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# ISOE INFORMATION SHEET

## EUROPEAN DOSIMETRIC RESULTS FOR 2015

ISOE European Technical Centre - Information Sheet No. 60

This ISOE Information Sheet presents the average annual collective doses per reactor (PWRs, VVERs, BWRs) for the period 2013-2015 in the European countries participating in ISOE.

In 2015 the average annual collective dose per reactor for PWRs slightly increased from 0.58 to 0.60 man·Sv, mainly due to Swiss and Belgian results (see Table 1).

Regarding VVER reactors, a slight decrease is observed in terms of average collective dose per reactor from 0.43 to 0.40 man·Sv, mainly due to Finnish and Russian results.

Regarding BWRs, the average annual collective dose per reactor increased from 0.88 to 0.99 man·Sv, mainly due to the Spanish result (outage) (see Table 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 stability of PWR average, a decrease for VVERs and an increase for BWRs (see Tables 3 and 4).

Regarding VVERs, the Czech Republic presents the lowest 3-year rolling average annual collective dose per reactor in 2013-2015 with 0.13 man·Sv per reactor, followed by the Slovak Republic (0.15 man·Sv per reactor), Finland (0.32 man·Sv per reactor), Hungary (0.41 man·Sv per reactor) and Russian Federation (0.56 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 2013-2015, three main groups can be distinguished (see Figure 2):

Belgium, Germany, United Kingdom:

Between 0.2 and 0.3 man·Sv per reactor

Spain, Switzerland, the Netherlands:

around 0.4 man·Sv per reactor

Sweden, France, Slovenia:

between 0.6 and 0.8 man·Sv per reactor

The 3-year rolling average annual collective dose per reactor for BWRs are quite similar in Germany, Sweden and Switzerland around 1 man·Sv per reactor. Finland is presenting the lowest value with 0.35 man·Sv per reactor and Spain the highest value with 1.67 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 Country Report published on the ISOE website ([www.isoe-network.net](http://www.isoe-network.net)).

Table 1. PWRs average annual collective dose per reactor by country from 2013 to 2015

Country (Number of reactors)	Average annual coll. dose per reactor (man-Sv)		
	2013	2014	2015
<b>PWR Group:</b>			
Belgium (7)	0.19	0.25	0.32
France (58)	0.79	0.72	0.71
Germany (7)	0.32	0.16	0.18
Netherlands (1)	0.83	0.23	0.22
Slovenia (1)	1.35	0.11	0.79
Spain (6)	0.39	0.39	0.39
Sweden (3)	0.52	0.72	0.68
Switzerland (3)	0.35	0.26	0.57
United Kingdom (1)	0.39	0.37	0.05
<b>PWR Sub-Total (87)</b>	<b>0.66</b>	<b>0.58</b>	<b>0.60</b>
Czech Republic (6)	0.12	0.11	0.14
Finland (2)	0.27	0.42	0.26
Hungary (4)	0.50	0.39	0.33
Russian Federation (18*)	0.52	0.62	0.56
Slovak Republic (4)	0.13	0.14	0.18
<b>VVER Sub-Total (34)</b>	<b>0.38</b>	<b>0.43</b>	<b>0.40</b>
<b>All PWR Group (121)</b>	<b>0.58</b>	<b>0.54</b>	<b>0.54</b>

\*Russian Federation: 17 reactors in 2013 and 2014;  
18 reactors in 2015

\*All VVER Group: 33 reactors in 2013 and 2014;  
34 reactors in 2015

\*All PWR Group: 120 reactors in 2013 and 2014;  
121 reactors in 2015

Table 2. BWRs average annual collective dose per reactor by country from 2013 to 2015

Country (Number of reactors)	Average annual coll. dose per reactor (man-Sv)		
	2013	2014	2015
<b>BWR Group:</b>			
Finland (2)	0.32	0.32	0.40
Germany (2)	1.09	1.16	1.11
Spain (1)	2.25	0.29	2.47
Sweden (7)	0.71	0.94	0.83
Switzerland (2)	1.11	1.23	1.23
<b>All BWR Group (14)</b>	<b>0.88</b>	<b>0.88</b>	<b>0.99</b>

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

Country	Average annual coll. dose per reactor (man-Sv)		
	2011-13	2012-14	2013-15
<b>PWR Group:</b>			
Belgium	0.30	0.26	0.25
France	0.73	0.73	0.74
Germany	0.32	0.23	0.22
Netherlands	0.48	0.46	0.43
Slovenia	0.77	0.78	0.75
Spain	0.45	0.42	0.39
Sweden	0.83	0.59	0.64
Switzerland	0.38	0.35	0.39
United Kingdom	0.32	0.26	0.27
<b>PWR Sub-Total</b>	<b>0.62</b>	<b>0.60</b>	<b>0.61</b>
Czech Republic	0.12	0.12	0.13
Finland	0.49	0.51	0.32
Hungary	0.51	0.45	0.41
Russian Federation	0.60	0.58	0.56
Slovak Republic	0.15	0.15	0.15
<b>VVER Sub-Total</b>	<b>0.44</b>	<b>0.43</b>	<b>0.40</b>
<b>All PWR Group</b>	<b>0.57</b>	<b>0.56</b>	<b>0.55</b>

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

Country	Average annual coll. dose per reactor (man-Sv)		
	2011-13	2012-14	2013-15
<b>BWR Group:</b>			
Finland	0.39	0.33	0.35
Germany	0.92	1.11	1.12
Spain	1.50	0.93	1.67
Sweden	0.82	0.77	0.83
Switzerland	1.23	1.28	1.19
<b>All BWR Group</b>	<b>0.86</b>	<b>0.83</b>	<b>0.91</b>

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

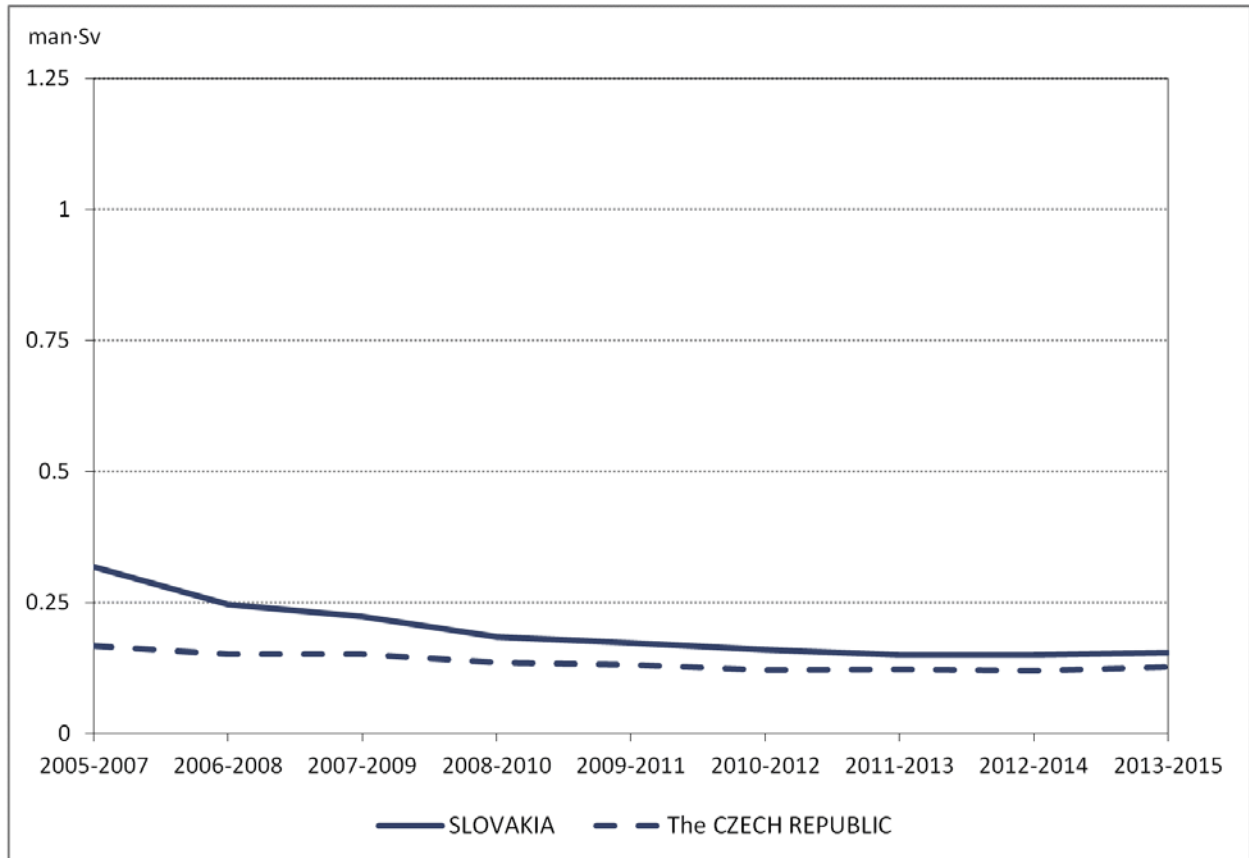
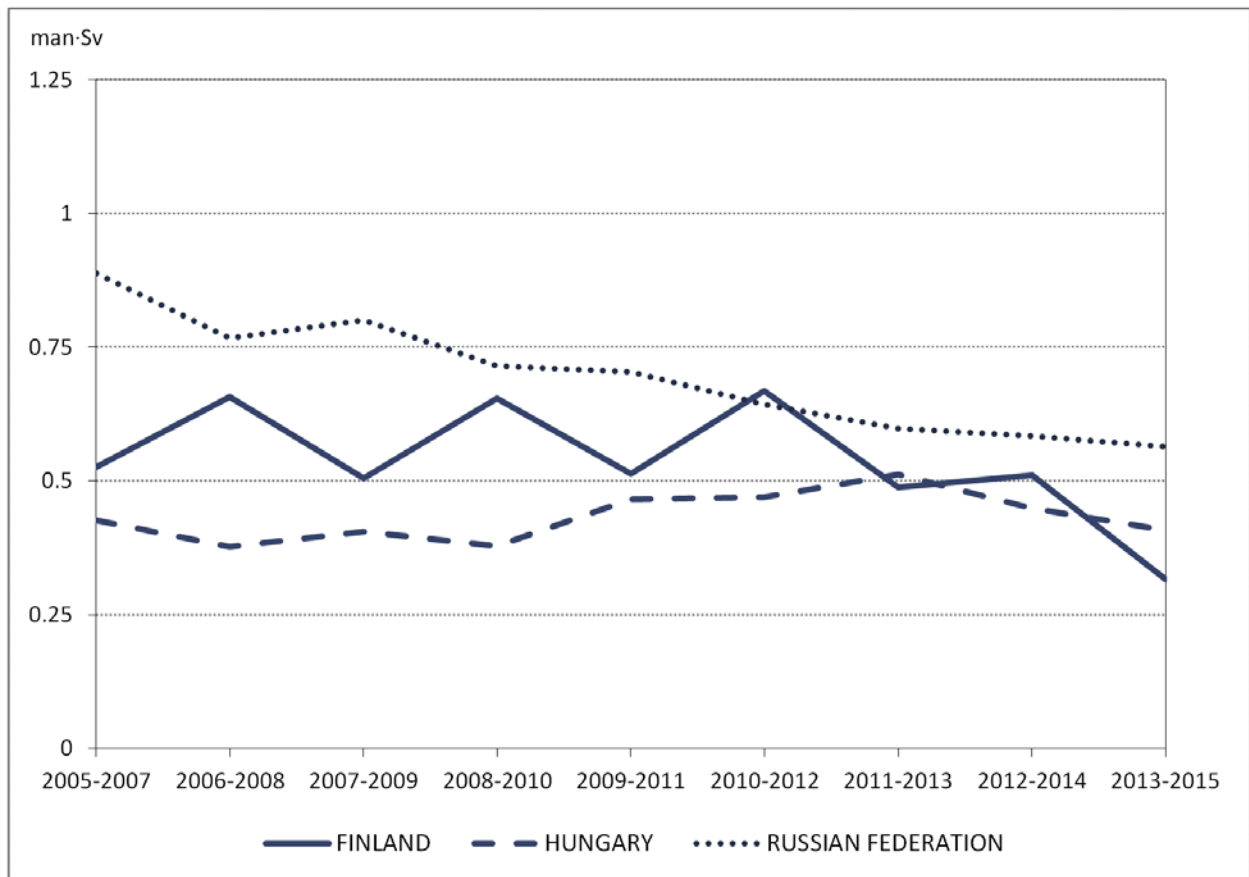


Figure 2. Evolution of the PWRs 3-Year Rolling Average Collective Dose per Reactor by Country

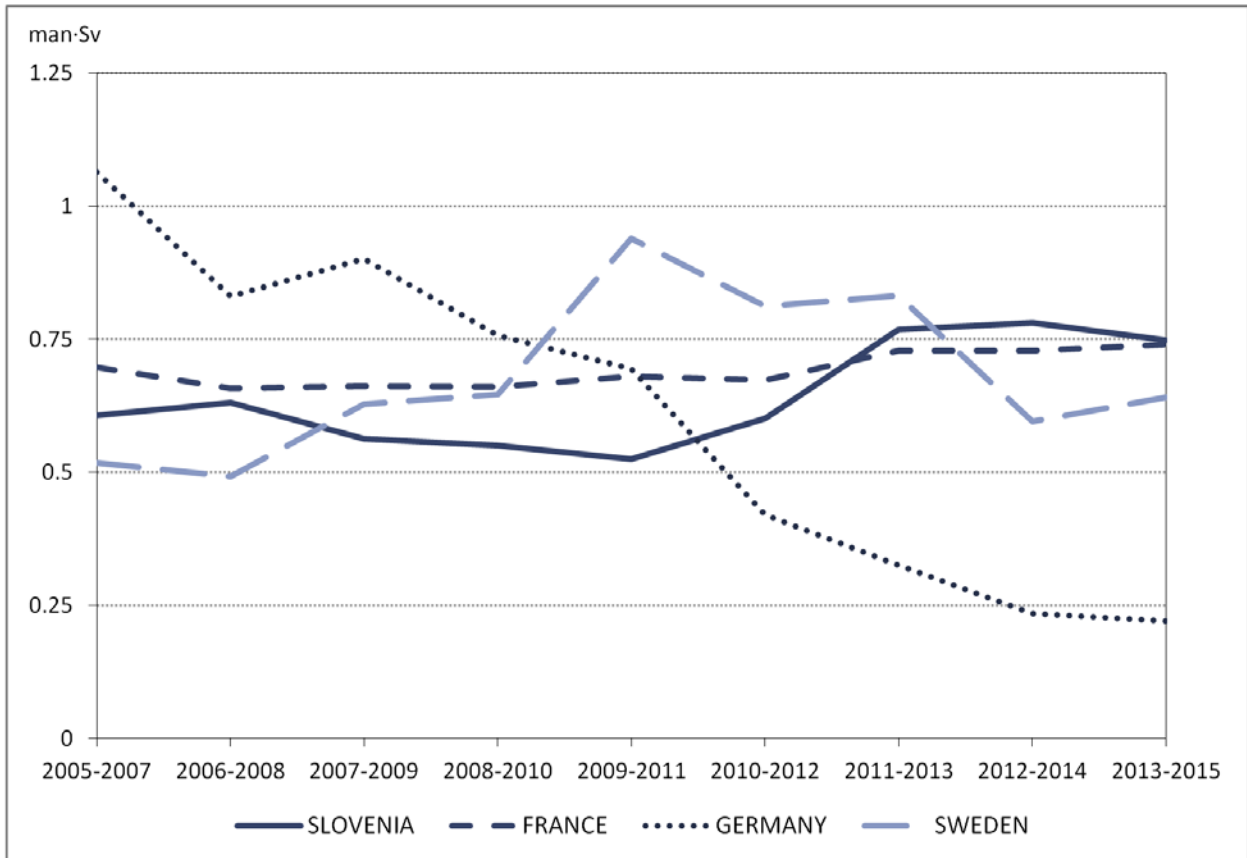
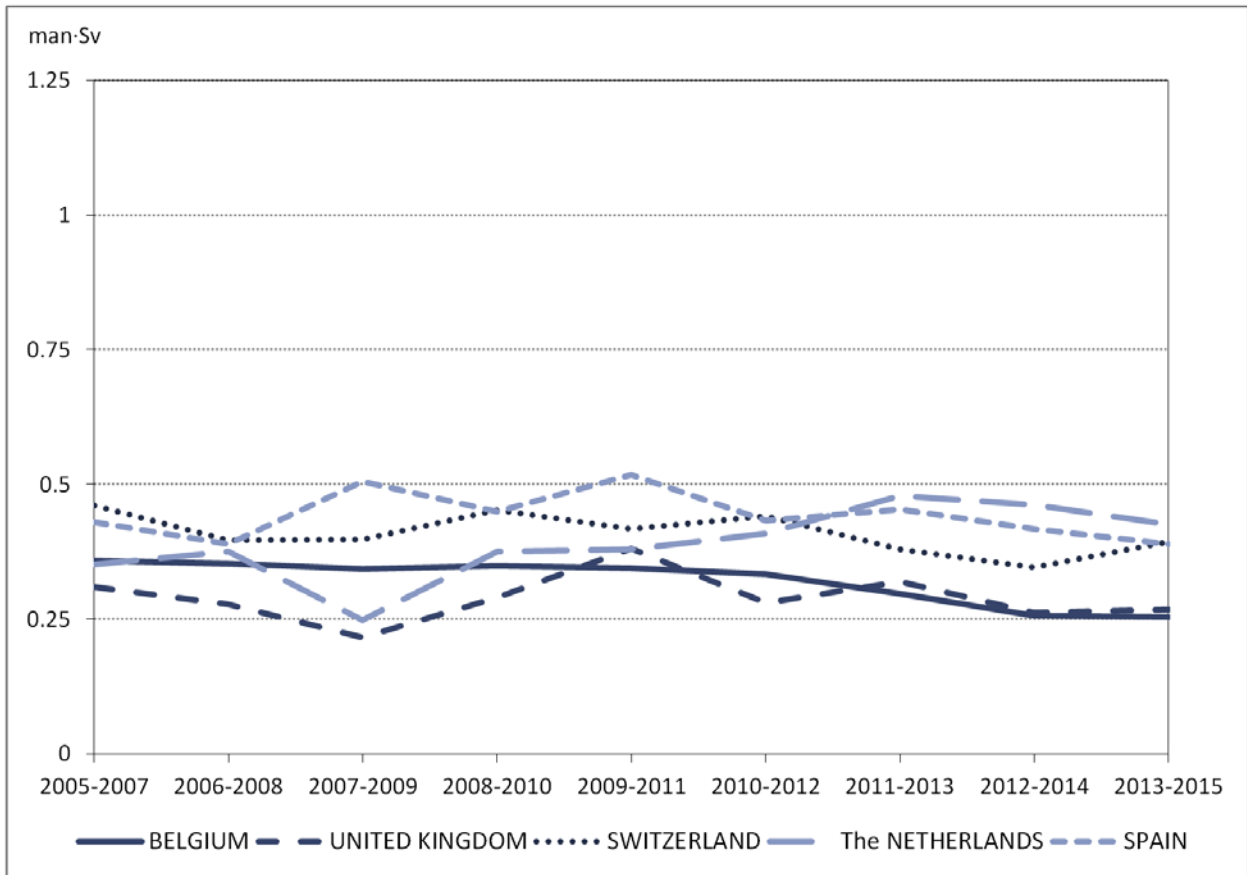


Figure 3. Evolution of the BWRs 3-Year Rolling Average Collective Dose per Reactor by Country

