

International Decommissioning Networking

Collaborations to Improve Safety and Efficiency in Decommissioning

Presented by

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Overview

- Examples of international decommissioning collaborations in Norway
- Some observations from WM09
- Exciting challenges in International Collaborations
 - Organisations learning at all levels
 - Decommissioning mindset
 - Recruiting the next generation
 - Human factors and new technology

Halden Reactor Project (HRP)

- International research project hosted by the Norwegian Institute for Energy Technology under the auspices of OECD NEA
- 18 member countries
- 50 years old – resold and reinvented every 3 years
 - Still using the same contract from 1958, though 😊
- Two main areas of research:
 - Fuel Safety and Reliability
 - Man Technology Organisation – Safety



Decommissioning at IFE and in the HRP

- Bilateral decommissioning research, focus on planning, training and communication, emphasis on ALARA
 - VRdose project (Fugen, Japan) 1999-2003
 - Virtual Decom (ENEA, Italy) 2001~2004
 - ChNPP Visualisation Centre (NMFA) 2006 - ...
- Halden Research Programme
 - Activity 1: Planning, stakeholder involvement, procedures and practice
 - Activity 2: Visualisation tools for characterisation and ALARA planning
- IAEA CRP on Innovative Technology, TecDoc just released
- Present IAEA CRP on Decommissioning Planning
 - “Procedures and Practices – can we bridge the gap?”

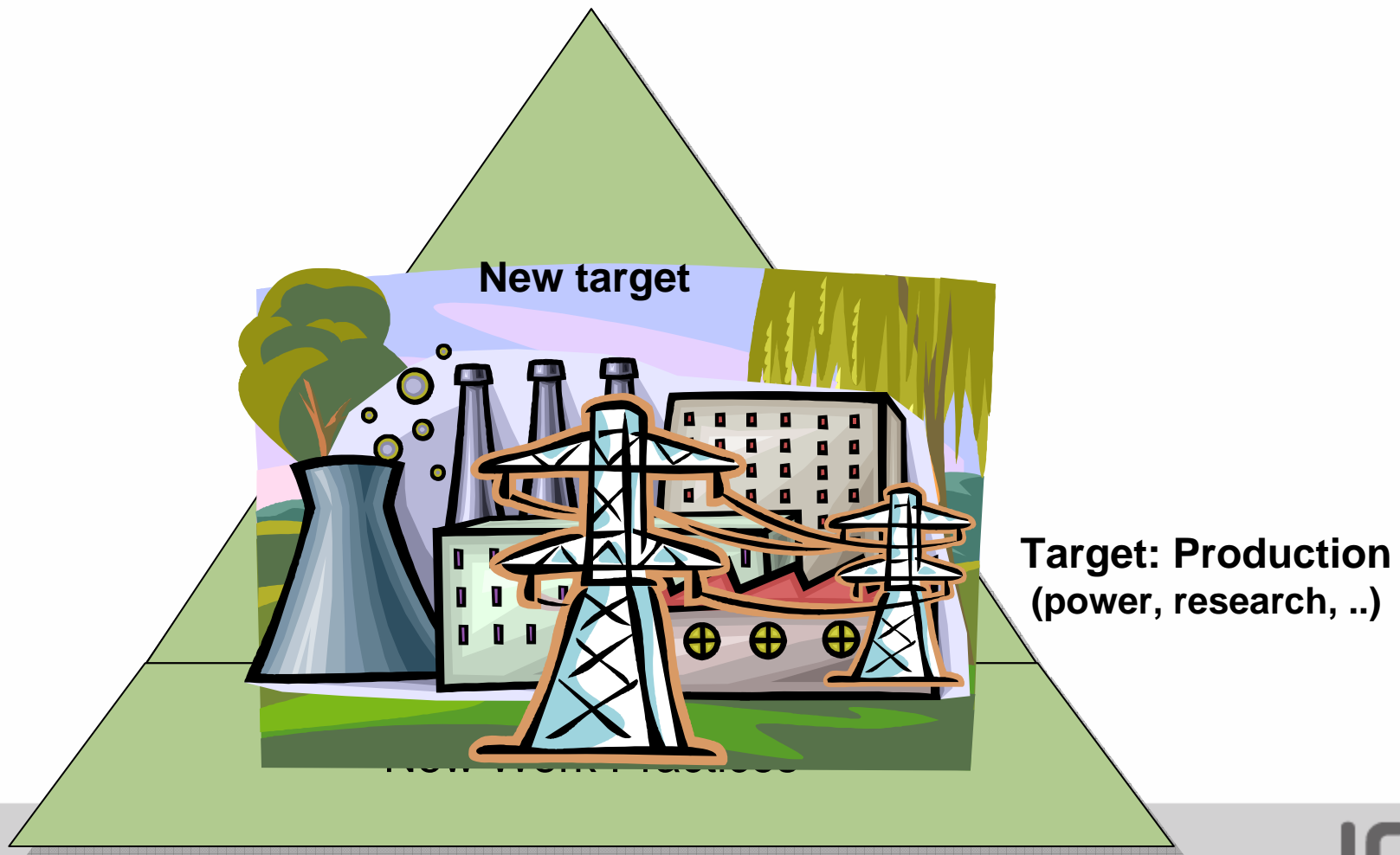
Some highlights from WM09

- The IDN is about systematically sharing information, transferring knowledge and comparing approaches
- It shall be hands-on and user oriented
- Receiving assistance has led to being able (and willing!) to offer assistance to others
- Intense and open communication is vital
- Teaching is the best way of learning
- There is a need for more advanced technology
 - new technologies are being developed
 - and it is important to make the right selection

Some highlights from WM09 cont

- Simpler and better solutions are often found by those with less resources
- Get the technical people talking and watch them learning
- Standardizing enables reuse and sharing
- Identify your target before you start decommissioning
- Work on mindsetting

Decommissioning is introducing change



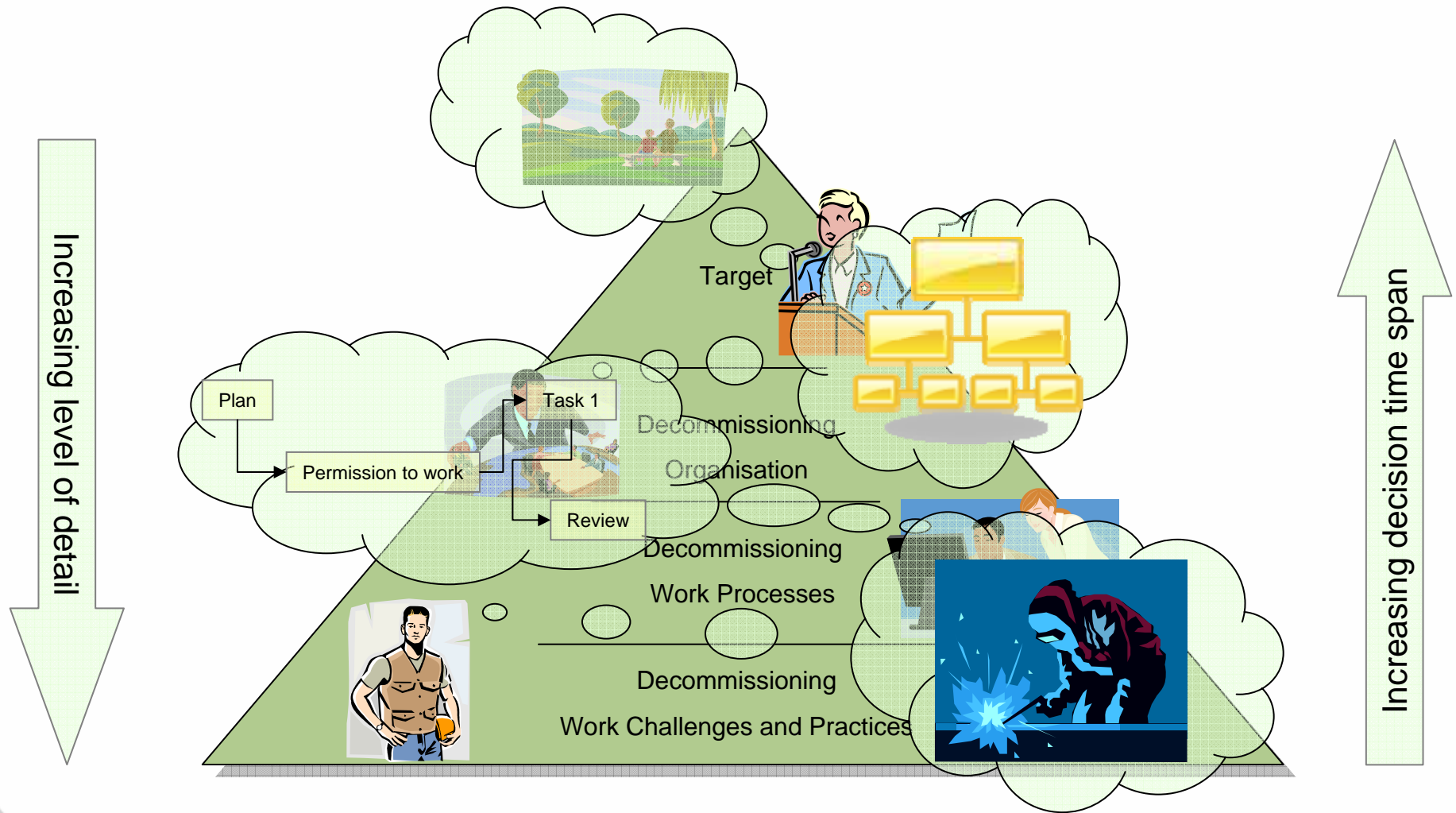
Maintaining congruency

requires

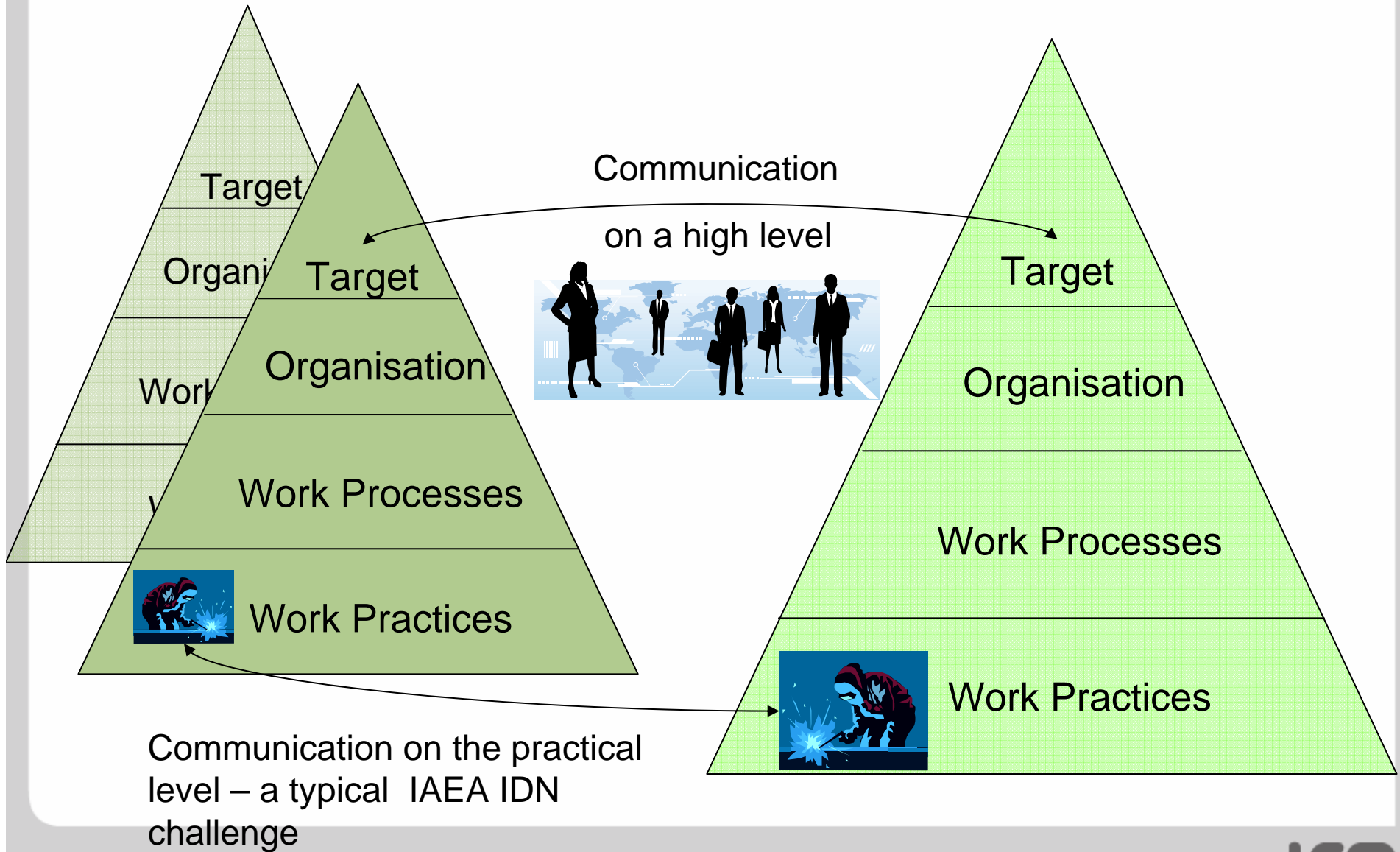
leadership, communication, change management , attention to mindset



Different decisions to be made and tasks to be accomplished on different levels of the organisation

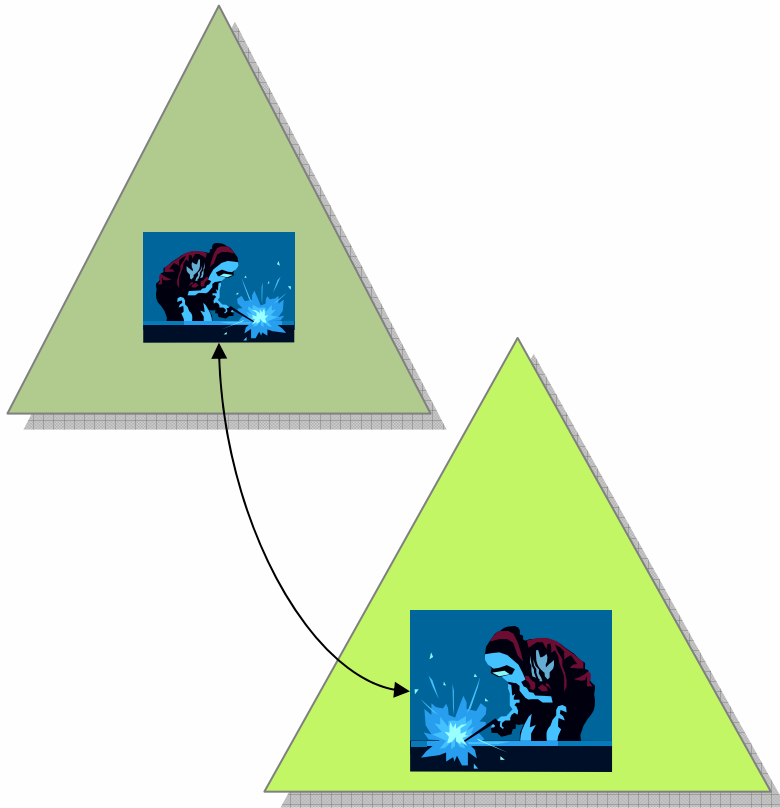


Others have been there before

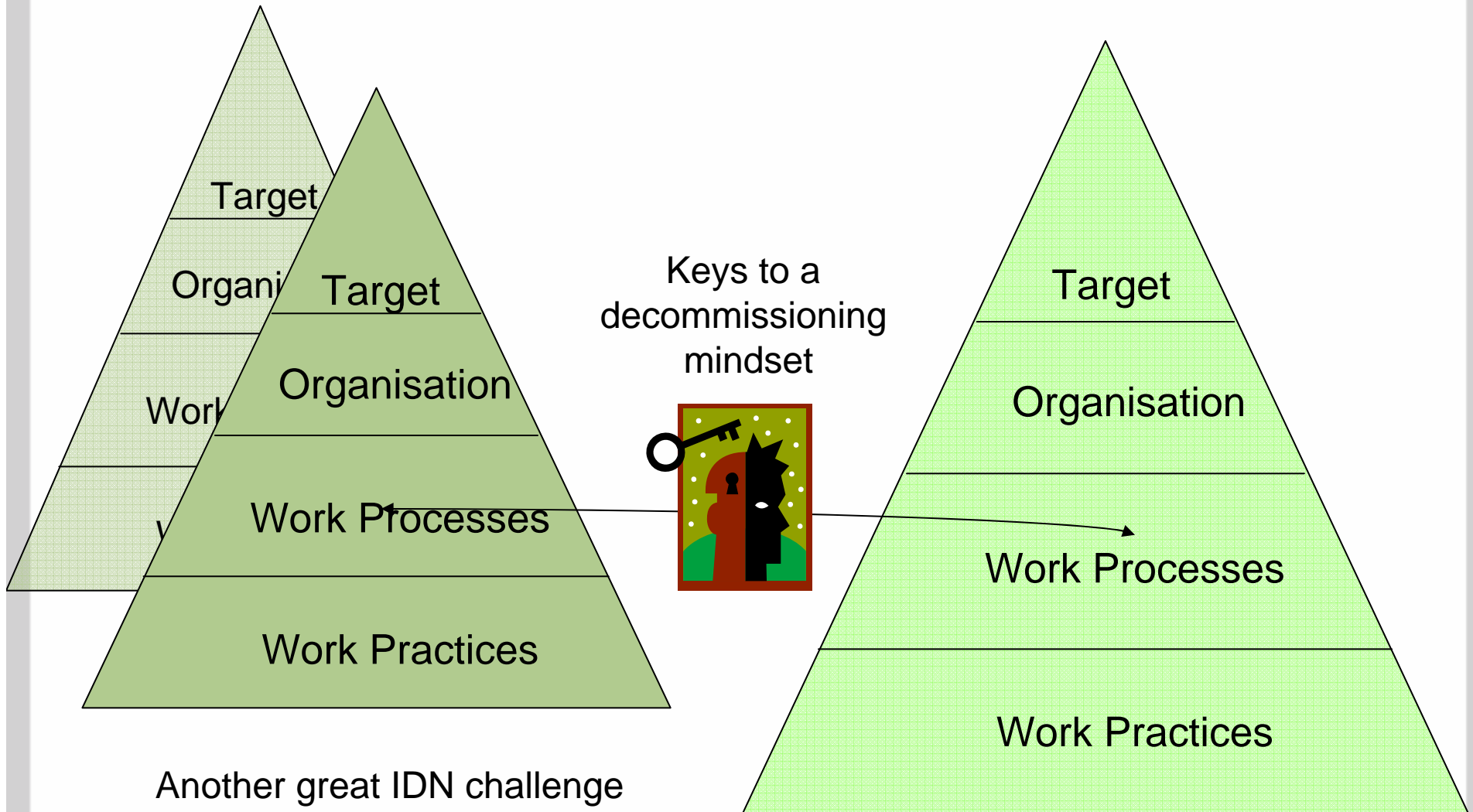


Exciting IDN Challenges

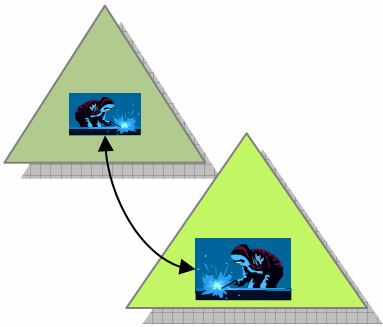
- Communication on the practical level



Others have struggled before



Exciting IDN Challenges



- Communication on the practical level
- Decommissioning mindset
 - Define
 - Assess
 - Improve



New people needed

- Recruiting
- Training
- Motivating

Recruiting young staff for decommissioning



- Our children live in a different world from the one we grew up in
- Important question for teenager study choices (ROSE Project)

“Who do I want to be?”

- Widespread new misunderstanding:
“*Hard science and technology is for profit and not used to help people*”

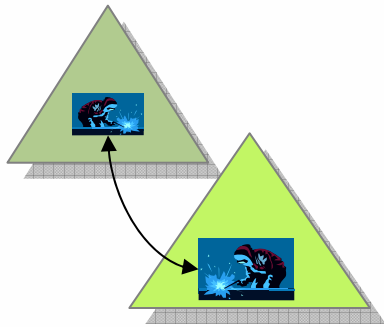
Recruiting young staff for decommissioning



Do I want to be one of those guys who really help in making climate friendly power safer?

- *“Should I help cleaning up after the past generations?”*
- *” Should we make sure that the next generation will have an easy job cleaning up after us?”*

Exciting IDN Challenges



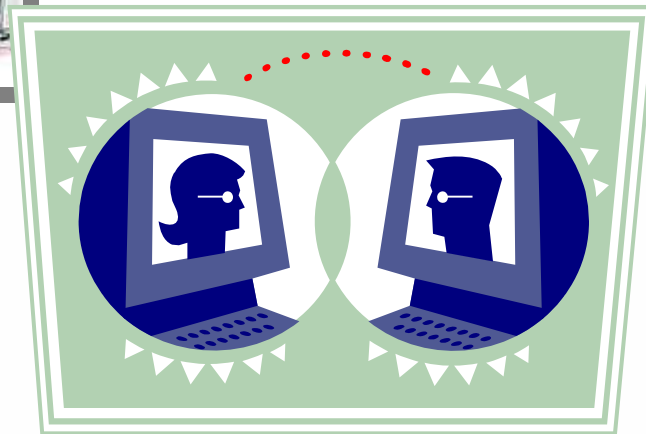
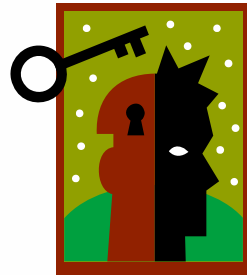
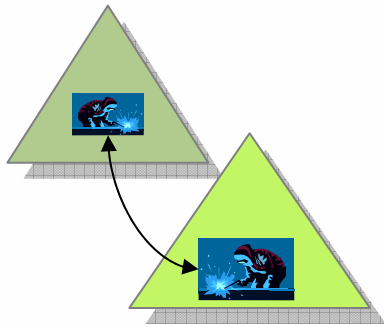
- Communication on the practical level
- Decommissioning mindset
- **ENGAGING** the next generation in their own environment



New Technologies Needed

- We are a careful business, preferring to use proven technology
 - Solving first-of-a-kind problems with second generation technology
- Much can be learned from other businesses while still keeping our focus on safety
- Our competitors in the petroleum sector are breaking ground in practical international collaboration
 - Dispersed teams
 - Expert centra
 - Knowledge and information visualisation for cross-disciplinary collaboration and communication
 - Working on mindset and work processes

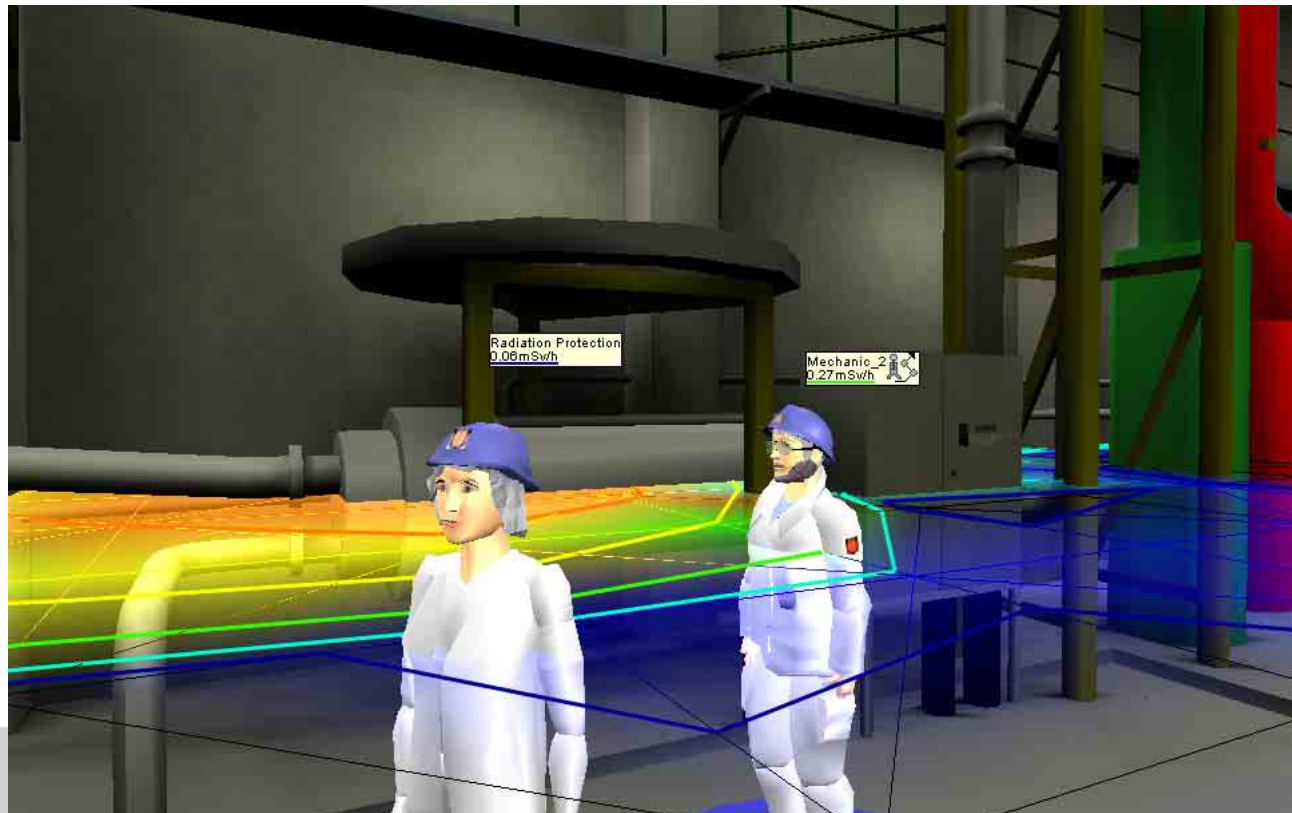
Exciting IDN Challenges



- Communication also between problem owners on the practical level
- Decommissioning Mindset
- Engaging the next generation in their own environment
- Learn from other domains

Example from our own domain - outage technology

- **Characterisation of radioactive contaminations by NPP radioprotection services** (corrosion products ~90 % of doses)
e.g. new EDF CdZnTe gamma spectrometer => dose / isotope
=> Origin of doses & Better radiation awareness (ALARA)



CdZnTe (CZT) gamma spectrometry

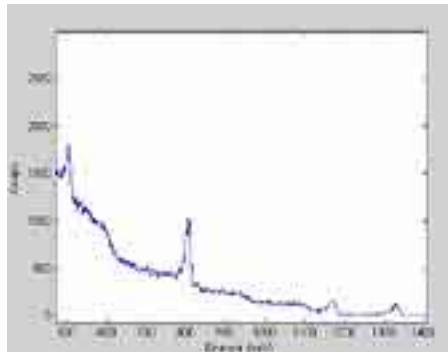
(EDF example)



Portable sensor



CZT probe
(semi-conductor)



Gamma spectrum
(acquisition : ~1500 secs.)

Isotopes :

58Co, 60Co

DOSE Contributions :

58Co : 38 %

60Co : 62 %

ACTIVITIES :

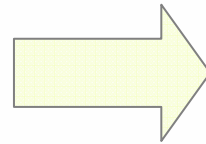
58Co : 63 %

60Co : 37 %

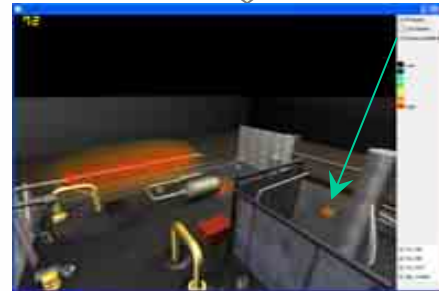
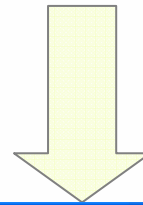
Analysis results

(software)

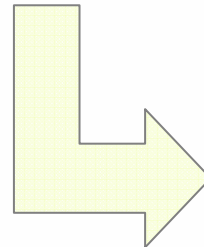
IFE -EDF Collaboration: Dose scenarios combined with In-situ Gamma Spectrometry



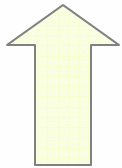
Main Isotopes



Visualisation and
occupational dose
estimates

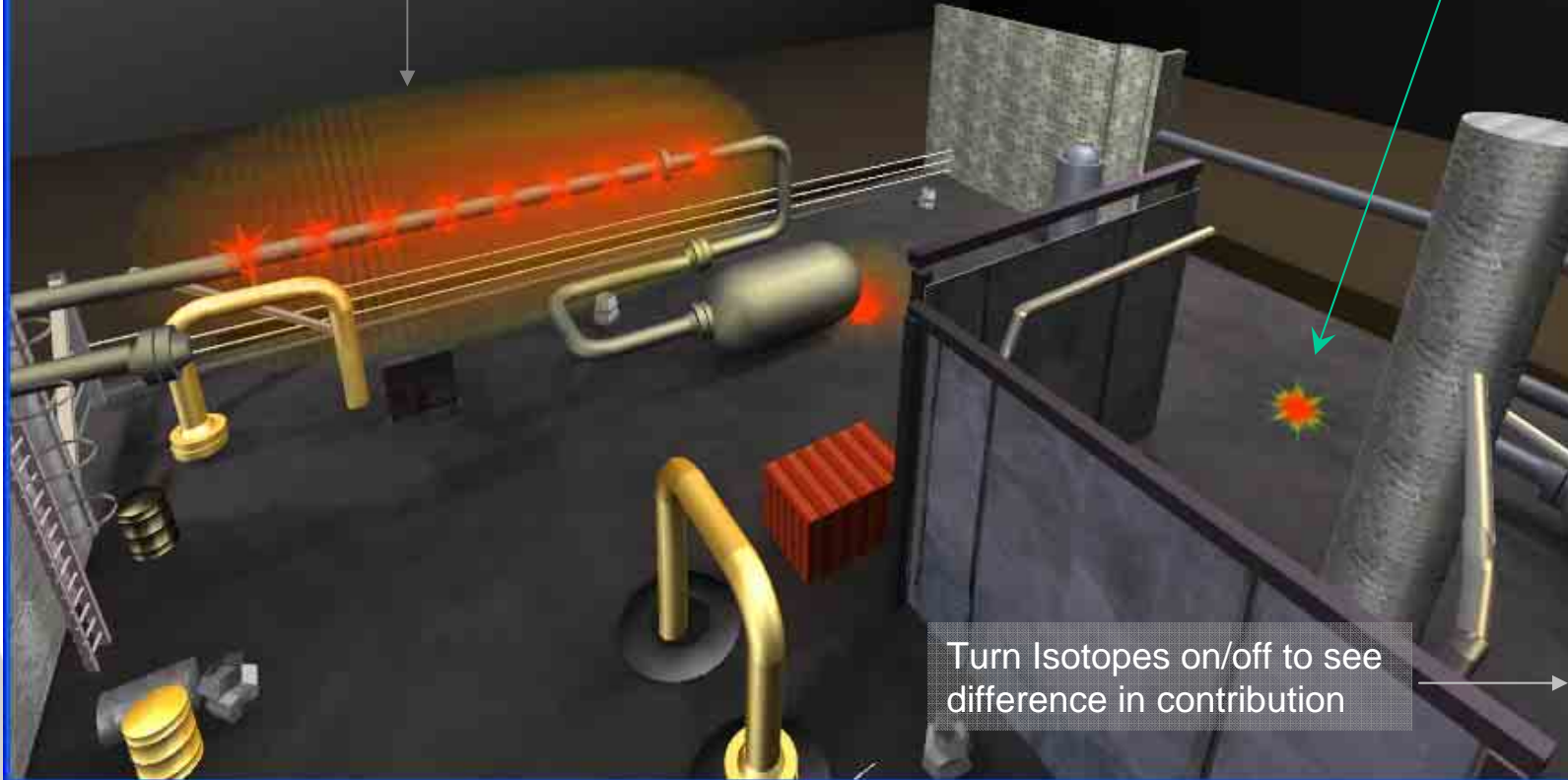


Work plan for high
risk activities



72

Co_58 and Co_60 in pipe (3cm Iron shielding) →
LineSource split into n PointSources



- PCloud
- LocCloud
- Source Indication



- Co_58
- Co_60
- Cs_137
- Ag_110m

Turn Isotopes on/off to see
difference in contribution

Isotope Calculator

Distance (cm):

60Co Activity (MBq):

58Co Activity (MBq):

110mAg Activity (MBq):

137Cs Activity (MBq):

Iron thickness (cm):

Lead thickness (cm):

Water thickness (cm):

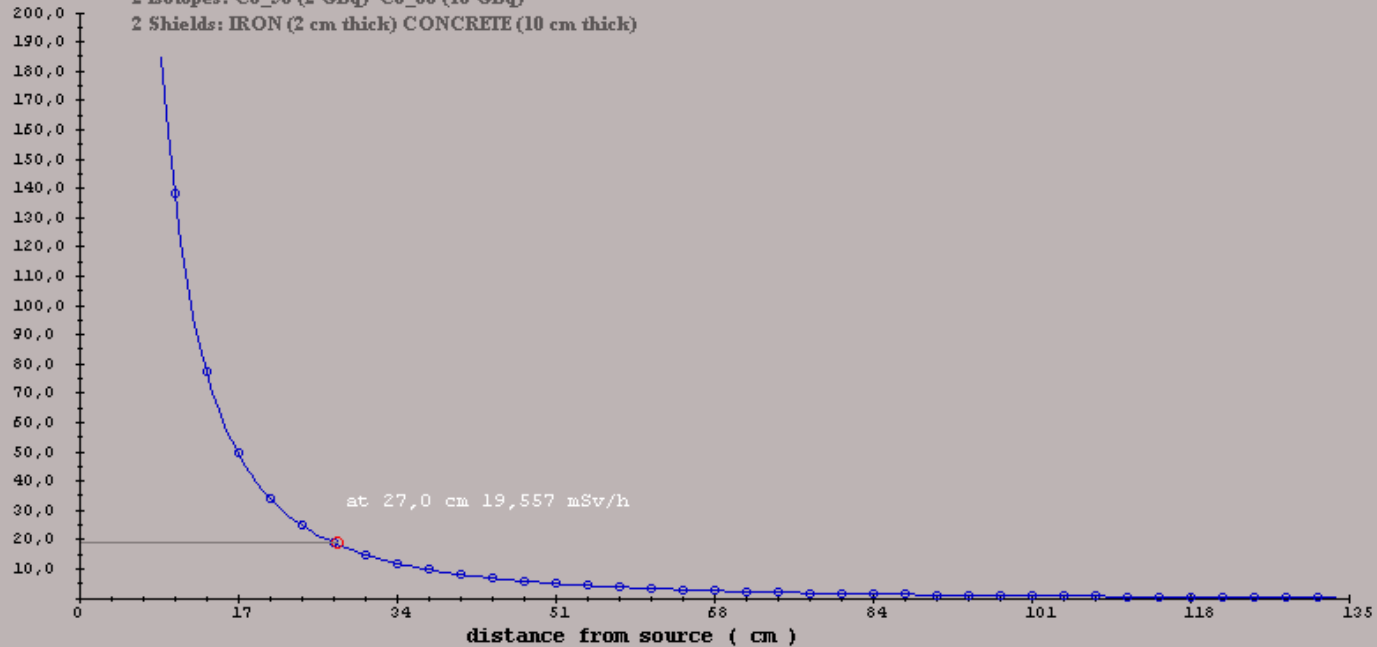
Concrete thickness (cm):

Calculate

Dose (tissue): **19.557392 (mS/h)**

mSv/h

2 Isotopes: Co_58 (2 GBq) Co_60 (10 GBq)
2 Shields: IRON (2 cm thick) CONCRETE (10 cm thick)



First application – network of RBMK reactors

- Target: Sharing hands on experience and learning from working together
- Applications in planning, training and stakeholder communication
- Kick-off RBMK Workshop in Halden in August 2009
 - ChNPP, LNPP, Kola, Kursk, Smolensk, Ignalina
 - Norwegian Ministry of Foreign affairs (sponsor)
 - EDF and IFE

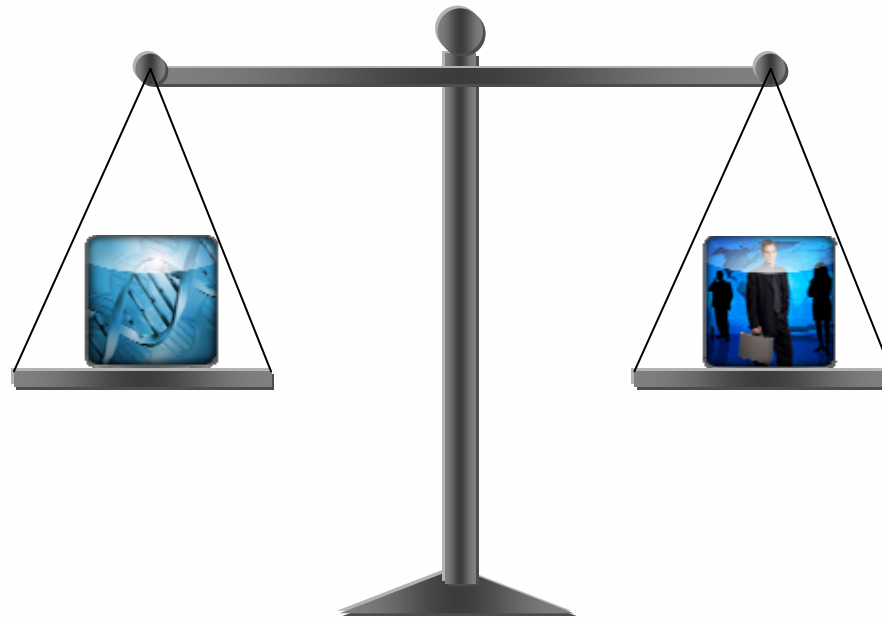
Usability studies and hands on experience combined



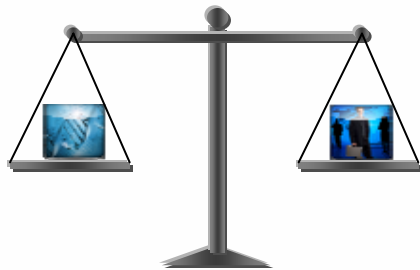
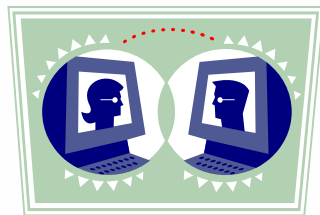
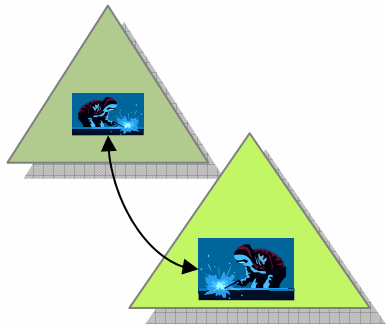
- All learn
 - Learning how to use new technology or the principles of a new work practice
 - Learning how technology or procedures could be improved
 - Discovering new possibilities and simplifications together
- Ownership requires early participation

Focus on new technology AND the people who will - or wont - use it

- Practices, people and technologies must be balanced



Conclusion: Exciting IDN Challenges



- Communication also between problem owners on the practical level
- Decommissioning Mindset
- Engaging the next generation in their own environment
- Learn from other domains
- Including the Human Factors in Technology issues and new Technologies in our work practices