

# Synthesis of Lessons learned for RP culture in the field of radon exposure management

R. Gschwind (UFC), C. Schieber (CEPN)

*ENGAGE EEAE Workshop*

*Athens, 13-15 February, 2019*

- France

- Actions developed within the “Franche-Comté Radon pluralist project” since 2011
  - To develop awareness on radon risk
  - To contribute to the information and the support of different actors who deal with the management of radon
- Actions developed in a general perspective of Indoor Air Quality and energy efficiency

- Local actions undertaken at the initiative of :
  - Local urban public authorities (PMA – metropolitan area of Montbéliard)
  - French Institute of RP and Nuclear safety (IRSN, technical support organisation of the French Safety Authority)
  - Center on Evaluation of Protection in the Nuclear Field (CEPN, Research and Expertise Center)
  - Regional Agency for Air Quality Monitoring (ATMO BFC)
  - Health Regional Agency (ARS)

- Involvement of many partners :
  - University of Franche-Comté
  - National and local authorities (Nuclear Safety Authority, Regional Environment Directorate)
  - National and regional experts on radiation protection and Indoor Air Quality (Federal Office of Public Health of Switzerland, Centre of Scientific Culture, Centre for studies and Expertise on Risks, Environment, Mobility and Urban and Country planning, French environment and Energy Management Agency, University Hospital)
  - Representatives of building professionals (French Building Trades Federation, consultants, artisans)

### ● Greece

- Actions implemented in the framework of the Radon National Action Plan
- Radon measurements performed in the country are accompanied by actions to increase public awareness and to inform local decision makers
  - Implementation of the Action Plan is coordinated by the Greek Atomic Energy Commission (EEAE)
  - EEAE performs radon measurements countrywide and takes communication actions
  - Involvement of Ministries (Environment, Interior, Health), Local Authorities, Building engineering organisations

### ● Switzerland

- Actions implemented in the framework of the Radon National Action Plan since 2012
  - Actions implemented by the Federal Office of Public Health (FOPH)
  - Collaboration with the Society of Engineers and Architects, universities of applied sciences and building professional schools

- Wide range of target stakeholders
  - The case studies reveal the wide range of target stakeholders for the dissemination of RP culture related to radon exposures in dwellings and public buildings:
    - Inhabitants living in radon areas
    - Building professionals
    - Local/national authorities
    - Local elected representatives
    - Local communities

## RP culture in the field of radon management Target Stakeholders – Aim of RP culture

- Aim of RP culture for the stakeholders present **some common aspects** (raise awareness about the health risk associated with radon exposure) as well as **specificities** related to the **specific role of these stakeholders** in the protection against radon exposure
- **General Public**
  - To raise their awareness about radon risk in dwellings
  - To acquire knowledge on ways to measure and to remediate
  - To increase their willingness to implement measurement in their home and remediation / protection actions





## RP culture in the field of radon management Target Stakeholders – Aim of RP culture

- Local elected representatives / local communities (mayors, group of municipalities ...)
  - To raise their awareness about radon risk in their local area
  - To acquire knowledge on their responsibilities regarding this risk
  - To implement measurement campaigns in their municipalities
  - To implement or support remediation / protective actions
- National / local authorities (in charge of RP, Health, Environment, Air Quality ...)
  - To raise their awareness about radon risk
  - To be involved the implementation of actions such as measurement campaigns, remediation / preventive actions



## RP culture in the field of radon management

### Characterization of RP culture

- The radon is **unknown** for most of the stakeholders: general public, building professionals, local actors, national/local authorities ...
- The **efficiency** of the implementation of radon action plans (at local or national level) relies on the **dissemination of RP culture** among the various types of stakeholders, to fulfil the different aims

### 1. Raising risk awareness (for all the target stakeholders)

- What is radon ?
  - Where does it come from ?
  - Health risk related to radon
  - Who is concerned (radon map areas) ?
- 
- The first element to raise awareness about radon risk is **the knowledge about health risk** associated with radon exposure, together with the necessary elements needed to understand the origin and source of radon exposures

- The health risk is expressed with reference to **the risk of lung cancer**
  - Radon is the second cause of lung cancer
  - The estimated number of lung cancer due to radon in the country (or in the local area)
- The link between the **level of radon concentration and the probability of lung cancer** is usually not a question raised at first by the general public or other stakeholders. It might be an information given later for those who wish to know more about mechanisms of health effects

- The **regulatory reference concentration level** (in Bq/m<sup>3</sup>) is the **key** element used to weight the level of risk. It is used **after measurement** campaign to commensurate the remediation actions.
- Together with the origin of radon, it is also important to inform the stakeholders on the main areas where radon can be an issue. This is usually done using the **radon map areas** published by the national authorities

## 2. Protective measures (for all the target stakeholders): main types of remediation and prevention actions

- The **description** of the main remediation / prevention measures have to be given together with **the information about the risk** (eg. Sealing the ground, improve ventilation system, treat the basement ...)
- The **degree of details** in the presentation of these measures will of course vary with the **type of stakeholders**. At this stage the objective is to avoid to raise concern about a risk by providing also “there is a health risk, there are the protection measures”

## RP culture in the field of radon management Characterization of RP culture

---

Beyond the basic knowledge about the health risk associated with radon and the main protective measures, **other elements need to be disseminated** to fulfil the aim of RP culture for the different stakeholders, related to **the type of actions and/or to role of these stakeholders**

## RP culture in the field of radon management Characterization of RP culture

- General public: focus on **assessment of radon levels and remediation / prevention actions**
  - How to measure radon in home ?
  - Who can provide measurement devices ?
  - What should be done according to the result of the measurement (providing a scale of actions between the two reference levels) ?
  - What are the remediation / preventive actions ?
  - Who are the building professionals than can help to implement those actions ?
  - Where to find more information ?





## RP culture in the field of radon management Characterization of RP culture

- Local elected representatives / local communities (mayors, group of municipalities ...): focus on **the identification of radon areas**, as well as **role and responsibilities** of local communities
  - What are the regulation and responsibilities of local elected representatives regarding radon in dwellings and in public buildings ?
  - Who are the national authorities, experts, building professionals that can provide more information or support ?
  - How to implement measurement campaigns in public buildings ?
  - How to develop radon risk awareness for inhabitants ?
  - What are the remediation / preventive actions ?
  - Who can help to implement those actions ?
  - How to support remediation and/or preventive actions for inhabitants at the local level ?



## RP culture in the field of radon management Characterization of RP culture

- Building professionals: focus on the identification of radon areas, the integrating of radon management as part of their professionalism
  - Detailed technical knowledge on remediation technics in old building and preventive measures in new building
  - Integrating radon issue when addressing building energy efficiency
  - Integrating radon issue when addressing indoor air quality



- National / local authorities (in charge of RP, Health, Environment, Air Quality ...): focus on **their role and responsibilities** regarding **radon action plan** implementation
  - Actions that can be implemented at the national/local level to increase radon risk awareness
  - Actions to be implemented at the national level to increase the radon expertise among building professionals
  - Integrating radon issue in the building energy politics
  - Integrating radon issue as part of indoor air quality management programs

- Some other considerations are also worth mentioning regarding the characterization of RP culture in the case of radon:

- *An individual and collective knowledge*

Actions to remediate radon form part of **multi-stakeholder, multi-disciplinary** processes. Individuals will not be in a position to implement measurement and/or/protective actions if radon is not an issue handled at the collective level

- *Radon risk in the context of Indoor Air Quality Issues*

In France and Switzerland, one can notice the integration of the radon risk within a more **global perspective of indoor air quality issue**, radon being a “pollutant” like other indoor pollutants giving rise to potential health effects

## RP culture in the field of radon management Process and tools to develop RP culture

- The **dissemination** of RP culture elements among the various stakeholders relies on the use of **multiple tools and processes**:

- leaflets,
- training sessions,
- dedicated meetings ...

to be adapted to the needs and integrated into radon action plans (at the local or national levels).

The **existence of a radon management regulatory framework** to refer is essential to support the processes elaborated to disseminate RP culture as it provides **legitimacy** to their initiators and structures to build upon action plans

## RP culture in the field of radon management Process and tools to develop RP culture

- A key lesson learned from the case studies is the importance of involving:
  - multidisciplinary teams in the elaboration of the tools
  - representatives of the target stakeholders in the elaboration of the communication media
- It is also necessary to involve acknowledged experts in their fields to disseminate the knowledge:
  - not only RP experts, but also experts from the target stakeholders groups (eg. Involvement of Scientific and Technical Center for Building in France)

## RP culture in the field of radon management Process and tools to develop RP culture

- Some specificities of the tools and processes according to the target stakeholders emerge from the case studies:
- General Public: **information, communication, involvement**
  - A first generic information to raise awareness is in most cases disseminated through the use of information leaflets
  - However, it is also essential to create meeting opportunities between population, experts, authorities, local elected representatives, to discuss and share the information initially provided in leaflets



- General Public: information, communication, involvement

- These meetings are also essential **after measurement campaigns** to explain the results of measurements and provide advice for remediation / prevention
- The elaboration of **guidelines** fro radon management will benefits from the involvement of stakeholder (sg. Switzerland where guidelines have been elaborated at the initiative of authorities with the involvement of representatives from owners/renters associations and local authorities)
- Information dissemination can also benefit from the help of (local) actors in charge of scientific culture dissemination or linked to public health issues (like Cancer League)



- General Public: information, communication, involvement
  - *In all cases, whatever the channel of communication about radon risk, one has to keep in mind the need to provide **at the same time** means/possibilities of **measurements** and means/possibilities of implementing **remediation/prevention actions***
  - The identification at local or regional level of “**radon consultants**” (eg. Switzerland), is one interesting way of ensuring relays at the local level for the dissemination of the technical information towards the population
  - **Dedicated websites** are also elaborated to inform about radon. The interest is to give access to complementary information when people have already been made aware of a radon issue

- Building professionals: **training, practice, networking**

- First issue is to identify the various types of building professions that can potentially been involved in diagnostic, remediation or prevention actions, and the adapted education and training program needed. It includes notably craftsmen form various fields, engineers, architects ....
- Initial training: the integration of radon issues in the professional schools is the basis to initiate awareness and to ensure and integration of these issues in the long term
- Continuous education: this is necessary not only for those who didn't beneficiate from an initial training, but also to regularly update the knowledge and techniques integrating feedback experience and new developments
- One issue with continuous education is that it is usually not mandatory for these types of professionals, and it is found **difficult to motivate** the professionals to attend training course besides their working time for a subject in which they are not sure that it will be useful to develop their activities.

- **Building professionals: training, practice, networking**
  - Enhancing professional competences: this is essential to foster the willingness of the professionals to be trained and to work in the field of radon diagnostic, remediation or prevention actions. The creation of a “**radon label**” or **certification** recognised at a national level should be part of the processes set up to disseminate the RP culture among professionals
  - E-learning tools can be developed to **facilitate the access to the training** (eg. Switzerland) but need to be completed with practical work on the field
  - Building professional associations, or unions, have a specific role in raising awareness about radon issue. It can take various forms: integrating radon issue in **seminars or congresses of the professions**, by favouring the interaction on radon topic in the initial training programmes related to their professions, by **creating network** of professionals that can **exchange about their practice and collect feed-back experience**

## RP culture in the field of radon management Process and tools to develop RP culture

- Finally, as radon is still unknown from a major part of the identified stakeholders, it is essential to consider the processes to disseminate RP culture on radon **on a long-term perspective**
- It takes time to involve the relevant stakeholders which can initiate or support the various types of dissemination actions
- These actions also have to be **renewed regularly to maintain dynamic** toward the radon action plans

## RP culture in the field of radon management Evaluation of the level of RP culture

- For the general public, the “success” of a measurement launched at a local level can be an indicator of radon awareness level in the population:
  - estimation of the number of homes where dosimeters have been provided,
  - rate of return of the dosimeters,
  - participation rate to the meeting organized to share the results,
  - participation rate to specific activities organized to explain remediation/prevention actions...

## RP culture in the field of radon management Evaluation of the level of RP culture

- The **willingness of various actors**, not coming from the RP field (eg. national/local health or environmental authorities, local elected representatives, building professional associations, ...) to be involved in radon action plan is also **an indicator of the progressive spreading** or radon risk awareness
- The introduction of radon issues **in building professional schools** programmes is also an example of the consideration of these issues by the profession
- In the same way, one can notice for example, **the anchoring of radon in some building codes** by the Swiss Society of engineers and architects

## RP culture in the field of radon management Lessons learned – Key issues

- The encountered difficulty to convey the danger posed by radon is not new
- Radon is often regarded as just another problem (eg. In terms of construction requirements or additional costs) and not as a health issue
- The dissemination of a RP culture in the field of radon starts with raising radon risk awareness (link between radon and cancer), to have it considered as a health issue, together with providing the elements on protective/remediation measures against radon.
- The consideration of radon as a health issue is a key point for many stakeholders to understand the regulatory requirements

## RP culture in the field of radon management Lessons learned – Key issues

- It can be useful to point out that **the radon level is part of the indoor air quality**, and should be considered as a pollutant to be avoid indoors like other hazardous substances, and **to integrate radon issue as part of a more global public health protection approach**
- Radon is **a complex issue**, which deals with radiological protection, but also geological, construction, behavioural, indoor air quality ...
- It is thus important:
  - **to develop a multidisciplinary approach** in the elaboration of RP culture dissemination actions,
  - **to share knowledge and expertise** from each type of stakeholders to be involved
  - **to adapt** the messages and actions to the target stakeholders



## RP culture in the field of radon management Lessons learned – Key issues

- Processes to build RP culture can be initiated by national or territorial (local) actors
- Both levels are in fact important: each having a specific role and should work closed together