

The Netherlands Academy of Engineering

The NAE is the Netherlands Academy of Engineering, uniting the top experts active in technological sciences, applied research and development from scientific, governmental, and industrial organizations in the Netherlands. Being elected as NAE Fellow is a recognition for an outstanding track record of engineering, technical innovation, and societal impact. The NAE Fellows and Young Engineers share a passion for engineering-based innovation to overcome many of our societal challenges, and to sustain our country's earning power within the European and international context.

Purpose

The purpose of the NAE is to foster a vibrant and effective climate of responsible, inclusive, and impactful engineering-based innovation, rooted in a world-class knowledge and talent base in the underlying technological sciences, which are distinct from other sciences in that they have human-designed artefacts and technical solutions (hardware as well as software based) as their object.

The NAE will do this by establishing a forum for constructive debate, by orchestrating the pivot to action, and by offering advice on urgent strategic challenges and necessary improvements to the Dutch knowledge and innovation system. The NAE will also strive to make the voice of engineering better heard among key decision makers in the Netherlands.

In taking position on issues, NAE, as a representative voice of the engineering community in the Netherlands, will be objective, non-political, ensuring a solid technological science and engineering underpinning, and focusing on what is best for the knowledge and innovation ecosystem and society at large. The Netherlands Academy of Engineering is an independent not-for profit organization, founded through the joint efforts of AcTI, KNAW and the Dutch Universities of Technology (4TU). It is initially financially sponsored by the Ministries of Education, Culture and Science (OCW) and Economic Affairs and Climate (EZK), and by the 4TU Federation.

The importance of engineering for innovative solutions and societal transitions

Engineering¹ is intrinsically a solution-oriented cross-disciplinary team activity, carried out by established companies and start-ups/scale-ups, public organizations, as well as

¹ Engineers use their skills and knowledge to solve problems and improve the quality of life. Within the NAE, engineering is defined as the creative application of science, mathematical methods, design thinking, and empirical evidence to the innovative design, construction, operation, and maintenance of structures, machines, materials, devices, systems, processes, and technology enabled services that address unmet end-user and societal needs.

knowledge institutes², in close collaboration with key customers. Engineering, human centric design, and the underlying technical sciences will clearly have to be at the heart of innovative solutions for most of the pressing societal challenges and transitions – whether it is about climate change, or safeguarding equitable access to energy, water, food, and healthcare. While there are many pockets of excellence in the Netherlands, the effectiveness of our knowledge and innovation ecosystem needs to improve, and we need orchestrated action to be able to tackle these challenges, to safeguard our quality of living, the sustainability of our environment, and to remain economically competitive in the European and global context.

The NAE as spider in the web of the engineering and innovation ecosystem

For innovation to be effective in creating solutions for important unmet needs, creative cross-disciplinary and cross-sector thinking, and its translation into orchestrated action and advice are required, involving all stakeholders. That is why the NAE positions itself as spider in the web of the knowledge and innovation ecosystem, connecting engineers and innovators at knowledge institutes, established and start-up companies, and governmental bodies, sharing the conviction that engineering based innovation is key to create and deploy solutions that address pressing societal issues and transitions.

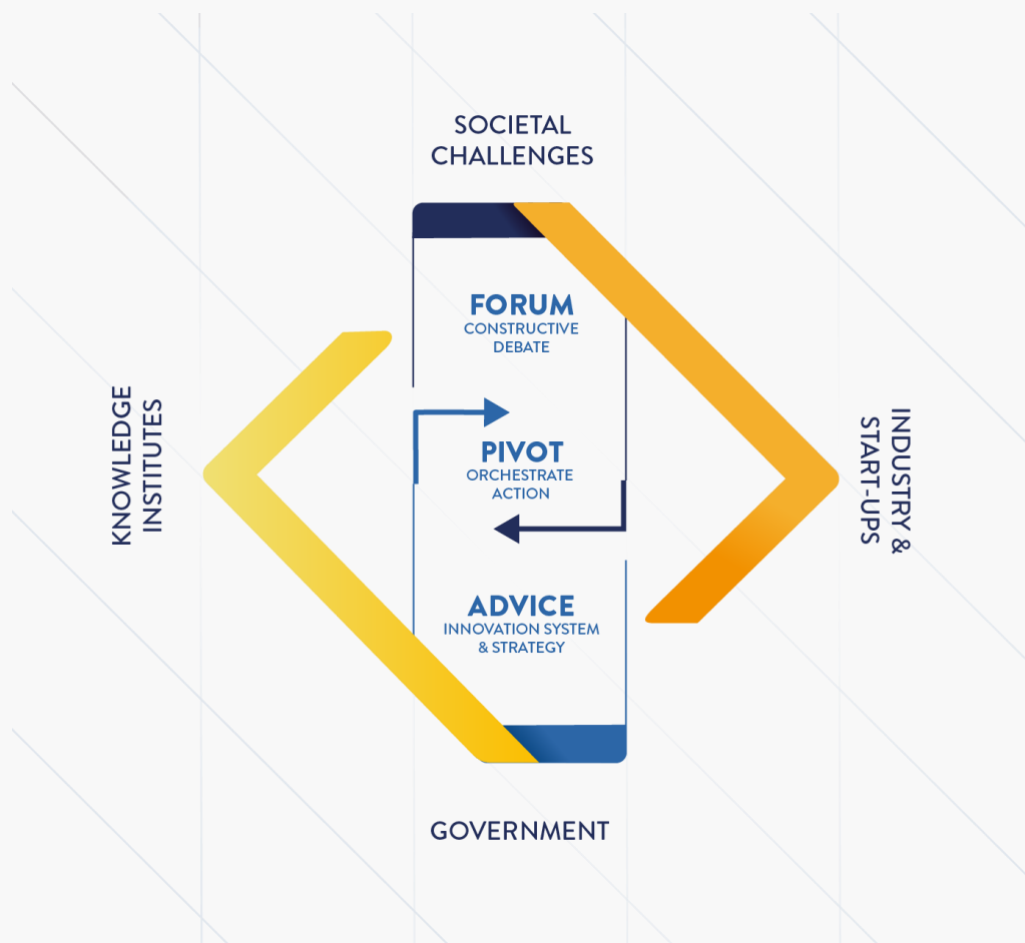
The NAE will provide:

- a Forum for constructive debate and learning – led by its members (Fellows, Young Engineers);
- a Pivot in the knowledge and innovation ecosystem – orchestrating action by making parties rally behind common goal;
- actionable Advice to key stakeholders – striving for complementarity to and collaboration with existing advisory bodies.

The Forum function enables the divergent thought leader role the Fellows and their network can play as the “tip of the iceberg” of the engineering and innovation community – thinking out-of-the-box. The Pivot function is all about translating selected urgently needed options into timely action. This is an orchestrating role, getting the best out of the ecosystem. The NAE will also provide Advice related to the functioning of the innovation system and on innovation strategy. This is a convergent role, recommending a preferred course of action from the many options³.

² For avoidance of doubt, “knowledge institutes” refers here to all types of universities (4TU, comprehensive universities, universities of applied sciences (hogescholen)), academic hospitals, and TO2 institutes.

³ The advisory role will focus in first instance on the participants in the knowledge and innovation ecosystem, complementing organizations like the AWTI or the Rathenau institute, which are aimed primarily at governmental policies.



The NAE aims to foster a climate of multidisciplinary collaboration between knowledge institutes, governmental bodies, and industry (multi-national companies, SME's, start-ups and scale-ups), covering

- integration of technological know-how and insights;
- collaboration and exchange of expertise and ideas;
- sharing of infrastructure, tools, and platforms;
- removing barriers that hinder the seamless translation of knowledge and insights into practical technological solutions to the benefit of society.

Challenges

Issues to be addressed include systemic improvements of the knowledge and innovation ecosystem such as the need to ensure appropriate funding and recognition of foundational technical sciences and the related human capital, valorization, spinning out IP and attracting VC money for startups, PPP orchestration and financing, as well as specific innovation strategy issues and initiatives to be taken. Current examples of topics to address include how to position the Netherlands versus the European Chips Act or other big EU themes like data access, cloud sovereignty, and the AI Act.

Engineering is at the heart of innovative solutions for many fields⁴, as recognized also in the Mission-driven Topsector and Innovation Policy (MTIB), with their Knowledge and Innovation

⁴ This includes renewable energy, smart grid and energy storage, water management, transportation and logistics, biotechnology and life sciences, health, smart cities and IoT, digitalization, cyber-physical systems/security, blockchain and cryptocurrency, advanced manufacturing, and industry

Agendas for the improvement of the earning power of the Netherlands, the approach to address societal challenges, and the role of key technologies therein⁵. Given the breadth of engineering-based knowledge and innovation, the NAE will choose what to focus on in its annual agenda, taking into account input from key stakeholders.

Combining forces with key actors in the ecosystem

To effectively realize its goals, the NAE will seek explicit partnerships or constructive relations with key actors in the ecosystem sharing its purpose, such as governmental departments, the National Growth Fund, KNAW and Rathenau Institute, STT, universities of technology (4TU), Universities of the Netherlands (UNL), universities of applied sciences (VH), the confederation of Netherlands Industry and Employers (VNO-NCW), top sectors, regional development agencies, TechLeap, and the Advisory council for science, technology, and innovation (AWTI). NAE aims to organize joint activities with partners and stakeholders, and to leverage each other's communication platforms.

NAE will also become a member of international organizations of Academies of Engineering (Euro-Case, CAETS) – taking this over from the current representation through ActI – and will seek to learn from best practices of these well-established organizations⁶, while keeping a focus on the special role and positioning of NAE within the Dutch innovation landscape. Examples of activities from sister engineering academies that will be considered for adoption, as being within the scope of the NAE, include professional development workshops and seminars, mentorship programs, public lectures and symposia, innovation challenges and hackathons, awards and recognition, student and/or community outreach activities, special interest groups, etc. The NAE could also help startups and SMEs to navigate the process of commercializing their technology at scale, teaming up with organizations such as TechLeap, and BioTech Booster.

Over time, the NAE could further increase its ambition, and team up more closely with its partners in the ecosystem, to help offer special Engineering/Innovation grants, international exchange programs, certification programs, an online learning and knowledge sharing platform, a platform for Industry-academia collaboration, an engineer-in-residence program, or a program focusing on tech transfer to SME's.

4.0, artificial intelligence and machine learning, agri-tech and food technology, quantum technology, environmental technology, materials science, and aerospace.

⁵ See <https://www.topsectoren.nl/missiesvoordetoekomst>

⁶ The academies of engineering worldwide generally aim to promote and support the engineering profession by recognizing the achievements of outstanding engineers, promoting, and supporting engineering education and research, and providing networking and professional development opportunities for engineers. They also help to advance the engineering profession through advocacy, standards setting, and the development of codes of ethics. It is important to note that the engineering profession and the definition of engineering can vary from country to country, depending on the laws, regulations, cultural aspects, and economic factors.

NAE Fellows and Young Engineers

To achieve its goals, NAE brings together a body of Fellows with diverse backgrounds, elected for their prestigious track record of impact in technical sciences and engineering-based innovation, their motivation and ability to make a difference, and for their objective, cross-sectoral, and high integrity attitude. Being elected as a Fellow comes with the commitment to make an impact within the NAE context (“noblesse oblige”).

NAE also nurtures a team of Young Engineers as members, with the aim to engage with emerging talent, to include their valuable perspectives, and to be open to novel knowledge innovation domains and engineering approaches.

Funding

At its foundation, the ministries of OCW and EZK jointly committed to make annual financial support available for a period of up to nine years. The Federation of Universities of Technology (4TU) provided kick-off funding for the NAE. Additional forms of financial or in-kind sponsorships will be investigated, ensuring that the independence and objectivity of NAE is guaranteed.

Governance

The NAE is governed by a Board, appointed by the General Assembly of its members. The Board will be supported by an Advisory Council and a Sounding Board in which formal partners and stakeholders will be represented. Day-to-day operations are managed by a bureau, consisting of a director, an office manager, and dedicated program managers for the Forum, Pivot, and Advisory roles of the NAE. The bureau also supports NAE committees chartered with specific topics, such as international affairs.