ISC3
International Sustainable Chemistry Collaborative Centre

Annual Report 2021

International Sustainable Chemistry Collaborative Centre (ISC3)

Implemented by:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Supported by:

DECHEMA Gesellschaft für Chemische Technik und Biotechnologie e.V.

Supported by:

LEUPHANA UNIVERSITÄT LÜNEBURG

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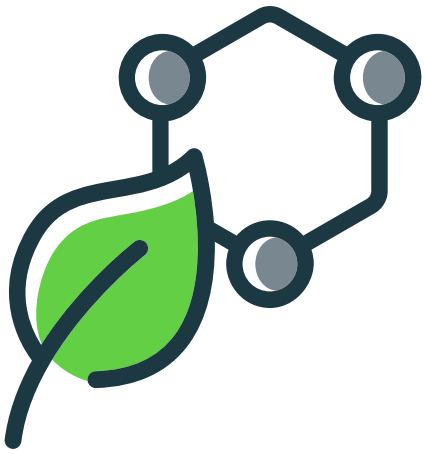


ISC3 — We transform chemistry

The International Sustainable Chemistry Collaborative Centre (ISC3) is a globally acting institution and a multi-stakeholder platform operating on behalf of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and the German Environment Agency (UBA). ISC3 aims to shape the transformation of the chemical sector towards Sustainable Chemistry, thus contributing to the preservation of the environment and the establishment of a circular economy in order to meet the United Nation's (UN's) Sustainable Development Goals (SDGs).

The ISC3 is hosted by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in cooperation with Leuphana University Lüneburg as ISC3 Research & Education Hub (ISC3 REH) and DECHEMA Society for Chemical Engineering and Biotechnology (DECHEMA e.V.) as ISC3 Innovation Hub.

www.isc3.org

Abbreviations

BMUV	German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
CCU	Carbon Capture and Utilization
CSS	Chemicals Strategy on Sustainability
EESG	Ecological, economic, social, governmental
EU	European Union
GdCH	Gesellschaft Deutscher Chemiker
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GSCC	Green and Sustainable Chemistry Conference
GSCW	Global Sustainable Chemistry Week
GSS	Global Start-Up Service
H2	Hydrogen
ISC3	International Sustainable Chemistry Collaborative Centre
ISC3 IH	ISC3 Innovation Hub
ISC3 REH	ISC3 Research and Education Hub
JCF	JungChemikerForum
LCA	Life Cycle Assessment
MBA	Master of Business Administration
MoUs	Memorandum of Understanding
M.Sc.	Master of Science
NGO	Non-Governmental Organisation
PS	Leuphana Professional School
PtC	Power-to-Chemicals
PtL	Power-to-Liquid
PtX	Power-to-X
SAICM	Strategic Approach to International Chemicals Management
SDG	Sustainable Development Goal
UBA	German Environment Agency
UN	United Nations
UN DESA	United Nations Department of Economic and Social Affairs
UNEA	United Nations Environment Assembly
UNFCCC-CoP	United Nations Framework Convention on Climate Change - Conference of the Parties

Activities of the International Sustainable Chemistry Collaborative Centre

This annual report covers the year 2021 marking the first year of the second phase which runs from 2021 to 2024. The focus of this phase lies on the consolidation and further development of the ISC3.

While several international efforts reasonably focus predominantly on the risks associated with the production of a large number of chemicals and their use in diverse areas of the economy and everyday life, the ISC3 also explicitly looks at the opportunities arising from Sustainable Chemistry. The ISC3 explores potential in the area of research and development, particularly in the context of products, processes and services, as well as innovative entrepreneurial ideas and business models.

An important pillar therefore lies in international chemicals policy with various multilateral conventions and the Strategic Approach to International Chemicals Management (SAICM).

Other central elements of the conceptual approach are education, cooperation, knowledge, and information.

With the continuous professionalisation of structures and processes, the optimisation of internal and external cooperation, the definition of strategies (internationalisation, communication, etc.) and the establishment of new recurring event formats, such as the ISC3's campaign week "Global Sustainable Chemistry Week" central elements in phase II were established.

The consolidation and further development of the centre was driven by the professional expansion of activities within the following six designated outputs which will be looked at in detail on the following pages:
Policy & Stakeholder Dialogue, Promoting Innovation in Sustainable Chemistry, Anchoring Sustainable Chemistry in Education, Training and Research, Knowledge & Information, Support for Emerging and Developing Countries, and Governance and Organisation.

Highlights 2021

Innovation

The webinar series "Sustainable Chemistry Club India" on the topic of "Sustainable Chemistry" was conceived together with the partner Science and Technology Park Pune in 2021 and had five sessions. The "Club" was initiated to raise awareness of the central role of Sustainable Chemistry in all sectors and value chains.
After a thorough preparation and selection process that started in March 2021, a total of seven international Start-Ups out of 25 entries in the second round made it to the finals of the ISC3 Innovation Challenge 2021.

Science & Innovation

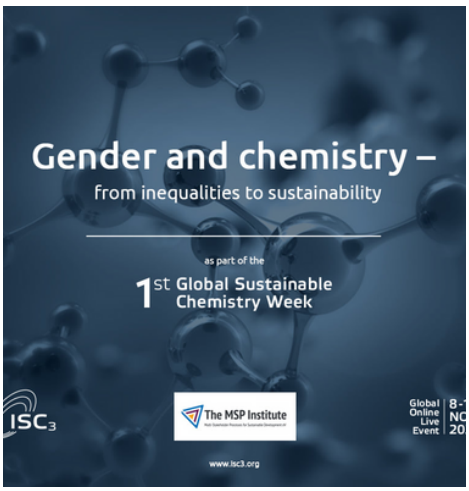
The focus topic "Plastics in Sustainable Building"* completed in 2019-2020 and the status quo of the ongoing topic (PtX/H2) were reflected with the Advisory and Scientific Board at the Stakeholder Forum in November 2021 and in September 2021.
A successful workshop with GIZ PtX-Hub and stakeholders from industry to discuss "Communication in Sustainable Chemistry Innovation". The two day agenda focused on the various aspects that need to be taken into consideration in communicating PtX and Sustainable Chemistry Innovation.

Research & Education

In the first quarter of 2021, ISC3 successfully submitted an application for the M.Sc. Sustainable Chemistry as "Sustainable Development Goal Good Practice" (SDG Good Practice) to the United Nations Department of Economic and Social Affairs (UN DESA). ISC3 and Leuphana University Lüneburg (as an academic institution) and the ISC3 REH are thus recognised as actively contributing to the achievement of SDGs 4, 9, 12 and 17.

THE GLOBAL GOALS

*https://www.isc3.org/page/sustainable-building-living



Policy: Gender

In the area of gender (focus topic: "Increased placement of gender issues"), an information and awareness raising event on "Gender dimensions in international chemicals policy" was held several times.
Additionally, the ISC3 interview series "Women in Sustainable Chemistry"* was continued on a regular basis. Exchanges with women decision-makers in Sustainable Chemistry help to better understand gender- and country-specific challenges and perspectives on the chemical sector.

Global Sustainable Chemistry Week

The International Sustainable Chemistry Collaborative Centre (ISC3) hosted its 1st Global Sustainable Chemistry Week on November 8-12, 2021, with various events, discussions, panels, lectures etc. given by stakeholders and partners. With the Global Sustainable Chemistry Week, the ISC3 strives to raise international awareness for the concept of Sustainable Chemistry and the actors in this field, offering a platform for all stakeholders to present their respective projects, business models, and research activities.
Single event formats such as workshops, lectures as well as panel discussions with a range of stakeholders from business, industry, academia, and civil society provided a wide range of perspectives on the transformation towards Sustainable Chemistry. The ISC3 contributed to the Global Sustainable Chemistry Week with the Stakeholder Forum, the Investor Forum, and a panel on the European Union's (EU) Chemicals Strategy on Sustainability (CSS).
With more than 1,000 participants across 30 hours of events and almost 100 programme partners and panelists, the first Global Sustainable Chemistry Week was a huge success.

Interview

Our Director of Science & Innovation, Dr. Claudio Cinquemani, had the opportunity to share ISC3's views on Sustainable Chemistry in a book on going "toxic free".

Policy: Youth

In the area of youth engagement and participation (focus topic: "Intensifying collaboration with youth"), a new event format, the "ISC3 Youth Day", was established. In this format young scientists can exchange ideas with various actors on topics of Sustainable Chemistry. The joint event on the topic of "Sustainable Development and Youth", which took place as part of the Global Sustainable Chemistry Week 2021, should be highlighted in this context. Furthermore, a Memorandum of Understanding (MoUs) was signed with the JungChemikerForum (JCF), the organisation of young members of the Gesellschaft Deutscher Chemiker (GdCH) in June 2021.

*https://www.isc3.org/page/gender-sustainable-chemistry/isc3-initiative-on-gender-sustainable-chemistry

1 Policy and Stakeholder Dialogue

1. Policy and Stakeholder Dialogue

Introducing the concept of Sustainable Chemistry

Policy & Stakeholder Dialogue aims to introduce the concept of Sustainable Chemistry into relevant processes and forums of international policy regarding chemical, environmental and sustainability issues.
Of relevance are multilateral conventions and the international chemical policy processes.
In 2021, the focus was on the SAICM process and the associated development of a follow-up agreement (SAICM Beyond 2020 process). Due to the ongoing pandemic, meetings of international stakeholders and related conferences accompanying the process were postponed from 2020/2021 to 2023.

1.1 Practical Implementation

For ISC3, practical implementation meant, among other things, supporting relevant international political processes, e.g. by organising side events at SAICM Beyond 2020, UNFCCC-CoPs, Science Policy Business Forum and UNEA.
Particularly important is the continuous outreach and exchange with the diverse landscape of actors in Sustainable Chemistry as well as other politically relevant stakeholders at national, regional and international level.

In 2021, the Policy & Stakeholder Dialogue was especially characterised by its cross-organisational interface function, whereby technical topics of the ISC3 Innovation Hub as well as the ISC3 Research and Education Hub could be placed in political forums in an exemplary manner.

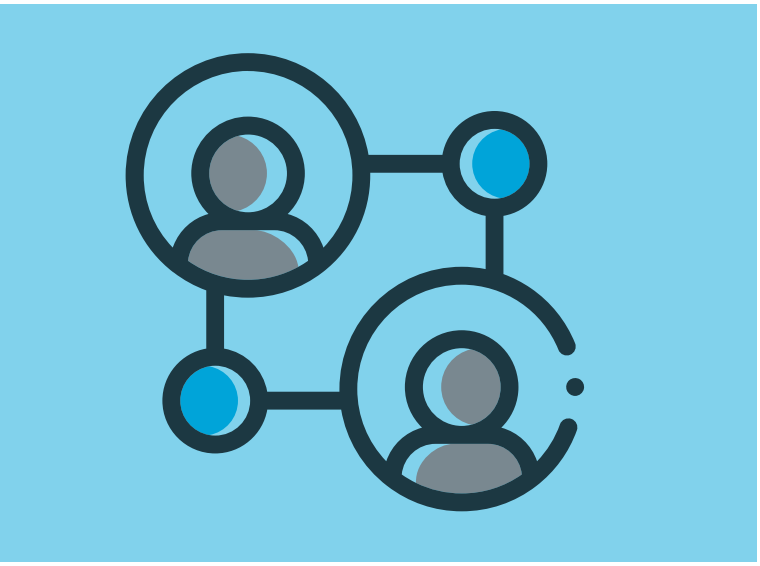
Due to ISC3's continuous advocacy work, a majority of ISC3 activities from the Promotion of Innovation to the Support for Developing and Emerging Countries became more visible at national, regional and international level (e.g. by holding event formats, conducting political dialogues, developing background and information papers).

Cross-organisational cooperation is to be continued and deepened in 2022-2024 to ensure that international decision-makers are aware of practical examples of Sustainable Chemistry and transfer respective insights on to their countries.

1.2 Global Sustainable Chemistry Week

The ISC3 adapted to the circumstances of the second year of the pandemic and resorted to innovative as well as digital solutions and tools in its correspondence and events.

Therefore, the originally planned Global Sustainable Chemistry Week 2021 (GSCW 2021) took place in a digital format. Many international stakeholders from the Sustainable Chemistry community were therefore able to join online without having to travel from all regions of the world. Within the GSCW 2021 the regular ISC3 Stakeholder Forum and the ISC3 Innovation Hub Investor Forum took place.



1.3 Youth and Gender

Important findings from the collaboration with civil society organisations (e.g. youth organisations and NGOs related to gender issues) were that there is a great demand for knowledge on sustainability and chemistry issues. That is why the ISC3 focused on the key topics "Intensifying collaboration with youth" and "Increasing placement of gender issues"[1]. This work will continue in 2022-2024, with a range of specific trainings that will be stablished (e.g. Sustainable Chemistry and SAICM) and the implementation of information and awareness raising events (e.g. gender dimensions in international chemicals policy).

In the area of youth engagement and participation (focus topic: "Intensifying collaboration with youth"), a new event format, the "ISC3 Youth Day", was established.
In this format young scientists can exchange ideas with various actors on topics of Sustainable Chemistry. Highlighted in this context should be the joint event on the topic of "Sustainable Development and Youth", which took place as part of the Global Sustainable Chemistry Week 2021.

In June 2021, a Memorandum of Understanding for the cooperation in the second phase was formally concluded with the JungChemikerForum (JCF), the organisation of young members of the Gesellschaft Deutscher Chemiker (GdCH). The new event format has proven to be promising for youth participation due to the high number of participants and is to be maintained in the further course of phase II.

In the area of gender (focus topic: "Increased placement of gender issues"), an information and awareness raising event on "Gender dimensions in international chemicals policy" was held several times.

Additionally, the ISC3 interview series "Women in Sustainable Chemistry" was published on a regular basis.[2] Exchanges with women decision-makers in Sustainable Chemistry help to better understand gender- and country-specific challenges and perspectives on the chemical sector.
In 2022-2024, the interview format will be continued with female stakeholders from other sectors (e.g. energy, business, industry) with the aim to make women scientists and role models more visible.

[1] Gender and youth, among others, have already been important topics and stakeholder groups for ISC3 since phase I (2017-2020).
The inclusion of diverse perspectives and the presentation of the multi-layered nature of the topic is important for the long-term positioning of Sustainable Chemistry, as the social dimension is considered.

2 Promoting Innovation in Sustainable Chemistry

2. Promoting Innovation in Sustainable Chemistry

Cross-sector and cross-value

The focus innovation aims to promote cross-sector and cross-value chain approaches to innovation, new business ideas and business models. Innovations are to be initiated and innovators in the field of Sustainable Chemistry are supported on a global level through the work of the ISC3 Innovation Hub (ISC3 IH).

We want to ensure that innovations in chemistry are increasingly oriented towards the environmental and social aspects of sustainability.

2.1 Regional presence

As Sustainable Chemistry should become increasingly established in economic reality, the aim is to strengthen the support for regional entrepreneurs in Sustainable Chemistry.
To increase this regional presence and to discuss detailed knowledge of the respective regional innovation environment, the Start-Up scene and the framework conditions, a large number of international activities and events were held. Furthermore, new communication channels were opened, and strategies developed for mobilising the private sector in the field of Sustainable Chemistry.

The ISC3 IH built a regional service using their Spiderweb Network - a developing network for formal collaboration.

2.2 Partnerships

By the end of 2021, six Memoranda of Understanding (MoUs) had been signed with international like-minded partner organisations from five continents.

In the frame of international collaboration, synergies were created: The services offered by the Global Start-Up Service (GSS) complement the existing offers of the regional partners and at the same time, the members of the GSS are supported through the regional networks.

Three potential new partnerships (Start.Up Lounge Africa, Green African Youth Organisation and Aceleradora Litoral) are set up for 2022.

2.3. Regional Focus

The regional focus of the ISC3 Innovation Hub in the second phase is Latin America, Africa and Southeast Asia. In these regions, joint initiatives were organised and implemented on the role of Sustainable Chemistry in achieving the UN's Agenda 2030 for Sustainable Development and supporting the regional innovation ecosystem.

A highlight is the webinar series "Sustainable Chemistry Club India" on the topic of "Sustainable Chemistry". This was implemented together with the partner Science and Technology Park Pune in India with five webinars held in 2021. The Club was initiated to raise awareness of the central role of Sustainable Chemistry in all sectors and value chains.
Learning objectives were to convey the connections between Sustainable Chemistry, the different industry sectors, and innovations. Participants therefore learn and understand the holistic concept of Sustainable Chemistry.
The webinars were held monthly and, in each session, a speaker from Europe and India was invited to share insights, experiences and challenges. This was followed by a discussion highlighting the relationship between Sustainable Chemistry and the topics of life cycle analysis, applications in the agricultural sector, the leather industry and hydrogen. The series will be continued in 2022.

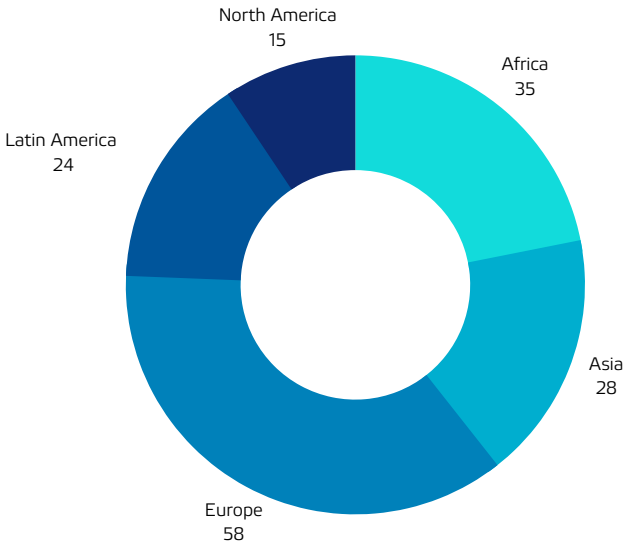
2.4 Global Start-Up Service

Another core activity of the ISC3 Innovation Hub was the expansion of the Global Start-up Service (GSS), the world's first global programme to provide support to Start-Ups in the field of Sustainable Chemistry. The services are oriented both to the topics of Sustainable Chemistry and to the needs of the Start-Ups. One example is workshops on Life Cycle Assessment (LCA) being held.
These helped Start-Ups without prior knowledge in the field of LCA to understand about the possibilities and limits of an ecological sustainability assessment. It also answered application questions of experienced Start-Ups (e.g. Mobius, MycoTEX).

With the help of this systematic analysis, the Start-Ups were able to assess themselves as well as to show external investors that their product represents an ecological improvement to the status quo. The fact that the social, ecological and economic components of Sustainable Chemistry are also reflected in the business model was discussed and exemplified in the workshop on the Sustainable Business Model Canvas.

The members of the GSS are also regularly invited to the initiatives with the above-mentioned partner organisations and actively participate or present their solutions in the relevant areas as "best practices" examples. By the deadline on December 2021, 160 Start-Ups were in the first level of the GSS and received general support. This corresponds to an increase of 60 Start-Ups compared to the number at the beginning of the second phase (January 2021).

The entrepreneurs from the respective Start-Ups break down numerically and geographically as follows: 35 from Africa, 28 from Asia, 58 from Europe, 24 from Latin America, and 15 from North America. The innovations pursued by the founders span a wide range of application fields, including agriculture, bioeconomy, new materials, waste management and construction.



2.5 Innovation Challenge

In 2021, the annual Innovation Challenge focused on the search for founders and their innovations from the focus topic of Sustainable Chemistry and Renewable Energies.

Sustainable solutions from the following chemical disciplines were particularly in demand: sustainable energy and greenhouse gas reduction, high-performance materials and high-performance technologies, innovative technologies in chemical production based on carbon neutral forms of energy and the use of CO2 as a raw material, durability and resilience of materials, and Power-to-X processes (PtX).

After a thorough preparation and selection process that started in March 2021, a total of seven international Start-Ups out of 25 entries in the second round made it to the finals of the ISC3 Innovation Challenge 2021. The finalists got the chance to compete for EUR 15,000 at the virtual 3rd Investor Forum 2021, which took place during the first ISC3 Sustainable Chemistry Week 2021. The winning teams were: UpCatalyst (main winner of the ISC3 Innovation Challenge 2021), LeafyLife (Best Regional Impact Award 2021) and Shobab Energy (Best Social Impact Award 2021).

UP Catalyst: CEO Gary Urb and Head of Innovation and R&D Einar Karu testing the synthesis reactor elements. Copyright: UP Catalyst

2.6 Investor Forum

Another established ISC3 event was the Investor Forum 2021, held as part of ISC3's first "Global Sustainable Chemistry Week 2021". A total of 170 international guests, including Start-Ups and guests from finance, industry, academia, non-governmental organisations (NGOs) and politics participated virtually. During the three-day event, Start-Ups from the Global Start-Up Service presented their innovative solutions to international investors. Both, the investors, and the Start-Ups from the field of Sustainable Chemistry had the opportunity to get to know each other and to talk in more detail about presented solutions. In addition, various panel discussions on the three main topics "New and alternative business models", "Regulation and reporting in the context of chemical-related constraints", and "The role of Sustainable Chemistry in the energy transition and possible ways forward" took place. The three-panel discussions were complemented by three pitching sessions with a total of 20 innovative Start-Ups. In addition, another 20 Start-Ups from the field of Sustainable Chemistry presented their innovations on a separate meeting platform for investors and Start-Ups, as well as in an "IF21 Investor Brochure" that was available digitally for investors. During the one-on-one meetings between Start-Ups and investors on a separate platform following the conference sessions, a total of almost 1000 minutes of B2B meetings were streamed.

3 Anchoring Sustainable Chemistry in education, training, and research

3. Anchoring Sustainable Chemistry in education, training, and research

Education

In 2021 the two study programs Master of Science (M.Sc.) Sustainable Chemistry and Master of Business Administration (MBA) Sustainable Chemistry Management were further developed and implemented. This was done in cooperation between the Leuphana Professional School (PS) and the ISC3 Research and Education Hub (REH) (both located at the Leuphana University of Lüneburg). The two study programmes M.Sc. Sustainable Chemistry and MBA Sustainable Chemistry Management are intended to gradually advance the integration of the topic of Sustainable Chemistry in the higher education sector.

3.1 M.Sc. Sustainable Chemistry

The M.Sc. Sustainable Chemistry programme is aimed at international professionals with a first academic degree in chemistry or a related subject and aims to provide expertise in the implementation of Sustainable Chemistry for practice in science, industry, public authorities, environmental organisations or similar fields of activity. Both the number of prospective students and the diversity of countries of origin (almost all continents are represented) have increased. The first students are to complete their studies in 2022 and receive the Master's degree.

Successful application as UN "Sustainable Development Goal Good Practices"

In the first quarter of 2021, ISC3 successfully submitted an application for the M.Sc. Sustainable Chemistry as "Sustainable Development Goal Good Practice" (SDG Good Practice) to the United Nations Department of Economic and Social Affairs (UN DESA). ISC3 and Leuphana University Lüneburg (as an

and the ISC3 REH are thus recognized as actively contributing to the achievement of SDGs 4, 9, 12 and 17.

3.2 MBA Sustainable Chemistry Management

In 2021, preparation took place for the MBA Sustainable Chemistry Management established in 2020 in cooperation with the Professional School of Leuphana University: It is another international online degree programme, which will start in March 2022. The target group are people who act at decision-making levels in practice and are relevant for the implementation of Sustainable Chemistry. Prior academic education in the field of chemistry is not mandatory.

3.3 Summer School

Another milestone was the annual Summer School on Sustainable Chemistry for Sustainable Development.
The Summer School introduced the concept of Sustainable Chemistry and an international and interdisciplinary group of participants discussed the focus topic "Sustainable Chemistry and Agriculture".

3.4 Research

In the area of research, four research topics were addressed and the "Green and Sustainable Chemistry Conference" (GSCC) was organised in cooperation with Elsevier.

The research activities of ISC3 REH highlight selected contributions of chemistry to international chemicals management in the context of the Strategic Approach to International Chemicals Management (SAICM) and the Sustainable Development Goals of the 2030 Agenda.
In 2021, as in previous reporting years, emerging research trends and their associated materials and processes were considered in depth to identify their potential and pitfalls for sustainable development as early as possible. One example is the electrochemical synthesis of chemicals. This is based on the use of renewable energies, carbon dioxide from industrial processes or from the atmosphere, and the electrolysis of water. It is crucial to understand whether there will be bottlenecks in the future in the availability of renewable energies on the one hand and of the required materials on the other (e.g. metals).

In order to achieve the goals of the Paris Climate Agreement, much hope is placed in "low-carbon" technologies. The decarbonisation of electric power, mobility and industry can counteract the progress of climate change. However, this leads to a strongly increasing demand for metals ("low carbon - high metal"). As a non-renewable resource, metals are of great importance for "low carbon" technologies as well as for catalysis, transport and electromobility, communication and digitalisation. In view of the increasing demand for renewable energies, the availability of metals seems to be crucial. Moreover, the recycling of some metals is very costly due to their small amount in the products, which moreover can be very complex. The manuscript "Closing the loop in the German silicon solar panel industry" (El-Khawad, L., Bartkowiak, D., Kümmerer, K.), submitted at the end of 2021, presents the first results. As part of this research activity, the ISC3 REH together with the Technical University of Dortmund and the Institute for the Future of Industrial Society, Düsseldorf organised the workshop "Metals matter!" in November 2021 at the Protestant Academy in Tutzing.

4 Knowledge and Information

4. Knowledge and Information

Key Questions

In 2021, key questions and approaches to Sustainable Chemistry were discussed, developed, processed, and shared within the capacity development programme (chapter 5) via various trainings and workshops. Knowledge, Information, and Communication were developed, bundled, and established in close cooperation of the three ISC3 hubs as well as other actors.

4.1 Focus Topics

ISC3 turns to current and future-relevant topics. A successful example is the workstream report on "Sustainable Building and Living, Focus on Plastics". The focus topic "Plastics in Sustainable Building" completed in 2019-2020 was reflected with the Advisory and Scientific Board at the Stakeholder Forum in November 2021 and in September 2021.

From this report, the ISC3 has published information that is tailored to the target groups as well as key findings.
Key messages from this process include the following findings:

- The linear, toxic and wasteful production and handling of plastics of the last decades need to be replaced by system thinking and careful planning starting already in the design phase.
- There is no universal solution to the approach of plastics because of different technical, economic and social conditions in each region.
- However, planning should take into account the whole value chain - from resource extraction, to transport, to production and to the use of recycling and reusing (circular economy and sustainability).

The information on the focus topics is further made available to decision-makers via the ISC3 Stakeholder dialogue and the subsequent capacity development measures according to their current, political and technological, economic or ecological relevance.

4.2 Renewable Energy and Sustainable Chemistry

In a stakeholder process, the topic "Renewable Energy and Sustainable Chemistry" with a focus on Power-to-X (PtX) and Power-to-Chemicals (PtC) was selected as particularly relevant. In

2021-2022, the work will focus on the sub-themes of Power-to-X (PtX) and hydrogen (H2) economy in Uruguay and Morocco.
Due to the complexity of the whole PtX process, Sustainable Chemistry should focus on at least three phases in the process: Input, Process and Output.
In the Input phase, it was essential to track how and where resources come from. The Process phase focused on available or future technologies that are economical and environmentally friendly, e.g. Carbon Capture and Utilization (CCU) or good water management. In the Output Phase it is important to consider the specific PtX products. Depending on the regional energy and industry structure (power grid, chemical parks) as well as the targets (internal, exports), appropriate PtX products have to be considered, e.g. pure hydrogen as gas or further PtL (Power-to-Liquid) and PtC products. In addition to production, storage and transport it is necessary to harbor potential negative side effects on sustainability aspects as defined by the EESG. The hydrogen economy and PtX have the great potential to defosilise and sustainably transform the whole world energy economy.

For this reason, it is important to think about the side effects of the process and the ideas of sustainable circular economy for the numerous component and systems already in the preparation phase.
The status quo of the topic (PtX/H2) was also reflected with the Advisory and Scientific Board at the Stakeholder Forum in November 2021 and in September 2021 respectively.

As a further development of the PtX/H2 theme, ISC3 announced Morocco as a new geographical focus of the focus topic for 2022.

For further work in years 2023-24, the theme of "Renewable Energy and Waste" has been identified.

The Advisory Board and Scientific Board are at the heart of ISC3 stakeholder engagement. The Boards support ISC3's mission and the international dialogue on the emerging concept of Sustainable Chemistry by providing advice, expertise and networking activities. In the spirit of international cooperation for sustainable development, the Boards are committed to an open, constructive and transparent dialogue that provides inspiration, critical review and strategic advice to ISC3. Board members engage in this dialogue based on their personal and professional experience, providing expert advice on technical, scientific and communication issues, as well as advice on ISC3's medium and long-term goals.

4.3 Common Understanding

Closely related to the knowledge review is the process of a Common Understanding of Sustainable Chemistry. The goal of the process is to develop a Common Understanding that corresponds to the current state of discussion and knowledge in the field. That serves as a guideline for ISC3, as a scientific foundation and for a communication strategy.

In January 2021 the 10 Key Characteristics[1] of Sustainable Chemistry were published. They consist of the following prinicples:

[1] https://www.isc3.org/page/key-characteristics-of-sustainable-chemistry

- holistic,
- precautionary,
- systems thinking,
- ethical and social responsibility,
- collaboration and transparency,
- sustainable and responsible innovation,
- sound chemicals management,
- circularity,
- green chemistry,
- and lifecycle.

For ISC3, anchoring the concept of Sustainable Chemistry in the scientific and political discourse is important.
At the same time, a transformative agenda towards more sustainability is to be offered and established to the participating stakeholders of the chemical sector. Due to the heterogenety of the stakeholders in the field of Sustainable Chemistry, the focus of the work is broad.

The exchange of information is promoted via the communication channels of the ISC3 such as social media, publications, the website, at events and via networking with partners and stakeholders. For this purpose, an international network consisting of partner organisations from different fields such as research, science, industry, NGOs, and others was established.
In addition, the organisation of events such as panel discussions, Stakeholder Forums, expert talks and workshops not only provide an opportunity to present the work of ISC3 but also to make the concept of Sustainable Chemistry better known to a broad interested public. At the same time, participants are connected, and synergies created. This way, ISC3 has already brought the concept of Sustainable Chemistry to the international UN forums as team lead in SAICM Communities of Practice as well as to the PtX training of the PtX-Hub Berlin. During the collaboration in the "Plastics and Building" workstream, sustainability aspects were integrated into the new building code in Kenya.

There is a steady increase of followers on ISC3's social networks, which is a further indicator that the communication of the successes of the ISC3 and its partners is meeting with growing interest, not only among experts but also among an interested public. This also includes the continuous development of the website.

4.4 Supporting Emerging and Developing Countries

ISC3 supports selected developing countries and emerging economies. This is done by means of demand-oriented capacity development approaches tailored to the respective national needs through training on Sustainable Chemistry. Together with stakeholders, application-oriented projects on practical and transferable solutions are carried out (e.g., in the form of project concepts for implementation projects). The aim is to strengthen capacities in selected emerging and developing countries to identify meaningful approaches to action in the field of Sustainable Chemistry.

The themes are selected based on the focus topics, for which the centre has already generated a plethora of knowledge. These are PtX and Sustainable Building and Plastic. Furthermore the Sustainable Business Model Biocide Leasing was identified as an additional topic.

Biocide Leasing. Copyright GIZ

This field of Biocide Leasing was significantly expanded within the scope of possibilities compared to the first phase (2017-2020) and the strategy for international cooperation activities was (further) developed.
Various information and training formats as well as consulting approaches and cooperation models will be highlighted. To this end, concepts for the implementation of concrete approaches to Sustainable Chemistry are to be developed together with the partners. With "Biocide Leasing", the ISC3 developed a first concept in 2021, which offers advice on a sustainable, innovative business model.

The ISC3 initially advised Uruguay and will in the future advise other partner countries on the operationalisation of the project approaches.

Target groups are on the one hand the chemical industry in the respective partner countries as well as sectors in which chemical products are used, as well as state actors and civil society organisations. These often have a "gatekeeper function" and are helpful in initiating cooperation.

For both groups, specific information, further education, and practice-oriented training offers are developed and offered together with suitable partner organisations. The aim is to jointly address multipliers to anchor the concept of Sustainable Chemistry in political processes and structures in the partner countries.
ISC3 selected the "National Construction Authority" of Kenya as a partner organisation because this institution developed a new building code. The ISC3 supported the institution to apply knowledge and competences from the field of Sustainable Chemistry into practise.

To identify suitable partners and entry points, as well as to exploit synergies, cooperation took place with existing GIZ activities and with other international development partners and regional organisations. In developing training approaches, ISC3 drew on analyses already prepared in the first phase of the project and on an existing network of contacts, which meant that the results of the focus topic "Sustainable Building & Living - Focus on Plastics" can be used as needed for training measures in Kenya, among other places.

Furthermore, the expertise of the GIZ PtX-Hub is being built upon and a workshop model is being jointly offered to enrich the hitherto rather technically oriented training with sustainability aspects.

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