

# Work Programme of the Governing Board of the Croatian Academy of Engineering for the Mandate Period 2022 to 2026

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## Introduction

This year marks the 30<sup>th</sup> anniversary of Croatian Academy of Engineering. Established on January 19<sup>th</sup>, 1993 as a Non-Governmental, Independent, Non-Partisan and Non-Profit Organization, the Academy was granted the status of a Scientific Organization in 2009. In total, 14 departments include 81 full members, 91 associate members, 86 emeritus members, 19 international members, and 9 honorary members. These scientists are outstanding researchers and engineers who play a vital role in the development of Croatian society. There are also 9 entrepreneurial members and 64 supporting members, important economic enterprises and scientific and educational institutions.

The Academy has gained a strong social reputation because of the hard work of prior governing boards and five former presidents. It is, however, our opinion that there is ample scope for improvement. After decades of disregarding the significance of manufacturing and industry, we believe that the future of the Republic of Croatia cannot be solely dependent on tourism and trade. We are of the opinion that the only way to achieve betterment is to invest more in manufacturing and reindustrialization. Production and reindustrialization are essentially high-tech activities in which a product

is no longer produced. The COVID-19 pandemic, which has yet to end, highlighted the resilience of high-tech companies and demonstrated that they were able to sustain growth even during the most challenging economic times.

It is in this context that the importance of this academy becomes apparent. In the final analysis, politicians are the gatekeepers of society, among whom, regrettably, there are few engineers. We have had the chance to observe that politicians tend to think in terms of ‘populism’, often with the objective of obtaining a second term in office, disregarding initiatives or legislation that may not generate immediate electoral support but could lead to sustainable economic development and job creation in the long term. First and foremost, the Academy should be the voice of reason. Gradually but consistently, it should promote the idea that without manufacturing, it is irrational to expect prosperity in the short or long term, and that investing in innovation and science is essential for any manufacturing in the 21<sup>st</sup> century. This will not be a simple task, but it is essential to begin working on it as soon as possible.

Following this, we will outline the most significant initiatives that we would undertake in the upcoming mandate, initiatives that we deem to be fully in line with the Academy’s vision and mission, and we will quote them below without alteration from our site:

- to be a leading creative and multidisciplinary scientific organization of the scientists of engineering and technological professions
- to competently and actively contribute to the development of engineering sciences and the transfer of knowledge vital to the progress of Croatian economy and welfare of its people
- to advocate a safe and useful application of technology, protection of environment and people from its inappropriate use
- to promote professionalism and responsible behaviour with high ethical standards.

## **Creating a financial plan and sustainable development**

### **Analysing financial indicators over the last 5 years**

The stability of the Croatian Academy of Engineering in recent years has allowed the Academy to play its part in the scientific system of Republic of Croatia, and in particular all the planned activities of the work plan. The main financial indicators showed that the Academy’s total assets were between HRK 800,000 and HRK 1,000,000k, with a step up to HRK 1,200,000 in 2020. This was mainly due to an increase in revenue in the financial assets section due to payments from the *IRI project*

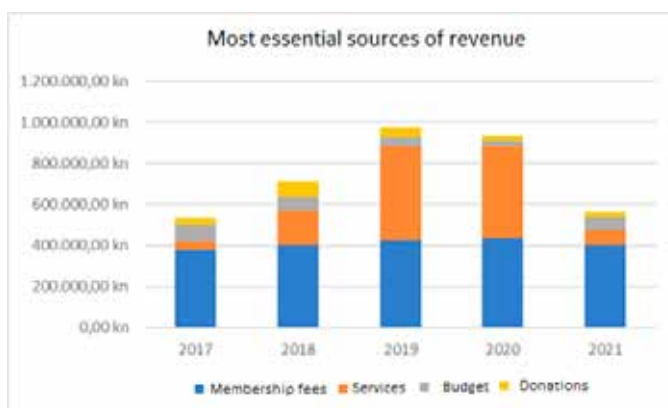
*Development of Tehnix’s Plant for Bioreactor Composting of Biodegradable Municipal Waste*, which was done through the Centre for development studies and projects. Non-financial assets have a fixed value and fluctuate around HRK 200,000.



**Fig. 1.** Main financial indicators of business results of the Academy over the last five years

The total revenue of the Academy rose in 2019 and 2020 as a result of the revenue generated from the above-mentioned project, while the total expenditure has remained relatively stable in recent years.

Figure 2 shows the main revenue items. It is evident that the Academy generates the majority of its revenue from membership dues and revenue from projects conducted through the Academy centres, while other sources contribute only marginally to the total revenue.



**Fig. 2.** The Academy’s most significant sources of revenue over the past five years.

The most significant components of the Academy's expenditure are outlined in Figure 3. It can be observed that the expenditure on the salaries of the Academy's staff is the most significant component, followed by the expenditure on services, which includes expenditure on the publication of magazines, printing, Academy awards, the maintenance of the Academy's website, and the provision of educational and other services.

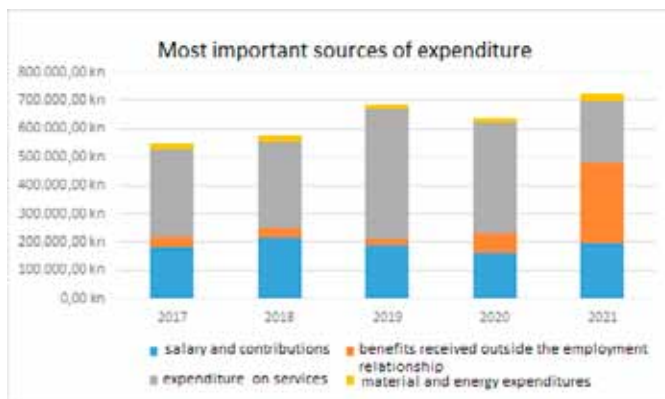


Fig. 3. The Academy's most important sources of expenditure over the last five years

## Projection of the Academy's finances during the mandate of the new Governing Board

The revenue generated by the Academy's projects over the past five years was primarily attributed to the project *Development of Tehnix's Plant for Bioreactor Composting of Biodegradable Municipal Waste*, while the revenue from membership fees remained relatively stable. Since these two items are HATZ's primary revenue sources, the new governing board will be focused on growing the number of supporting members and thus the revenue from membership fees. The increase is expected to be between 5% and 10% per year, taking the total revenue from HRK membership fees from \$15.00 to \$30.00. The increased revenue can be attributed to the increased involvement of centres in the execution of projects, which will also be reflected in the work of the new Governing Board.

With the exception of expenditure on staff, the Academy's expenditure was constant and came from the Academy's activities, such as publication activities, honouring the most successful members and organising conferences. The functioning of the Academy's office may be rated favourably, therefore a major restructuring is not required. As a result, expenditure on employees will remain stable in the coming years. The

Academy's activities, both those that will continue under the mandate of the new Governing Board and those that are integral to the work plan, along with annual inflation, are projected to result in a smaller expenditure increase of 3% – 5% annually, which not only ensures stable business operations but also increases the Academy's overall financial assets.

## Planned activities

### **Increasing the scientific and technical standing and reputation of the Academy in Croatia, and visibility of the Academy in the business world and key Croatian institutions**

- Although the Academy is a national leader among entrepreneurs, scientists and engineers through the work of its committees, we think that these efforts should be more actively supported through social media, as it is one of the simplest ways to reach a wider audience of outside stakeholders as well as members. At the same time, more emphasis should be placed on making statements and taking an unambiguous position on current technical issues, such as the current (long-term) problems of supplying the market with gas from alternative sources, the price of oil derivatives, the price of food, supply chain interruptions, and so on.
- One of the primary objectives of the Academy should be to expand the visibility of the Engineering Power Bulletin, which will lead to higher awareness of the Academy. In addition to improving the working methods of the editorial board to ensure publication continuity, the focus for the following period should be on the integration of the bulletin into relevant databases, initially with DOAJ and subsequently with SCOPUS. One of the ways to make works more accessible to a broader audience is to consider the introduction of a Digital Object Identifier (DOI) for each work published.
- The members and associates of the Academy should be encouraged to continue working on the third and fourth volumes of the Technical Encyclopaedia in collaboration with the Miroslav Krleža Institute of Lexicography and Croatian Academy of Sciences and Arts. Members and associates should actively participate in the publication of the Technical Encyclopaedia, as it is the most significant publishing activity of the Academy, not only in terms of deadlines but also in terms of the quality of articles produced.
- The Statute of the Academy and other related documents that regulate the Academy's activities should be updated regularly in order to respond to alterations in existing regulations while also enhancing the legal basis for day-to-day activities.

- The Academy, as an institution that assembles the most prominent Croatian researchers in the areas of engineering and biotechnology, must play a significant role in the creation of national policy documents that are essential for the development of the engineering field and the economic and social progress of Croatia. This will make sure that when writing these papers, the outcomes and significance of the engineering field and STEM fields are not overlooked.
- The Academy should be more actively involved in the development of the national legislative framework that will govern the Academy's activities, and members of the Academy should be involved in public discussions when new laws are passed. At the same time, the Academy's standpoint as an institution should be laid out clearly.
- The Academy's 30<sup>th</sup> anniversary will get special attention, with a variety of events scheduled to mark the occasion, in addition to the major event, the Solemn Assembly. The solemn anniversary should undoubtedly be accompanied by a suitable theme, which will be covered in the Academy's Annual and conferences and round tables will be organized during which the role and importance of the Academy will be better known to scientists and entrepreneurs, whose field of activity is primarily focused on technical and biotechnological sciences. The central activity that will further advance the 30th anniversary of the Academy in the international context is certainly the organization of the CAETS Annual Conference 2023.
- In addition to the initiatives indicated above, collaboration with HAZU and other national academies should undoubtedly be continued. Along with already-existing initiatives like the Croatian Technical Encyclopaedia, on which a substantial number of Academy members are engaged, cooperation with Croatian Academy of Sciences and Arts should continue through new initiatives of a similar kind and the preparation of joint events. The coordination of the national academies, the Croatian Academy of Medical Sciences, the Croatian Academy of Legal Sciences, and the Croatian Academy of Forestry Sciences, as well as the work of the Council, which our Academy initiated, should be strengthened further, primarily for the purpose of resolving common status issues, but also through the implementation of various joint dissemination activities.

## **Increasing the Academy's international recognition and influence**

- The Academy's impact and worldwide reputation will definitely grow as a result of continued and supported cooperation with regional technical academies through combined working sessions, events, or joint statements on

current technical profession concerns. In accordance with the strategy started and maintained by CAETS, special emphasis should be made to ongoing initiatives to investigate the feasibility of establishing academies of technical sciences in the nations of South Eastern Europe.

- The Academy's strength lies in its international membership. In addition to increasing the Academy's worldwide membership, a greater focus will be placed on their more active participation in Academy activities, such as writing articles in the Academy's bulletins or hosting (virtual) lectures and workshops.
- The strong involvement of the Academy in international organizations will undoubtedly continue, notably through Euro-CASE and CAETS, but also through bilateral collaborations with other academies. The Academy should encourage the integration of its eminent members in the international committees of Euro-CASE and CAETS, but also in the technical and scientific activities coordinated by the international partners of the Academy. Members of the Academy should actively engage in the creation of priority subjects that should be promoted and brought to the attention of the general public through their work in the Euro-CASE and CAETS committees. The main activity, which will further strengthen the role of the Academy in the international association, is mainly the organization of the already started CAETS 2023 annual conference.
- It is worth noting that the candidate for the Academy's Vice-President Position, Prof. Neven Duić Ph.D., was elected the Chairperson of the COATS 2023 Organising and Planning Committee. Organising the conference will help Academy get a better foothold in the world by connecting with others during the planning and execution of the conference.
- Academy members should be encouraged to participate in Euro-CASE and SAPEA working groups. Over the last two years, Academy members have engaged in two working groups to establish guidelines and recommendations, one for food production and agriculture and the other for higher engineering education.
- Participation in working groups strengthens, among other things, the Academy's reputation on the international scene.

## **Strengthening staff and mobilization of members**

- The Academy could facilitate the mobilization of members by organizing meetings of the governing board and the presidency in regional university centres across the country, such as in Osijek (3), Rijeka (2), and Split (1).

Informal discussions with members revealed that they would like to get more involved, but that travelling to Zagreb was an obstacle for them. Therefore, the geographical distribution of the activities of the Academy related to the organization of round tables, workshops and conferences should be encouraged. More members should also be involved in the work of the Academy, for example by changing the terms and conditions for promotion from associate to member status, making an Academy-related activity a requirement for promotion (e.g., publication of a paper in the Annual or the Engineering Power Bulletin), or actively participating in the organization of an Academy-related round table or workshop on behalf of and in association with the Academy.

### **Increased cooperation with economists and engineers**

- Scientists from business sector are highly motivated to become members of the Academy. Due to the nature of their work, they do not have much time to write scientific papers, however, we do not view significant accomplishments in industry as being of lesser value than journal articles. Their involvement in the Academy would make it more likely that they' will work together on projects, amongst other things. As a result, we would review the criteria for electing members to take greater account of key industry achievements.
- The membership fees of the supporting members make up a significant part of the Academy's revenue. Attracting additional supporting members will not only enhance funds for the Academy's normal operations but would also open up fresh possibilities for joint projects. It is also necessary to provide a model in which potential group members can see their interest, because without this it is unlikely that a company will make a significant contribution today.
- The Engineer's Day celebration is definitely an activity that should be continued in the future. This type of long-term partnership with Croatian Engineering Association will provide the Academy with access to a wider network of scientists, engineers, and Croatian Engineering Association members from the business world. This will enable the Academy to better inform the public about current developments in the technical field.

### **Strengthening the influence of the Academy on the engineering education process**

- Because it is the basis of education in all engineering fields, the fundamental form of formal education of engineers within the study programs of higher education institutions should unquestionably be regularly supported. It is



important to note, however, that there are also other forms of informal and non-formal education to which the Academy can make an important contribution through its members. One of the ways the Academy can help with engineering education is by creating a Croatian technical dictionary. This should be done as a joint effort between the Academy and the other institutes, just like the Croatian technical encyclopaedia. This project will almost certainly be acknowledged by all engineering professions.

- Promoting the Croatian Qualification Framework as a fundamental link between labour market needs and higher education is one of the tools by which the Academy can further position itself between science and business. In doing so, the Academy can contribute to a stronger link between occupational standards, qualification standards and study programmes by conducting occupational surveys or developing proposals for key occupations, knowledge and skills whose core competences are recognised by the economy - a specific specialised occupation. Not only that, but also in the light of the recommendations of the European engineering umbrella organizations (e.g., FEANI) concerning the competences needed for the training of engineers in educational institutions, the Academy can have a significant impact on the organisation and content of the study programmes and, in the long run, help the higher education institutions to align the study programmes with Croatian Qualifications Framework. For example, positive experiences in adapting study programmes to the Croatian Qualifications Framework can be presented in one of the Academy's Annuals, and an overview of the positions of the European engineering umbrella organisations on engineering education can also be provided.

### **Strengthening the influence of the Academy as a cohesive factor between the institutions of the Croatian academic community and the stakeholders from the business community**

- One of the Academy's strengths is its multi-disciplinary membership. This allows us to keep going with activities that involve members and associates of the Academy working on projects with businesses that are funded by European funds and where the Academy supports activities through its centres. The successful implementation of such initiatives ensures the smooth financial functioning of the Academy and is the most important source of income along with membership fees. Efforts to implement these measures must therefore be intensified. As previously mentioned, collaboration initiatives with the business sector should continue to be pursued through the Academy's planned Technology Transfer Centre whose work should be given special emphasis and special attention in the upcoming period.

## Conclusion

By focusing our efforts on the aforementioned challenges and continuing to work on the Academy's ongoing activities, we can not only sustain but significantly enhance its public perception. This Academy must above all be a factor of cohesion between the institutions from which our members come and a powerful promoter of technology transfer between Croatian science and the Croatian and world economy.

Finally, the translation of the name of our Academy into English is Croatian Academy of Engineering. In the neighbouring country there is the Slovenian Academy of Engineering. We are a member of the International Council of Academies of Engineering and Technological Sciences and the European Council of Applied Sciences and Engineering. We do not underestimate the importance of science; on the contrary, we will continue to support basic research; however, we believe that science should primarily serve technology and technology should serve the economy, that we should be the engineers mentioned by Theodore von Kármán, not only describing what exists but also creating what never existed.