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# ISOE INFORMATION SHEET

## EUROPEAN DOSIMETRIC RESULTS FOR 2010

ISOE European Technical Centre - Information Sheet No. 54

**T**his ISOE Information Sheet presents the average annual collective doses per reactor (PWRs, VVERs, BWRs) for the period 2008 - 2010 in the European countries participating in ISOE.

In 2010 the average annual collective dose per reactor for all PWRs and VVERs remains stable around 0.62 man·Sv.

Regarding PWR reactors, the average collective dose significantly decreased going from 0.70 man·Sv per reactor for 2009 to 0.57 man·Sv per reactor for 2010. Three countries mainly contribute to this decrease: Germany, Spain and Sweden. However, an increase in Switzerland, Slovenia and in the Netherlands can be noticed.

Regarding BWRs, the average collective dose has decreased compared to 2009, with a value at 0.84 man·Sv compared to 1.26 in 2009 (see Tables 1 and 2).

The evolution of the 3-year rolling average annual collective dose, which provides a better representation of the general trend in dose, shows a continuity of the decrease for VVERs. There is a stability of the averages for PWRs and, after an increase in 2007-2009, a decrease of the value of 2008-2010 for BWRs, lower than the 2006-2008 value (see Tables 3 and 4).

Regarding VVERs, the Czech Republic presents the lowest 3-year rolling average annual collective dose per reactor in 2008-2010 with 0.13 man·Sv

per reactor, followed by the Slovak Republic (0.15 man·Sv per reactor), Hungary (0.38 man·Sv per reactor) and Finland (0.65 man·Sv per reactor) (see Figure 1).

For European PWRs, the data per country show that with respect to the 3-year rolling average annual collective dose for 2008 - 2010, six main groups can be distinguished (see Figure 2):

- United Kingdom:  
below 0.3 man·Sv per reactor,
- Belgium, The Netherlands, United Kingdom:  
between 0.3 and 0.4 man·Sv per reactor,
- Spain, Switzerland:  
around 0.45 man·Sv per reactor,
- Slovenia :  
around 0.55 man·Sv per reactor,
- France, Sweden:  
around 0.65 man·Sv per reactor,
- Germany:  
above 0.7 man·Sv per reactor.

The 3-year rolling average annual collective dose per reactor for BWRs are quite similar in Germany, Spain, Sweden and Switzerland around 1 man·Sv per reactor. Finland is presenting the lowest value with 0.50 man·Sv per reactor (see Figure 3).

For further information on the evolution of collective doses in different countries, please refer to the country reports in ISOE Annual Report (see ISOE Network website, Publications menu - <http://www.isoe-network.net/>).

Table 1. PWRs average annual collective dose per reactor by country from 2008 to 2010

Country (Number of reactors)	Average annual coll. dose per reactor (man·Sv)		
	2008	2009	2010
<b>PWR Group:</b>			
Belgium (7)	0.39	0.36	0.30
France (58)	0.66	0.70	0.62
Germany (11)	0.62	1.05	0.61
Netherlands (1)	0.27	0.24	0.62
Slovenia (1)	0.15	0.65	0.85
Spain (6)	0.29	0.72	0.37
Sweden (3)	0.56	0.92	0.46
Switzerland (3)	0.46	0.36	0.53
United Kingdom (1)	0.26	0.34	0.27
<b>PWR Sub-Total</b>	<b>0.59</b>	<b>0.70</b>	<b>0.57</b>
Czech Republic (6)	0.13	0.15	0.12
Finland (2)	0.78	0.38	0.81
Hungary (4)	0.33	0.44	0.37
Slovak Republic* (6)	0.16	0.17	0.11
<b>VVER Sub-Total</b>	<b>0.26</b>	<b>0.25</b>	<b>0.25</b>
<b>All PWR Group</b>	<b>0.53</b>	<b>0.63</b>	<b>0.62</b>

\*includes JAVYS 1 and 2 reactors which are in preparation stage for decommissioning (respectively shutdown since 1<sup>st</sup> January 2007 and 1<sup>st</sup> January 2009).

Table 2. BWRs average annual collective dose per reactor by country from 2008 to 2010

Country (Number of reactors)	Average annual coll. dose per reactor (man·Sv)		
	2008	2009	2010
<b>BWR Group:</b>			
Finland (2)	0.46	0.59	0.45
Germany (6)	1.19	1.01	0.83
Spain (2)	0.50	2.31	0.54
Sweden (7)	0.85	1.41	0.93
Switzerland (2)	1.16	1.14	1.25
<b>All BWR Group</b>	<b>0.91</b>	<b>1.26</b>	<b>0.84</b>

Table 3. PWRs 3-year rolling average annual collective dose per reactor by country

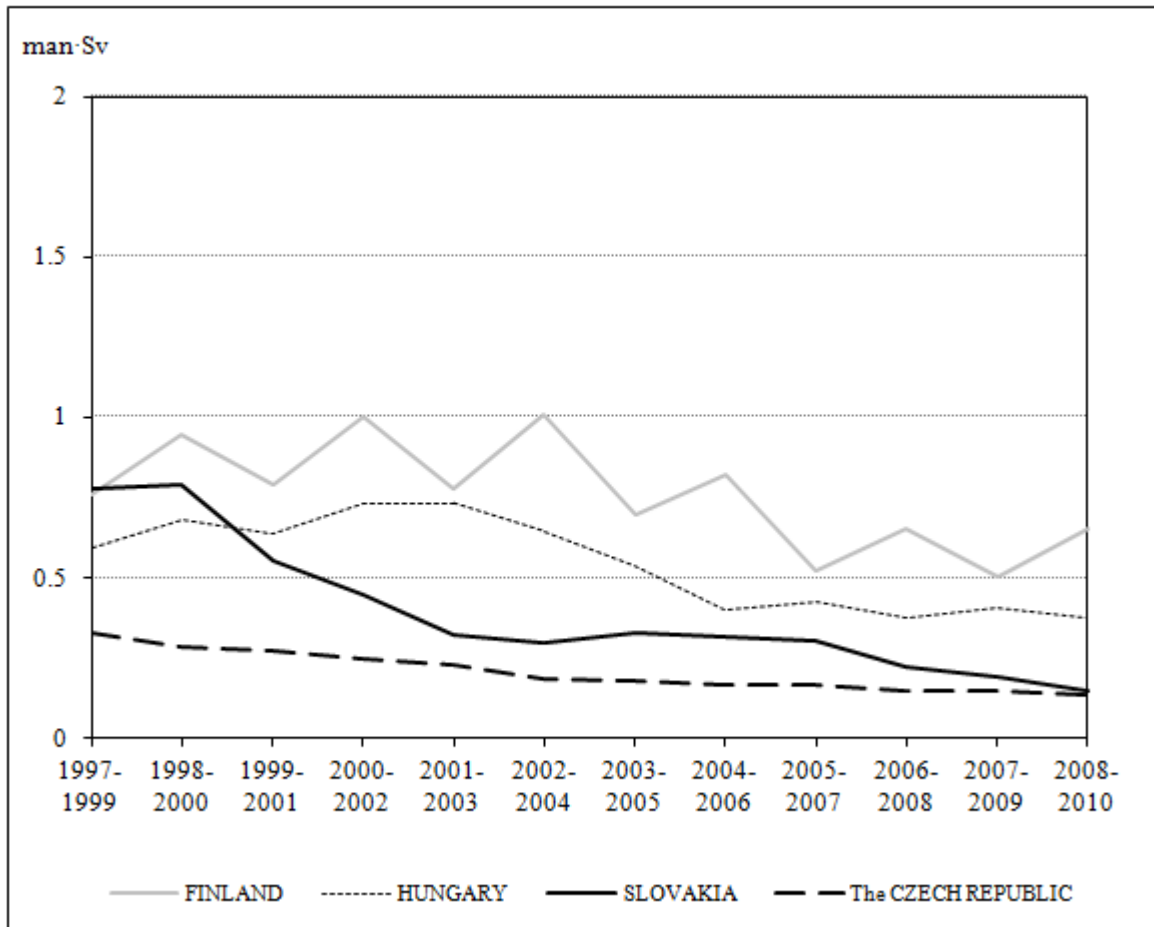
Country	Average annual coll. dose per reactor (man·Sv)		
	2006-08	2007-09	2008-10
<b>PWR Group:</b>			
Belgium	0.36	0.35	0.35
France	0.66	0.66	0.66
Germany	0.83	0.90	0.76
Netherlands	0.38	0.25	0.38
Slovenia	0.63	0.56	0.55
Spain	0.39	0.50	0.46
Sweden	0.49	0.63	0.65
Switzerland	0.40	0.40	0.45
United Kingdom	0.28	0.22	0.29
<b>PWR Sub-Total</b>	<b>0.62</b>	<b>0.64</b>	<b>0.62</b>
Czech Republic	0.15	0.15	0.13
Finland	0.66	0.50	0.65
Hungary	0.38	0.41	0.38
Slovak Republic*	0.23	0.19	0.15
<b>VVER Sub-Total</b>	<b>0.28</b>	<b>0.26</b>	<b>0.25</b>
<b>All PWR Group</b>	<b>0.56</b>	<b>0.57</b>	<b>0.56</b>

\*includes JAVYS 1 and 2 reactors which are in preparation stage for decommissioning (respectively shutdown since 1<sup>st</sup> January 2007 and 1<sup>st</sup> January 2009).

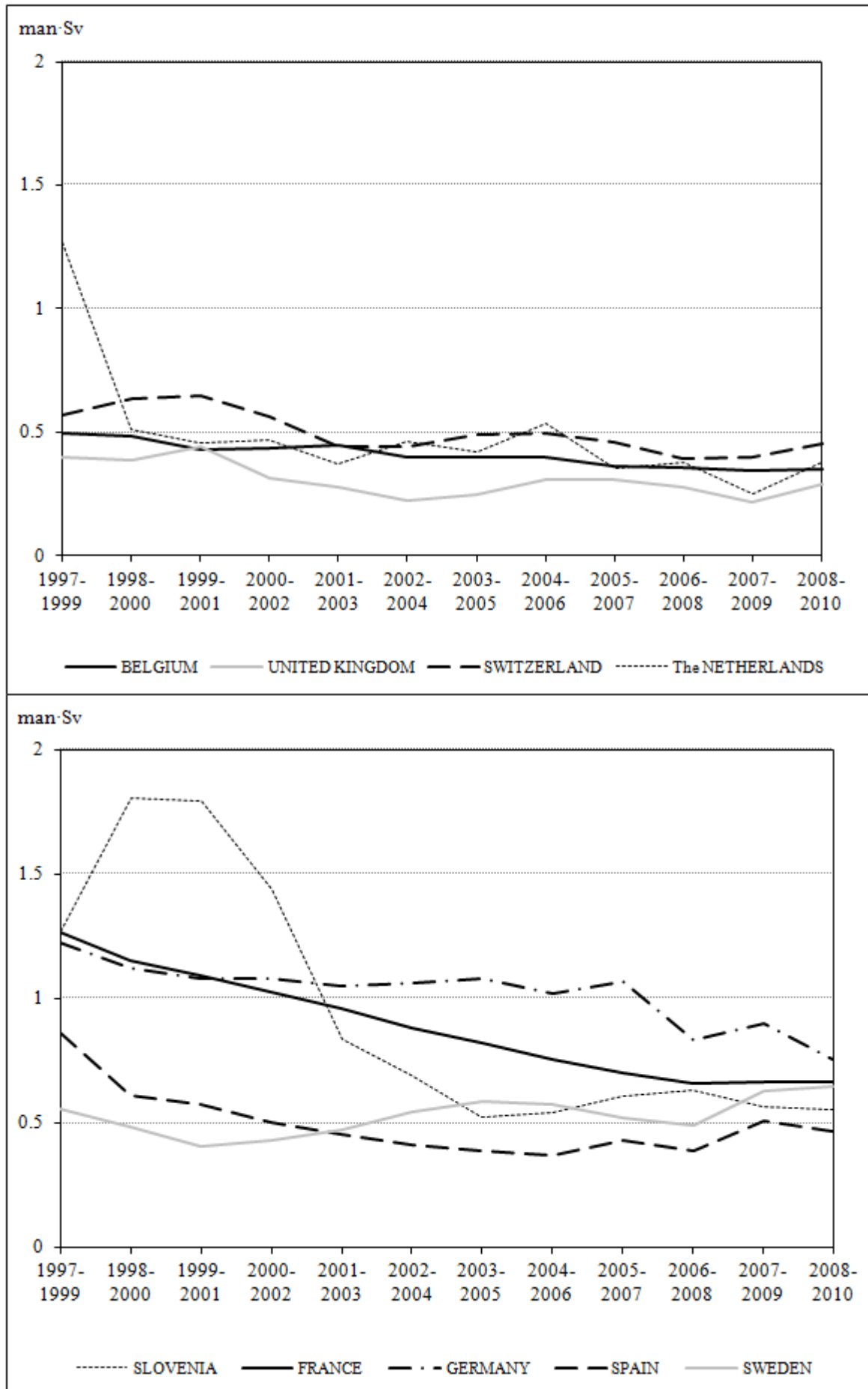
Table 4. BWRs 3-year rolling average annual collective dose per reactor by country

Country	Average annual coll. dose per reactor (man·Sv)		
	2006-08	2007-09	2008-10
<b>BWR Group:</b>			
Finland	0.72	0.55	0.50
Germany	1.11	1.06	1.01
Spain	1.69	2.32	1.12
Sweden	1.02	1.12	1.06
Switzerland	1.08	1.13	1.18
<b>All BWR Group</b>	<b>1.09</b>	<b>1.17</b>	<b>1.01</b>

**Figure 1. Evolution of the VVERs 3-Year Rolling Average Collective Dose per Reactor by Country**



**Figure 2. Evolution of the PWRs 3-Year Rolling Average Collective Dose per Reactor by Country**



**Figure 3. Evolution of the BWRs 3-Year Rolling Average Collective Dose per Reactor by Country**

