positive results so far transferred by means of:

- *Board & Council meetings,*
- *Web site with estimated 6000 hits in December 2010,*
- *Workshops and conferences,* where they were *"able to attract the best international experts" and*
- *the resulting own publications* which were distributed *to 5000 contacts* as *.pdf downloads and few hard copies*.

IRGC has not yet defined relevant objectives and performance indicators or established sufficient tools to evaluate their real outcome and communicate it to stakeholders and policy makers. This will be an important task for a successful and strategic performance in the field of risk governance.

A statement of an IRGC representative during the evaluation "*The process is more important than the edited final report"* is fine, but more stakeholders could be involved. Therefore the ability to analyse complex information and to prepare scientific positions must be enforced

at IRGC's management level (see 7). The publication of reports by IRGC itself in refereed journals should be encouraged to increase IRGC's scientific visibility.

To succeed in the long-term as a transfer institution in the field of risk governance, IRGC has to reinforce the use of **established tools** to generate valuable publications for stakeholders and policy makers, such as:

- process-related considerations, e.g. appropriate stakeholder involvement prior and during the risk assessment, handling, justification or explanation of minority opinions;
- a sufficiently detailed description of the strengths, robustness and limitations of data used for risk assessment;
- a clear description of the underlying assumptions and uncertainties providing the reasoning for decisions;
- a list of criteria for inclusion or exclusion of available scientific information for a given risk assessment, e.g. criteria for selection of pivotal studies and data, being part of the risk assessment;
- structured and stepwise approaches in hazard and risk assessment, based on previous studies.

An **additional opportunity** could be a contribution to (higher) education and training, especially with nearby universities; this step is considered, but not implemented yet.

6.2 IRGC as a national and international Platform

The members of the Board and the S&TC represent a choice of highly ranked international individuals. There are important in-kind performances from and to members of the S&TC. The Panel is not able to quantify the "externalities" produced by IRGC in favour of individual members, but they are certainly important. To keep international top persons (combining quality with visibility) and to get a decent institutional payback is a very difficult task - a question of **balancing coherence, prestige and cost**.

The planned strategic changes go in the right direction, especially by clarifying functions and by reducing the number of members. The S&TC should be clearly responsible for IRGC's quality management (R&D and other services). Core funding by Federal government gives IRGC the advantage of a neutral and independent platform. Neutrality is a prerequisite for unbiased international collaboration, but the national university landscape can be understood as hub (see 5.4).

Finally, the new strategy will bring an important (financial) leverage if an intelligent geographic and cultural diversification can be found. Most important will be that decentralized units, the local affiliates, of IRGC are able to bear a portion of the overhead costs.

6.3 Chances and Risks of the new IRGC Strategy

The new strategy comes just in time.

The presented **reengineering** consists of two main elements: a focused mission and some pragmatic steps that should secure the institutional stability. Critical developments, especially the inability to acquire the necessary third-party money, have been realized. The new bottom-line redefines past strengths in a realistic way:

- IRGC is an independent institution.
- IRGC proceeds science-based and tackles with “hard” and “soft” scientific applications.
- IRGC multi-stakeholder and multi-national approach must be turned into successful projects that - finally - can be financed.

In the last few months promising steps have been taken; several implementations are on their way. The Panel thinks that **empowering** the management and developing a distinctive quality management and reporting system over three levels (Board, S&TC, Managing Director) are most important prerequisites. During the discussion the IRGC’s Chairman was speaking of a new “envelope” for the S&TC – quality assurance is surely one part of it. The other one is balancing IRGC’s attitude between “push” and “pull”. As said before, there are good reasons to believe that more “pull” and fostering concrete projects may be successful. In that sense the idea of being a niche-player is reasonable.

The “new business model” introduces **local affiliates in different countries** that should attire additional funding and enable new nodes to make the network more efficient. This again is a strong idea, but as one says, "the devil is in the details!". Our discussion with the Board showed that the dilemma of developing the network and making economies at the same time has been recognized. So operational coherence combined with hard marketing will count.

As mentioned earlier, the *additional documentation* was not accompanied by a revised business plan. During the session with Board members only (February 23, 1:30 to 3 pm) a sketch of a **financial plan** for the next four to five years was given orally to the Panel:

- Minimal budget p.a. “over all”: 3.0 Mio CHF,
- Cost of the core (administrative overhead): 1.5 Mio CHF.

After our discussion on the financial reporting given with the Self-Assessment and some checks of the core cost (especially for the staff and the Geneva office) we think that these numbers are adequate. IRGC cannot survive with less money.

This was another reason, why the Panel stressed on the idea of **"joint production"** in the context with the preparation of future projects - long-term scale economies should be realized. It assumes that more and more scientific organizations are able to deliver not only pure science but scientific-based services as well. The borderline between academia and consulting is floating – in both directions, by the way. A backward-integration with U.S. partners or a European institution (e.g. a Fraunhofer institute, a certain part of CNRS or a selected institute of the ETH domain) could be rather attractive for IRGC. If IRGC would get into a close collaboration with a Swiss entity, a better integration into the Swiss university landscape could be realized; this finally would be an intelligent way to compete for additional federal or EU money.

As a conclusion, we think that IRGC strategically is on a good track. The implementation of the new strategy will be successful, if

- the missing financial model is realistic;
- the right nodes are established, geographically and politically, bringing in new third-party money;
- centralized production cost is kept low, especially through joint production.

7. Open Issues

The analysis of chapter 5 and the assessment of the new strategy (6.3) showed arguments to rethink the way of **anchoring** IRGC and the institution's own organization. But in both cases the Panel does not intend to offer a detailed advice. For that a deeper analysis would be compulsory; our findings are just by-products of an assessment with a different goal: the justification of further funding. The necessary (positive) recommendations will be given in chapter 8.

So here the Panel presents some major points of the ongoing **reengineering** that IRGC could consider in case that federal funding will continue. The following matrix defines different levels and management activities.

	Strategy	**Operation**	**R&D**
Political environment	Find a new way to Swiss foreign policy	Insist on a reporting to funder	-
Swiss University landscape	Chose strategic partnership(s)	Prepare joint projects (e.g. EU, SNF)	Use existing R&D resources ("joint production")
Processes & structures	Focus & harmonize IRGC's bodies	Empower management (see below)	Define "preferred suppliers" with strong PhD students
Profile & portfolio	Do less – sharpen the profile	Define balanced areas of action that match IRGC's comparative abilities	Develop specific projects to enhance the profile
Efficiency	Make bodies smaller (less members)	S&TC members don't use IRGC project ideas for their own	Enhance branding
Financing & third-party money	Define product-lines for customers that pay	Let affiliates finance a part of the overhead	Link fundraising with a attractive menu of projects

The new strategy intends to "empower" the management. The Panel agrees and sees four main dimensions. In other words: the **management** should be integrally responsible for

- operational leadership including fundraising,
- taking scientific and portfolio related decisions,
- administration, controlling and reporting,
- guiding local affiliates.

8. Recommendations to SER

The evaluation was based on a well-established documentation, intensive desk-research, and fruitful discussions during the four day's site-visit. After having presented the analysis and the assessment, the Panel proceeds to the following **conclusions** to SER:

a) Let IRGC survive with a twofold mission:
   - as a scientifically-based and stakeholder-oriented knowledge platform,
   - as a focused instrument to foster Switzerland's international presence.

b) Keep Federal government's annual contribution of approximately CHF 0.6 Mio for the next four years to guarantee a part of IRGC's „core budget".

c) Control the repositioning and the reengineering started with IRGC's new strategy meeting of January (Documentation of February 14, 2011).

d) Introduce additional incentives with a performance mandate and define complementary program research for IRGC and national partners.

The bottom-line of our argumentation requires the commitment of SER to let the institution survive with a stricter, clearer mission, understanding IRGC as an instrument of Swiss international presence. This recommendation is only possible, because the new strategy and the reengineering started on January 29, 2011, is a good sign. The elements proposed were highly necessary; it gives way to operational efficiency and the capacity to acquire third-party money.

Point b) suggests a constant federal funding that is in line with the respective federal law. The Panel intensively discussed several legal prerequisites and possible alternatives (see also our remarks on *Open Issues*). The Chairman of the Panel will be happy to explain the outcome.

The federal funding should be linked to conditions, which can be checked easily, e.g.

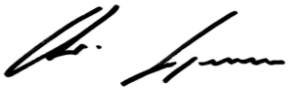
- concrete collaborations with partners within Switzerland
- the number of active affiliates
- acquired third-party money.

In a strategic sense, point d) is connected to point b). The Panel assumes that unconditional grants should be restricted and stop after a few years. Instead, Federal government could think of preparing an envelope that would give additional incentives to those that are performing well in the field of risk governance (among which IRGC could be). Such **incentives** could be not only reactive (higher funding due to better performance) but also proactive; the Panel sees two different types of "packages":

- a small national research program (“NFP”) to create a competitive environment and to bring in other interested institutions;
- a joint tender of several Ministries (e.g. Foreign policy, Defense, Security) for risk related services as an instrument of transparency (“Ressortforschungspolitik”).

Aarau, Basle, Lausanne and Stuttgart, March 23, 2011

Peer Leader, Dr. Stephan Bieri



Peer, Regierungsrat Dr. Christoph Eymann

Peer, Prof. Dr. Laurent Vulliet

Peer, Prof. Dr. Heike Walles

Secretary, Hans Rudolf Hagmann

Advisor, Joakim Rüegger

Appendix 1: Terms of Reference (i)

Evaluation of IRGC

December 2010

1. Introduction

The International Risk Governance Council (IRGC) was founded in 2003. After 7 years of operation, the institute's output should be evaluated and reasons for further federal funding showed.

The State Secretariat for Education and Research (SER), mandates Dr. Stephan Bieri, Bieri IP Partner GmbH (BIPP), to chair a Peer Review of the International Risk Governance Council (IRGC).

A Peer Group of up to four experts will be recruited based on a list of suggestions. BIPP will provide administrative assistance.

This Panel is asked to review IRGC according to these Terms of Reference and as detailed under section 2 and section 3. The quality of the output, direction of the research, strategic potential and the funding sources are the core points of the evaluation.

Furthermore, the Panel is requested to look at specific organizational questions and also to explore the international network and environment.

2. Terms of Reference

The charge to the evaluation Panel is:

- To evaluate the quality and direction of the research carried out to date;
- To explore the proposed future direction of scientific research and political advice for the institute and provide an assessment of the institute's ability to compete internationally;
- To comment on the organizational structure of the institute with relevance to the above mentioned points.

By that, the evaluation should provide an instrument for the SER to obtain a realistic assessment of the current and future demand and competitive position that justifies further federal funding.

The evaluation fundamentally deals with the effectiveness, efficiency, and possible synergies of an institution. It does not intend to evaluate single researchers or groups; nor does it intend to determine a formal benchmark of IRGC against other institutions in the field.

Appendix 1: Terms of Reference (ii)

3. Questions

a) Comparing IRGC with other leading institutes in the broader field of risk management and governance: How do they differ in terms of profile, competitive position, influence, and academic reputation?

b) Does the existing research and advising capacity sufficiently reflect current and future trends of promising research areas in the health, life sciences, technology, economics, and social sciences?

c) Does IRGC have an appropriate understanding of current and future R&D opportunities?

d) Does the quality management of IRGC work efficiently?

e) Does IRGC have an appropriate network of associated scientific partners and infrastructures? Is IRGC's concept of "make or buy" feasible?

f) Is IRGC sufficiently embedded within the scientific community? Do reasonable synergies exist with important research programmes in Europe, in the USA, in Asia and elsewhere?

g) Is IRGC able to acquire third party money? Do reasonable contacts exist with important research programmes in Europe, in the USA and in Asia?

h) Does IRGC contribute to the excellence of Switzerland as a hub for science and technology?

i) Does the partnership between SER and IRGC contribute to Switzerland's general research and innovation policy objectives and what are future perspectives for such a partnership?

4. Milestones

Milestones	Description
23.12.2010	Mandate signed Panel completed Documentation set
10.12.2010	IRGC Self assessment provided Peer Leader and General Secretary did meet Programme and invitations distributed
20.-23.02.2011	Evaluation programme in Geneva
23.02.2011	First presentation to SER and IRGC
09.03.2011	Presentation to SER in Berne
31.03.2011	Redaction of final report accomplished

Appendix 2: Program (i)

Day 1, Sunday, February 20, 2011

Day 1: Sunday, February 20, 2011		City
1600	Evaluation Process officially begins	Lausanne
1600 – 1700	Panel meeting	Lausanne
1700 – 1800 (1)	**Charge given to Panel by SER** IRGC Participants : Board : Charles Kleiber, Chairman S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : 1.1 Letter SER 11.12.2009	Lausanne, Hotel Mirabeau
1830 – 2030 (2)	**Dinner with selected IRGC members and the Managing Director** IRGC Participants : Board : Charles Kleiber, Chairman Minister Jose-Mariano Gago S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : -	Lausanne, Hotel Mirabeau
2030 – 2200	Panel meeting	Lausanne

Appendix 2: Program (ii)

Day 2, Monday, February 21, 2011 (i)

Day 2: Monday, February 21, 2011		City
0630 - 0730	Breakfast	Lausanne
0800 – 0830	Panel meeting	Lausanne
0830 – 1000 (3)	**IRGC: introduction - mission and abstract of self-evaluation** IRGC Participants : Board : Charles Kleiber, Chairman S&TC : Prof. Manuel Heitor Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : 2.1 A short introduction (presentation) 2.2 Introduction to the IRGC Network	Lausanne-EPFL Hotel Starling
1000 – 1030	Break	Lausanne
1030 – 1230 (4)	**IRGC: presentation of scientific approach and publication analysis** IRGC Participants : Board : Michel Maila (video-interview) S&TC : Prof. Granger Morgan, Chairman Prof. Ortwin Renn (video-interview) Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : 2.3a Questions to Michel Maila 2.3b Video-interview Michel Maila (on CD) 2.4a Questions to Ortwin Renn 2.4b Video-interview Ortwin Renn (on CD) 2.5 New rules of engagement for the S&TC	Lausanne-EPFL Hotel Starling
1230 – 1330	Light Lunch	Lausanne
	Transfer to Geneva	
1430 – 1445 (5)	**Panel tour of IRGC facilities** IRGC Participants : Board : - S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Malin Samuelsson, Project Manager Diane Boulay, Project Manager a.i. Belinda Cleeland, Project Officer Laurence Chatelus, Administrator Corine Devanthéry, Communication Officer Manuel Tomas-Borges, Intern Guests : - Documents : -	Geneva-IRGC Room "Inn" + offices 1st floor

Appendix 2: Program (iii)

Day 2, Monday, February 21, 2011 (ii)

1445 – 1530 (6)	**Discussion and coffee with IRGC staff** IRGC Participants : Board : - S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Malin Samuelsson, Project Manager Diane Boulay, Project Manager a.i. Belinda Cleeland, Project Officer Laurence Chatelus, Administrator Corine Devanthéry, Communication Officer Manuel Tomas-Borges, Intern Guests : - Documents : -	Geneva-IRGC Room "Inn"
1530 – 1600	Break	
1600 – 1630 (7)	**IRGC: presentation of organization and governance** IRGC Participants : Board : Charles Kleiber, Chairman S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : 2.6 Overview of IRGC Organs 2.7 IRGC Board – Composition from 01.01.2011	Geneva-IRGC Room "Inn"
1630 – 1730 (8)	**IRGC: presentation of sources and drivers of risks with discussion** IRGC Participants : Board : - S&TC : Prof. Granger Morgan, Chairman Prof. Wolfgang Kröger, Founding Rector Prof. John Graham (video-recorded interview) Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Belinda Cleeland, Project Officer Guests : - Documents : 2.8a Questions to John Graham 2.8b Video Interview John Graham (on CD)	Geneva-IRGC Room "Inn"

Appendix 2: Program (iv)

Day 2, Monday February 21, 2011 (iii)

1730 – 1800 (9)	**Discussion; open issues** IRGC Participants : Board : - S&TC : Prof. Granger Morgan, Chairman Prof. Wolfgang Kröger, Founding Rector Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : -	Geneva-IRGC Room "Inn"
1830 – 1930 (10)	**Dinner** IRGC Participants : Board : Charles Kleiber, Chairman S&TC : Prof. Granger Morgan, Chairman Prof. Wolfgang Kröger, Founding Rector Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : -	Geneva-Airport Rest. Altitude
	Transfer to Lausanne	
2030 – 2200	Panel meeting	Lausanne

Appendix 2: Program (v)

Day 3, Tuesday, February 22, 2011 (i)

Day 3: Tuesday, February 22, 2011		
0630 – 0730	Breakfast	Lausanne
0800 – 0900 (11)	**IRGC: presentation of projects** IRGC Participants : Board : - S&TC : Prof. Granger Morgan, Chairman Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : 3.1 Assessment by G. Morgan of selected IRGC projects 3.2 Assessment by M. Heitor of selected IRGC projects 3.3 Assessment by O. Renn of selected IRGC projects 3.4 Project outline "Global food security" 3.5 Project outline "Rebound effects in energy efficiency"	Lausanne-EPFL Hotel Starling
0900 – 1000 (12)	**IRGC: presentation of knowledge transfer and communication** IRGC Participants : Board : Michael Oborne Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : 3.6 Some Signature Events in 2011	Lausanne-EPFL Hotel Starling
1000 – 1030	Break	
1030 – 1130 (13)	**IRGC: Strategic Planning** IRGC Participants : Board : Charles Kleiber, Chairman John Drzik, Vice-Chairman Ambassador Walter Fust S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : 3.7 Summary of Strategy session 29.01.2010 3.8 10 questions – Summary of answers	Lausanne-EPFL Hotel Starling

Appendix 2: Program (vi)

Day 3, Tuesday February 22, 2011 (ii)

1130 – 1200 (14)	**Discussion; open issues** IRGC Participants : Board : Charles Kleiber, Chairman John Drzik, Vice-Chairman Ambassador Walter Fust S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : -	Lausanne-EPFL Hotel Starling
1200 – 1330	Lunch	
1330 – 1500 (15)	**Closed meeting with a delegation of the Foundation Board** IRGC Participants : Board : Charles Kleiber, Chairman John Drzik, Vice-Chairman Ambassador Walter Fust Michael Oborne Philippe Gillet S&TC : - Secretariat : - Guests : - Documents : -	Lausanne-EPFL Hotel Starling
1500 – 1630	Panel meeting	
1630 – 1800 (16)	**Presentation of IRGCs clients and partners** IRGC Participants : Board : - S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : Swiss federal office for Civil Protection – Stefan Brem Swiss Reinsurance Company – Reto Schnarwiler University of Ottawa – Prof. Marc Saner (video-recorded interview) Documents : 3.9a Questions to Prof. Marc Saner 3.9b Video interview Prof. Marc Saner (on CD)	Lausanne-EPFL Hotel Starling
1830 – 2100	Dinner	
2100 – 2230	Panel meeting	

Appendix 2: Program (vii)

Day 4, Wednesday, February 23, 2011

Day 4: Wednesday, February 23, 2011		City
0630 – 0730	Breakfast	Lausanne
0800 – 0900	Panel meeting (Hotel)	
0900 – 1030 (17)	**IRGC: Answers to open-issues; concluding discussion** IRGC Participants : Board : Charles Kleiber, Chairman Christian Mumenthaler S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : -	Lausanne-EPFL Hotel Starling
1030 – 1300	Panel working session	
1300 – 1400	Light Lunch	
1400 – 1530 (18)	**Panel presents main results to SER and Managing Director of IRGC** IRGC Participants : Board : Charles Kleiber, Chairman - S&TC : - Secretariat : Marie-Valentine Florin, Managing Director David Urbach, Senior Adviser Guests : - Documents : -	Lausanne-EPFL Hotel Starling
1530 – 1600	Panel meeting (further timing of report)	
1630	Depart	

Appendix 3, IRGC's Publications (i)

Book

- Global Risk Governance: Concept and practice using the IRGC framework (2008)

Risk Governance

- White Paper: Risk Governance Towards an Integrative Approach (September 2005)
- An Introduction to the IRGC Risk Governance Framework (February 2008)
- Report: Risk Governance Deficits: An analysis and illustration of the most common deficits in risk governance (September 2009)
- Policy Brief: Risk Governance Deficits: Analysis, illustration and recommendations (May 2010)

Emerging Risks

- Concept Note: Emerging Risks: Sources, drivers and governance issues (September 2009)
- Report: The Emergence of Risks: Contributing Factors (December 2010)

Air Quality

- Concept Note: The Linkages Between Air Quality and Climate Policies: Governance deficits and challenges (December 2008)

Bioenergy

- Executive Summary: Risk Governance Guidelines for Bioenergy Policies (September 2008)
- Policy Brief: Risk Governance Guidelines for Bioenergy Policies (September 2008)

Carbon Capture and Storage

- Policy Brief: Regulation of Carbon Capture and Storage (February 2008)
- Concept Note: Power Plant CO2 Capture Technologies: Risks and risk governance deficits (October 2009)

Appendix 3, IRGC's Publications (ii)

Critical Infrastructure

- White Paper: Managing & Reducing Social Vulnerabilities From Coupled Critical Infrastructures (October 2006)
- Policy Brief: Managing & Reducing Social Vulnerabilities From Coupled Critical Infrastructures (November 2007)

Geoengineering

- Opinion Piece: Cooling the Earth Through Solar Radiation Management: The need for research and an approach to its governance (September 2010)

Nanotechnology

- White Paper: Nanotechnology Risk Governance (July 2006)
- Policy Brief: Nanotechnology Risk Governance: Recommendations for a global coordinated approach to the governance of potential risks (October 2007)
- Report: Risk Governance of Nanotechnology Applications in Food and Cosmetics (December 2008)
- Policy Brief: Appropriate Risk Governance Strategies for Nanotechnology Applications in Food and Cosmetics (May 2009)

Pollination Services

- Concept Note: Risk Governance of Pollination Services (July 2009)

Synthetic Biology

- Concept Note: Synthetic Biology: Risks and opportunities of an emerging field (May 2008)
- Concept Note: Risk Governance of Synthetic Biology (updated and revised) (October 2009)
- Policy Brief: Guidelines for the Appropriate Risk Governance of Synthetic Biology (December 2010)

Appendix 4, Answers given by IRGC (i)

IRGC Evaluation

Some elements of answer to the questions of the Terms of Reference

22 February 2011

* * *

Chairman of the Board to SER

The new definition of IRGC is work in progress. The exact redefinition of its strategy still requires thinking, but the Board and the S&TC share the fundamental belief that such an organisation that is science-based and forward looking is required to address some of the global problems that society is facing.

a) Comparing IRGC with other leading institutes in the broader field of risk management and governance: How do they differ in terms of profile, competitive position, influence, and academic reputation?

IRGC's work is fundamentally related to:
- scientific rigour and fact-based analysis, as a base for decision-making (even if political)
- science and technology as a major dimension.

There is no similar organisation known to us with the same focus on multi-disciplinary governance of risks, same global coverage and same scientific and research base.

IRGC is:
1. Independent and neutral – reinforced by its Swiss home base and support
2. Global, rather than national
3. Having a balance of academic, government and private sector resources involved in the organisation
4. Focused on risk governance and bridging the gap between science and policy
5. Focused on risk topics which are emerging or may be neglected.
6. Aiming to build bridges between science and policy.

IRGC operates as a think tank and tries to integrate natural, social and technical sciences into a common picture of the risks, at the intersection (building bridges and facilitating dialogue) between scientific research and risk managers. IRGC publications bring in novel ideas and concepts, presented in an accessible manner to non-scientists, in particular to decisions makers who are involved in policymaking or regulation about matters connected to science and technology but for which matters of social science, management or communication are also important. When people cite IRGC, it is most often for its substantial and science-based contribution guaranteed by the the high calibre of the S&TC.

In the future, IRGC will emphasise the dimension of governance (knowledge transfer) and in particular decision-making, drawing on resources from behaviour science, cognitive science. Its profile will be finetuned in the next few weeks, in order to refine IRGC's position on the push – pull axis.

Appendix 4, Answers given by IRGC (ii)

b) Does the existing research and advising capacity sufficiently reflect current and future trends of promising research areas in the health, life sciences, technology, economics, and social sciences?

IRGC understands itself as a small, agile organisation that has always tried to drive its competitive advantage by positioning itself at the forefront of debates on emerging risk governance issues, mainly at the intersection between natural sciences, life sciences and social sciences (for example, on *regulation* of carbon capture and storage, or on international *governance of research* on solar radiation management). Part of its competitive advantage lies in its ability to identify important issues and to initiate a research and analysis process about them (which then has often its own dynamic afterwards) and propose initial governance suggestions.

IRGC can monitor research, collect data, harmonise views, build consensus and facilitate knowledge transfer, notably to non-experts who have to take decisions. It facilitates collaborative research activities and allows knowledge to be integrated into other fields and into the decision making process.

The choice of topics for specific project work results from a selection process that combines expertise from members of the S&TC and needs from improved risk governance for issues identified in various fora (workshop participants, scientific journals, etc).
In the future, IRGC will develop its innovative nature, while keeping a strict analytical rigour in the process and aims to develop its competences in medicine (human health) and economics.

c) Does IRGC have an appropriate understanding of current and future R&D opportunities?

IRGC is a research-based organization that, through the diverse membership of the S&TC, and now also through its growing number of network institutions, has access to the current and emerging state of risk and related research activities. The focus on *ignored or neglected* issues has made IRGC known as a place for identification of areas where current and future R&D opportunities exist and to which IRGC will have access through the institutional network that it is forming, and the academic and scientific affiliates that are part of it.

d) Does the quality management of IRGC work efficiently?

IRGC applies quality criteria in the selection of research teams and material. It relies on careful selection of experts involved in its multi-stakeholder workshops. It then applies procedures for quality management, including referencing, analytical rigor and peer reviewing. Collective production in workshops and co-authoring of some documents are part of the process.

Since November 2010, there is a separation between the roles of the S&TC as of supervisory authority for the scientific quality and the role of academic affiliates, for the work production.

During 2011, the composition of the S&TC will be renewed, to be more representative of its role as a multi-disciplinary and multi-regional entity.

Appendix 4, Answers given by IRGC (iii)

e) Does IRGC have an appropriate network of associated scientific partners and infrastructures? Is IRGC's concept of "make or buy" feasible?

IRGC already has collaborative ties with a number of the world's leading academic groups working in risk assessment, management and communication (e.g. see affiliations of the S&TC members), that provide in-kind resources, in particular in the form of research services. This was for example the case with Carnegie Mellon University, Stuttgart University and is now the case with Tsinghua University (this list is not exhaustive).

In the future, the IRGC institutional network and in particular poles/branches will increase IRGC's critical mass, allow it to expand into new topics and increase the production capability,making the organisation more robust and less reliant on the role of the S&TC. IRGC will act as a catalyst, convener, and platform for making products or helping to make the products. This network is not the goal per se, but is a means for meeting the objective.

f) Is IRGC sufficiently embedded within the scientific community? Do reasonable synergies exist with important research programmes in Europe, in the USA, in Asia and elsewhere?

This question is linked to the one above: notably through S&TC members IRGC has access to many other experts in various fields. This was used for example to work on the concept of contributing factors to risk emergence, or for the project on loss of pollination services.

IRGC also has had a significant presence in professional societies such as the Society for Risk Analysis. The new move to transform IRGC into a "networked organization" will strengthen such ties, in particular with the "branches".

g) Is IRGC able to acquire third party money? Do reasonable contacts exist with important research programmes in Europe, in the USA and in Asia?

Securing external support from third parties has been a problem and is also a problem for many similar even much larger organisations (including IIASA, OECD). For IRGC it is probably the result of an unclear definition of its profile and therefore of its "unique selling proposition". There has been some limited third party support, but not enough. The Board is being rejuvenated and dedicated to addressing this issue. In the future much project support will come through network members.

Given its nature, IRGC does not always fully qualify to funding from research programmes. As far as they are relevant to its activity, IRGC will try to seek such funding (a potential example could be EU programmes to facilitate integration of science in society).

Indirectly, IRGC has had access to NSF funding from Carnegie Mellon (CMU) (to support collaborative work with IRGC, for example for the work on carbon capture and sequestration (CCS) or on the governance of solar radiation management. NSF funding to CMU and funding from the German Federal Ministry for Education and Research are available to IRGC for the planned workshops on rebound effect from energy efficient technologies.) In-kind contributions are also important, in the form of hosting event, for example with the hosting of the Governmental Forum in Abu Dhabi in 2010.

In the future, we consider IRGC's funding to be constituted of:

- core funding from governments for which Switzerland as a host country plays a prominent role, as well as some large companies from the private sector or some foundation (philanthropy),
- project funding for topical studies.

Appendix 4, Answers given by IRGC (iv)

h) Does IRGC contribute to the excellence of Switzerland as a hub for science and technology?

Switzerland's position on the international scene depends on its capacity to address the main issues that drive the present world, and to influence the management of risks and opportunities. With its strong emphasis on being fact based, with its encouragement to balanced science and technology developments, IRGC can play a role in that.

IRGC is an example of an internationally recognised Swiss contribution to risk knowledge and governance, illustrating how, with a very modest contribution, significant international impact can be achieved.

While the role of IRGC can only be modest, IRGC can be used by the Swiss authorities to:

- Organise independent, neutral platforms for discussion, assembling stakeholders on emerging, neglected and value-loaded issues.
- Allow Swiss academic institutions,to exploit and export their knowledge, offering them a platform for international activities and positioning them on the international scene.
- Shape the policies and thoughts on country risk assessment and management, notably within the federal administration (e.g. within projects on critical infrastructure protection and "Risiko Schweiz").

i) Does the partnership between SER and IRGC contribute to Switzerland's general research and innovation policy objectives and what are future perspectives for such a partnership?

IRGC is contributing to place Switzerland on the international scientific scene in risk governance. Through its network, IRGC can be a main pillar of Switzerland's science policy, in particular in the building of effective collaboration with priority countries. The new network organisation will help to get others around the world to better contribute to this important effort.

j) For whom is IRGC producing?

IRGC is producing for a wide audience of experts, practitioners and decisionmakers, mainly, but not exclusively, in the public sectors. It is currently moving, as per discussions held in January 2011 into a business model that gives potentially room to individual sponsors, with specific requests.

k) Internal governance

The process of streamlining the internal governance has started in 2010 and will be pursued at the two planned meetings of the Board of Foundation, in April and November 2011. It will involve more rotation of members and possibly reducing the number of members.

As mentioned earlier, the separation of the roles of scientific supervision (S&TC), decision on project work (Board) and production itself (mainly affiliates), will be implemented in 2011. In the future, internal governance will also include the perspectives of risk decision makers and practitioners in the project selection process, to balance the role of the S&TC and of the Board.

Appendix 5, List of Abbreviations

Abbreviation	Description
BIPP	Bieri IP Partner GmbH, Aarau
CCS	Carbon Capture and Sequestration (capturing carbon dioxide (CO_2))
CLISP	Climate Change Adaption by Spatial Planning In the Alpine Space, a European project
CMU	Carnegie Mellon University, Pittsburgh, PA
CNRS	Centre national de la recherche scientifique, largest governmental research organization in France
ETH	Swiss Federal Institute of Technology, Zurich and Lausanne (german: Eidgenössische Technische Hochschule)
FIFG	Swiss federal law of science-enhancement: Forschungs- und Innovations-förderungsgesetz
FTE	Full-time equivalent
HIV	Human immunodeficiency virus, a member of the retrovirus family
IIASA	International Institute for Applied Systems Analysis, Laxenburg, Austria
NFP	(Swiss) National Research Program (Nationals Forschungsprogramm)
NGO	non-governmental organization
NSF	National Science Foundation, US government agency
OECD	Organisation for Economic Co-operation and Development, Paris
R&D	Research and Developmen
S&TC	Scientific & Technical Council of IRGC
SER	(Swiss) State Secretariat for Education and Research
TOR	Terms of reference
TPH	Swiss Institute of Tropical and Public Health, Basle
UNO	United Nations Organization
WEF	World Economic Forum (WEF) is a Swiss non-profit foundation