RICOMET 2016

Ethically justified decision-making process in nuclear and radiological emergency

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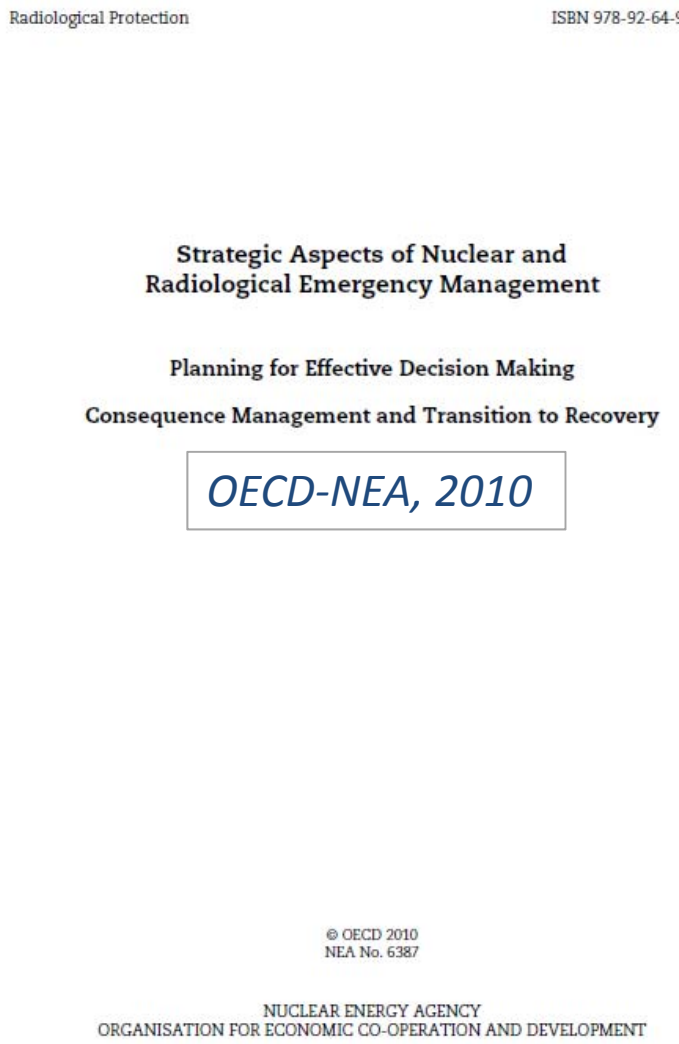
Decision making process in nuclear emergency

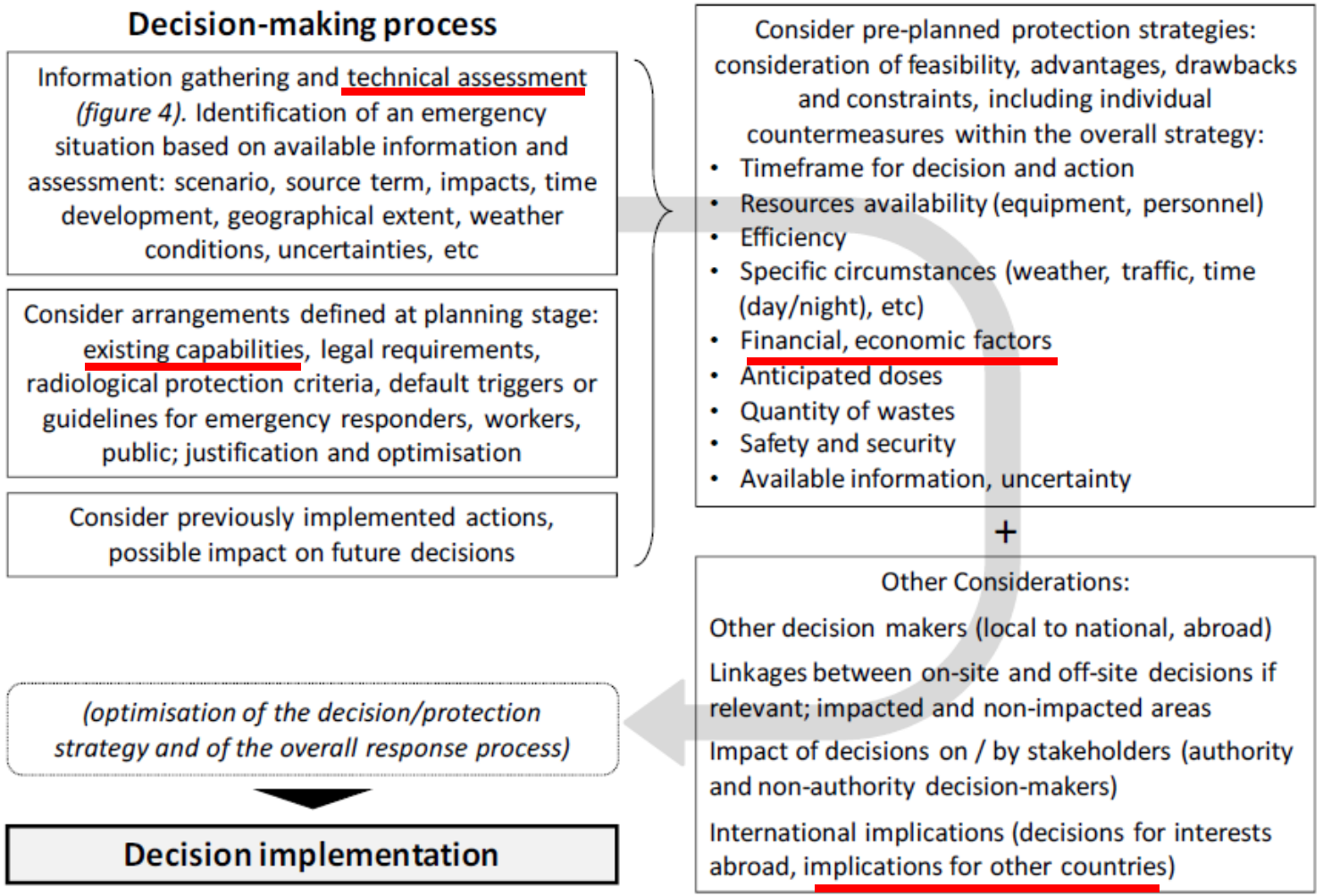


"**Decision making** is at the core of emergency managment, and such a framework will help emergency planners put in place arrangments that facilitate **timely**, **effective** and **compatible** decision making by response organisations at every level within the **integrated response**."

Decision making process in nuclear emergency

OECD-NEA, 2010

Different factors to consider in decision making



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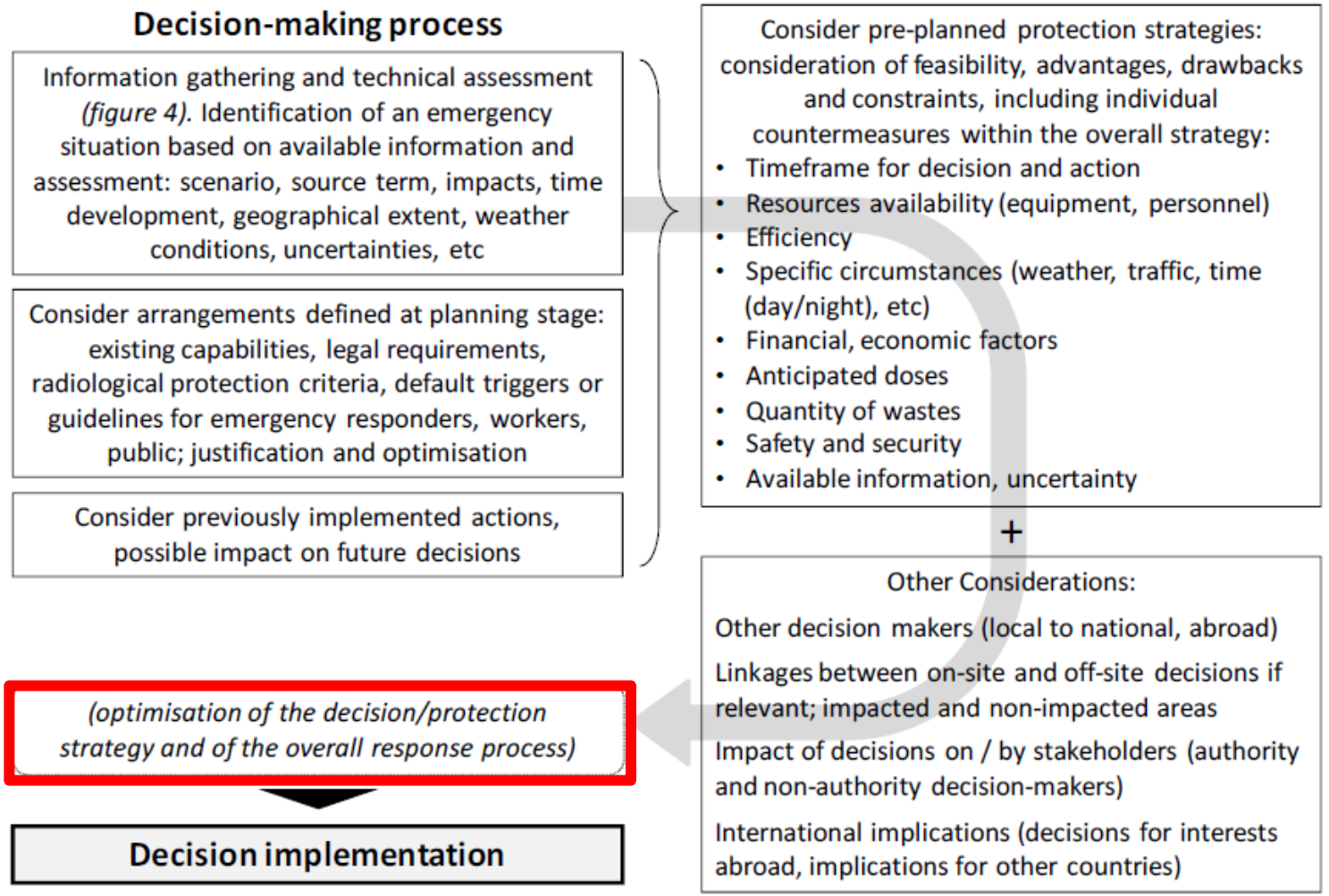
Different factors to consider in decision making



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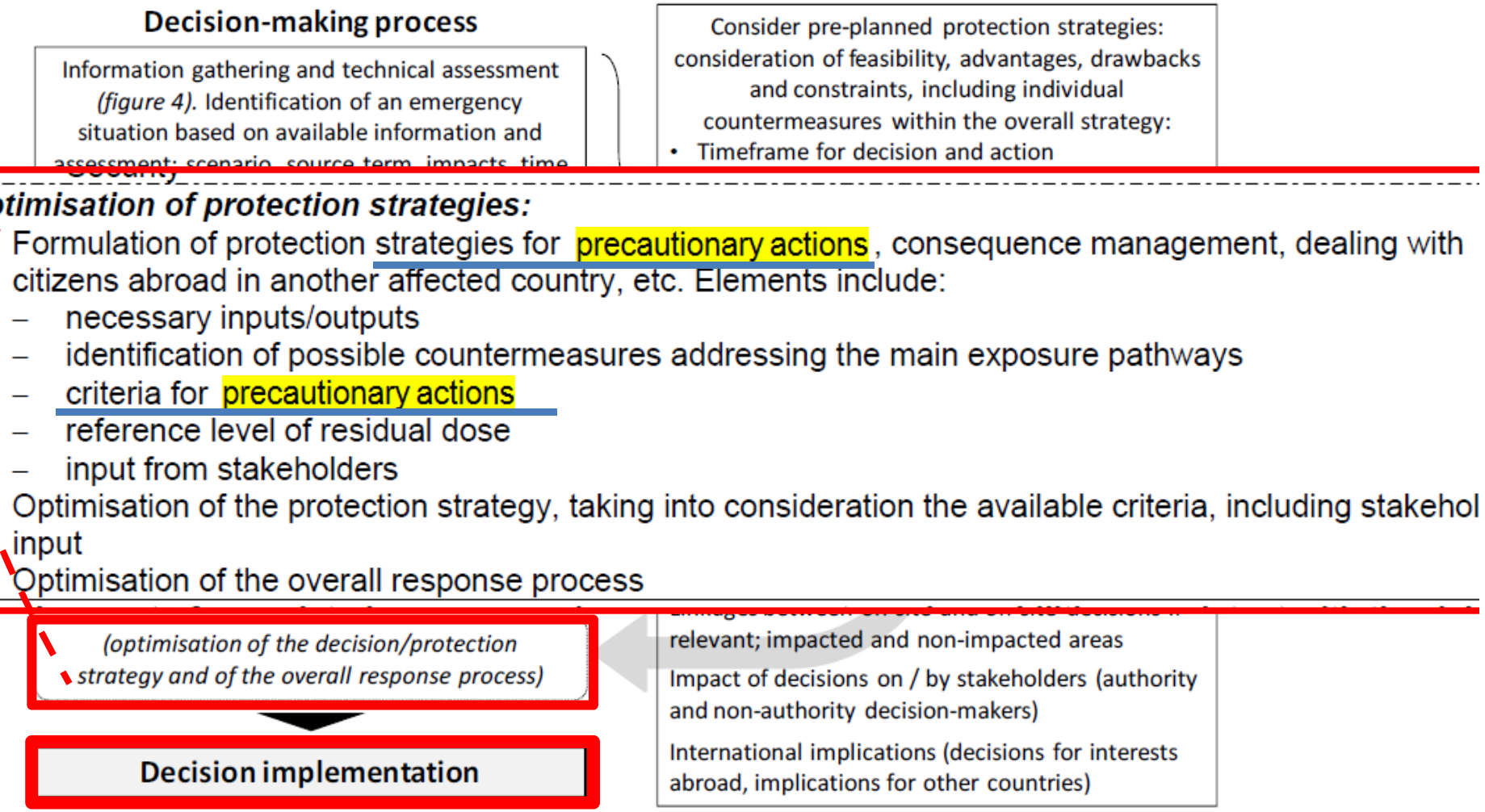
Different factors to consider in decision making



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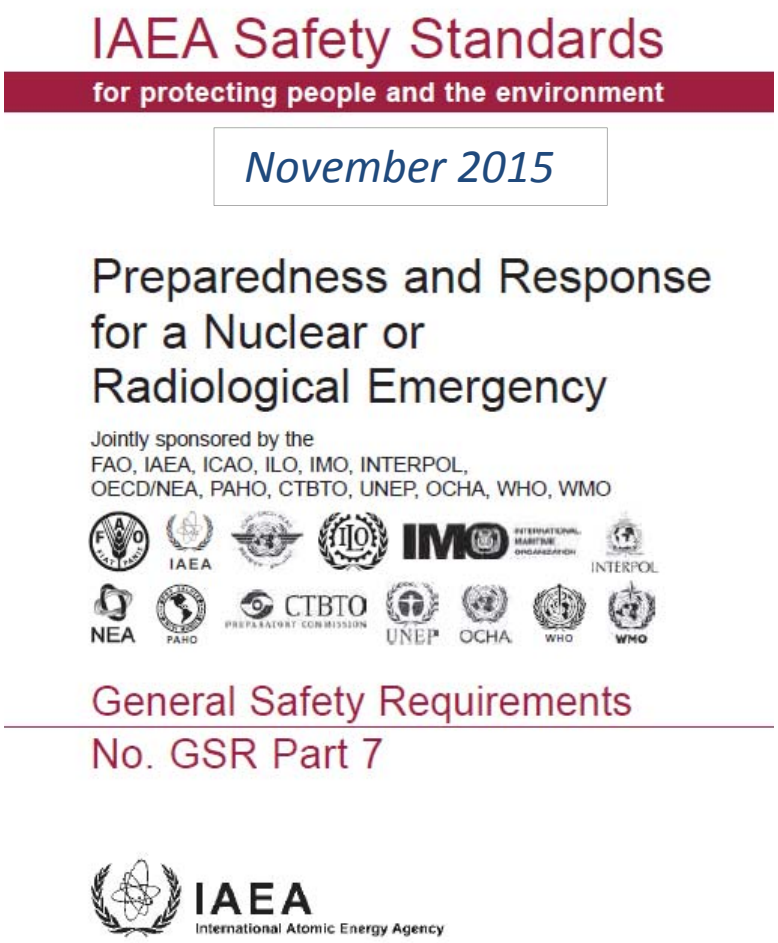
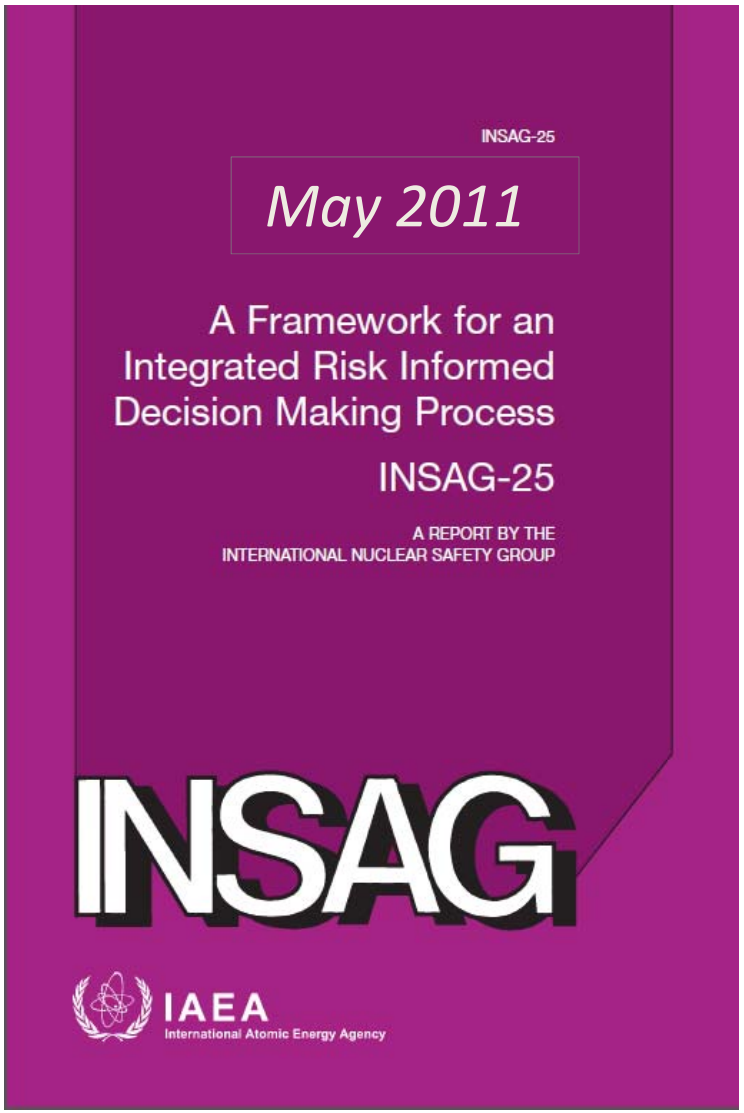


"The scientific considerations underlying the IAEA safety standards provide an objective basis for decisions concerning safety; **however,** decision makers must also make informed judgments and must determine how best to balance the benefits of an action or an activity against the associated radiation risk and **any other detriment impacts to which it gives rise.**"

Integrated Risk Informed Decision Making (IRIDM) process

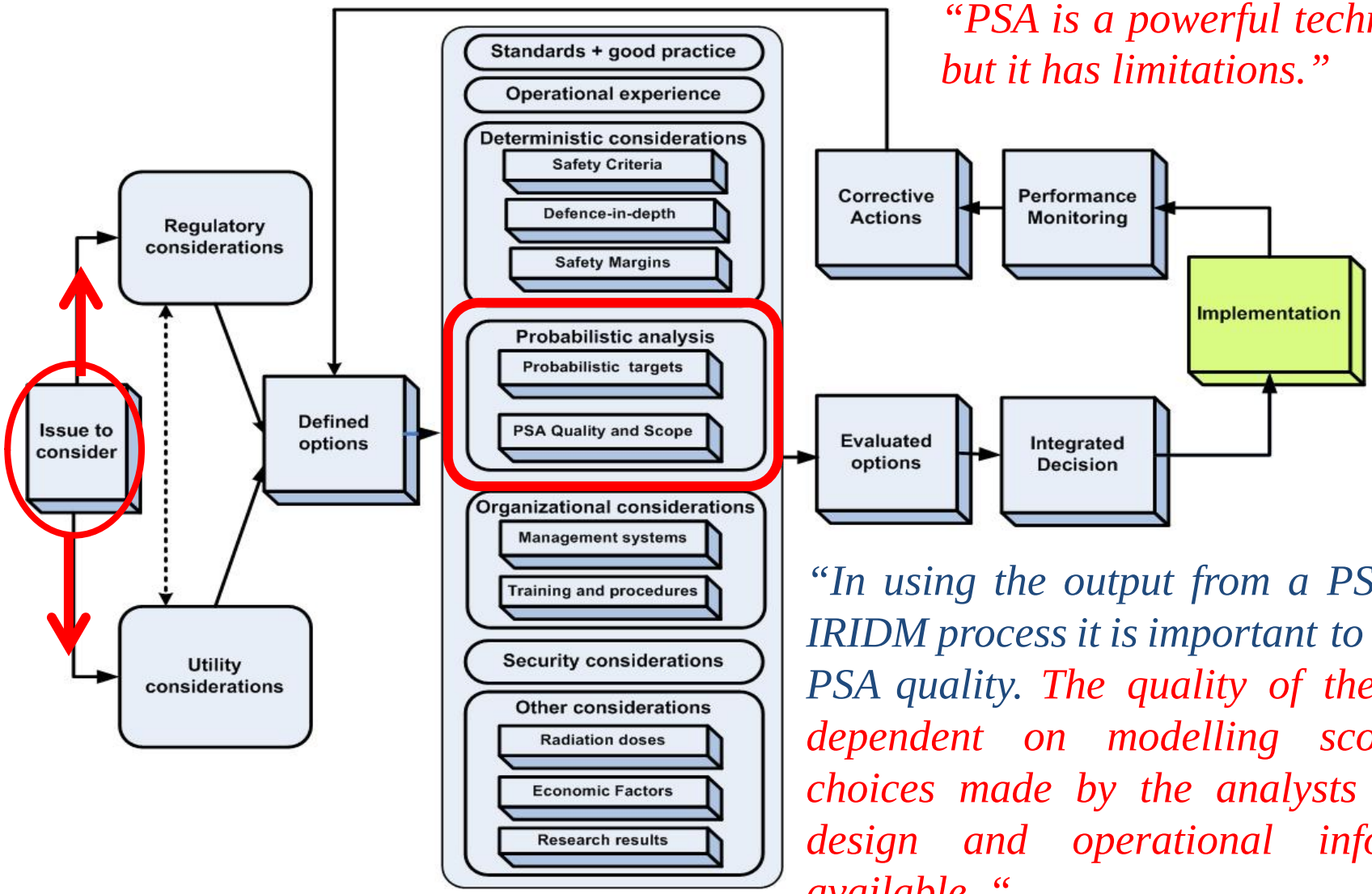


The International Nuclear Safety Group INSAG-IAEA focused on key aspects of the *integrated risk informed decision making* (IRIDM) *process.*

IRIDM is considered in many aspects as: justification of facilities and activities, optimization of protection, limitation of risk to individuals, prevention of accidents, emergency preparedness and response.

This process considers a balance between deterministic and probabilistic analyses, together with good engineering practice.

Integrated Risk Informed Decision Making (IRIDM) process



"PSA is a powerful technique, but it has limitations."

"In using the output from a PSA in the IRIDM process it is important to consider PSA quality. The quality of the PSA is dependent on modelling scope, the choices made by the analysts and the design and operational information available. "

INSAG –Forum 2013

57th Regular Session of the IAEA General Conference

INSAG Forum

Monday, 16 September 2013, 2pm, Meeting Room C3

Programme	
Opening remarks	D. Flory - Deputy Director General
Chairman's Introduction	J. Laaksonen - INSAG Vice Chairman
Key INSAG Messages	D. Torgerson – INSAG
INSAG Views on Current Issues	M.Weightman – INSAG
Research activities and needs related to the Fukushima Daiichi accident	F.P. Weiss – INSAG

http://www-ns.iaea.org/committees/insag.asp

On 'Research activities and needs related to the Fukushima NPP accident' in the part dedicated to *Further post-Fukushima research topics important to address*, it was considered the:

Enhancement of PSA method to include :

- rare external combinations,
- multiple failure states
- human behaviour and reliability in extreme sitations.

In the part dedicated to *Research for improved on-site accident management*, it was considered the:

Development of methods for assessment of ability of decision taken in an emergency situation

INSAG –Forum 2014

Defence-in-Depth and Its Role in Nuclear Safety

INSAG Annual Forum Examines Safety Approaches

Monday 22 September 2014 11:15 CEST

INSAG 2014, held during the 58 General Conference of the IAEA, was dedicated to explore 'Defence-in-Depth' (nuclear safety concept relating to the designing and operating of nuclear facilities that aims to prevent and mitigate accidents) and the way forwards for further strengthening nuclear safety.

Opening his presentation with words of caution, Mike Weightman, one of Britain's top nuclear safety inspectors and member of INSAG, stated "The Fukushima accident didn't ruin the civil nuclear industry, but another one could." His presentation called for the nuclear industry to adapt to the expectations of the public today. He emphasized the need to develop ethics and values that would be stronger than laws and regulations and would help instill a safety culture in the nuclear industry.

https://www.iaea.org/newscenter/news/defence-depth-and-its-role-nuclear-safety

Acting ethically in decision making

The traditional view based on science and good practices (if applied mechanically) has shown its limits and there is the recognition to consider the role of ethical and social values in decision-making process, and the importance of **making explicit the ethical perspectives** in the emergency planning process.

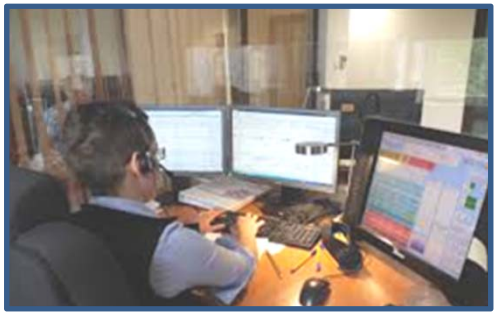
Emergency management timeline and emergency phases			
Preparedness	Response		Recovery
	Early	Intermediate	Late

Risk management, in particular in crisis and early response, needs a better evaluation of the ethical basis for the risk assessment, towards a really integrated approach, considering the technical risk assessment together with social and ethical aspects, avoiding fragmentation of the decision making process.

Acting ethically in decision making

A good decision should be obtained by evaluating and choosing among **alternatives,** within a defined set of rules for an ethical behavior, and by considering its capability to accomplish the most important goals.

The nature and complexity of nuclear crisis or emergency, make hard to provide clear rules for the judgment and decision-making process, **if ethical dilemmas are faced and confronted, for the fist time, at the beginning of the emergency** when the decisions are pressing.



Acting ethically in decision making

Three ethical theories

Consequentialism (Utilitarianism)– focuses on the **results of a given action**, to maximize good consequences - the greatest benefit to the most people –(risk-based approach)

Duty ethics (Deontology) - focuses on the **duties of a moral agent-** an action is good or bad depends on the quality of the action itself – certain actions are inherently bad - ends do not justify the means.(rights-based approach)

Virtue ethics - focuses on the **moral character of the agent who is acting** - the rightness of an action is based on the virtuous motives of the agent.

Consequentialism, duty and virtue ethics are all relevant in decision making

Easy to say the '*Greatest Good* ', but in condition of emergency is a complex task

What is a right or good action ?

Who do we protect, and at what level of safety ?

Consequentialism is in general considered the preferred moral system, the most related criticism is that by focusing on the greatest benefits for the most people the rights and welfare of the few can be ignored.

An awareness of different approaches can help to face dilemmas.

Consequentialism, duty and virtue ethics are all relevant in decision making

In particular in condition of great uncertainty, we have to take into consideration that even if utilitarianism is the preferred approach, in the reality it is **not the actual consequences** that define moral merit (difficulty to predict results of an action in initial emergency), but what the moral agents are justified in believing **which will be the consequences** of their action or non-action.

Extreme conditions may be seen as calling to **focus only on the results** of the chosen action, but at the same time we can think that virtue ethics approach is need, since the **right action depend on the ability, motivation and awareness** of the person or team to deliberate.

Duty ethics also present weaknesses since duty based justifications may be difficult to delineate in emergency and when they are defined **conflicts can be evident since multiple players** are involved. Moreover, where duties are clear, it is likely that persons and organizations have conflicting duties.

“Crises and early emergencies are a bad time to do planning”

Little time to reflect before acting.

In activities of preparedness to nuclear emergency, an effective approach strategy requires anticipating decision-making needs

Plans are developed in advance → critiqued → rehearsed → refined

The quality of the planning process may contribute to the degree of preparedness and response success

The ability to make timely decisions in the condition of crisis or emergency situation in evolution is critical

The actions taken in the first few hours following accident may be crucial in potential consequences for human health and environment.

Emergency management of real situations is dealing with uncertainties and affects several aspects: from the technical to the social, from the political to the economical.

Ethical aspects should be considered in advance **-before the emergency-** for their clear recognition and for reinforcing ethically driven pathways.
At the same time consideration on uncertainties role should be envisioned

Nuclear and Radiological Emergency Guidelines

Preparedness, Response and Recovery

2015

www.ifrc.org
Saving lives, changing minds.

International Federation of Red Cross and Red Crescent Societies

"Preparing for the unexpected and impossible"

*"The frequency of '**high impact, low probability**' or so called 'Black Swan' events in recent years has signalled the emergence of a new 'normal'"*

These guidelines drawn on the lessons learned from the response to the accident at; Three Mile Islandand; Chernobyl and Fukushima

5. The Fundamental Principles and ethical considerations in CBRN response[5]

"We hope they (guidelines) will help National Societies to think through the various scenarios they may have to deal with should thay face a nuclear or radiological emergency "

Emergency managment programmes are evaluated through exercises to assure an adequate level of readiness to identify scenarios

Lesson learnt – reactive approach

The impact of 2011 Fukushima events increased the attention to the importance for effective crisis communication and a new exercise of the NEA series (INEX 5) **is now focusing on** notifications, **communications,** and interfaces to handle catastrophic events involving radiation and natural disasters.

INEX-3 participants addressed the decision-making processes employed once serious radiation contamination has taken place

INEX-4 exercise on consequence management and the transition to recovery

Emergency managment programmes are evaluated through exercises to assure an adequate level of readiness to identify scenarios

To be proactive

Within unclear and uncertain emergency situation, decisions and actions should be taken, as well as evaluations and judgments, **involving ethical aspects**, in particular in the early phase that must be taken promptly and that are typically undertaken in a top-down way.

It is important that ethical considerations are made explicit during the planning process so that **when decisions must be made they can be consistent with the spirit of the ethical judgments that has guided the planning process.**

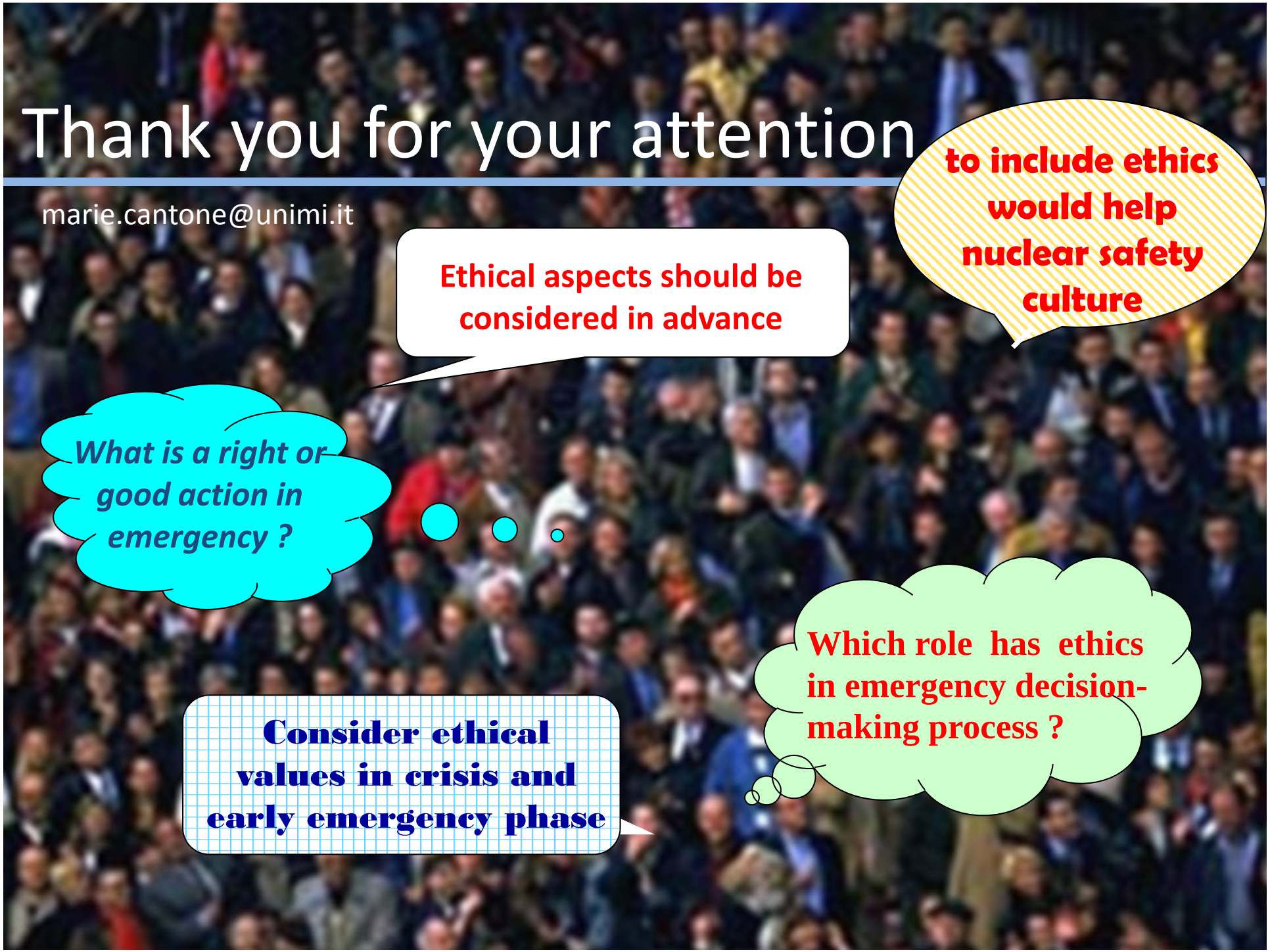
Final remarks

The question of **ethically justified decision making processes** is part of our general experience, although not explicitly addressed, up to now, by the main documents on nuclear emergency.

Decision-making is the core of nuclear and radiological emergency management and we have **to prevent possible moral black holes.**

In order to avoid the case that ethical issues will not be adequately addressed and, at the same time, to contribute assuring optimal protection for health and for environment, **we can:**

> consider, discuss, and clearly articulate the inclusion of ethical objectives in the main documents and practices on nuclear emergencies and related exercises.

Thank you for your attention

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