Study: Stainless steel circular economy significantly reduces the risk of climate change in Thailand

Wednesday 27 March, 2024

- **$C0_2$ savings correspond to the annual CO_2 footprint of almost the inhabitants of the Muang Chachoengsao district**
- **Thailand particularly affected by climate change: 9th place in the global long-term climate change risk index**
- **Policymakers should create good framework conditions for a professional circular economy and thus climate protection**

Bangkok/Thailand, 27 March 2024

Increased recycling of stainless steel can make a noticeable contribution to mitigate climate change in Thailand and globally. This is the result of a recent joint study by a number of prestigious Thai and German scientists, on behalf of Oryx Stainless (Thailand) Co., Ltd., which looked at the social welfare benefits of recycling stainless steel in Thailand. The Fraunhofer Center for International Management and Knowledge Economy IMW from Leipzig, Germany, planned and coordinated the study with the support of the German Embassy. For every ton of stainless steel scrap used to produce new stainless steel, 6.71 tons of CO_2 are saved compared to the use of primary raw materials. This was the result of the scientific analysis conducted by Fraunhofer UMSICHT using the example of the recycling processes at Oryx Stainless in Thailand. Oryx Stainless is one of the world's leading suppliers of recycled stainless steel with five sites in Asia and Europe. Based on the stainless steel scrap handled by Oryx Stainless in Thailand in the reference year of the study (2021), the scientists calculate CO_2 savings of 556,000 tons. This approximately corresponds to the annual CO_2 footprint of the inhabitants of the Muang Chachoengsao district which is close to the Thai location of Oryx Stainless or 1.45 percent of the total greenhouse gas emissions from all industrial processes in the country. The potential for Thailand and the climate becomes clear when one sees that almost 3.6 million tons of CO_2 were saved within the entire Oryx Stainless Group in the reference year.

The fight against climate change is of particular importance for Thailand, as the country is already suffering greatly from the effects of global warming. Thailand ranks 9th in the global long-term climate change risk index, which covers the years 2000 to 2019. Thailand is highly exposed to natural hazards such as heat waves, droughts, floods, cyclones and storm surges. Floods pose the greatest threat to Thailand in terms of frequency and damage. The country is already one of the ten most flood-affected countries in the world.

In terms of the economic costs caused by climate change, the volume of stainless steel scrap that Oryx Stainless Thailand Co., Ltd. put back into the production cycle saved around 1.9 billion Thai baht equivalating more than 50 million US dollars, according to calculations by Thai and German scientists. This corresponds to the combined national average annual income of around 7.000 Thais.

The calculation is based on the "Scrap Bonus" indicator developed by the Fraunhofer Center for International Management and Knowledge Economy IMW, which was individually adapted to Thai conditions by the international research team for the study. The indicator is calculated in two steps. In the first step, the environmental impact avoided by using one ton of stainless steel scrap in steel production is quantified. In the second step, various economic estimates and price references from emissions trading systems are used to convert the avoided environmental impact into Thai baht. In other words, a price is assigned to the (avoided) pollution.

"This study shows that the smart use of recycling raw materials such as stainless steel scrap and their use in the production of new products can make a tangible contribution to the fight against climate change. Stainless steel scrap is a particularly valuable secondary raw material due to its very high recyclability. Stainless steel can be recycled without any loss of quality. Worldwide, 95% of stainless steel is recycled at the end of its lifespan. 70% is recycled as stainless steel. Scrap currently accounts for around 48% of raw materials for stainless steel production worldwide. In Europe, leading stainless steel producers go to the limits of what is technically feasible and use up to 95% secondary raw material blends for the production of new stainless steel," says Sirichai Tempoomsuk/CFO, Oryx Stainless (Thailand), Co., Ltd.

Stainless steel producer Southeast Asia: growth market

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With a stainless steel production of 7.79 million tons in 2023, Asia (excluding China and South Korea) is already a major player. The Southeast Asian steel industry, including the stainless steel sector, is expected to increase its production capacities significantly in the coming years, with countries such as Malaysia and Indonesia building up millions of tons of new capacity. Thailand produced around 366,000 tons of stainless steel in 2022 and is, simultaneously, the second largest consumer of stainless steel in Southeast Asia.

Creating good framework conditions for recycling and thus climate protection

"The growth perspective in Southeast Asia and thus in Thailand underlines the need for the smart use of our resources in view of the ongoing climate change caused by the emission of greenhouse gases. This is where politics is needed, also in Thailand. Smart recycling creates both economic and environmental benefits for Thai society. To take full advantage of these benefits, policy makers should ensure a level playing field for raw materials and provide favorable operating conditions for the recycling industry," comments Christian Klöppelt, Research Fellow, Fraunhofer IMW as spokesperson for the research consortium.

Concretely, the international researchers propose considering the pricing of CO_2 emissions in Thailand. Additionally, there's a suggestion to expand the Thai Bio-Circular-Green (BCG) Economy Model to include metal scrap. Moreover, creating conducive operating conditions for the recycling industry is recommended. Lastly, a humble appeal is made to the government to lend support to research, development, and education initiatives in these areas. The study is presented to the professional public on Wednesday, March 27th, 2024, at the Hyatt Regency Bangkok Sukhumvit, Thailand.

About

Oryx Stainless Group with its parent company Oryx Stainless Holding B. V. is an internationally leading business group for trading and processing scrap metal as a raw material for stainless steel production. Customers include producers of long and flat stainless steels around the world. On the supplier side Oryx Stainless has a wide, continuously expanding, international procurement base. As a business group that operates worldwide, delivering good service and a transport infrastructure that works smoothly are essential to us. The company guarantees both with their sites in Europe and South-East Asia. Since 2012 Oryx Stainless is present in Thailand via Oryx Stainless (Thailand) Co., Ltd. The company is also present in Southeast Asia with a subsidiary in Malaysia.

Asian Institute of Technology (AIT) established in 1959, is a leading international institution for postgraduate studies, emphasizing engineering, environmental sciences, and management studies. AIT's comprehensive academic programs, research endeavors, and practical engagement initiatives equip its graduates for professional excellence and leadership roles both within Asia and on a global scale. Situated amidst lush greenery just north of Bangkok, Thailand, AIT provides a serene and picturesque campus environment conducive to fostering a diverse and cosmopolitan learning atmosphere. AIT's dedication to sustainable development and societal progress has earned it recognition on the global stage. In the 2023 Impact Rankings, which evaluate universities based on their alignment with the United Nations' Sustainable Development Goals (SDGs), AIT achieved a commendable rank within the range of 201-300 out of 1,591 universities representing 112 countries and regions. This achievement underscores AIT's unwavering commitment to driving positive social change and promoting sustainable practices within its academic and operational endeavors.

Ms. Ushnish Tuladhar, M.Eng.

On 14 February 1978, the project had permission from **Mahidol University, Thailand** to develop into the **Faculty of Environment and Resource Studies.** Clearly, the Faculty had developed itself in various aspects focusing more on curricula, researches, seminars and conferences, and training programs. In 1983, the Faculty moved from Ratchasupamitr, Bangkok to Salaya Campus, Nakhon Pathom province. The program is a pathway for graduates to learn and eventually transfer their knowledge and apply their skills to internationally enhance the better environmental conditions. Especially, the program also aware on the global paradigm shift with sustainable development goals (17 SDGs) which is embedded in the National Strategic Plan 20 years for Thailand (B.E. 2560-2580) and the National Plan of Economic and Social Development 13 (B.E. 2565-2569).

Asst. Prof. Ratchaphong Klinsrisuk, Ph.D.

National Science and Technology Development Agency (NSTDA) of Thailand was established in December 1991 as an autonomous government agency under the National Science and Technology Development Act 1991. NSTDA is affiliated to the Ministry of Higher Education, Science, Research and

Innovation, with the Minister serving as the chairman of NSTDA Governing Board.

NSTDA is entrusted with an important task to accelerate science, technology and innovation development in Thailand in order to respond to the need of the industry and enhance the country's competitiveness in the global economy, and as a result, making contribution to national economic and social development.

Dr. Jitti Mungkalasiri

Fraunhofer Center for International Management and Knowledge Economy IMW looks back on more than seventeen years of applied socio-economic research and experience in Leipzig. The institute supports customers and partners in using globalization, digitization, and structural change as a motor for innovation. The interdisciplinary research team at the Leipzig site and, since 2020, also at the Center for Economics and Management of Technologies CEM in Halle (Saale) accompanies companies, organizations, institutions, states, municipalities and regions with international projects, network activities and analyses scientifically based on strategic decision-making processes. Here, they develop powerful and effective strategies, processes, and tools, in order to facilitate knowledge and technology transfer and to convert it into innovative products and services. Holistic sustainability assessments of future scenarios, including the quantification of environmental and value-added effects and as presented in this project, the estimation of social costs, are a core competence of the Fraunhofer IMW and serve to develop ecologically and socially balanced and economically viable solutions with a global perspective.

Christian Klöppelt, M.Sc.

Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT is pioneering the way to a sustainable world. With research on carbon management, circular economy, green hydrogen and local energy systems, the institute makes concrete contributions to achieving the 17 Sustainable Development Goals (SDGs) of the United Nations. Fraunhofer UMSICHT develops innovative, industrially feasible technologies, products and services for the circular economy and brings them to application. The focus is on the balance of economically successful, socially equitable and sustainable developments.

The institute has sites in Germany. In 2022, Fraunhofer UMSICHT generated a turnover of 58 million euros with a workforce of 600 employees. As an institute of the Fraunhofer-Gesellschaft, the world’s leading applied research organization, we are globally networked and promote international cooperation.

Dr.-Ing. Markus Hiebel

University of Applied Sciences Jena was founded in 1991, making it one of the first in the new federal states of Germany. For several years, it has not only been Thuringia's largest, but also the most research-intensive university for applied sciences. It currently has around 4,400 Bachelor's and Master's students. In addition, it employs around 470 people in the areas of science, administration, technology and the library. The University of Applied Sciences Jena works closely with partners from business and science. The research fields in the areas of "precision systems", "technologies and materials" and "health and sustainability" reflect both technically and socially current topics. In addition, there is the interdisciplinary field of digitization, in which various aspects of Industry 4.0 are examined. This interaction of different disciplines enables a creative and innovative approach to research topics and problems.

Prof. Dr. Frank Pothen

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