

# **PUBLIC OPINION ON RADIOACTIVE WASTE MANAGEMENT IN THE EUROPEAN UNION**

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## **ABSTRACT**

In 1998 the European Commission conducted a survey to determine the interest, knowledge and feelings of the European citizens about radioactive waste and its management. The results show that the population of the Union is very interested in how waste is managed, but rather poorly informed and very worried about it. There are some significant regional variations. There are also some clear messages for governments and the waste management agencies.

### **The Eurobarometer Survey**

In October/November 1998, the European Commission conducted an opinion survey on radioactive waste management as part of the Eurobarometer series. The service responsible was DG XI – the Directorate-General for the Environment. Full details of Eurobarometer surveys can be obtained on the web site of DG X – the Directorate-General for Information, Communication, Culture and Audiovisual Media.

In each country of the European Union, questions concerning radioactive waste were put to a totally random selection of people. On average, around 1000 people (minimum age 15 years) were questioned in each Member State (2000 in Germany, 1300 in the UK and 600 in Luxembourg). This gave a representative cross section of the population of the Union.

This was the first survey of its kind, specifically concerning radioactive waste, undertaken by the Commission. For this reason, a relatively wide range of questions was put. These can generally be grouped into five areas.

The first area covered how well people thought they were informed about radioactive waste and also tried to identify the preferred sources of information. The second examined actual knowledge about radioactive waste, including questions about which country in the EU produced most radioactive wastes, what quantities of waste are produced, the sources of the waste and some of the characteristics of the waste.

The third part covered the public's views on different aspects of radioactive waste management. It tried to establish how interested people are about radioactive waste and what are their main concerns. It examined if people are more worried about what happens to radioactive waste in their own country, in other countries of the Union or in those countries that have applied to join the Union. It also raised the issue of the movement of wastes between states, in particular the willingness to store radioactive waste from other countries.

There was a section specifically related to geologic disposal of high level and long-lived radioactive waste. This included questions concerning willingness to dispose of wastes originating in other countries, how close people were willing to live to a repository, siting procedures and the main concerns about a repository.

Finally, there were questions concerning which generation, present or future, should be

responsible for decisions on waste disposal and the possible role for the European Union in this area.

For each question, a breakdown of the replies is available by country and, within each country, by age, education, sex, employment status, profession, income brackets and environment (rural, town, city).

### **How well informed does the average European Citizen think he is about radioactive waste?**

Answer: Not very well.

Around 20% think they are well informed, though of these only 1 in 10 (2% of the total population) think they are “very well” informed while the remaining 9 out of 10 say “fairly well”. This contrasts with 44% saying that they are “poorly” informed and 32% saying “not at all” informed. There is a very significant regional variation with people in the Netherlands, Finland and Sweden feeling best informed (over 30% in each case) down to around 10% of the people in Portugal.

At first glance, this could be explained by better information in countries with nuclear power plants. However, less than 12% of the people in Spain felt themselves well informed and France and Belgium also came below the 20% average. On the other hand, Denmark exceeded 30%. – with only 12% saying they were not at all informed. There were no very major socio-demographic variations, though the higher educated and higher paid generally believed themselves to be better informed.

In response to a question concerning their preferred sources for additional information on wastes in their country, the most popular choice was the government (45%) closely followed by the media (43%). Independent scientists came third (36%) while national waste management agencies (35%) narrowly beat NGOs (34%). Only 22% wanted more information from the Commission services with a similar number ready to take information from waste producers. Political parties – at 11% - were the least popular source. Again there were some surprising regional variations. For example, nearly 60% of the Irish preferred information from their government – while this was the case for only 30% of the people in Italy. Possibly a more surprising statistic is that NGOs were more popular in Belgium than in any other country (with 46% of the people) and least popular in Denmark (22%). Belgians also have most faith in the media (62%) while the Spanish seem to have least trust in their waste agency as a source of information (19% compared to the EU average of 35%).

Interestingly, when asked who they would look to for information on wastes in other countries, government sources were much less popular (19%) – below 10% in Italy. The preferred source was the media (35%) and the Commission services improved their rating (30%). In fact, in a number of countries the Commission was rated higher than the media as a source.

### **So how much do European citizens actually know about radioactive waste?**

Answer: Not a lot!

Asked who produced more radioactive waste in the Union, 45% did not know. This varied from 20% in Denmark to over 60% in Spain. One person in four (24%) identified France, one in five Germany (20%) and one in fourteen (7%) the UK. There were some remarkable variations. The Irish clearly believe that the UK is the greatest producer of waste (39% said UK, 13% said Germany and only 7% said France). The British people agreed that they were the major

producer, though by a less clear margin. For every person who identified France as the biggest producer, two in Spain and Greece – and three in Portugal - identified Germany. The Danes also identified the Germans as the biggest producer. The Finns and the Swedes put France and Germany on a par – so did the French! Only the Germans, the Dutch and the Austrians clearly identified France as the biggest producer.

Asked if they had any idea as to how much radioactive waste is produced per capita each year in the EU, 63% said “no”. Given a range of possible quantities, only 7% opted for the lowest amount (below one litre/year). This is actually the correct answer. One in four (25%) guessed at between one litre and 100 litres and 5% guessed at above 100 litres. One of the main messages of the nuclear sector concerns the small quantities of waste it produces. This does not appear to have got across to the public. The most accurate answers came from the Netherlands and Denmark (over 15% identified correct range). Only one percent of the people in Spain gave the correct answer and a massive 84% had “no idea”. Portugal, Greece and Ireland also had low score.

There then followed a series of “true or false” statements concerning radioactive waste. The results of these are summarised in the following table (DK = “don’t know”):

STATEMENT	TRUE	FALSE	DK
Only nuclear power plants produce radioactive waste	21	65	14
Radioactive wastes are produced by industry in general	57	27	16
Hospitals produce radioactive waste	69	12	18
All uses of radioactive material result in radioactive waste	74	9	18
There are many sorts of radioactive waste	75	3	21
All radioactive wastes are very dangerous	79	10	11

The “good news” appears to be that only a minority - one in five - believes nuclear power plants to be the only source of radioactive wastes. The “bad news” is that four out of five believe all radioactive wastes to be very dangerous. Again there were strong regional variations. While 93% of the Dutch know that hospitals produce radioactive waste, slightly less than half of the Germans knows it. Only 50% of the people in the Netherlands think all radioactive waste is very dangerous while 96% of the people in Greece think that they are (as do 86% of the people in France). Portugal, Spain and Ireland had the most “don’t knows”. The Dutch, followed by the Scandinavian countries generally had the smallest number.

Asked what they think was done with radioactive waste produced in their country the average European believes that they are stored temporarily while waiting for a decision. This question did not distinguish between different classes of waste. The person interviewed could chose between 5 different options. They could chose more than one option. The results are summarised below:

What is done with most of the radioactive waste in your country	%
Disposed of at sea	26
Buried at or near surface	12
Disposed of deep below ground	35
Sent to other countries	27
Stored temporarily while waiting for a decision	44
Other methods	3
Don’t know	17

What is most startling here is that one in every four Europeans believe that radioactive waste is disposed of in the sea – a practice not used since 1983. A massive 64% of the people in

Greece think that this is the case and 44% of the people in Ireland. What is possible even more surprising is that 40% of the people in the UK think that sea dumping is still practised.

Only 12% know that waste is disposed of by shallow surface methods. This, of course, is a widely used well established procedure by which Member States commonly dispose of by far the greater part of their radioactive wastes. The French appeared to be the best informed on this subject, but even then only 20% identified this as a disposal route.

Thirty five percent believe them to be disposed of deep under the earth. While this is presently true in Germany (though only 25% of Germans gave this as an answer), it is certainly not true in the UK and France where over half the population think it is!

Twenty seven percent think that their country exports its radioactive waste. Over 50% of the people in Denmark and Luxembourg gave this answer, as did close to 50% of the Dutch and over 40% of the Germans. Rather surprisingly, 36% of the Finns and Swedes thought that their country exported at least some of its waste.

While over 70% of the Germans and the Dutch identified temporary storage as a management route in their country, less than 30% of the people in the UK and 24% of the people in Spain did.

It would appear that many people do not have a clear idea what really happens to radioactive waste in their country. We might have helped if we had asked how the different classes of waste are managed, rather than lumping them all together – but we doubt this. What probably causes the confusion is the mixing in people’s minds of actual practices, past practices (sea dumping) and future plans (deep geological disposal).

**The management of radioactive wastes**

The people were then questioned about their specific concerns about radioactive waste management. What worried them about radioactive waste? But first, they were asked how interested they were about radioactive waste management in their own and other countries. The results are summarised in the following table:

<b>Question</b>	<b>Very Interested or Interested</b>	<b>Little interest or No interest</b>
Are you interested in the management of wastes in your country	79%	17%
Are you interested in the management of wastes in other countries of the EU	70%	25%
Are you interested in the management of waste in the Applicant States	69%	26%

There was relatively little variation from country to country here, though the Greeks tended to have the strongest interest while the Danes and the Dutch expressed least. One out of every ten people interviewed in Austria did not know if they were interested – or not!

People were then asked how worried they were about management of wastes in the three areas:

<b>Question</b>	<b>Very Worried or Worried</b>	<b>Little worried or No worried</b>
Are you worried about the management of wastes in	76%	21%

your country

Are you worried by the management of wastes in other countries of the EU	74%	21%
Are you worried by the management of waste in the Applicant States	76%	18%

Here there was considerably more regional variation. The most worried about management of wastes in their own country were the Greeks followed by the Italians and the Spanish. The least concerned were the Swedes, followed by the Dutch and the Finns. A similar regional pattern emerges about concerns over radioactive waste management in other Member States.

Concerns over how waste is managed in the Applicant States are strongest in Sweden, Greece, France, Finland and Austria. Portugal, Spain and Denmark appear to be least concerned. There is, as would be expected, a reasonable correlation between proximity to the source and concern.

There then followed three key questions.

***Should your country store temporarily radioactive wastes for other Member States?***

***Should your country treat radioactive waste for other Member States?***

***Should your country be ready to dispose of radioactive waste from other Member States?***

(In each case assume the other State is willing to pay for the service).

The responses were clear:

<b>Question</b>	<b>Yes</b>	<b>No</b>
Store wastes for others	7%	86%
Treat waste for others	13%	78%
Dispose of waste for others	12%	80%

These results came as no real surprise and, we have no doubt, will be used by many to justify an “our waste only” approach to management and disposal.

However, there are some interesting variations. We cannot really understand why people are more willing to dispose of others waste rather than temporarily store it. Is it because disposal is seen as a safer option than storage?

The Netherlands turned out to be the most Community-minded with 35% of the population being ready to dispose of other people’s waste. Portugal came second with 19%. Germany, France, Sweden and Denmark were slightly more favourable than the Community average. Sweden was the Member State most willing to store other people waste (with 14% in favour).

By far the strongest negative reactions came from Greece and Ireland. Belgium and Denmark were also particularly strongly opposed to temporary storage of other people’s waste.

***Why haven’t we disposed of high-level radioactive waste?***

Three-quarters of the population (75%) think that no Member States had yet managed to dispose of high level radioactive waste because there is no way to do it. A very similar percentage (76%) thinks that this failure has a negative impact on the image of nuclear energy. This view is particularly common in Sweden, the Netherlands and Denmark.

Over 80% realise that it is difficult and politically unpopular to take decisions concerning the disposal of any toxic wastes. The Danes, the Dutch and the Swedes were particularly conscious of this problem.

Only half the population agreed with the suggestion that the delay in disposal was a result of careful study of all the options before taking a decision. However, the Dutch were more favourable to this position (74%), as were the Swedes (66%).

Portugal and Spain had by far the greatest number of “don’t knows” in response to these questions.

### **Should there be regional repositories or should each dispose of his own waste?**

The answer to this question was a very large majority (75%) in favour of each disposing of their own waste with only 12% in favour of a smaller number of regional repositories. However, over 20% of the Danes, the Dutch and the Germans favoured regional repositories followed by Sweden (20%) and Finland (19%). Spain, Portugal, Italy, Greece and Ireland were most against regional repositories, which, in the case of many of these countries is quite surprising as they would probably have the most to gain by others taking their waste (while few would expect them to host a geological repository).

Asked their opinion on the steps that should be taken before deciding on a site, the interviewees placed the options in the following order of preference:

- Keep the public informed
- Do a detailed environmental impact assessment
- Consult the population near the chosen site
- Consult medical experts
- Assure transparency in choice of site and technologies to be used
- Consult independent scientists
- Consult the environment protection societies.

However, it must be stressed that all these options scored highly – none less than 86%! Regional variations do exist but are not pronounced. The clear message is that all these actions are very important.

### ***How close would you be willing to live to a geological repository?***

Less than 1% of the population is willing to live within 1 km of a repository (3% in Denmark, the Netherlands and Sweden). Three percent are willing to live within 10km and a further 5% within 50 km and another 8% within 100km. Over 40% do not want to live within 1000km of a repository and 15% say there is no minimum distance that they would accept between themselves and a repository!

Close to 40% of the people in the Netherlands, 33% in Finland, 28% in Denmark and 25% in Sweden are willing to live within 100km of a repository. On the other hand only 2% of the people in Greece, 5% in Spain, and 7% in Ireland would be willing to live at such a distance. In fact, over 40% of the Greeks and over 30% of the Irish do not want any repositories.

### ***What are the potential problems that would concern you about a repository being built in your vicinity?***

Five possible concerns were listed to which the interviewee could respond. The following

table summarises the result.

<b>Possible concern</b>	<b>Very worried + Worried</b>	<b>Little worried + Not worried</b>
Transport to the site	66 + 24 = 90%	7 + 1 = 8%
Effect on health	74 + 19 = 93%	5 + 1 = 6%
Effects on the local environment	71 + 21 = 92%	5 + 1 = 6%
Problems for future generations	67 + 23 = 90%	6 + 1 = 7%
Impact on property prices	50 + 21 = 71%	15 + 10 = 25%

The Greeks (99%) and the Irish (96%) are the most worried about waste transport to the repository. The Swedes show the least concern, but even there over 50% are “very worried”.

The Greeks are also the most worried about the effects of health (with 95% very worried and 5% worried). Ireland, Italy, Spain, Portugal and the UK all score above 95%. The Swedes again are the least worried with only 44% being “very worried” and 21% saying “little worried”.

The Greeks are also the most worried about the effect on the local environment (99%) followed by Italy (96%), Ireland and UK (both 95%). The Swedes again show the least concern (74%).

Greece, Ireland and the UK again expressed the greatest concern (97%, 95% and 94% respectively). Sweden again least worried (79%).

The UK (87%), Ireland (85%) and Sweden (80%) are the most concerned about the impact of a repository on property prices. Austria (58%), Germany and Belgium (both 63%) are the least concerned about this aspect.

### **Responsibilities for radioactive waste management**

The present generation gains benefits from the electricity generated by nuclear power stations. Who should be responsible for finding and implementing a solution for the management of radioactive wastes from these stations? Three replies were possible.

#### **Who should be responsible for finding a solution**

The present generation	54%
The future generations	6%
Both	35%

The Danes were most in favour of the present generation finding and implementing a solution (70%) closely followed by the Finns (69%) and the Irish (67%). A very surprisingly small percentage of Belgians (22%) supported this proposition.

Belgium (65%), France (43%) and Luxembourg (40%) were the countries most in favour of both present and future generations finding and implementing a solution.

Belgium (9%) was the country with most support for delaying a solution until future generations, though it is clear that no Member State favoured this option.

Finally, the people were asked if they would be reassured if the European Union set the rule for the treatment and safety of radioactive wastes. Over 68% said that they would be more reassured while 21% said they would not be more reassured. Ten percent did not know.

There were some very interesting variations from one Member State to another.

All countries said they would be more reassured if the Union set the rules. In Denmark, the margin between those that would be more reassured (46.5%) and those that would not (46.2%) was very small. However in some other countries such as Italy (87% against 5%), Spain (85% against 8%), France (80% against 15%) and Portugal (78% against 10%) the margin was very large in favour of greater European Union involvement in regulating radioactive waste management.

### **Socio-demographic Variations**

While we have a detailed breakdown of all the data, we have not done a detailed analysis of the socio-demographic variations. A few generalisations can easily be made.

Men do appear to be slightly better informed than women about nuclear issues. They are also a little more interested and less worried about them.

People with higher levels of education, professional status and salaries are best informed, more interested and least worried.

However, at first glance the differences between the groups are not that strong. A more detailed study would need to be made of the data before any conclusions are drawn concerning socio-demographic variations.

### **Conclusions**

The citizens of the European Union are people are worried about radioactive waste management both inside and outside the Union. Most are very interested in knowing more radioactive waste management – in their own country, within the Union and in the Applicant States. However, only one in five feel that they are presently adequately informed. The Member States in the Northeast are usually much better informed than those in the Southwest.

The government and the media are the sources most looked to by the public for more information about radioactive waste, in particular in their own countries. The waste management agencies are also expected to play an important role. The Commission services should be active in providing information on radioactive waste management in other countries.

The message that nuclear power produces very small quantities of waste does not seem to have been accepted by the public. Only 7% of the population guessed that the volume of waste per person per year is below one litre (it is in fact below 200ml). Those who did guess were often out by two orders of magnitude or more. The people in Spain seemed particularly poorly informed.

While most people know that radioactive waste has other sources than nuclear power plants, the large majority believe that all the waste is very dangerous. One person in ten in the Union realises that shallow land burial is a technique for radioactive waste disposal. Unfortunately, too many believe that radioactive waste is still disposed of at sea or it is exported to other countries.

Most people do not want their country to store, treat or dispose of waste from other countries. Interestingly more are against temporary storage than disposal. Could this indicate that the public sees temporary storage as the more dangerous? Some Member States are less negative

to the idea than others. One person in three in the Netherlands would be ready to dispose of waste from another Member State. However, three-quarters of the population think each State should dispose of its own waste.

Less than twenty percent of Europeans are willing to live within 100 km of a repository. Over 40% do not want to live within 1000 km of a repository. Fifteen percent do not want any repositories at all.

It is very difficult to reconcile views where people think that their country should dispose of its own waste – but the majority of the population do not want to live within 1000km of a repository. What happens in the smaller countries with nuclear power plants? Whatever does happen, it is vitally important to establish and maintain a full and open dialogue with the public when siting a repository. Environmental impact assessments can play a major role here.

Very few people want to leave the problem of high level waste for future generations to solve. They either want this generation to solve it or to share the responsibility with a future generation. Most understand the difficulty politicians have in reaching decisions on disposal sites for any form of toxic wastes. Too many believe we do not yet have a solution for disposal - and too few believe that the delay is to allow us time to study carefully the different options. We believe that the message here is that further delay will only make matters worse and solutions more difficult to implement.