

ISOE INFORMATION SHEET

EUROPEAN DOSIMETRIC RESULTS FOR 2006

ISOE European Technical Centre - Information Sheet No. 46 (2007)

This ISOE Information Sheet presents the average collective doses per reactor (PWRs, VVERs, BWRs) for the period 2004 - 2006 in the European countries participating in ISOE.

In 2006 the average collective dose per reactor for PWRs and VVERs reached the lowest value since 3 years, at around 0.58 man·Sv per reactor, although the total number of outages during this year has been increasing (102 outages in 2006 against 93 in 2004). Most countries are showing a stable or decreasing trend over the last three years. The average collective dose per reactor for European BWRs has also decreased compared to 2005, with a value at around 0.99 man·Sv, but is still higher than 2004 (0.84 man·Sv) (see Tables 1 to 3).

The evolution of the 3-year rolling average annual collective dose, which provides a better representation of the general trend in dose, shows a light continuity of the decrease for PWRs and VVERs, going from 0.74 man·Sv per reactor for 2002-2004 to 0.65 man·Sv per reactor for 2004-2006 (see Table 4).

Regarding VVERs, the Czech Republic showed the lowest 3-year rolling average annual collective dose per reactor in 2004-2006 with 0.17 man·Sv, followed by the Slovak Republic (0.32 man·Sv), Hungary (0.40 man·Sv) and Finland (0.82 man·Sv) (see Figure 1).

For European PWRs, the data from individual countries shows that with respect to the 3-year rolling average annual collective dose for 2004-2006, three main groups can be distinguished (see Figure 2):

- Belgium, Spain and United Kingdom: 0.3 to 0.4 man·Sv per reactor,
- Slovenia, Sweden, Switzerland and The Netherlands: around 0.5 to 0.6 man·Sv per reactor,
- France and Germany: around 0.7 to 1 man·Sv per reactor.

The trend for BWRs appears to be more stable, with 1.01 man·Sv per reactor for 2002-2004 and 1.00 man·Sv per reactor for 2004-2006 (see Table 5). The 3-year rolling average annual collective doses per reactor for BWRs are quite similar in all European countries, the minimum being Sweden with 0.91 man·Sv, and the maximum Switzerland with 1.08 man·Sv (see Figure 3).

Table 1. PWRs average collective dose per reactor by country from 2004 to 2006

Country	Average coll. dose per reactor (man·Sv)		
	2004	2005	2006
PWR Group:			
Belgium	0.41	0.41	0.39
France	0.79	0.78	0.69
Germany	0.90	1.32	0.86
Netherlands	0.79	0.20	0.62
Slovenia	0.69	0.07	0.86
Spain	0.31	0.42	0.38
Sweden	0.58	0.63	0.51
Switzerland	0.48	0.66	0.35
United Kingdom	0.03	0.36	0.52
PWR Sub-Total	0.71	0.76	0.64
Czech Republic	0.16	0.18	0.15
Finland	1.25	0.38	0.82
Hungary	0.38	0.47	0.35
Slovak Republic	0.29	0.40	0.28
VVER Sub-Total	0.37	0.34	0.31
All PWR Group	0.66	0.69	0.58

Table 2. BWRs average collective dose per reactor by country from 2004 to 2006

Country	Average coll. dose per reactor (man·Sv)		
	2004	2005	2006
BWR Group:			
Finland	0.74	1.14	1.10
Germany	1.06	1.01	1.14
Spain	0.46	2.32	0.41
Sweden	0.63	1.06	1.08
Switzerland	1.44	0.99	0.80
All BWR Group	0.84	1.18	0.99

Table 3. Number of outages versus number of operating PWR and BWR reactors from 2004 to 2006

Country	Number of outages / Number of reactors		
	2004	2005	2006
PWR Group:			
Belgium	6/7	6/7	6/7
France	47/58	52/58	53/58
Germany	11/12	11/11	11/11
Netherlands	1/1	1/1	1/1
Slovenia	1/1	0/1	1/1
Spain	3/7	5/7	5/7
Sweden	3/3	3/3	3/3
Switzerland	3/3	3/3	3/3
United Kingdom	0/1	1/1	1/1
PWR Total	75/93	82/92	84/92
Czech Republic	6/6	6/6	6/6
Finland	2/2	2/2	2/2
Hungary	4/4	4/4	4/4
Slovak Republic	6/6	6/6	6/6
VVER Total	18/18	18/18	18/18
All PWR Group	93/111	100/110	102/110
BWR Group:			
Finland	2/2	2/2	2/2
Germany	6/6	6/6	6/6
Spain	0/2	2/2	0/2
Sweden	8/8	7/7	7/7
Switzerland	2/2	1/2	2/2
All BWR Group	18/20	18/19	17/19

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

Country	Average coll. dose per reactor (man·Sv)		
	2002-04	2003-05	2003-06
PWR Group:			
Belgium	0.40	0.40	0.40
France	0.88	0.82	0.75
Germany	1.06	1.08	1.02
Netherlands	0.47	0.42	0.54
Slovenia	0.69	0.52	0.54
Spain	0.41	0.39	0.37
Sweden	0.54	0.58	0.57
Switzerland	0.44	0.49	0.50
United Kingdom	0.22	0.25	0.31
PWR Sub-Total	0.80	0.76	0.71
Czech Republic	0.18	0.18	0.17
Finland	1.01	0.70	0.82
Hungary	0.65	0.54	0.40
Slovak Republic	0.30	0.33	0.32
VVER Sub-Total	0.44	0.37	0.34
All PWR Group	0.74	0.70	0.65

Table 5. BWRs 3-year average annual collective dose per reactor by country

Country	Average coll. dose per reactor (man·Sv)		
	2002-04	2003-05	2003-06
BWR Group:			
Finland	0.61	0.81	0.99
Germany	0.92	1.00	1.07
Spain	1.40	1.67	1.06
Sweden	1.07	0.97	0.91
Switzerland	1.07	1.16	1.08
All BWR Group	1.01	1.05	1.00

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

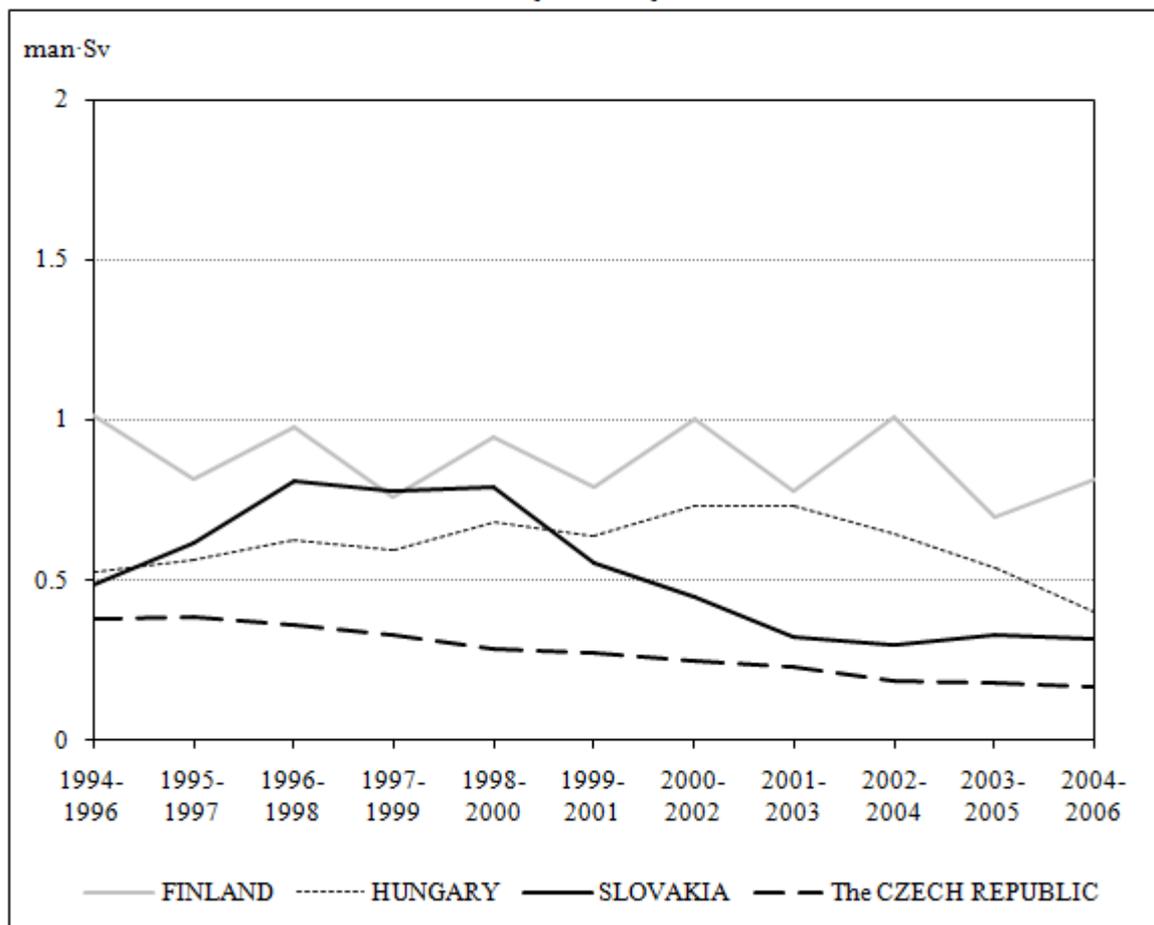


Figure 2. Evolution of the PWRs 3-Years Rolling Average Collective Dose per Reactor by Country

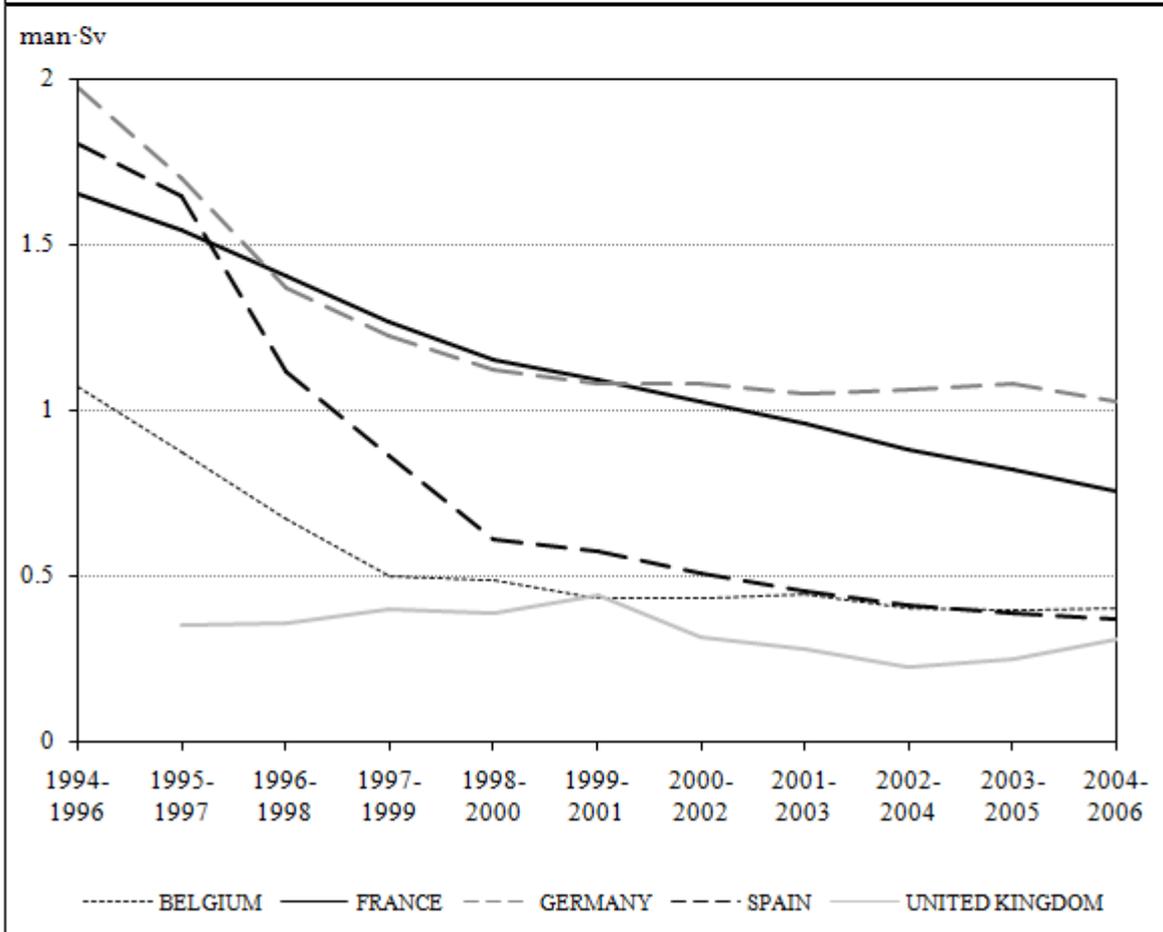
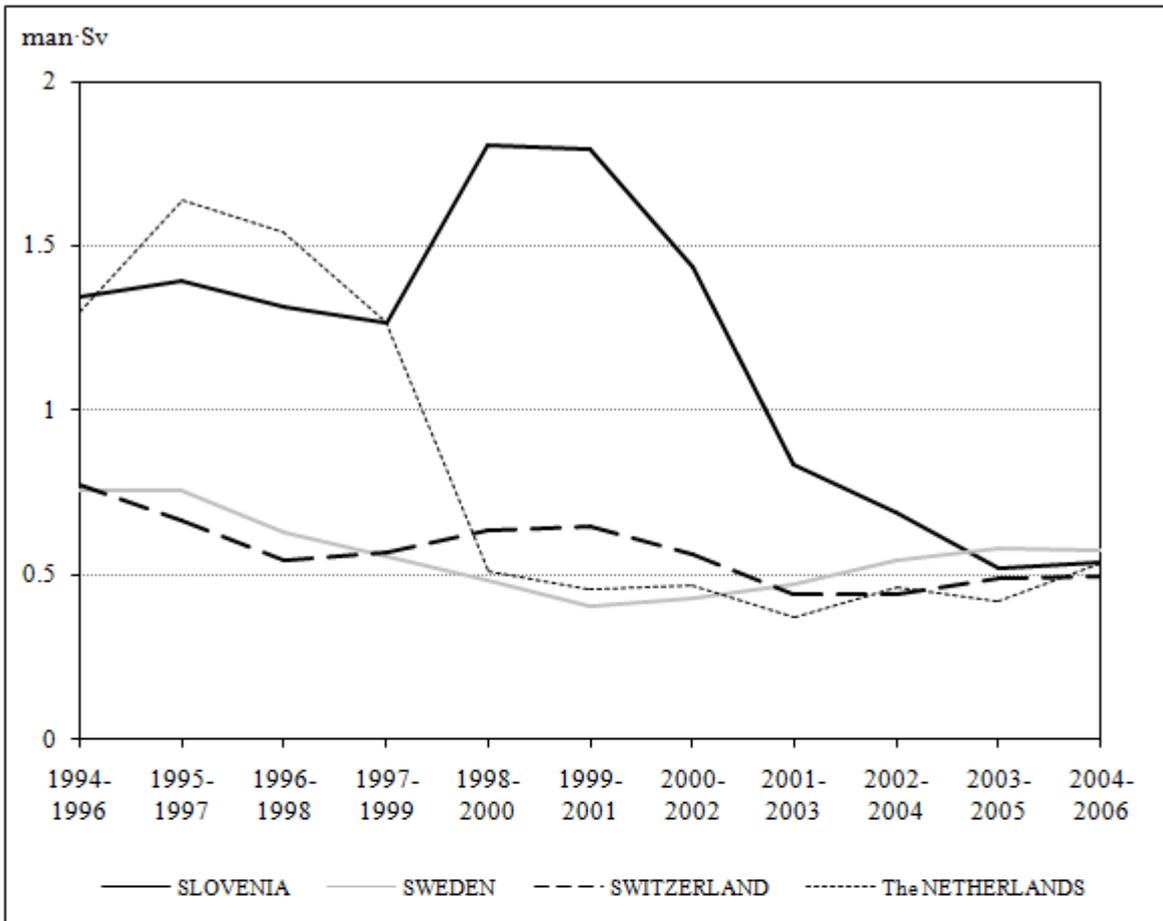


Figure 3. Evolution of the BWRs 3-Years Rolling Average Collective Dose per Reactor by Country

