

## METHODOLOGY FOR INTERNATIONAL PEER-REVIEW ASSESSMENT OF LARGE RESEARCH INFRASTRUCTURES OF THE CZECH REPUBLIC

### 1. INTRODUCTION

The *Methodology for International Peer-Review Assessment of Large Research Infrastructures of the Czech Republic* aims to establish the evaluation framework for **interim monitoring of current state of implementation and performance of the large research infrastructures that were approved for public funding until 2022 by the Government of the Czech Republic**. These 48 large research infrastructures, which are subject to the assessment procedure, are included in the [2019 update to the Roadmap of Large Research Infrastructures of the Czech Republic for the years 2016-2022](#). Besides the procedure of interim evaluation of large research infrastructures, which have been already supported from public funds of the Czech Republic, the methodology framework also applies to the **ex-ante assessment of new large research infrastructure project proposals, to be submitted as brand new projects to enter the Roadmap of Large Research Infrastructures of the Czech Republic in 2023**.

The envisaged goal of the assessment exercise is to provide the Ministry of Education, Youth and Sports and the Government of the Czech Republic with an **expert basis to adopt informed political decision on public funding of large research infrastructures of the Czech Republic in the multiannual financial framework 2023-2029**. The large research infrastructures, to be approved for public funding by the Government of the Czech Republic, will also be included in the **next update to the Roadmap of Large Research Infrastructures of the Czech Republic, to be published in 2023**. Furthermore, large research infrastructures approved for public funding as the result of the national roadmapping procedure in the Czech Republic will receive the political and financial commitment, when applying for the **next update to the Roadmap of European Strategy Forum on Research Infrastructures, to be launched in 2025**, as members of European research infrastructure consortia.

The latest **2019 update to the Roadmap of Large Research Infrastructures of the Czech Republic for the years 2016-2022** represents an executive summary of the large research infrastructures agenda development in the Czech Republic since 2009. The Roadmap provides a comprehensive briefing on roadmapping, policy-making and public funding of large research infrastructures in the Czech Republic in the past decade, including an overview of the typology of large research infrastructures of the Czech Republic, their internationalisation and international cooperation in the European Research Area and worldwide, and introduction to international peer-review assessments held in 2014 and 2017. Last but not least, presentation of a total of 48 large research infrastructure projects, implemented in a broad range of scientific and technological fields, completes the Roadmap jointly with landscape analysis and overview of memberships of the Czech Republic in international research infrastructure legal entities and international R&D organisations and their specific research infrastructure projects.

In the overall perspective, the 2019 update to the *Roadmap of Large Research Infrastructures of the Czech Republic for the years 2016-2022* shall be viewed as a complementary document accompanying the *Methodology for International Peer-Review Assessment of Large Research Infrastructures of the Czech Republic*, together with the text of the **Call for Submitting the Documentation for International Peer-Review Assessment of Large Research Infrastructures of the Czech Republic** and the templates of the **Assessment Questionnaire** and **Consensus Report**.

## 2. LARGE RESEARCH INFRASTRUCTURE DEFINITION

Article (2)(2)(d) of the **Act No. 130/2002 Coll.**, on the Support of Research, Experimental Development and Innovation from Public Funds and on Amendments to Some Related Acts (the Act on the Support of Research, Experimental Development and Innovation), as amended, introduces the **legal definition of the large research infrastructure** as *“a research infrastructure, which is a research facility necessary for conducting comprehensive research and development with high financial and technology demands, approved by the Government and established to be used also by other research organisations.”* When referring to a research infrastructure, the Act on Support of Research, Experimental Development and Innovation links to the **European law-based definition of research infrastructure** as follows: *“Research infrastructure means facilities, resources and related services that are used by the scientific community to conduct research in their respective fields and covers scientific equipment or sets of instruments, knowledge-based resources such as collections, archives or structured scientific information, enabling information and communication technology-based infrastructures such as grid, computing, software and communication, or any other entity of a unique nature essential to conduct research. Such infrastructures may be ‘single-sited’ or ‘distributed’ (an organised network of resources) in accordance with Article 2(a) of Council Regulation (EC) No 723/2009 of 25 June 2009 on the Community legal framework for a European Research Infrastructure Consortium (ERIC).”*<sup>1</sup>

## 3. EVALUATION AND MONITORING CRITERIA

The interim monitoring of large research infrastructures and ex-ante evaluation of new large research infrastructure project proposals will be based on a comprehensive set of assessment criteria. Definition of each criteria and instructions to provide the envisaged information and data is described in detail in the **assessment questionnaire template**. The completed assessment questionnaire, to be filled in by the management of a large research infrastructure, will be the main information source describing the current state of implementation, operation and performance of a large research infrastructure. Based on the information and data provided within the assessment questionnaire, the international peer-review evaluation of a large research infrastructure will be performed. The contents of the assessment questionnaire correspond to the **monitoring criteria** of large research infrastructures, as follows:

- **Scientific and technological role and mission;**
- **Governance and management structure;**
- **Relevance, importance and significance;**
- **Cooperation, networking and clustering;**
- **Socio-economic benefits and impact;**
- **User strategy and open access policy;**
- **e-Infrastructure needs;**
- **Feasibility study and SWOT analysis;**
- **Benchmarking;**
- **Public relations and outreach;**
- **Capacity use and R&D and innovation results;**

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<sup>1</sup> Framework for State Aid for Research and Development and Innovation (2014/C 198/01) and the Commission Regulation (EU) No. 651/2014 of 17th June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty.

- **Costs and budget;**
- **Key performance indicators.**

As regards the **key performance indicators (KPIs)** criteria, the international assessment committee is supposed to evaluate the relevance and ambition of KPIs figures and provide the Ministry of Education, Youth and Sports guidance on the final values of KPIs, to be included in the grant agreements on public funding of large research infrastructures in 2023-2029. Default figures of KPIs will always be proposed by the management of a large research infrastructure within the assessment questionnaire. The task of the international assessment committee will be to evaluate the KPIs values, take into consideration the accompanying explanation and, eventually, recommend modifications of the KPIs figures. Once the grant agreement on public funding of a large research infrastructure is concluded the fulfilment of KPIs will be monitored by the Ministry of Education, Youth and Sports on a regular and a multiannual basis. In the case that a large research infrastructure does not meet some of the KPIs target values, financial support from public funds shall be reduced for the forthcoming period and until the next round of KPIs monitoring, after which it may be re-adjusted to the original sum.

The portfolio of KPIs, to be filled in with target values by management of a large research infrastructure and evaluated by the international assessment committee, is determined by the Ministry of Education, Youth and Sports. The **KPIs portfolio** complies with the “RACER” criteria, meaning that the KPIs should be Relevant (i.e. closely linked to the objectives of large research infrastructure over a particular period of time); Accepted (i.e. adopted by the large research infrastructure and Ministry of Education, Youth and Sports, otherwise there would be a limited implementation); Credible (i.e. unambiguous and easy to interpret to non-experts); Easy to monitor (i.e. gathering of the data collections should be possible at low cost); and Robust (against manipulation, etc.). It is taken for granted that **not each KPI might be relevant for each large research infrastructure**, due to the diverse scientific and technological role and mission of each particular R&D facility. Given that, the management of a large research infrastructure may refrain from filling in the target values of the KPI (considered not relevant), provided that thorough explanation is amended, which the international assessment committee may take into consideration. To put every KPI target value in its specific context, the management of a large research infrastructure shall provide short narrative for each KPI, explaining the rationale behind the filled in figures. Portfolio of KPIs fixed for the international peer-review assessment includes the following KPIs:

- **Number of user requests for access** (i.e. number of scientists and/or students applying for access to R&D facilities/resources provided by a large research infrastructure in the open access regime);
- **Number of users served** (i.e. number of scientists and/or students, who have been granted access to R&D facilities/resources of a large research infrastructure as users in the open access regime);
- **Number of Master and Ph.D. student users** (i.e. number of Master and Ph.D. students, who have performed some of studies at or using R&D facilities/resources of a large research infrastructure);
- **Number of user R&D results** (i.e. number of R&D results deriving from R&D activities conducted by users of R&D facilities/resources of a large research infrastructure in the open access regime);

- **Number of user publications** (i.e. number of publications based on R&D activities of users of R&D facilities/resources of a large research infrastructure performed in the open access regime);
- **Number of operator R&D results** (i.e. number of R&D results deriving from R&D activities that aim at improving the large research infrastructure's service portfolio provided to the user community);
- **Number of operator publications** (i.e. number of publications based on R&D activities that aim at improving the large research infrastructure's service portfolio provided to the user community);
- **Number of publicly available data sets** (i.e. number of data sets, which are produced by users of a large research infrastructure in the open access regime and subsequently used by other external users, either from scientific community or general public);
- **Number of commercial users** (i.e. number of legal entities using R&D facilities/resources of a large research infrastructure in the commercial regime, when paying commercial revenues for services);
- **Income from commercial users** (i.e. revenues from economic activities based on providing of R&D facilities/resources of a large research infrastructure to external users in the commercial regime);
- **Income from non-commercial activities** (i.e. revenues of the large research infrastructure deriving from non-user and non-economic activities, e.g. grants for complementary R&D projects, etc.).

Regarding the criteria of **capacity use and R&D and innovation results**, the task of the international assessment committee will be to evaluate scientific and technological results reached by the **operators and users of large research infrastructures**. To provide the international assessment committee with necessary information on these achievements, the management of a large research infrastructure will prepare **a summary analysis of all R&D and innovation results and an overview of selected top-class R&D and innovation results** (i.e. the most valuable results in terms of their scientific excellence and/or socio-economic impact) reached in the previous period.

The large research infrastructures, which were approved by the Government of the Czech Republic for public funding in 2016-2022, will prepare a sample of **50 top-class R&D and innovation results reached in 2016-2020 by the users and a sample of 15 top-class R&D and innovation results reached in 2016-2020 by the operators**. The large research infrastructures, which were adopted by the Government of the Czech Republic for financing from public funds in 2019-2022, will deliver a sample of **20 top-class R&D and innovation results reached in 2019-2020 by the users and a sample of 5 top-class R&D and innovation results reached in 2019-2020 by the operators**.

All the selected top-class R&D and innovation results will be grouped either as results of publication or non-publication nature. The results of publication nature will be marked as the **"Excellence Science"**<sup>2</sup> results and the results of non-publication nature will be assigned to the group of

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<sup>2</sup> **Publication results:** peer-reviewed scientific article; book; chapter in a book; paper in proceedings – according to the Methodology for Evaluating Research Organisations and Research, Development and Innovation Purpose-Tied Aid Programmes approved by the Resolution of the Government of the Czech Republic of 8th February 2017 No 107.

**“Application”<sup>3</sup>** results. Neither of the top-class R&D and innovation results can be assigned to both the categories at the same time.

The summary analysis of all R&D and innovation results will be filled in the relevant tables within the **assessment questionnaire template**. The data on top-class R&D and innovation results will be filled in the relevant **annex template** enclosed to the assessment questionnaire template.

As the large research infrastructures differ a lot in terms of servicing the basic and/or applied sciences, the minimum number of top-class R&D and innovation results to be reported in the “Excellent Science” and/or “Application” category is not determined. The threshold criteria will be the submission of the adequate number of top-class R&D and innovation results in both categories in total. If a large research infrastructure will not be able to comply with the requested number of top-class R&D and innovation results for objective reasons (i.e. user community of the large research infrastructure or the absolute number of R&D and innovation results is limited due to the nature of expertise and services provided), the management of large research infrastructure is expected to include relevant **justification**.

#### **4. INTERNATIONAL ASSESSMENT COMMITTEE**

The interim evaluation of large research infrastructures and ex-ante evaluation of new large research infrastructure project proposals will be performed by an **international assessment committee**, to be appointed by the Ministry of Education, Youth and Sports. The international assessment committee will consist of a total of **6 scientific panels** of 5 members each. The physical sciences and engineering oriented scientific panel will be an exception with 7 members, due to a higher number of large research infrastructures to be assessed in this scientific field. Each scientific panel will be coordinated by a Chair, chosen from the scientific panel members. A **Chair** of the entire international assessment committee will also be appointed, to oversee the work of the scientific panels so that each applies the assessment criteria to the same extent and with the same relevance. Expertise of individual scientific panels of the international assessment committee will correspond to the scientific areas that are determined by the *Roadmap of Large Research Infrastructures of the Czech Republic for the years 2016-2022* and by the *Roadmap of European Strategy Forum on Research Infrastructures*. Specialisation of scientific panels of the international assessment committee will, therefore, include the following **disciplinary domains**:

- **Physical sciences and engineering;**
- **Energy;**
- **Environmental sciences;**
- **Health and food (≈ Biological and medical sciences);**
- **Social sciences and humanities (≈ Social and cultural innovations);**
- **e-Infrastructures (≈ Data, computing and digital research infrastructures).**

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<sup>3</sup> **Non-publication results:** patent; pilot plant; verified technology; variety; breed; utility model; industrial design; prototype; functioning sample; results projected into legislation and standards; results projected into guidelines and other non-legislative regulations; results projected into approved strategic and/or policy documents by state or by public administration bodies; methodology; medical procedure; conservation procedure; specialised map; software; specialised public database; research report; summary research report; audio-visual work; holding an exhibition; holding an exhibition with a critical catalogue; holding a conference; holding a workshop; other results – in accordance with the Methodology for Evaluating Research Organisations and Research, Development and Innovation Purpose-Tied Aid Programmes approved by the Resolution of the Government of the Czech Republic of 8th February 2017 No 107.

Members of the international assessment committee will be impartial, renowned and internationally recognized experts on research infrastructures. The absence of **conflict of interest** of the international assessment committee members will be proved by an affirmation that will be a part of the **agreement to complete a job**, to be concluded between the member of international assessment committee and the Ministry of Education, Youth and Sports. Member of the international assessment committee shall not be: (a) an employee of a large research infrastructure or a close relative to an employee of a large research infrastructure, which is subject to the international peer-review assessment; (b) a member of a large research infrastructure international scientific and technical advisory committee; (c) a member of the executive and/or management board/s of the international legal entity (e.g. ERIC, international R&D organisation, etc.), which the Czech Republic and large research infrastructure are engaged with; and (d) personally biased in any way.

## **5. EVALUATION PROCEDURE**

The large research infrastructures that are already financed from public funds of the Czech Republic, and the large research infrastructure new project proposals submitted for the ex-ante evaluation, will be assessed by the international assessment committee, based on completed forms of the **assessment questionnaire**.

The assessment questionnaires will include all key information and data necessary for a thorough and comprehensive evaluation procedure, according to the monitoring criteria stipulated for international peer-review assessment.

Besides the assessment questionnaires, scientific panels of the international assessment committee will also receive outputs from an **external international peer-review**, which will involve 3 international reviews prepared for each large research infrastructure (or new proposal thereof). These international reviews will be conducted and delivered to scientific panels of the international assessment committee by the Ministry of Education, Youth and Sports. The principal purpose of these external international peer-reviews will be to obtain additional independent expert opinions, but the external peer-reviews will be of consultative relevance only and shall not be interpreted as having direct and straightforward implication on the overall assessment results. The summary decision on the outcomes of assessment will remain the exclusive responsibility of the scientific panels of international assessment committee.

Another input to the international assessment peer-review procedure will be the **hearings/interviews** organised by the Ministry of Education, Youth and Sports between the management of large research infrastructures (or those, who will submit new project proposals) and members of the scientific panels of international assessment committee. An interview with max. 3 representatives of the management of large research infrastructure is supposed to last up to 60 minutes. The topics to be addressed by the respective scientific panel of the international assessment committee during such an interview will be communicated to the representatives of management of the large research infrastructure in sufficient advance, 7 days before the interview at the latest, via the Ministry of Education, Youth and Sports.

With the aim of informing the scientific panels of international assessment committee on the results of the latest international peer-review assessment, held in 2017, the scientific panels of international assessment committee will be provided with **consensus reports**, recording these outcomes. The 2017 consensus reports will be of auxiliary nature only, but may help the reviewers to consider the progress of large research infrastructures since the last international peer-review assessment and consider how the large research infrastructures projected the recommendations given back then by the international assessment committee in their future strategy approaches.

Should be a scientific panel of the international assessment committee willing to visit a large research infrastructure, the Ministry of Education, Youth and Sports may arrange the **on-site-visit**. Nevertheless, the on-site-visit may form a part of the international peer-review assessment only if explicitly required by a scientific panel of the international assessment committee and shall not be a compulsory part of the international peer-review assessment procedure.

The summary decision of scientific panels of the international assessment committee will be based on a synthesis of the outputs of above-mentioned assessment processes as well as on deliberations of the scientific panels of international assessment committee, to be held in person at least two times either in Prague or other location. The final conclusions will be filled in the template of the **consensus report**, stating the overall evaluation results in a pre-defined structure, including comments, clarifications and recommendations for the future.

The large research infrastructures subject to the interim evaluation as well as newly submitted project proposals subject to the ex-ante assessment will be granted a score indicating the **summary qualitative level** on the scale from 5 to 0, where 5 will be the highest score and 1 will be the lowest.

The large research infrastructures (or newly submitted proposals), which will receive 0, will be found by the international assessment committee non-compliant with the general criteria of a large research infrastructure. The overall evaluation scale is as follows:

- **5 – Excellent quality;**
- **4 – High quality;**
- **3 – Good quality;**
- **2 – Low quality;**
- **1 – Very low quality;**
- **0 – Does not comply with the basic criteria of a large research infrastructure.**

## **6. ASSESSMENT TIMETABLE**

The indicative timetable for performing the interim evaluation of large research infrastructures of the Czech Republic, which were adopted by the Government of the Czech Republic for public funding until 2022, and ex-ante evaluation of new large research infrastructure project proposals, is as follows. The actual timetable may be adjusted during the assessment procedure by the Ministry of Education, Youth and Sports, depending on the progress of the evaluation process in each individual assessment phase.

- a) The ***Call for Submitting the Documentation for International Peer-Review Assessment of Large Research Infrastructures of the Czech Republic*** will be opened on **10th September 2020**, with the deadline for delivering the filled in assessment questionnaires to the Ministry of Education, Youth and Sports on **10th December 2020** at the latest.
- b) Besides providing a continuous individual guidance to representatives of the management of large research infrastructures to fill in the assessment questionnaire in the proper way, the Ministry of Education, Youth and Sports will also organise an **information day on 15th September 2020**, to be held in the premises of the Ministry of Education, Youth and Sports.
- c) By December 2020, the **international assessment committee** to perform the evaluation, including the Chair and 6 scientific panels, will be appointed by the Ministry of Education, Youth and Sports. Members of the international assessment committee shall conclude agreements to



complete a job by the end of 2020 and the international peer-review assessment procedure shall be initiated on **1st January 2021**.

- d) The **1st series of in-person meetings of scientific panels** of international assessment committee will be held in **February or March 2021** in Prague in order to facilitate exchange of first impressions of international assessment committee scientific panel members, after having studied thoroughly the assessment questionnaires for the first time.
- e) Simultaneously to the work of the international assessment committee, the Ministry of Education, Youth and Sports will organise the **external international peer-review**, consisting in 3 reviews per each large research infrastructure project. The outcomes shall be forwarded to scientific panels of the international assessment committee on a continuous basis and no later than **31st May 2021**.
- f) The **2nd series of in-person meetings of scientific panels** of international assessment committee will be held in **May or June 2021** in Prague in order to arrange the hearings and interviews between the scientific panels of international assessment committee and representatives of management of large research infrastructures or their newly submitted proposals.
- g) **Summary decisions** of scientific panels of the international assessment committee, reported in the way of **consensus reports**, shall be finalised by **30th June 2021**, and afterwards communicated by the Ministry of Education, Youth and Sports to large research infrastructures and proposers of their new project proposals on an individual basis no later than **15th July 2021**.
- h) If a large research infrastructure or a new project proposal shall make an **appeal<sup>4</sup> against summary decision** of scientific panel of the international assessment committee such an appeal can be made by the management of large research infrastructure or new project proposal by **15th August 2021** at the latest. Then, the appeal shall be addressed by the respective scientific panel of international assessment committee and resolved by a final decision no later than **15th September 2021**.

## **7. FOLLOW-UP STEPS**

Once the definitive versions of consensus reports on the international peer-review assessment of large research infrastructures and new project proposals are finalised, the Ministry of Education, Youth and Sports will prepare an executive summary of the international peer-review assessment outcomes and present it for information to the **Research, Development and Innovation Council by 15th November 2021**. Afterwards, the executive summary will also be submitted for information to the **Government of the Czech Republic by 15th December 2021**.

Once the Government of the Czech Republic acknowledges the information on the outputs of interim assessment of large research infrastructures and ex-ante evaluation of their new project proposals the **Ministry of Education, Youth and Sports will publish the consensus reports** on webpages to share the international peer-review assessment results with the scientific and general public transparently.

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<sup>4</sup> In the case of an **appeal against summary decision** of the scientific panel of international assessment committee such an appeal will be accepted only if the management of large research infrastructure or new project proposal will be of the opinion that the scientific panel of international assessment committee neglected some important information in the evaluation procedure and did not take such information into consideration, when drawing the summary conclusions. Appeal will be neither accepted nor submitted for further consideration by the respective scientific panel of international assessment committee if it addresses only dissatisfaction with summary decision of the scientific panel of international assessment committee.



Outcomes of the international peer-review assessment of large research infrastructures and their new project proposals will be then used by the Ministry of Education, Youth and Sports for the preparation of **a comprehensive expert basis for adopting the informed political decision by the Government of the Czech Republic on public funding of large research infrastructures in 2023-2029.**

At the beginning of 2022, the Ministry of Education, Youth and Sports will make an official proposal on the budgetary allocation for large research infrastructures as an **initial input to the preparatory works on the draft state budget expenditures of the Czech Republic on R&D and innovations in 2023, mid-term outlook for 2024-2025 and long-term outlook for 2026-2029.** By 31st May 2022, the Government of the Czech Republic is supposed to approve the final draft, which will serve the Ministry of Education, Youth and Sports as the **budgetary basis to prepare the proposal on public funding of large research infrastructures in the period 2023+.**

According to the adopted state budget expenditures of the Czech Republic on R&D and innovations in the years 2023+, the Ministry of Education, Youth and Sports will prepare the **comprehensive proposal for the large research infrastructures' public funding in 2023-2029, to be adopted by the Government of the Czech Republic by the end of 2022.**

Following the adoption of large research infrastructures for the financial support from public funds of the Czech Republic in 2023-2029, the Ministry of Education, Youth and Sports will, accordingly, update the *Roadmap of Large Research Infrastructures of the Czech Republic for the years 2016-2022* and, in 2023, the ***Roadmap of Large Research Infrastructures of the Czech Republic for the years 2023-2029*** will be released.