

Public Opinion about Nuclear Energy – Year 2021 Poll

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ABSTRACT

Public information activities of the Nuclear Training Centre ICJT at the Jožef Stefan Institute started 28 years ago. We inform the visitors about nuclear energy in general and about Krško Nuclear Power Plant by live lectures, by an exhibition and by radioactivity workshops.

The main target group of information activities are schoolchildren and their teachers. Most of them are from the 8th and 9th grade of elementary school, aged 14 to 15. The visitors can choose between live lectures on nuclear technologies (fission and fusion), a lecture about use of radiation in medicine, industry and science and a lecture on stable isotopes. For younger visitors, a lecture about energy and an energy workshop is available. The visit includes a demonstration of radioactivity and a guided tour of a permanent exhibition.

In the pre-Covid-19 decade, we had close to 8000 visitors per year and we monitored the opinion trends by polling some 1000 youngsters every year. The poll was always conducted before the lecture or visiting the exhibition, in order to obtain an unbiased opinion. There are 10 questions in the poll and they remained unchanged for several years in order to follow the trends. In the year 2021, we performed majority of the visits by a video conference system and polled 786 listeners/visitors of total 1556. Despite lower statistical accuracy, we observed no major change in public opinion compared to previous years.

As always, this year's poll results show poor comprehension of nuclear energy, radiation and radioactive waste. A relative majority of youngsters consistently recognizes that NPP Krško would be difficult to replace by renewables. More youngsters are in favour of the second unit of NPP Krško than against it.

1 INTRODUCTION

Each year since 1993 we send invitations to all elementary and high schools in Slovenia to visit the ICJT Information Centre. The response of schools and the coverage of communities in Slovenia is reasonably good (Figure 1).

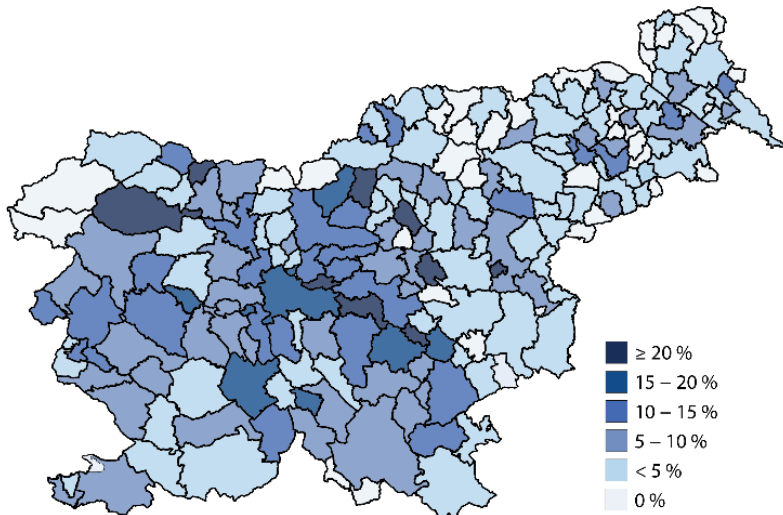


Figure 1: Percentage of population of local communities that have visited ICJT since 1993

The mainstays of the visit are a live lecture about nuclear energy, explanation of basic facts of radioactivity in a demonstration lab and a guided tour of the permanent exhibition about nuclear technology. The bilingual (Slovenian/English) “Mini Encyclopaedia of Nuclear Energy” is freely available for every visitor. Interested visitors can tour the research reactor TRIGA and/or the Tandetron ion accelerator on site. The depth of explanation is adapted to the level of visitors.

The poll has been conducted and the results have been reported for 28 years [1, 2] using several basic questions derived from the early public opinion research of the Faculty of Social Sciences in Ljubljana thirty-five years ago [3] with some questions updated in 2004 and 2008. The average results in the interval 1993 (or 2004, 2008, respectively) – 2018 and their standard deviation represent the “baseline” for comparison with the results from the last 3 years’ polling.

We conduct the poll every spring and always at the beginning of the visit to obtain unbiased opinions based on the knowledge from the school and everyday life.

In the initial years, polling of youngsters using paper questionnaires may have seemed inferior to polling of adult population by interviewers using stationary phones. Arguably, the results of our polling in recent years may carry more weight than the traditional stationary phone polling, due to the following reasons:

- Stationary phones are practically obsolete,
- The willingness to answer in a phone survey is decreasing and the sample in the survey may no longer be representative, rendering the poll results unreliable,
- In our case all the visiting youngsters are polled unselectively (the only selection being the visit of a certain school which does not influence much the individuals’ opinion within the group),
- The statistical weight of our results (approximately 1000 persons per poll, 786 persons in 2021) considerably exceeds the weight of a traditional stationary phone poll (400-600 persons per poll).

In 2021, due to specific Covid-19 conditions, the poll was conducted using a web application.

The polling of youngsters is not representative for the general population of Slovenia. Their perception of risks may be more relaxed than the perception of the adults. Still, their positions reflect opinions they hear in their families and media information. As already stated, the important point is that the unselective sampling method introduces no bias in terms of polled population.

Figure 2 shows the age distribution of polled population. The share of 19+ polled persons in 2021 is considerably higher in comparison with the 2004-2018 average due to a group of adult listeners in time of the poll.

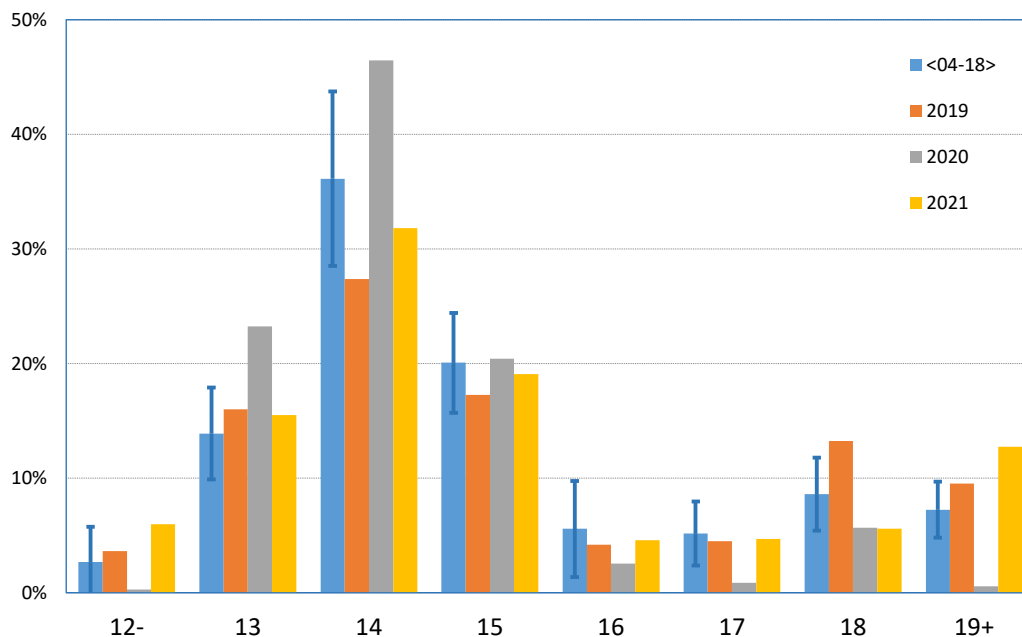


Figure 2: Age distribution of polled population

2 RESULTS OF THE 2021 POLL

Due to the lower number of visitors/listeners in spring 2021, we polled 786 listeners (47 % female and 53 % male) between January 1st and July 4th. Graphs and comments according to the questions in the questionnaire show the results divided into five groups covering:

- General relative perceptions of risks and environmental dangers,
- Knowledge and understanding of several basic facts of nuclear energy and radioactive waste,
- Reasons for/against nuclear energy
- Agreement with the potential unit 2 of NPP Krško and awareness about the limitations of other sources of electricity,
- Position towards nuclear energy and sources of information.

Our observation is, that neglecting scatter in the results, the opinion of youngsters turns out surprisingly consistent over 28 years of polling implying some mid-term stability regardless of changes or events (e.g. Fukushima accident in Japan in 2011) in the nuclear sphere.

2.1 General questions about risks, environment and acceptability

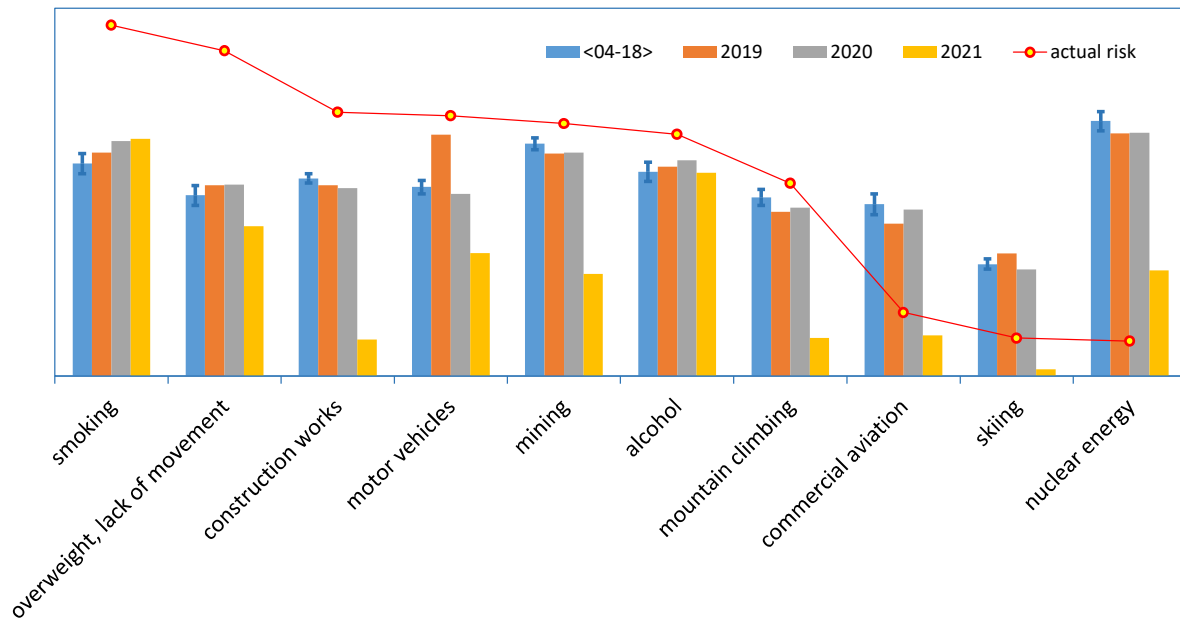


Figure 3: Ranking of human activities by perception of risk
(Actual risk based on calculated Loss of Life Expectancy [4])

Until the last year the data for the graph was obtained by ranking the risks on paper questionnaires. Due to polling using a web application in 2021 it was more practical to change from ranking to choosing three most risky activities. This introduced changes in the graph. Smoking and alcohol were obviously chosen as very risky activities and kept their values, while perception of other risks substantially changed as compared to risks based on Loss of Life Expectancy [4]. Disparity between the actual risk and the perceived risk used to be consistently highest for nuclear energy (Figure 3), like in most countries. A group of adult listeners effectively “lowered” the perceived risk of nuclear energy.

2.2 Understanding basic facts about nuclear energy, radiation and radioactive waste

Respondents have to answer whether some statements about nuclear energy are true or false. For the left half of statements, the correct answer is “true”, and for the right half, the correct answer is “false” (in the actual paper questionnaire, the statements are given in random order). Figure 4 shows the percentage of agreement (belief) with respective statements. Several results are disappointing and do not change much over the years. Some 50% of respondents believe that radiation from radioactive waste (RW) repository is detectable 1 km from the site and 30% think that NPPs cause acid rain. Less than 30% know that NPPs do not contribute to the greenhouse effect. This is probably due to lack of information about nuclear energy and radioactivity in the elementary school curriculum.

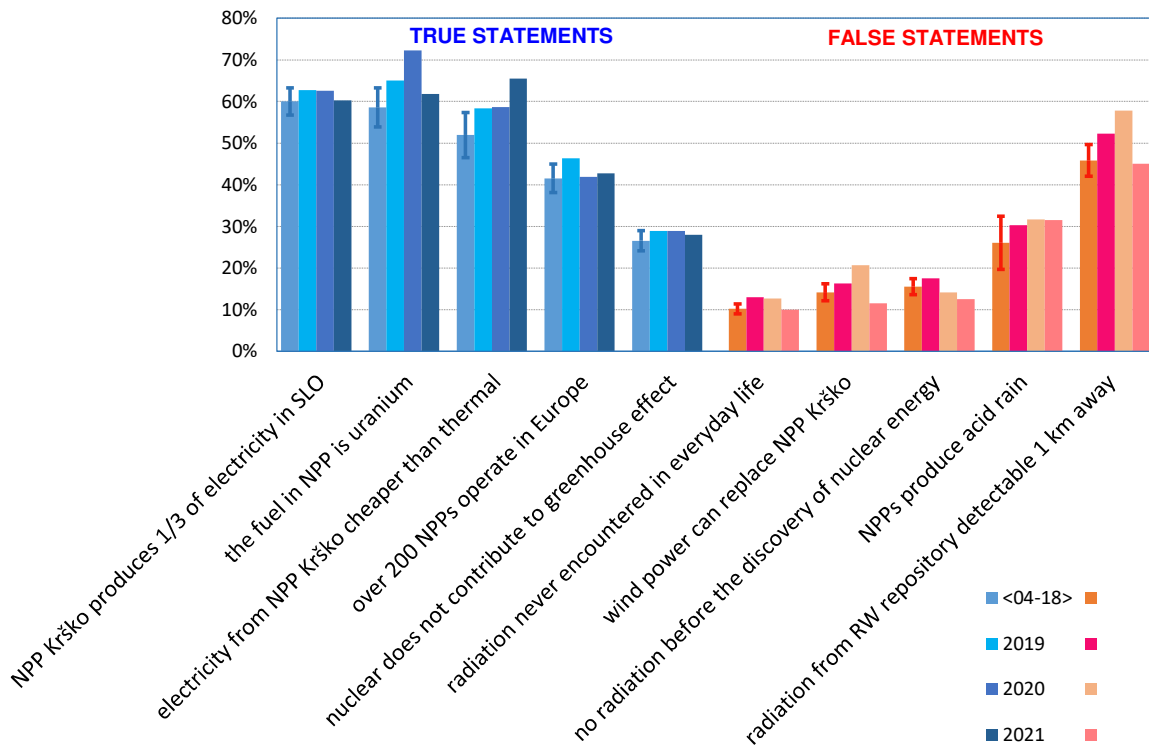


Figure 4: Agreement with the statements – knowledge about nuclear energy

On the other hand, most youngsters know that NPP Krško produces 1/3 of electricity in Slovenia, which is cheaper than electricity produced in thermal power plants. This is probably due to unproblematic operation of NPP Krško where economic news prevails in the media.

2.3 Reasons for/against nuclear energy

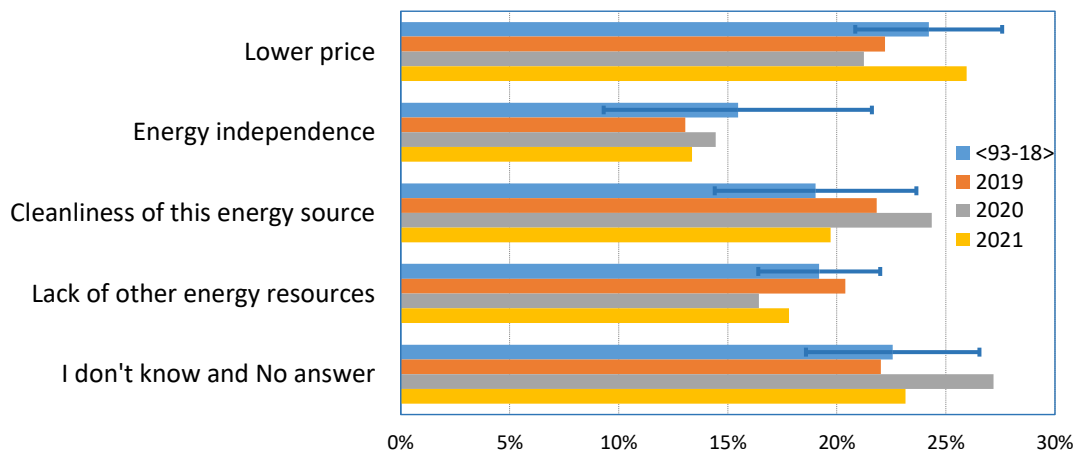


Figure 5: What are the reasons for use of nuclear energy? (One answer possible)

In general, lower price stands out (Figure 5) in spite of the high scatter in the results. This is consistent with the result in Figure 4 about the price of the electricity generated by NPP Krško.

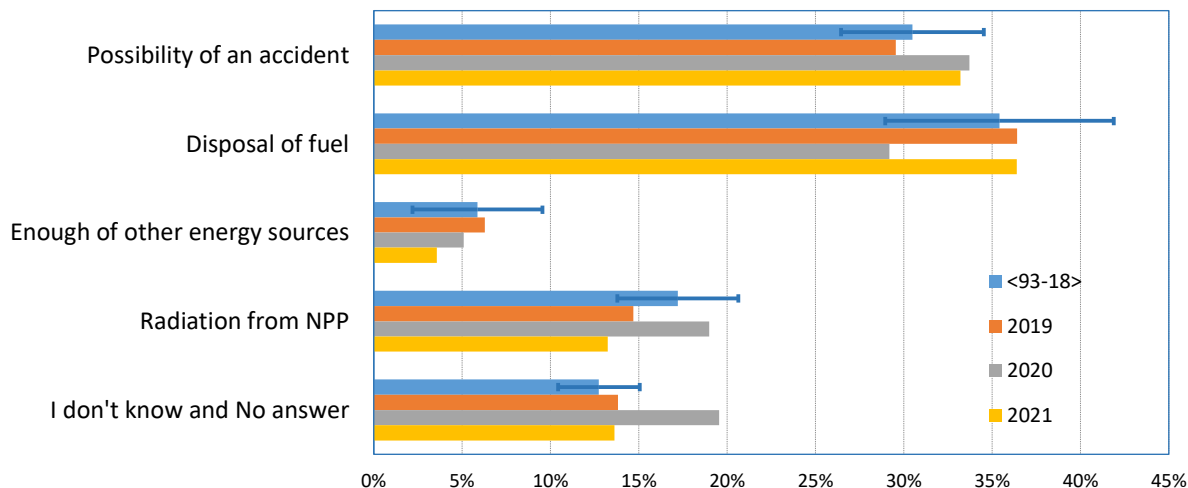


Figure 6: What are the reasons against nuclear energy? (One answer possible)

In general, spent fuel disposal is perceived as the main reason against nuclear power (consistent with the result about radiation from the RW repository in Figure 4), stronger even than possibility of an accident (Figure 6).

2.4 Position towards NPP Krško

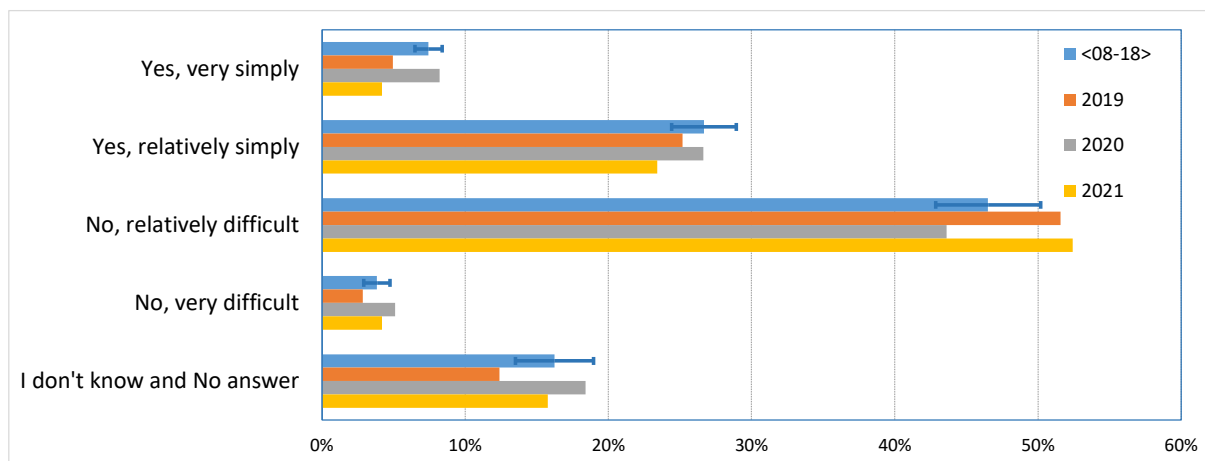


Figure 7: Do you believe that other sources (e.g., renewables) can replace NPP Krško?

A relative majority of youngsters consistently recognizes that NPP Krško would be difficult to replace by renewables (Figure 7).

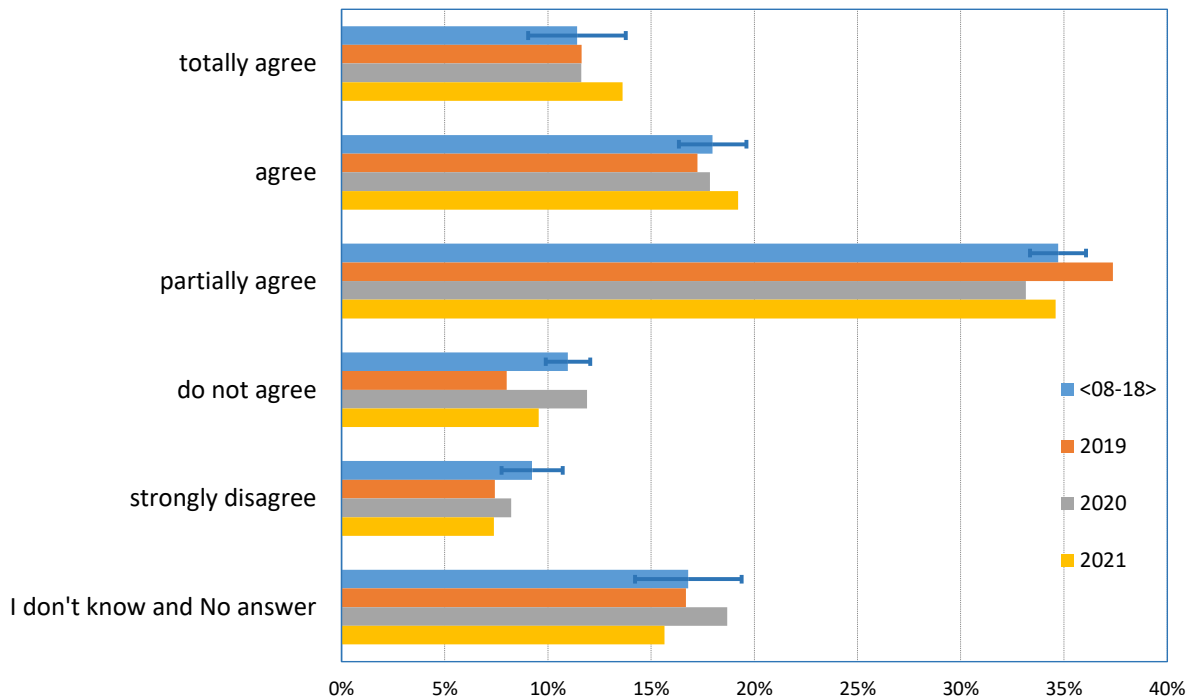


Figure 8: To what extent do you agree with the second NPP in Krško?

The share of “partially agree” stands out and does not change much over years (Figure 8). The sum of more definite answers “totally agree” + “agree” exceeds the sum of answers “do not agree” + “strongly disagree”. A high degree of scatter obscures any trend.

2.5 Position towards nuclear energy and sources of information

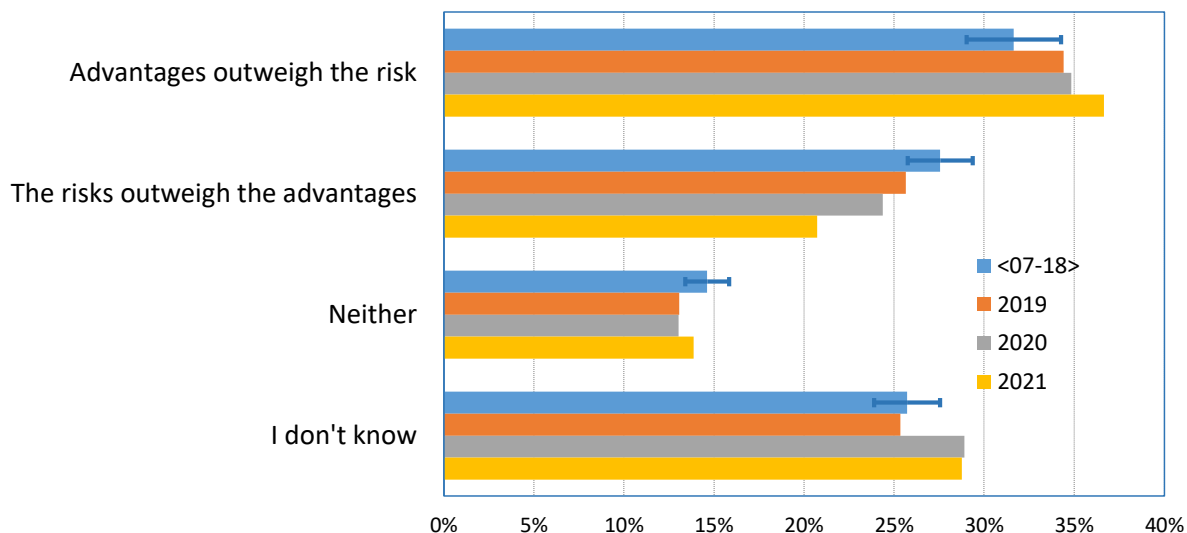


Figure 9: What is your general opinion on nuclear energy?

The category “Advantages...” exceeds the “Risks...” but the sum of “Neither” and “I don’t know” is actually the prevailing category (Figure 9). This indication warrants ongoing education and information activities.

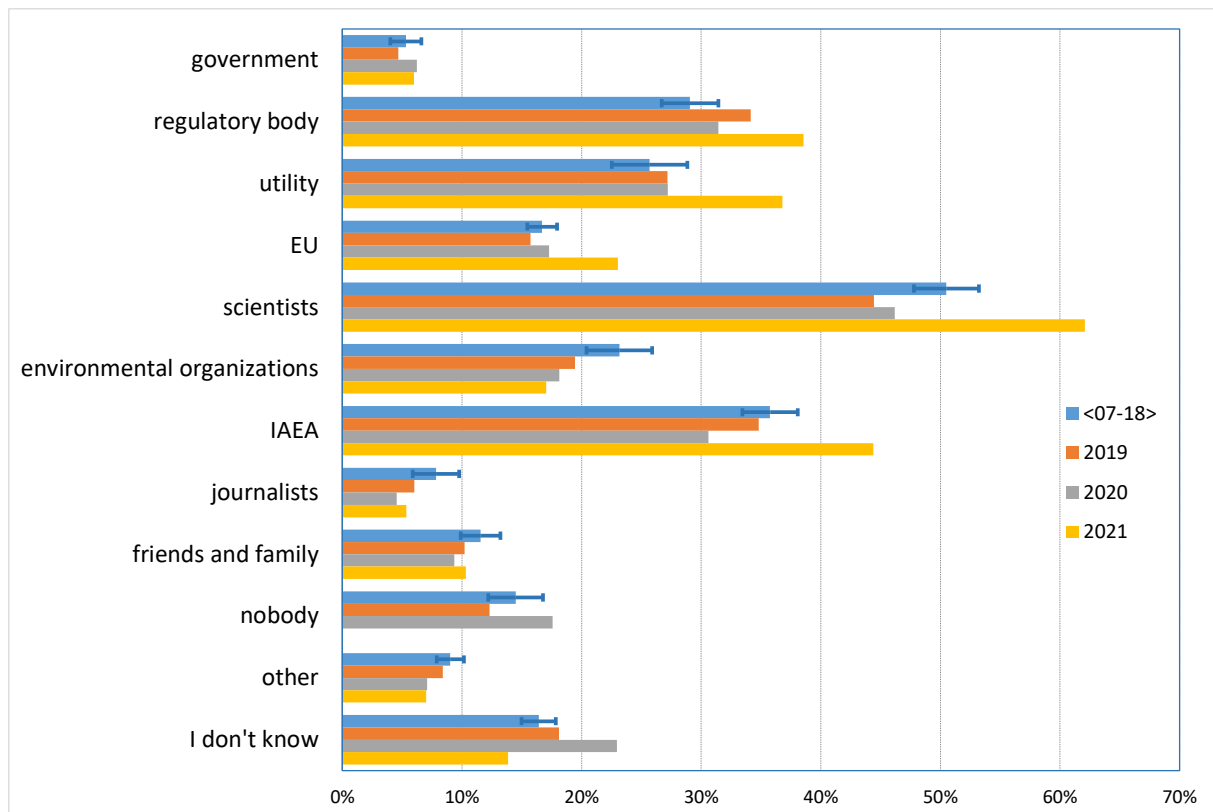


Figure 10: Which three of the following would you trust most to give you information about nuclear safety?

Scientists consistently enjoy the highest trust among information sources relevant to youngsters. International Atomic Energy Agency, regulatory body, utility and environmental organizations have a relatively good credibility over the years, while credibility of the government and journalists remains low (Figure 10).

3 CONCLUSIONS

The aim of this paper was to look for indications that would serve as a feedback for ongoing information activities of the Information Centre at the Jožef Stefan Institute:

- Youngsters strongly overrate risk of nuclear energy as compared to risks in everyday life. The knowledge about nuclear energy, radiation and radioactive waste is generally deficient.
- Youngsters perceive low price of nuclear electricity as a good reason for the use of nuclear energy.
- Youngsters perceive spent fuel disposal and possibility of an accident as main reasons against nuclear energy.
- Youngsters are aware about the limitations of renewable sources of electricity. The second NPP in Krško has more supporters than opponents. Similarly, the advantages of nuclear energy exceed the perceived risks.
- Category of answer “I don’t know” varies between 15 % and 25 % at all questions. This may be due to scarce information about nuclear in media in recent years and warrants ongoing education and information activities.
- Scientists are consistently the most trusted source of information while government and journalists are the least trusted source of information.

This year we polled 786 visitors/listeners by a web application. Despite lower statistical accuracy, we observed no major change in public opinion compared to previous years.

Neglecting scatter in the results, the opinion of youngsters turns out surprisingly consistent over 28 years of polling implying some mid-term stability regardless of changes or events in the nuclear sphere (e.g. Fukushima accident).

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