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NUCLEAR ENERGY IN SLOVENIA – STATUS AND PERSPECTIVES

Abstract: Slovenia operates one nuclear power plant, NPP Krško. It is expected that its operating license will be extended for 10 or 20 years beyond the current date of 2023. Furthermore, there are serious plans to build a second nuclear unit in Slovenia in the next 10 to 15 years.

Well trained professionals on one side and public acceptance on the other are two important elements of a successful nuclear program. Nuclear Training Centre Ljubljana has an important role in these aspects. Future nuclear professionals are trained on the research reactor TRIGA and public information that is focused primarily on youngsters has resulted in positive trends in public opinion. The plans for a new nuclear unit present new challenges and opportunities not only for the nuclear community in Slovenia, but for industry, universities and research organizations as well.

INTRODUCTION

Slovenia is the smallest country in the world that operates a nuclear power plant. It is located in Krško and owned jointly with Croatia (50: 50). The Westinghouse pressurized water reactor started commercial operation in 1983 and its current net power is 696 MW_e. During its history, the NPP was an issue both in technical and socio-political terms, but it has an excellent operating and safety record, competitive price of electricity, and – in the last decade – a good public acceptance. The share of nuclear in the total production of electricity in Slovenia is around 38% (coal-fired thermal 33%, hydro 29%).

Other important institutions, related to nuclear energy in Slovenia are the Slovenian Nuclear Safety Administration (regulatory body), Jožef Stefan Institute, ARAO – Agency for Radwaste Management, and some other technical support organizations (TSOs). Jožef Stefan institute is the largest research organization in Slovenia. In addition to basic and applied research in natural sciences, including

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nuclear engineering, it operates a 250 kW TRIGA research reactor, and a nuclear training center ICJT.

ELECTRICITY PRODUCTION AND CONSUMPTION

After World war II, electricity consumption has been steadily growing in Slovenia, with exception of the years of economic crisis (1990–92 and 2008–10). The production has followed this demand, first by construction of hydro-power plants, then by thermal power plants, followed by the nuclear power plant.

In the early 1990s there was a strong political movement to prematurely close the NPP Krško, in parallel to a public debate about the prospects of energy conservation and alternative renewable energy sources. Nevertheless, with economic growth the electricity consumption has started growing again and the contribution of alternative renewable sources (e. g., wind, solar) remained completely negligible (with small exception of biomass). A possible result of this debate, however, was that since 1980s there were no major investments in large electric system infrastructural objects (e. g., power plants and high-voltage lines). In the beginning of 21st century Slovenia was faced with significant import of electricity. Due to economic crisis, this import has decreased in the last two years, but there is no doubt that the gap between the consumption and production will start growing again.

Figure 1 shows the history of electricity production and consumption in Slovenia. Furthermore, it shows a prediction based on assumption that all currently planned power plants are built as scheduled, and also that the lifetime of Krško NPP (currently scheduled until 2023) is extended for at least 10 years. As the con-

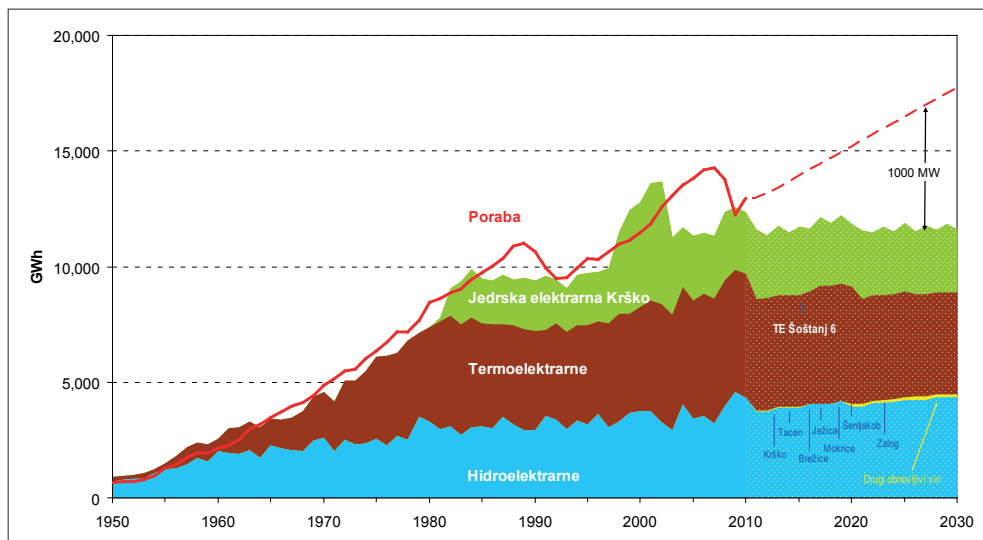


Fig. 1: electricity production and consumption in Slovenia

sumption is expected to grow similarly as in the past, the deficit in electricity production is expected to grow.

It is a very reasonable prediction that between 2020 and 2030 a production capacity of around 1000 MW will be missing in the electricity balance of Slovenia. As most of available hydro potential is already being used, and similar situation is with the domestic coal, the only feasible options are a gas powered plant or a nuclear power plant.

New nuclear power plant has several advantages and indeed, the Government of Slovenia has already in 2006 announced a national plan which calls for a “second unit” of NPP Krško. The economic crisis and the Fukushima accident have somewhat “cooled down” these ideas, but currently there is no parliamentary party that would oppose nuclear power in Slovenia. The situation with the public and media after Fukushima is not so simple; therefore also the politicians might change their minds.

On the other hand, economical, environmental and strategic arguments strongly support the nuclear case, consequently in a few years time we might expect a stronger support for nuclear again. If this will be the case, there will be three major challenges of the nuclear project: public acceptance, economy (large capital costs), and human resources.

Public acceptance is of paramount importance. The planning and construction of a new NPP takes at least a decade and requires huge investment funds. Any delays due to public opposition increase the cost and even small (in percentage) increases can make the project economically non-viable. It is expected that the decision about the new NPP will be taken on a national referendum.

Large investment is a well-known drawback of nuclear energy and it is especially problematic after the economic crisis when all investors are much more careful.

The third challenge will be how to educate and train enough skilled professionals, not only for the nuclear plant itself but also for the regulatory body, educational institutions, TSOs etc. This problem is even bigger because the nuclear industry will have to compete for good engineers with other industries who also lack technically skilled people.

Nuclear training center ICJT will play an important role in dealing with the first and the third of the issues listed above.

MILAN ČOPIČ NUCLEAR TRAINING CENTER (ICJT)

The Nuclear Training Center (in Slovenian language *Izobraževalni center za jedrsko tehnologijo* or ICJT) was established in 1989. Its primary mission was training of nuclear professionals, but very soon its activities included also public information. Today, the vision of the centre is to be respected source of knowledge about nuclear technologies in the country and internationally. It covers a wide range of activities connected with nuclear science and technology that go beyond pure nuclear training. Naturally, these activities have evolved from training of nuclear power plant personnel and can be divided into four areas: training of nuclear tech-

nology, radiation protection training, international training courses, and public information.

The basic activity in the training centre is the initial theoretical training of licensed personnel of NPP Krško. Shorter standard courses are organized for other NPP technical staff, as well as personnel of regulatory body, technical support organizations, radwaste agency etc. All these courses involve theory and description of NPP systems. There are also specialized courses focused on some specific issues of NPP operation.

Jožef Stefan Institute is authorized by the Ministry of Health for training in the field of radiation protection. There is a variety of courses offered for professionals working in different areas of industry, medicine and research. Since professional licenses are typically valid for two or five years, there are both standard/introductory courses and refresher courses. All courses involve classroom lectures and practical exercises. The training centre also supervises the radiation protection training in NPP Krško.

Public information is based on a live lecture and a visit of the permanent exhibition. It covers a broad range of topics such as energy and electricity, nuclear physics, the greenhouse effect, NPP technology, radioactive waste disposal etc. We have published several publications for general public and much information is also available at our homepage www.icjt.org. Visitors are mostly children from elementary and high schools. Their number (around 8000 yearly) represents almost one half of a school generation in Slovenia.

TANGIBLE RESULTS AFTER 15 YEARS OF INFORMATION ACTIVITIES

Public information of nuclear issues is a very long-term activity. After 15 years of activity we can claim that changes in public attitude toward nuclear are visible. Some results of public opinion polls (performed independently of ICJT) can be directly related to our activity.

The first tangible results of ICJT's public information activity came from a Eurobarometer poll in spring 2005 [1]. In this poll, among other questions, respondents in all EU countries were asked several questions testing their factual knowledge on radioactive waste. Respondents from Slovenia showed third best knowledge in Europe.

Slovenian Agency for Radwaste Management (ARAO) performs regular opinion polls on a representative sample of adult population in Slovenia since 1995. In their 2007 poll [2], one of the questions was whom do you trust most concerning siting of radioactive waste repository. Several institutions were offered as possible answer and Jožef Stefan Institute (JSI) is perceived as the most trusted source for nuclear waste siting issues, clearly ahead of an environmental organization which was second. A professional polling company Epis performed a public opinion poll on nuclear energy in 2008 [3]. They have tested both the knowledge and the acceptance of nuclear energy in Slovenia. The most interesting part of this poll is the

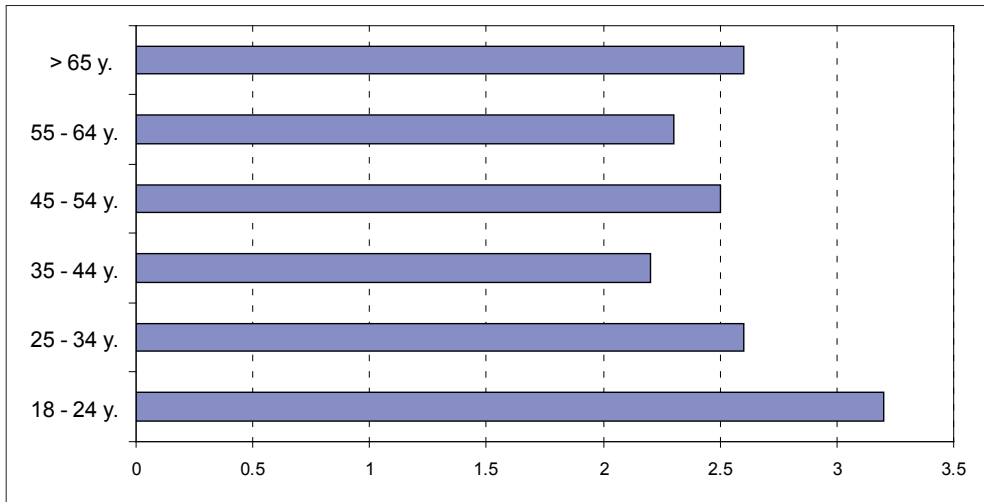


Fig. 2. Support of second NPP in Krško among different age groups in Slovenia [3]

analysis of answers according to the age of respondents. This analysis shows that the youngest age group, 18–24 years, exhibits the highest degree of knowledge, as well as the highest support for a second NPP in Krško among all age groups (Fig. 2).

Youngsters who visited ICJT Information Center in 1996, when we first had over 7000 visitors, are now 27 years old. Since then, a significant fraction of each generation visited ICJT. These are exactly the respondents in age group 18–24 years. Their better knowledge and attitude shows that our past activity has paid off.

CONCLUSIONS

Slovenia has a very good experience with operating nuclear power plant Krško. It is expected that its operating lifetime will be extended for another 10 or 20 years and there are also plans to build the second unit of NPP Krško in the next 10–15 years.

Realization of a new NPP project strongly depends on public acceptance, economic conditions and human resources. Nuclear Training Center Ljubljana (ICJT) will play an important role in public acceptance and human resources, because there are several synergies between professional training and public information.

The credibility of Information center at ICJT originates from being part of academic institution, as well as from strictly avoiding any propaganda, but presenting facts (both benefits and risks) and leaving the audience to decide.

In the last couple of years, three independent public opinion polls have shown positive results in public awareness and acceptance of nuclear energy that can be attributed to 15 years of information activity of ICJT.

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