



Working Plan on Innovation 2024-2025



WORKING PLAN ON INNOVATION

BETWEEN

BRAZIL AND SWEDEN

(2024-2025)



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INTRODUCTION

The cooperation in science, technology, and innovation between Brazil and Sweden is based on the Additional Protocol on Cooperation in High Industrial and Innovative Technology, signed in 2009, within the framework of the Economic, Industrial and Technological Cooperation Agreement, signed between the Brazilian and the Swedish governments in 1984 and in force since 1986.

In 2016, Brazil and Sweden signed a Memorandum of Understanding for Sustainable Mining Cooperation, in which the promotion of the use of Science, Technology and Innovation in sustainable mining is one of its priority areas.

The technological spill-over effects from the aeronautical sector derived from the partnership established by the Gripen NG project. The cooperation on aeronautics have brought researchers and entrepreneurs together from both countries with concrete results for the benefit of the overall bilateral STI cooperation.

In the 4th meeting of the Steering Group on Innovation (SGI), under the Additional Protocol on Cooperation in High Industrial and Innovative Technology, held in 2019 in Stockholm, both parties agreed to develop a working plan in order to provide guidance for the bilateral activities in priority areas coordinated by the Brazilian Ministry of Science, Technology and Innovation, and the Swedish Ministry of Enterprise and Innovation. The SGI encourages the Funding Agencies of both countries to finance the activities according to the prioritized areas established in this document.

In the update on the 29th of October 2021, new projects and events were included as well as a new column in table 1 (Annex I) describing the projects' state of the art in October 2021.

In the new action plan approved 9th of November 2023, the four thematical areas have been maintained, with an adjustment to "Smart Cities" to expand the concept of "Sustainable Cities". Also, an Annex with contact information for the funding agency WG has been added, Annex V, to be updated frequently. In Annex I, there is a division between ongoing (approved projects/activities) and planned projects/activities which are not yet funded. In the latter case it is stated what is the next step in the column "State of the art". Annex II lists bilateral project known to the group but not handled within this collaboration. Annex III extends with information about activities relevant to the collaboration. Annex IV provides some information for each thematic area regarding the priority for both Brazil and Sweden, as well as some activities. Finally, Annex V lists the points of contact of the funding agencies.

SGI highlights that the Brazil-Sweden cooperation on innovation is dynamic, and this Working Plan reflects the dynamism of the bilateral relationship. In this context, it is desirable that new



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activities be added during the established period. In this case, they should be reported to the Executive Committee on Innovation (ECI).

PRIORITY AREAS

Both countries express interest in continuing to strengthen the relationship in Science, Technology, and Innovation in fields of interest defined as such by the SGI.

The WP presented here may be amended at any time. The SGI will approve the amendments put forward by the Executive Committee on Innovation (ECI).

The prioritized areas of the WP are:

- Sustainable Mining
- Sustainable Cities
- Bioeconomy, and
- Health

Ongoing and planned activities that will be carried out under this WP are listed in Annex I and IV. In Annex II are listed ended projects. In Annex III are listed bilateral projects, known to this group but not handled within this collaboration.

The costs for the activities carried out within the framework of the bilateral cooperation will be borne by each national institution involved, as jointly decided between them, subject to availability of funds. The ECI and SGI meetings are planned according to Annex IV, with the possibility of extra meetings, if agreed by both parties. Annex IV also contains information on other important activities for the collaboration and will be updated frequently. Common understandings reached by both countries in each of the priority areas of this WP are detailed in Annex V.



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ANNEX I

Sustainable Mining

PoCs	Member	Institution	E-mail
Focal Point	BR - Marisa Monte	CETEM - Centro de Tecnologia Mineral	mmonte@cetem.gov.br
	Mikael Larsson	SweRim	mikael.larsson@swerim.se
Altern	TBD		
	TBD		-

Ongoing Projects

Year	Project	Description project	Brazilian partner	Sweden partner	Instrument(s)	State of the art November 2023
Approved 2020	Reverse iron oxide magnetic ultrasonic nanobubble-flotation" (RIO-MUN)		University of São Paulo (USP), ITV – Instituto Tecnológico Vale (private research institution)	Luleå University of Technology (LTU), Nouryon		



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Planned Projects/activity

Year	Project/Activity	Description project/activity	Brazilian partner	Sweden partner	Instrument(s)	State of the art November 2023
2024	To assist contact persons in order to submit projects to VINNOVA /Embrapii Call 2024	To work together to maximize project approvals by directly hiring between the Embrapii Unit and Vinnova. 5 different project initiatives have been discussed in relation to the current joint call. Partner discussions ongoing	Metalmat-UFRJ; VALE Maranhão; ITV, Pará Federal University.	Swerim, Ltu, Chalmers, LKAB, Kaunis Iron, Boliden	Vinnova; Embrapii, mining industries	Ongoing discussions for attending to the joint supporting innovation projects (Embrapii&Vinnova)
2025	Stakeholder meeting/workshop/webinar to stimulate initiation of projects within the mining area	Eco-efficient comminution. More efficient material handling processes/methods; Recycling; More efficient water management; Digitalization, automation, and machine learning for more efficient processes. Webinar organized in conjunction with the Brazil-Sweden	CETEM	Swerim	Open invitation to the Swedish and Brazilian mining cluster including experts from each of the themes. Speakers thematic experts and decision makers within companies and research institutions	New action
2026	Technical visits and visiting researchers	To promote exchanges, so that Brazilian researchers can undertake work abroad with the aim of maintaining contact with competitive Swedish institutes. It also seeks to attract Swedish researchers who want to visit Brazilian research institutes and universities.	CETEM	Swerim	Professors who work in mining expertise and R&D Centers in Mining / Swedish mining Companies	New action



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Sustainable Cities

PoCs	Member	Institution	E-mail
Focal Point	Claudia Morosi Czarneski	MCTI	cmorosi@mcti.gov.br
Altern	Marcela Aboim Raposo	MCTI	marcela.aboim@mcti.gov.br
Focal Point	Staffan Filipsson	IVL	Staffan.filipsson@ivl.se
Focal Point	Eva Stattin	RISE	Eva.stattin@ri.se



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Ongoing Projects

Year	Project	Description project	Brazilian partner	Sweden partner	Instrument(s)	State of the art November 2023
2021-2024	INNOREC	Development of an innovative technology for resource recovery from anaerobic treatment of sewage	Boomatec, SANEPAR, SENAI EQ	ENWA IVL	VINNOVA / EMPRAPII	Successful development of a new technology for Brazilian and Swedish end-users. Successful development of corporation between all partners.
2023-2025	AI-qua-City	AI based system for predictive maintenance sewage water networks	ICMC-USP SABESP	IVL RISE	EUREKA Global Stars	Waiting for administrative clearance from FAPESP
2024	AI and making cities smarter	Monitoring and fostering applications of AI for Smart Cities	TBD	RISE – Research Institutes of Sweden IVL Swedish Environmental Research Institute		Planning for application
	Interoperable smart city information platforms	Infrastructure that makes it possible to share data in a controlled way – a basis for collaboration and development.	TBD	RISE – Research Institutes of Sweden Smart City Lab IVL Swedish Environmental Research Institute		Planning for application



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Planned Projects/activity

Year	Project/Activity	Description project/activity	Brazilian partner	Sweden partner	Instrument(s)	State of the art November 2023
2024	Webinar	Activities developed by Citinova in Florianopolis	MCTI	IVL		Not started
2024	Webinar	Activities that can be developed by Sweden in Florianopolis	MCTI	IVL		Not started
2024	Webinar	Definition of joint activities	MCTI	IVL		Not started
2025	Mission to Brazil	Visit the project Citinova in Florianopolis	MCTI	IVL		Not started
2025	Mission to Sweden	Visit synergistic initiatives	MCTI	IVL		Not started
2024	EMPRAPII - VINNOVA Call	Turning wastewater into highly valuable products through removal of carbondioxide	Embrapii	VINNOVA	Public bilateral call for proposals	Discussion started
2024	PoC Spring Meeting	Checkup meeting for Brazilian and Swedish points of contact.	Points of contact	Points of contact		Not started
2024	Visit(s)	Possible visit of Brazilian delegation to Sweden and/or of Swedish delegation to Brazil.	Government, Academic and Business sectors, municipalities, research institutes, R&D&I centers; Individual researchers (networking).	Government, Academic and Business sectors, municipalities, research institutes, R&D&I centers; Individual researchers (networking).		Not started



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2024	PoC Fall Meeting	Meeting for Brazilian and Swedish points of contact to update the working plan	Points of contact	Points of contact		Not started
2024	AI and making cities smarter	Monitoring and fostering applications of AI for Smart Cities	TBD	RISE – Research Institutes of Sweden IVL Swedish Environmental Research Institute	TBD	Planning for application
2024	Interoperable smart city information platforms	Infrastructure that makes it possible to share data in a controlled way – a basis for collaboration and development.	TBD	RISE – Research Institutes of Sweden Smart City Lab IVL Swedish Environmental Research Institute	TBD	Planning for application
2025	PoC Spring Meeting	Checkup meeting for Brazilian and Swedish points of contact-	Points of contact	Points of contact		Not started
2025	Visit(s)	Possible visit of Brazilian delegation to Sweden and/or of Swedish delegation to Brazil.	Government, Academic and Business sectors, municipalities, research institutes, R&D&I centers; Individual researchers (networking)	Government, Academic and Business sectors, municipalities, research institutes, R&D&I centers; Individual researchers (networking)		Not started
2025	PoC Fall Meeting	Meeting for Brazilian and Swedish points of contact to update the working plan	Points of contact	Points of contact		Not started



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Bioeconomy

PoCs	Member	Institution	E-mail
Focal Point	Bruno César Prosdocimi Nunes	Ministry of Science, Technology, and Innovation – MCTI	bruno.nunes@mcti.gov.br
	Ewellyn Capanema	Research Institutes of Sweden – RISE	ewellyn.capanema@ri.se
Altern	Luis Gustavo Asp Pacheco	Ministry of Agriculture and Livestock – MAPA	luis.pacheco@agro.gov.br
	Tbd		



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Ongoing Projects

Year	Project	Description project	Brazilian partner	Sweden partner	Instrument(s)	State of the art November 2023
2019	Bio-based materials from Kraft lignins (LIGNOMAT)	LignoMat aims to exploit the potential of lignin as one of the major components of woody raw materials. The opportunities to integrate thermoplastic and thermoset production in a pulp mill will be investigated.	Klabin, Federal Rural University of Rio de Janeiro (UFRRJ), SENAI CETIQT	Valmet AB, RenCom AB, RISE	Sweden- Vinnova. Brazil- FINEP	The LignoBoost plant was designed, built, tested and Klabin has produced and shipped to Sweden two types of lignin. The first sample was fully characterized and tested by Lignin Industries, former RenCom in thermoplastics. It was also modified by RISE and testing is ongoing. Partners in Brazil received funds from FINEP February 2023
2021	Lignin Based Zeolites: Mesopore forming agent for zeolites	Lignin will be used as mesopore forming agents for zeolites as its functional groups could interact positively with zeolite precursors. Mesoporous zeolites have enhanced diffusion properties and, thus, increased lifetime on catalysis applications.	SENAI CETIQT Zeofertil FCCSA	RISE Polyfuels	Sweden – Vinnova Brazil – EMBRAPII	Project approved for funds and on going. Project end March 2024
2021	Nano Lignin cellulose in Compression Moulding composites	Production of CNC/CNF Production of lignin Production of nano-lignin - cellulose colloidal Fiber coating Compression moulding	SENAI Klabin	RISE Biosorbe	Sweden – Vinnova Brazil – EMBRAPII	Project approved for funds and on going. Project end March 2024
2021	Lignocellulosic Materials (CNF, Lignin) in Personal Care- LCNF-2	CNC/CNF production Lignin production LCNF/LCNC Lignin nano cellulose colloidal Multifunctional beauty products	SENAI ASSESSA Eldorado	RISE FineCELL	Sweden – Vinnova Brazil – EMBRAPII	Project approved for funds and on going. Project end March 2024



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Planned Projects/activity

DATE	LOCAL	EVENT	DESCRIPTION	TARGET AUDIENCE
Feb - 2024	Webconference	BSG Meeting	Alignment and planning actions	Government, Academic and Business sectors
May - 2024	Webinar and Matchmaking	Public Webinar	2 day Webinar and Matchmaking event on “Sustainable Forest Management” and “Science and Technology for Biorefinery” for both Brazilian and Swedish researchers, corporations, institutes and universities	Academic and Business sectors
Jul - 2024	Webconference	BSG Meeting	Alignment and planning actions Beginning the interaction between funding agencies to harmonize forms and procedures Definitions about Brazil-Sweden Innovation Week	Government, Academic and Business sectors
Sept - 2024	Webinar and Matchmaking	Public Webinar	2 day Webinar and Matchmaking event on “Sustainable Forest Management” and “Science and Technology for Biorefinery” for both Brazilian and Swedish researchers, corporations, institutes and universities	Academic and Business sectors
Sept - 2024	Webinar	GreenRio 2024	Debate between Brazilian and Swedish experts on topics of interest to cooperation. The aim is the strengthening of cooperation networks and the prospecting of lines of research for possible joint actions	Government representatives, researchers, businessmen and the general public
Oct - 2024	Webconference	BSG Meeting	Alignment and planning actions. Beginning the definition of possible Joint Call	Government, Academic and Business sectors
Nov - 2024	Swedish Embassy in Brazil	Brazil-Sweden Innovation Week	Seminars, technical visits and other scientific dissemination activities in Brazil	Government, researchers, business, general public
Feb - 2025	Webconference	BSG Meeting	Alignment and planning actions Working on the possible Joint Call and harmonizing funding agencies forms and procedures	Government, Academic and Business sectors
May - 2025	Webinar and Matchmaking event	Public Webinar	2 day Webinar and Matchmaking event on “Sustainable Forest Management” and “Science and Technology for Biorefinery” for both Brazilian and Swedish researchers, corporations, institutes and universities	Academic and Business sectors



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Jul - 2025	Webconference	BSG Meeting	Alignment and planning actions Working on the possible Joint Call	Government, Academic and Business sectors
Sept - 2025	Webinar and Matchmaking	Public Webinar	2 day Webinar and Matchmaking event on “Sustainable Forest Management” and “Science and Technology for Biorefinery” for both Brazilian and Swedish researchers, corporations, institutes and universities	Academic and Business sectors
Sept - 2025	Webinar	GreenRio 2025	Debate between Brazilian and Swedish experts on topics of interest to cooperation. The aim is the strengthening of cooperation networks and the prospecting of lines of research for possible joint actions	Government, researchers, business, general public
Oct - 2025	Webconference	BSG Meeting	Alignment and planning actions. Finishing the possible Joint Call paper	Government, Academic and Business sectors
Nov - 2025	Brazilian Embassy in Sweden	Brazil-Sweden Innovation Week	Seminars, technical visits and other scientific dissemination activities in Sweden Presentation of Report of Working Plan 2024-2025 Definition of Working Plan 2026-2027	Government, researchers, business, general public



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Year	Project/Activity	Description project/activity	Brazilian partner	Sweden partner	Instrument(s)	State of the art November 2023
2024	Lignocellulosic Materials, CNF, Lignin and proteins in Personal Care LCNF-3	Continue development of functional ingredients for cosmetic industries. Skin protection and boosting regeneration through non-animal based protein:lignin:MC formulations for cosmetic applications	SENAI Assessa	RISE <i>Perrigo(?)</i> <i>FineCell (?)</i> ACO, ESTELLE & THILD (?) ?Swedish skin care brands?	Vinnova EMBRAPII	Planning
2024	Developing MFC/CNC:Lignin nanoparticle-based formulations for barriers -NanoClig2	Continue development and improvement of MFC/CNC/lignin dispersions to be used in barrier coatings through film extrusion and injection moulding and or self-standing films. Production of MFC-CNC: Lignin Based Dispersion Solutions to be used in fiber based packaging and injection moulding	SENAI Klabin	Finecell, Fiberlean, Stora-Enso, Lignin IndustriesAutomotive Companies	Vinnova EMBRAPII	Planning
2024	Rubber Reinforcement by addition of lignocellulosic materials	Use of nanocellulose as a potential alternative for rubber vulcanization process. However, it reinforces the need to study nanocellulose functionalization routes to improve hydrophobicity, solubility and compatibility properties, increasing interfacial compatibilities between nanocellulose and natural rubber.	SENAI CETIQT <i>Others (?)</i>	RISE <i>Others (?)</i>	Vinnova EMBRAPII	Planning
2024	Lignin based emulsifiers in cosmetics	Obtaining surfactant from lignocellulosic biomass for use in cosmetic formulations. Evaluate possible green routes of lignin modification to introduce better hydrophilic groups along the polymer chains for later use as a biosurfactant in cosmetic emulsions. In addition to the surfactant property, lignin	SENAI CETIQT <i>Others (?)</i>	RISE <i>Others (?)</i>	Vinnova EMBRAPII	Planning



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		can also provide anti-UV function in cosmetic formulations				
2024	Biofuels from Catalytic hydrogenation of lignin	Explore the use of lignin as a substrate in catalytic hydrogenation reactions to obtain renewable biofuels, such as biodiesel, biokerosene or biogas. biodiesel synthesis by converting lignin into fatty acid methyl esters (FAMES) through hydrogenation and subsequent esterification reactions. Bio-kerosene, on the other hand, can be obtained by upgrading lignin-derived aromatic compounds through hydrogenation and isomerization reactions. Biogas, a mixture of methane and hydrogenation of lignin followed by anaerobic digestion carbon dioxide, can be generated through	SENAI CETIQT <i>Others (?)</i>	RISE <i>Others (?)</i>	Vinnova EMBRAPII	Planning
2024	Biorefinery lignin as a source of silicon for synthesis of Zeolites	Explore the use of lignin derived from 2G ethanol production as a source of silicon and template for the synthesis of zeolitic materials (Si-Al), such as ZSM-5. Use of lignin from 2G ethanol production as a silicon source and template for Si-Al zeolite materials. This project can contribute to the recovery of sugarcane residues and provide a sustainable path for the zeolite synthesis.	SENAI CETIQT <i>Others (?)</i>	RISE <i>Others (?)</i>	Vinnova EMBRAPII	Planning
2024	Ligno-Cellulose based Sustainable packaging and sensors for agricultural and Marine IoT systems	innovative bio-based products to substitute traditional materials with high environmental footprint and its exploitation in sensors fabrication using printing techniques for testing of new developed materials	SENAI CETIQT Eldorado Institute	RISE <i>Others (?)</i>	Vinnova EMBRAPII	Planning



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		Sustainable substrates printable functional materials for sensors in Agricultural and Marine sector based on Bio-graphene, Lignin, biopolymers, LASER / Photonic graphitization				
2024	Revealing the structure-properties correlation of novel lignin EVOH-based barrier material	Conduct in situ X-ray scattering characterization for L- EVOH at control relative humidity and mechanical test for revealing barrier properties-structure relationship. Dissemination of the usefulness of X-ray scattering techniques in the research field among the company and our networks	CNPEM SENAI	RISE Domsjö	Vinnova EMBRAPII	Planning
2024	Production of low molar mass compounds from Lignin via biochemical routes	Evaluate new pathways of co-culture systems and combination of bacterial and fungal enzymes to degrade lignin. The bioconversion of lignin using microbes separation strategies tailored to the compounds of industrial interest	SENAI ??	RISE ??	Vinnova EMBRAPII	Planning



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Health

PoCs	Member	Institution	E-mail
Focal Point	Marie Sjölander	RISE	marie.sjolinder@ri.se
	Luiz Ary Messina	RNP	Luiz.messina@rnp.br
	Paulo Lopes	RNP	Paulo.lopes@rnp.br
	Martin Schalling	KI Karolinska Institute	martin.schalling@ki.se
Altern			



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Ongoing Projects

Year	Project	Description project	Brazilian partner	Sweden partner	Instrument(s)	State of the art November 2023
2022-2023		<i>eID enabled Standardized and HARmonized health REcords management (e-SHARE)</i>	Gisele Zuniga, Actadigitalis	Thashmee Karunaratne, Stockholm University		Support from Vinnova
2022-2023		<i>Automated decision support in health and applications of machine learning</i>	Anna Sara Levin, Professor, MD, Head of Department of Infectious Diseases, Faculdade de Medicina, Universidade de São Paulo (USP)	Pontus Naucler, Associate Professor in Epidemiology, Karolinska Institutet (KI) and Consultant of Infectious Diseases, Karolinska University Hospital		Support from KI



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2022-2023		<i>Internet based Cognitive Behavioral Therapy for Obsessive Compulsive Disorder</i>	Roseli G. Shavitt, University of São Paulo, Department of Psychiatry	Christian Rück, Department of Clinical Neuroscience, Karolinska Institutet		Support from KI
2023 Nov 6-7	Workshop on Facilitate AI and ML collaborations in Health	November (6-7) : Organized by The Swedish Consulate SP; Dan Henningson and Martin Schalling; https://ki.se/en/collaboration/brazilian-swedish-workshop-on-aiml-in-life-science-and-engineering Brazilian-Swedish Collaborative workshop on AI in Life Science and Engineering	Workshop at USP, SP	Swedish Consulate SP, Dan Henning KI, Martin Schalling;		



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Planned Projects/activity

Year	Project/Activity	Description project/activity	Brazilian partner	Sweden partner	Instrument(s)	State of the art November 2023
2023		<i>Artificial Intelligence for Personalized E-healthcare in an Omnichannel Platform Enhancer (AI4PEOPLE)</i>	Luciana Pereira, Federal University of ABC – UFABC Renato Nabuco, MZLAB	Petter Krus, Linköping University Thomas Davidsson, Hallandia V AB		FAPESP/EUREKA to be decided in 2023
2023		<i>Ending Child Obesity with Artificial Intelligence (ECHO AI)</i>	Erico Vasconcelos, UNIVERSIDADE FORMANDO PESSOAS NO SETOR SAÚDE LTDA. Maria Rita Oliveira, UNESP	Peter Bergsten, Uppsala University		FAPESP/EUREKA to be decided in 2023 Partner from Germany, Andreas Keck, Syte Capital GmbH



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ANNEX II

Other Bilateral Projects not handled within this group

(but relevant for the Swedish -Brazilian collaboration)

Health

Year	Project name	Description of project ()	Brazilian partner	Sweden partner	Instrument (s)
2006-2023	RUTE	Brazilian Telemedicine University Network RUTE – a health collaborative network with 2 to 3 scientific virtual sessions everyday in 45 health specialties, composed together of 140 university and teaching hospitals www.rute.rnp.br	140 University and Teaching Hospitals		RNP/MCTI
2023	Digital Health in the SW-BR Ministries of HHealth	Ministries from both countries discuss Digital Health, focusing in this first meeting on Oct 10 th on collaborative themes, which include digital services for citizens, structuring a national digital infrastructure, interoperability solutions for National Quality Records, among others	Brazilian Ministry of Health, RNP	Swedish Ministry of Health, RISE, Karolinska Institute and the Swedish eHealth Agency	



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ANNEX III

Events concerning SGIs 2024-2025

Date	Event	Venue	BR partner	SE partner
May 2024	ECI-meeting	Web conference	MCTI	MCE
October 2024	ECI-meeting	Web conference	MCTI	MCE
November 2024	SGI-meeting	Brazil, Florianopolis	MCTI	MCE
November 2024	Innovation week in Brazil	Brazil	MCTI	MCE/Embassy
May 2024 (TBD)	Matchmaking Bilateral call	Web conference	Enrich	RISE
November 2024 (TBD)	Matchmaking Bilateral call	Brazil+Web	Enrich	RISE
November 2024 (TBD)	Delegation visits from Sweden	Brazil	MCTI	MCE/Embassy
November 2024 (TBD)	Startup matchmaking	Brazil	CISB	SISP/Ignite
May 2025	ECI-meeting	Web conference		
October 2025	ECI-meeting	Web conference		
November 2025	SGI-meeting	Sweden, tbd		
November 2025	The V Brazil-Sweden Innovation Week	Sweden, Stockholm		



Joint Program of Cooperation 2024-2025

ANNEX IV

Sustainable Mining

Brazil and Sweden are both strong mining nations with several ongoing successful collaborations in sustainable mining. Both are stimulated by public funding and through direct cooperation funded by the collaborating companies. This creates a solid foundation to build the intensified collaboration on. The cooperation between the different actors in the mining area have been difficult to start due to several reasons, i.e. difficulties with common financing schemes, Covid-19 pandemic, reorganization within industrial actors due to change in strategic focus. A renewed strategic work in 2022 between Sweden and Brazil POCs in 2022 renewed the areas interest and organizing research areas of interest for future cooperation as:

- Eco-efficient comminution;
- More efficient material handling processes/methods;
- Recycling;
- More efficient water management;
- Digitalization, automation, and machine learning for more efficient processes.
- fossil-free mining.

The themes the digital mine, sustainable water management, and rock mechanics and seismicity have also been identified and relevant for the collaboration. However, this list is dynamic and may be updated as the collaboration prolongs.

For the short-term goals, the initiatives are planned to stimulate joint applications of projects for the VINNOVA-EMBRAPII call for collaboration on innovative projects between Sweden and Brazil based on the call 2023. Research ideas have created which are being discussed with the potential partners from both countries.



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In the long-term, the theme-oriented workshops, technical visits, and the extended invitation to planned national events aim to stimulate a growing understanding of competences and need as well as knowledge about instruments and thereby contribute to the generation of a robust project portfolio within the identified themes. Direct collaboration between partners as well as joint Brazilian-EU calls are relevant instruments in addition to direct collaboration instruments for long-term partnerships.

Sustainable Cities

Sustainability is becoming increasingly crucial for the Sweden-Brazil Innovation Initiative as a whole, as manifested by the participation of the Brazilian Ministry of Environment and Climate Change and the Swedish Environmental Protection Agency. Both Brazil and Sweden strive for a mission-oriented development of our societies. For the collaboration in the Sustainable and Smart Cities frame, the United Nations (UN) Sustainable Development Goal (SDG) 11, UN-SDG-11, serves as the overall mission: to make cities and human settlements inclusive, safe, resilient, and sustainable. The world's population is constantly increasing. To accommodate everyone, we need to build modern, sustainable cities. To survive and prosper, we need new intelligent urban planning that creates safe, affordable, inclusive, and resilient cities with green and culturally inspiring living conditions.

With the challenge of digital inclusion of their population, Brazil and Sweden have both developed expertise in smart cities, and work to collaborate, bringing together governments' initiatives, businesses, research institutes, and universities from both countries. This collaboration is based on short-term and mid-term actions. It includes organizations with a focus on Sustainable and Smart Cities, where fundamental factors are the use of digitalization and the development of digital platforms that allow the assessment of living conditions and also enable the use of Artificial Intelligence (AI) for their improvement. These are essential tools for implementing the solutions that make cities smarter and more sustainable.



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One considerable advantage of applying AI in water management (drinking water supply, maintenance of water pipe networks, wastewater treatment, resource recovery from sewage, etc.) is access to large amounts of data. This large amount of data, often delivered in real-time, serves as an excellent platform for assessment of the current situation and building-up of competence within the development of applied AI tools for predictive maintenance of city sewage water networks and that also could be transferred to other sectors, such as environment, mobility, energy, etc. In addition to the build-up of knowledge within AI, the need to develop water management technologies could bring today's wastewater treatment plants into production facilities for fossil-free energy, fossil-free nutrients, and fresh water. AI applied to water management will develop Brazilian and Swedish cities to become more climate resistant and healthier and have the potential to reduce greenhouse gas emissions by producing fossil-free energy.

In addition to AI and water management, the following areas for collaboration could also strengthen both our countries to leverage science, technology, and innovation for sustainable urban development in Brazilian and Swedish cities and metropolitan regions:

- Low-carbon transport solutions: The partners intend to develop innovative and smart solutions to promote low-carbon transport pathways for citizens and goods, contributing to reducing greenhouse gas emissions.
- Shared data infrastructure: The collaboration emphasizes creating an infrastructure for controlled data sharing as a basis for further development. This approach aligns with Open & Agile Smart Cities (OASC) recommendations and visions for smart cities in the EU and Brazil.

The motivation for continuing the collaboration between Brazil and Sweden in Sustainable Cities is anchored in our shared commitment to sustainable and smart development, utilizing science, technology, and innovation to enhance the livability of our cities and metropolitan regions. The specific areas described above for collaboration within the context of Sustainable Cities are prioritized by both countries. In addition, there are several benefits for our both countries to co-develop those areas that will result in a win-win situation for each country:



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- Both countries work "mission oriented" in those areas that are pointed out above (sustainable water management linked to the use of AI and smart sensors) in which we propose a developed cooperation.
- Both countries want to focus more on Sustainable and Smart Cities where AI is a tool that can be used for their implementation.
- Both countries have already developed good expertise in those fields and therefore brings knowledge from each side that will be further strengthened by the collaboration.
- Especially in the field of water management, there is in both countries access to large amounts of real time data from different sensors for application and development of AI tools and both of our countries have many cities that are interested in the development of applications within AI.
- Both countries are working with data platforms to be explored with AI, and the connection to EU initiatives is important for the possibility of scaling up and for the continuity of the collaboration (one recent example is the successful Eureka Global Stars application for the joint development of AI-tools and robust, on-line sensors for water management in the sustainable cities). This means that we do not have to start from scratch with finding synergies and partners. Instead, we could directly deepen the collaboration.
- There are interested actors from both countries, including the industry that wants to be involved in developing AI as a tool, e.g., in the field of water management
- In both Sweden and Brazil, the opportunity to use the platforms such as Smart City Lab and Viable Cities Climate-neutral cities, together with Swedish and Brazilian platforms, to strengthen the field is understood to be a good area in which water companies in both countries have shown interest in using AI and also linked to the development of smart, robust sensors.
- There is a clear win-win situation where both countries have complementary competencies, access to data, etc., provides valuable development in the Sustainable Cities area, which can be further developed in both countries.



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Bioeconomy

Brazil and Sweden consider the development of the bioeconomy as part of their strategies for sustainable development. Both countries make efforts to develop a sustainable and circular bioeconomy, taking advantage of the natural opportunities offered, such as forest resources and biodiversity, and making use of the capacities in research and development, such as bioindustries. For this reason, the Bioeconomy Sub-Group singled out two themes for the bilateral cooperation: sustainable forest management and technologies for biorefineries.

We identified cooperative projects developed between Brazilian and Swedish companies and science and technology institutes. It is expected that the activities proposed in this work plan will help to deepen these relationships and create new synergies by involving new actors in the debate. It is likely that at the end of this first cycle, new projects may emerge.

As instruments of this first cycle of activities, we propose to hold face-to-face and virtual meetings for debate between government, academic, and business sectors. Also, it is expected to hold face-to-face seminars and technical visits to cooperative projects that already exist, as well as to companies and research and development institutions interested in integrating this cooperation. No joint activities have been planned involving the use of financial resources.

For the Brazilian side, the Ministry of Science, Technology and Innovation (MCTI) and the Ministry of Agriculture, Livestock, and Food Supply (MAPA) lead the cooperation with the support of Finep and Embrapii, both linked to MCTI. For the Swedish side, the strategic innovation partnership programme BioInnovation and Research Institutes of Sweden (RISE) lead the cooperation with support from Vinnova, the Swedish innovation agency.



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Health

Supporting collaboration on Lifelong Health regarding engaging patients and health professionals through interoperable, collaborative platforms and validated solutions searching for scientific evidence

Development of new solutions and platforms that support the individual and the health systems flow in gaining control over his/her own health during the entire life span, in following a patients journey. This topic covers solutions and platforms ranging from applications addressing end-costumers in providing support in moving towards a healthier lifestyle to technology that increases the patients control over his/her own health in terms of equipment and sensors that allow both the patient and the health care to monitor and/or follow important physical parameters.

Digital solutions and structuring platforms for prevention of lifestyle related diseases: Lifestyle related diseases entails huge costs for society and health care. There exist many solutions that target end-customers but there is also a need for expanding technology solutions and interoperable platforms into a more systemic approach addressing large challenges regarding public health.

Digital solutions, collaborative and interoperable platforms aiming at postponing dependency and need for care: When an older adult has started to become dependent the decline and the need for care and support increases fast. Therefore, solutions that contributes to postpone this point in time will both lower costs for society and increase quality of life for the individuals.

Digital solutions, collaborative and interoperable platforms for monitoring and home care: Hospital admissions can be brought forward, and chronic diseases can be monitored in a continuous way when moving hospital care to the home. Monitoring equipment can be tailored to each individual and to his/her diagnose or context. This kind of technology will provide a cost-efficient patient centered care in a way where the individual will gain control and perceive flexibility in terms of having the opportunity to remain in the home environment.



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ANNEX V

Contact information for Funding Agencies

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To meet at regular intervals to explore funding opportunities in the respective countries, and when possible initiate various activities, e.g. calls, in support of the cooperation