RESEARCH, INNOVATION AND ENTERPRISE 2030

MANUFACTURING, TRADE AND CONNECTIVITY

BIOECONOMY FUNDING INITIATIVE

Unlocking new carbon sources from sidestreams

Call-for-Proposals FY2026

1 INTRODUCTION

1.1 The bioeconomy is a growing industry that uses biological resources or biotechnology pathways for manufacturing ("bio-based manufacturing"), and offers a pathway to bolster Singapore's resilience in the Energy and Chemicals sector. Guided by industry-defined problem statements, the Bioeconomy Funding Initiative (FI) will support mission-driven, translational research with a 3- to 10-year horizon for commercial impact.

1.2 Bio-based manufacturing remains heavily dependent on refined feedstocks like corn-derived dextrose, which are costly and compete with food supply. In contrast, the key industries of Southeast Asia (SEA) generate vast underutilised sidestreams that offer a cheaper and more sustainable alternative. To capture this opportunity, the Agency for Science, Technology and Research (A*STAR) invites proposals to unlock new carbon sources from these industrial sidestreams.

1.3 Projects can be funded for up to **3 years** and for up to **SGD 6M (inclusive of 30% overheads)**. Researchers are to propose a budget and duration that is commensurate with the scope of the work to be accomplished. Note that this grant is intended to fund capability development, and not projects with large capital expenditures (i.e. Equipment/Infrastructure quantum).

1.4 Proposals will be subjected to a technical review in accordance with the following criteria and weightages:

- Relevance of technical capabilities to be built (25%).
- Scientific quality and novelty (25%).
- Likelihood for industry adoption (25%).
- Relevance and strength of prior work (15%).
- Potential for subsequent follow-on funding (10%).

2 PROJECT REQUIREMENTS

2.1 General requirements

2.1.1 Proposals must articulate how they would contribute to a bio-based value chain that is economically competitive with fossil-based manufacturing at scale. Proposed technology could involve a biogenic sidestream, biological conversion as the primary value-add, or both.

2.1.2 At the end of the project duration, proposals must target a Technology Readiness Level (TRL) of 5 or above.

2.1.3 A preliminary Technoeconomic Analysis (TEA) of the proposed technology is required. Refer to the prescribed TEA Worksheet for guidance.

2.1.4 Proposals that are supported by a preliminary Lifecycle Assessment will be evaluated favourably.

2.1.5 Proposals must outline a credible pathway to industrial adoption. Where proposals are otherwise competitive, evidence of industry engagement – from a Letter of Intent or Memorandum of Understanding through to a signed Research Collaboration Agreement – will be evaluated favourably.

2.2 Sidestream requirements

2.2.1 Proposals must comply with the sidestream requirements specified in Annex A.

2.2.2 Proposals with sidestreams that meet the following strategic criteria will be evaluated favourably.

- **SEA relevance**: Arising from manufacturing industries in which SEA has a leading or globally significant position (e.g. palm oil, cassava starch).
- **Availability**: Generated in substantial volumes at the industrial scale (e.g. around the Mt/year range). Near-term expansion driven by market, regulatory, or other industry tailwinds would be advantageous (e.g. Indonesia B50 biodiesel mandate).
- Examples include palm empty fruit bunches, palm mesocarp fibres, crude glycerol from palm-derived biodiesel production, cassava pulp.

2.2.3 Projects must endeavour to replicate industrial conditions for their chosen sidestream. This includes testing across batch-to-batch compositional variability, which may be intrinsic to the source material or be introduced through industrial processing and supply chain traceability gaps.

2.2.4 Proposals must explicitly justify their choice of sidestream, including against the criteria listed in 2.2.2. Where applicable, the TEA should account for the market economics of the chosen sidestream.

2.2.5 Industry collaborations are strongly encouraged, particularly where partners can provide access to bona fide sidestreams, inform synthetic reconstructions, or advise on industrial conditions and market economics. Proposals demonstrating such collaborations, or a credible pathway to it (refer to 2.1.5), will be evaluated favourably.

2.3 Technology requirements

2.3.1 Proposed technologies must:

- **Be scalable**: Technologies must be developed towards processing the nominated sidestream at commercially relevant volumes.
- **Improve end-to-end techno-economics**: Technologies must enable economically competitive sidestream-to-product conversion. In practice, this frequently centres on three interrelated challenges: (1) the crudeness and variability of raw sidestreams, (2) underutilisation of available sidestream fractions, and (3) the technical limitations of existing capabilities.

2.3.2 Biological and (physico)chemical technologies are within scope. Where applicable, hybrid approaches are encouraged to tackle the diverse problem statements across the value chain.

2.3.3 Annex B provides illustrative examples of technologies within scope.

2.4 Target molecule requirements

2.4.1 The following classes of target molecule are within scope.

- High value specialty chemicals and its precursors, including for the agrochemical, nutrition, flavour & fragrance, and beauty & personal care industries.
- Petrochemical drop-ins.
- Platform chemicals with broad versatility for downstream conversion.

2.4.2 Proposals must articulate a credible market opportunity for the target molecule. This should be presented separately from the TEA, and should generally not be used to offset cost gaps that are not addressed by the technology itself. The following are non-exhaustive examples of considerations that may be addressed in the justification.

- Barriers to market entry, including any regulatory pathways required.
- Addressable market size at the target specification.
- Value proposition beyond cost.
    - For a bio-based specialty chemical that offers superior functionality for a specified end-application, proposals may claim a price premium over the incumbent. The premium size should be supported with justification.

2.4.3 Industry collaborations are strongly encouraged to validate and anchor the project to the market justification presented in 2.4.2. Proposals demonstrating such collaborations, or a credible pathway to industrial adoption (refer to 2.1.5), will be evaluated favourably.

3 ELIGIBILITY AND FUNDING RULES

3.1 The Lead PI should:

3.1.1 Lead a laboratory or research programme in a Singapore publicly funded research organisation or Institute of Higher Learning (IHL);

3.1.2 Have an exemplary track record of leadership ability in coordinating research programmes, mentoring research teams, and achieving highly productive research outcomes;

3.1.3 Have a strong track record of translational outcomes, either through entrepreneurship activities and/or industry engagement.

3.2 Co-I(s) and Team PI(s) must hold an appointment in a Singapore publicly funded research organisation or IHL.

3.3 Funding will only be awarded to Singapore public sector research performers. Overseas institutions, industry partners, companies, or other external collaborators may participate as Collaborator(s), but will not receive grant funding.

3.4 Collaborator(s) may contribute technology, expertise, manpower, data, samples, access, facilities, or other in-kind support where relevant.

3.5 Proposals must not be duplicative or be substantially similar to any previous project or proposal submissions. With respect to assuming the role of Lead PI, each public sector research applicant can only submit a single proposal for consideration.

3.6 A total budget of up to SGD 6M, inclusive of 30% overheads, may be requested for a funding period of up to 3 years. Budgets must be submitted in Singapore dollars (SGD). Projects must comply to the provisions outlined in Grant Rules (version 3.0)

and Grant Terms and Conditions (version 3.0), including those relating to non-fundable items.

3.7 Applicants who wish to be considered for an exception to the eligibility criteria must submit a waiver request, which will be assessed on a case-by-case basis. Such requests must be sent to the Bioeconomy mailbox (Bioeconomy@a-star.edu.sg) no later than seven working days before the application deadline. Late requests will be declined automatically.

4 APPLICATION PROCESS

4.1 The Host Institution's Office of Research (ORE) is responsible for submitting the final list of eligible proposals to the Bioeconomy mailbox (Bioeconomy@a-star.edu.sg) by **11 January 2027, Monday, 12pm (Singapore Standard Time)**. Late or incomplete submissions will not be accepted.

4.2 The indicative timeline of grant call activities is as follows:

Activity	**Timeline (SGT)**
Grant call opens	26 Oct 2026
Submission deadline	11 Jan 2027, 12pm
Technical review	Jan-Feb 2027
Shortlisting	Feb-Mar 2027
In-person pitching (refer to 4.3)	Week of 22 Mar 2027
Announcement of results	Target Apr 2027
Issue of Letter of Award	Target May 2027
Project Commencement	Target Jun 2027

4.3 Applicants may be contacted for follow-up as part of the shortlisting process, which may include an in-person pitch. Notifications are targeted to be sent by 12 March 2027. Applicants must ensure they are available for the in-person pitch during the week of 22 March 2027.

4.4 To support a focused and competitive evaluation process, an institutional application quota will be imposed as detailed below. Institutions are encouraged to align their internal review and selection processes to shortlist projects prior to submission. Proposals must be submitted with the appropriate endorsement by the respective Host Institution's Director of Research or equivalent.

Institution	Maximum number of applications that can be submitted
National University of Singapore	4
Nanyang Technological University	4
Singapore Institute of Technology	4
Agency for Science, Technology and Research	4
All other public research institutes in Singapore	2

5 SUBMISSION REQUIREMENTS

5.1 Applicants are required to use the prescribed Proposal Template and to adhere to the guidelines set out in its introductory section.

5.2 Proposals must define technical milestones and key deliverables, and propose decision gates at appropriate points for go/no-go assessment of project continuation.

5.3 Proposals are required to specify quantitative targets for the Key Performance Indicators (KPIs) and Technical Indicators (TIs) relevant to the proposed project. KPIs and TIs must be selected exclusively from the lists below; no deviations will be allowed. Refer to Appendix 1 of the prescribed Proposal Template for the definitions of the KPIs and TIs.

5.3.1 KPIs:

- No. of Research Collaboration Agreements (RCAs) signed with total value of S$_____.[1]
- Follow-on funding accruable to FI-funded projects, including both public sources and private sources (e.g. fundraising for related venture spinoffs).
- No. of new Research Scientists and Engineers (RSE) including post-graduates (Masters, PhDs) and professionals trained in bioeconomy-related topics.
- No. of IP filed, including TDs, patents and know how.

5.3.2 TIs:

- Value capture derived from, including but not limited to (i) industry cash (invoiced), (ii) value of current equity holdings and (iii) licensing revenue (i.e. upfront/one-time payments; recurring revenue from royalty-

[1] Applicants are reminded that overseas cash and in-kind contributions are not counted towards the total project value.

bearing IP licenses; licensing revenue from end-user license agreement; equity received in lieu of upfront/royalty payments; assignment fees; and equity sales).

- No. of new/improved products, processes or services (NIPPS) launched.
- No. of publications in top 10% highly cited journals.
- No. of completed bioeconomy-related T-Ups.
- Total market valuation of spin-offs/start-ups.
- No. of successful deep tech spin-offs/start-ups.
- No. of projects reaching pilot scale (>100 L).
- No. of conference abstracts accepted for presentations.
- No. of projects that receive follow-on funding.

5.4 Relevant privileged or confidential information should be disclosed where necessary to provide a clearer understanding of the project. Such information should be clearly marked within the proposal.

5.5 Applicants are required to complete and submit the prescribed Budget Template, in adherence to the guidelines set out in the first section of each sheet.

5.6 Applicants are reminded to submit a preliminary TEA.

6 EVALUATION PROCESS AND CRITERIA

6.1 Proposals will undergo a technical review by International Peer Reviewers (IPR), who are key domain experts from industry and academia.

6.2 Applicants are reminded of the following criteria and weightages that will be used for the technical review by IPR:

- Relevance of technical capabilities to be built (25%).
- Scientific quality and novelty (25%).
- Likelihood for industry adoption (25%).
- Relevance and strength of prior work (15%).
- Potential for subsequent follow-on funding (10%).

6.3 Applicants may be required to follow-up as part of the shortlisting process, and this may include an in-person pitch. Refer to 4.3 for the indicative timeline.

6.4 The FI Programme Committee will lead the evaluation and make the primary funding recommendations.

6.5 All decisions are final and appeals will not be considered.

7 POST-AWARD MANAGEMENT

7.1 The grant will be administered in accordance with the provisions outlined in Grant Rules (version 3.0) and Grant Terms and Conditions (version 3.0).

7.2 Project performance will be monitored against the technical milestones, key deliverables, decision gates, KPI and TI targets, timelines and performance expectations set out in the proposal, which applicants are required to define and scope.

7.3 Projects will be actively managed and their progress reviewed. This includes ad hoc review sessions and the submission of annual project reports to A*STAR via iGrants. Projects funded for the full three-year duration will additionally undergo a mid-term review.

7.4 Projects are required to submit an updated TEA at the project mid-point. This includes updating data and assumptions against project findings, and quantifying any deviations alongside their cost implications.

7.5 Materials prepared for reviews will serve as documentation of project progress. Review outcomes may inform funding decisions and go/no-go assessments for project continuation.

7.6 At the end of the project, project teams must submit a Final Report and a Final Statement of Accounts to A*STAR via iGrants.

7.7 To evaluate the project's delivery of longer-term outcomes, A*STAR will continue to collect TI metrics for up to three years post-project completion.

8 CONTACT

8.1 For further information and enquiries, please contact the Bioeconomy Innovation Office at Bioeconomy@a-star.edu.sg.

9 FREQUENTLY ASKED QUESTIONS

Programme overview		
9.1	How do grants under the Bioeconomy FI differ from IAF-ICP/GAP?	While similar in the aim to address industrial needs, funding under IAF-ICP and GAP focuses on addressing localised problem statements; collaborating directly with companies to target a < 3-year horizon for commercialisation impact. Conversely, funding under Bioeconomy FI focuses on a longer horizon. This accommodates for mission-driven, translational research to address problem statements further upstream; for instance, on enabling platform capabilities that impact broadly across the bioeconomy domain.
9.2	What is the role of the Bioeconomy Innovation Office (IO)?	The Bioeconomy IO is responsible for the management of this grant call.
9.3	What research area outside this grant call is of interest to the MTC Bioeconomy FI?	The Bioeconomy FI is intended to operate through selected thematic calls over RIE 2030. In addition to the focus on feedstock for this grant call, other thematics of interest to the FI includes engineering next-generation strains & enzyme pathways, and optimising bioprocessing & recovery. Further details will be announced when ready.
Scope of the current grant call (project requirements)		
9.4	Is it preferred for proposals to target multiple sidestreams or feedstock classes?	Breadth across sidestreams is welcomed as it improves feedstock flexibility and supply resilience. However, the economic competitiveness of the bio-based value chain remains the priority. Should proposals target multiple sidestreams, the TEA should be anchored to the primary one.
9.5	Should proposals focus on unlocking a sidestream as a platform feedstock with broad	Projects that achieve the former will deliver greater impact to the bioeconomy, but the economic

	downstream applicability, or on bringing it all the way to a specific end-product?	competitiveness of the defined bio-based value chain remains the priority. Proposals may choose to target both, and if supported by cost-competitive techno-economics, will be welcomed. In this respect, applicants are encouraged to collaborate across institutional and disciplinary boundaries to leverage complementary expertise and resources.
9.6	How many projects will be funded?	The final number is not fixed and will depend on the following aspects of the proposals received: quality, portfolio balance, funding requirements, and recommendations from the expert panels and FI Programme Committee.
9.7	Are multidisciplinary or multi-institutional collaborations required?	Neither are mandatory but encouraged when they can bring together complementary expertise and capabilities needed to address the complex problem statements of this grant call. Project teams should be structured according to what is necessary to deliver the intended outcomes, subject to meeting the eligibility and funding rules of the grant call.
Eligibility and funding rules		
9.8	Are there any mandatory requirements for industry contributions?	Industry contributions are not explicitly required in this grant call, although will be favourably considered.
Application process		
9.9	What is included in the application package?	The full package for this grant call includes: 1. Proposal Brief 2. Proposal Template 3. Budget Template 4. TEA Worksheet 5. Grant Rules (version 3.0) 6. Grant Terms and Conditions (version 3.0)

9.10	Can applicants submit an abstract for pre-assessment before applying?	To maintain fairness across applicants, the Bioeconomy IO will not conduct any pre-assessment prior to submission.
9.11	How are proposals curated within each Host Institution to meet the institutional quota?	Curation is managed internally within each Host Institution. Applicants are advised to engage their respective Office of Research to clarify their institutional review process and associated timelines.
Others		
9.12	What are the intellectual property (IP) expectations and arrangements for projects funded under this grant?	There are no requirements for an issued patent to be in place at the point of application. Applicants should describe relevant background IP, ownership or access arrangements, existing patent filings where applicable, and the new protectable or commercialisable IP expected from the project, with a credible path towards downstream development and value creation. Any IP arising from an awarded project is expected to remain with the respective institution(s), consistent with the prevailing public-sector competitive research grant IP arrangements.
9.13	Who can I contact for further queries?	For further information and enquiries, please contact the Bioeconomy IO at Bioeconomy@a-star.edu.sg.

ANNEX A: SIDESTREAM REQUIREMENTS

A.1 For the purpose of this grant:

- Sidestreams: Secondary materials, flows, or outputs generated as an integral part of an existing industry's primary process. The strategic criteria for sidestreams in 2.2.2 therefore apply to the originating industry — with preference for those operating at significant scale within SEA.
- Feedstock: The material input to the proposed technology, obtained from the target industrial sidestream either directly or after processing.

A.2 The sidestreams of the following industries are within scope.

- Agri-food and industrial crop processing (e.g. palm, cassava, rice, coconut) of significant volumes.
- Sugar (e.g. sugarcane bagasse, crude molasses).
- Oleochemicals and biodiesel.
- Pulp & paper.

A.3 The following feedstock categories are within scope.

- Minimally refined sugars/carbohydrates.
- Lignocellulosic biomass.
- Lipid-based streams.
- Gaseous carbon.
- Platform chemical intermediates derived from the processing of industrial sidestreams.

A.4 The following categories are not within scope.

- Carbon dioxide from ambient air or industrial sources.
- Algae biomass (e.g. microalgae, macroalgae, and cyanobacteria).

A.5 All proposals must demonstrate favourable techno-economics. Applicants may propose sidestreams beyond those listed in A.2, provided this requirement is met. Exclusions under A.4 apply.

ANNEX B: TECHNOLOGY REQUIREMENTS

B.1 The examples below illustrate, without being exhaustive, technologies which may be expected to improve end-to-end value chain economics when technically mature and deployed at scale.

- Lignin depolymerisation with minimal formation of degradation products. This includes lignin-first approaches across chemical, biological, and hybrid strategies.
- Catalysts capable of converting minimally degraded lignin-derived streams with high stability, activity, and selectivity.
- Catalysts with enhanced tolerance to inhibitors present in pretreated lignocellulose, crude glycerol, or crude carbohydrate sidestreams.
- Mild pretreatment strategies that minimise inhibitory by-products without compromising feedstock processing efficacy.
- Direct conversion of sidestreams in their native state, obviating the need for costly pre-processing steps such as purification, drying, or concentration.
- Effective conversion of crude sidestreams to readily separable platform chemical intermediates (e.g. ethanol), wherein separation inherently removes feedstock complexity and inhibitor burden whilst unlocking diverse product portfolios.
- Integrated feedstock characterisation, real-time monitoring, and dynamic process control systems that enable biorefinery operations to robustly adapt to sidestream variability and process performance.
- Downstream product recovery that achieves the specifications required for the end-application with low water and energy demand.
- Process intensification across the value chain, encompassing strategies such as continuous processing, high-solids loading and unit operations minimisation (e.g. one-pot conversions, consolidated bioprocessing, or integrated reaction and separation).
- Compact, distributed and low-capex processing modules that can be deployed at/near sidestream-generating facilities.

APPENDIX 1: REVISION SUMMARY

Version Date	Description of Revisions	
16 November 2026	4.1, 4.2	Submission deadline extended from 4 Jan 2027 12pm SGT to 11 Jan 2027, 12pm SGT
	4.2, 4.3	In-person pitching shifted from Week of 8 Mar 2027 to Week of 22 Mar 2027
	4.3	Target date for notifications shifted from 26 Feb 2027 to 12 Mar 2027.