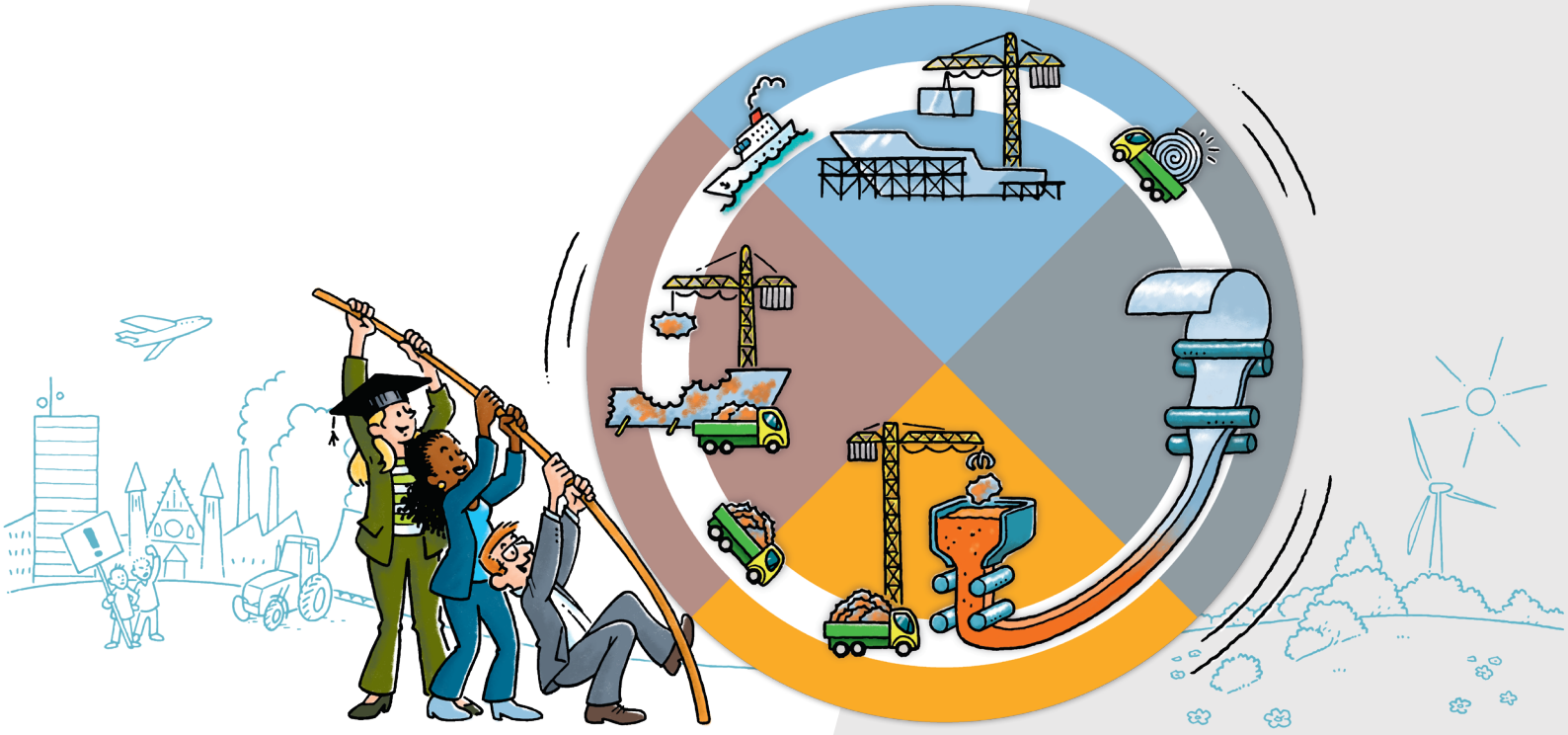
EXECUTIVE SUMMARY

The Dutch steel sector faces a major transition. The production, processing, use and recovery of steel needs to be made significantly more sustainable by 2030 and completely CO_2 neutral by 2050. *Groeien met Groen Staal* is a plan to achieve this, with a range of technologies based on hydrogen, renewable energy and circular iron and steel processing, completely removing the dependency on fossil-fuel based processes. This will involve major changes throughout the steel value chain.

Groeien met Groen Staal rises to the challenge. The required innovations will be established through a collaboration of industrial parties carrying out demonstration projects, showcasing the feasibility of the technologies in an industrial setting, and leading knowledge institutes developing the underlying knowledge required. In the coming 8 years, with a broad consortium covering the entire value chain, the required innovations will be developed for the benefit of the entire Dutch steel sector. They will be the basis for fully green steel in 2050.

Individual companies in the consortium are willing to implement green innovations. In view of the large number of actors in the steel value chain, and the interdependence of their activities, coordination is required to effectively push the transition forward. The contribution of the Growth Fund will enable the coordination of these initiatives to accelerate the steel transition and to reach the Dutch and European sustainability goals by 2030 and 2050. Next to the financial contribution from the government, the policies of the government should be such that the boundary conditions of the transition of the steel sector are supported, e.g. stimulating policies for green steel and facilitating of the development of the renewable energy sector. Effectivity of government incentives, of high importance for the steel transition to succeed, will be investigated as well. Globally, several initiatives are made to make the steel industry more sustainable. For this reason, this proposal has an international component; several foreign players in the production, processing and use of steel, related to major Dutch industries, are involved to support the Dutch industry to make the transition to green steel. Steel value chains and knowledge networks are international and certainly strongly European and therefore, international cooperations are required to make *Groeien met Groen Staal* a success.

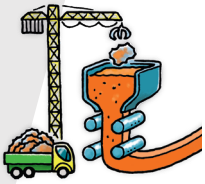


ACTIVITIES

The program is divided into five different themes, that contribute to the technical, economic, environmental and societal impact.

THEME I: SYSTEM CHANGE

The transition that the steel sector is facing plays at 3 different levels: factory level, value chain level and societal level. Using a scenario approach, the innovations required on these three levels will be analysed, optimised and integrated. Policy measures will be proposed to accelerate the green transition.

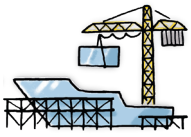


THEME II: PRODUCTION

In the steel production process a lot of CO_2 is released. In this theme, various alternative production routes are investigated to reduce emissions. Pilot plants are being built as demonstrators. The ultimate goal is to eliminate 5% of the total Dutch CO_2 emissions and improve other environmental aspects.

THEME III: PROCESSING

After production, processing steps give the steel the properties to make it ready for use. Processing steps will need to adapt to green steel. The focus of this theme is making processing more sustainable.



THEME IV: USE

In this theme, steel is converted into products. The question is how the manufacturing process needs to be adapted to green steel and what this means for the product. Additionally, new functionalities of the new steels will drive product innovation. We will also look into the direct reuse of products, which could be an attractive business model in some industries.

THEME V: RECOVERY

Technology must be developed to improve the processing of scrap to let the Dutch economy benefit from higher scrap quality. An example is the demonstrator 'Intelligent dismantling of (sea) ships', aiming at getting ship dismantling back to the Netherlands, in order to regain sufficient local scrap streams.

IMPACTS

The program impacts four areas: climate goals, economical benefits, resource autonomy and human capital. The steel industry will flourish in the coming decades. The program will make the Netherlands more resilient in a restless world and competitive with a highly educated workforce.

PARTICIPANTS IN THE CONSORTIUM

The consortium is led by M2i, the organisation that is leading in the Netherlands when it comes to public-private partnerships in the field of materials research. With more than 25 years of expertise in setting up research programs, M2i provides an infrastructure for cooperation, allowing for a fast start. M2i also has tools for dissemination and valorisation of knowledge. The involvement of M2i further safeguards the continuation of activities after the growth fund period.

The affiliated companies are all at the forefront of their field and are equipped with large R&D groups with which momentum can be given to the transition of the sector. Prominent steel suppliers are responsible for demonstration projects, which will show the advancement of technology, giving the companies a competitive benefit. In the work packages, contributions will be made by all relevant Dutch research groups and knowledge institutions. A number of foreign companies and institutions are also participating to bring in the right expertise. With this, the consortium will be a pioneer for the others in the sector.

Twenty-one companies are contributing to the consortium. This means that the results of the program are distributed throughout the country. The same applies to education. Institutions throughout the Netherlands participate. Various branch organisations are also participating, thus achieving a good exchange of information with parties throughout the country. After the start of the program, it will be possible for additional parties to join.

BUDGET

The total budget is 177 MEuro for a period of 8 years (2024-2031). The requested funding is 124 MEuro. The participating companies do bring in-kind contributions, and invest 67 MEuro in prototypes and demonstration units.

To analyse the economic effects of *Groeien met Groen Staal*, two realistic scenarios have been developed, which both project a strong positive effect on the Dutch economy. By remaining frontrunner in the steel, sector a major positive effect on the total sector turnover is projected.

Additionally, the transition of the steel sector creates attractive job offerings. Good economic perspectives will create a positive sector image, improving the business climate for tech companies.

Finally, the foreign consortium parties will guard the international alignment of the steel transition.