

A look ahead: Opportunities for Bioeconomy R&D in Singapore

6th October 2026

ARES PRIVATE (SENSITIVE NORMAL)



Bioeconomy in Singapore



Global Bioeconomy is advancing at a rapid pace

Strengthening Policy & Regulatory Frameworks



European Commission - Press release



Commission presents new Bioeconomy Strategy to drive green growth, competitiveness and resilience across Europe

Brussels, 27 November 2025

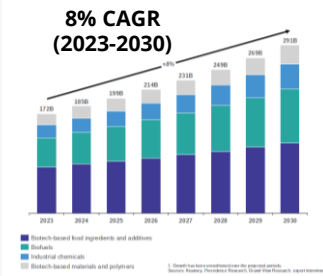
Today, the Commission adopted a new [Strategic Framework for a Competitive and Sustainable EU Bioeconomy](#), charting a way forward to build a clean, competitive and resilient European economy. By using renewable biological resources from land and sea and providing alternatives to critical raw materials, the EU will move forward towards a **more circular and decarbonised economy and can decrease dependence on fossil imports**.



U.S. Department of Energy Announces \$18.6 Million to Support Production of Low-Carbon Biofuels and Bioproducts

SEPTEMBER 12, 2023

Growing Industry Adoption & Market Demand



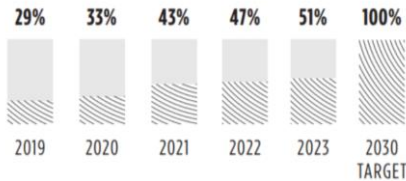
Evonik breaks ground on biotechnology expansion in Slovakia



L'ORÉAL



By 2030
100% of our plastic packaging will be reusable, recyclable or compostable.



Increasing Research & Innovation Activities

NSF Biofoundries 19.3M (2024)

UKRI Engineering Biology Mission Hub 22M (2024)

EU Horizon 18M (2026)

JST GteX 21M (2023)

NSF Awards Boston University Nearly \$20 Million to Advance National Cloud Lab Network



Adapted from a story by Andrew Thurston for The Drive
Boston University has been awarded nearly \$20 million from the U.S. National Science Foundation (NSF) to help establish the National Cloud Lab Network, a nationwide system of AI-enabled, programmable laboratories that will transform how science and engineering research is conducted. Through the NSF Test Bed "Toward a

AI-directed protein-engineering cloud lab receives \$20 million from NSF

Northwestern facility will be nation's first open automated lab for designing, building and testing proteins.



3 Major Archetypes in Bioeconomy's Evolution

1 REGULATION-DRIVEN ADOPTION

Compliance today, transformation tomorrow.



Government mandates and regulatory push—like the EU Renewable Energy Directive—initially focused on biofuels. Today, regulatory pressure is expanding into agriculture driven by health and safety concerns, reducing chemical pesticide use and accelerating agricultural biologicals (bio-based pesticides, biostimulants, and fertilisers).

EXAMPLES



Corteva launched its first bioinsecticide made from microbes.



BASF Agricultural Solutions successfully commissions new fermentation plant in Ludwigshafen.

2 SUSTAINABILITY-DRIVEN SUBSTITUTION

Same performance, lower footprint.



Companies invest in drop-in biomolecules that are chemically identical to petrochemical products but derived from renewable sources. These biomolecules integrate easily into existing systems, enabling companies to meet sustainability goals without major infrastructure changes.

EXAMPLES



Coca-Cola uses bio-based Polyethylene Terephthalate (PET) as drop-in resin in their PlantBottle™ containers.



Braskem produces bio-based Polyethylene (PE) made from sugarcane to replace conventional PE, a common plastic.

3 PERFORMANCE-DRIVEN INNOVATION

Better by design. Beyond compliance.



**SUPERIOR PERFORMANCE.
NEW VALUE. NEW MARKETS.**

Advances in science and engineering unlock bio-based products that outperform petrochemical alternatives in performance, functionality, and sustainability—creating opportunities for new markets and premiums.

EXAMPLES



Evonik's rhamnolipids offer superior foaming and skin-mildness for personal care.



Avantium's bio-based Polyethylene Furanoate (PEF) outperforms PET in packaging.

Local Bioeconomy R&D ecosystem & Industrial activities have also grown over the years

Industry



Public-Private Partnership



Public R&D



Grow Singapore's Bioeconomy Footprint

The Bioeconomy FI will develop platform capability to transform Singapore's Energy & Chemicals (E&C) sector, with growth underpinned by climate change, energy transition and rising demand for sustainable products.

Key Objectives of the Bioeconomy FI



Strengthen Singapore's global Bioeconomy presence

Position Singapore as a credible & global innovation node for bioeconomy-related research



Advance capability to commercial impact

Translate FI-funded research to commercial relevance & foster growth of local startups

This will be achieved through R&D projects curated and managed by a dedicated Bioeconomy Innovation Office (IO).

The Bioeconomy Innovation Office consists of members with technical and operational backgrounds



Wong Min Hao

Programme Director (interim)
PhD (Chemical Engineering)
MBA & MSc (Chemical Engineering)

Past Experiences

- Leadership appointments in A*STAR
- Project leader at Boston Consulting Group for specialty chemicals companies
- Technical advisor to Biotech VCs



Seah Kang Yee

Senior Assistant Director
PhD (Organic Chemistry)

Past Experiences

- A*STAR Advanced Energy & Decarbonisation Office officer
- A*STAR Sustainability & Energy cluster officer



Teo Wei Liang

Senior Manager
PhD (Chemistry)

Past Experiences

- A*STAR Sustainability & Energy cluster officer
- Research experiences span across defence, start-ups, and academia



Tan Jing Chong

Manager
PhD (Biotechnology)

Past Experiences

- A*STAR Singapore Institute of Food and Biotechnology Innovation (SIFBI) researcher

The Bioeconomy Innovation Office (IO) team will work closely with MTI, EDB, NRF and other A*STAR entities to further develop Singapore's R&D ecosystem and partnership with industry.

MTC Bioeconomy FI will focus on TRL 3 – 7

	Horizon 3	Horizon 2	Horizon 1
Time for impact	> 10 years	3-10 years	< 3 years
Description	[Research, Talent] Curiosity-driven research	[Translation] Mission-driven translation research that is aligned to R&D focus areas identified by the sector leads	[Commercialisation] Applied research comprising of innovation with companies to deepen innovation mandate of industry leaders in Singapore
Funding	YIRG, CRP, Frontier CRP	MTC Mission FI	IAF-ICP/GAP

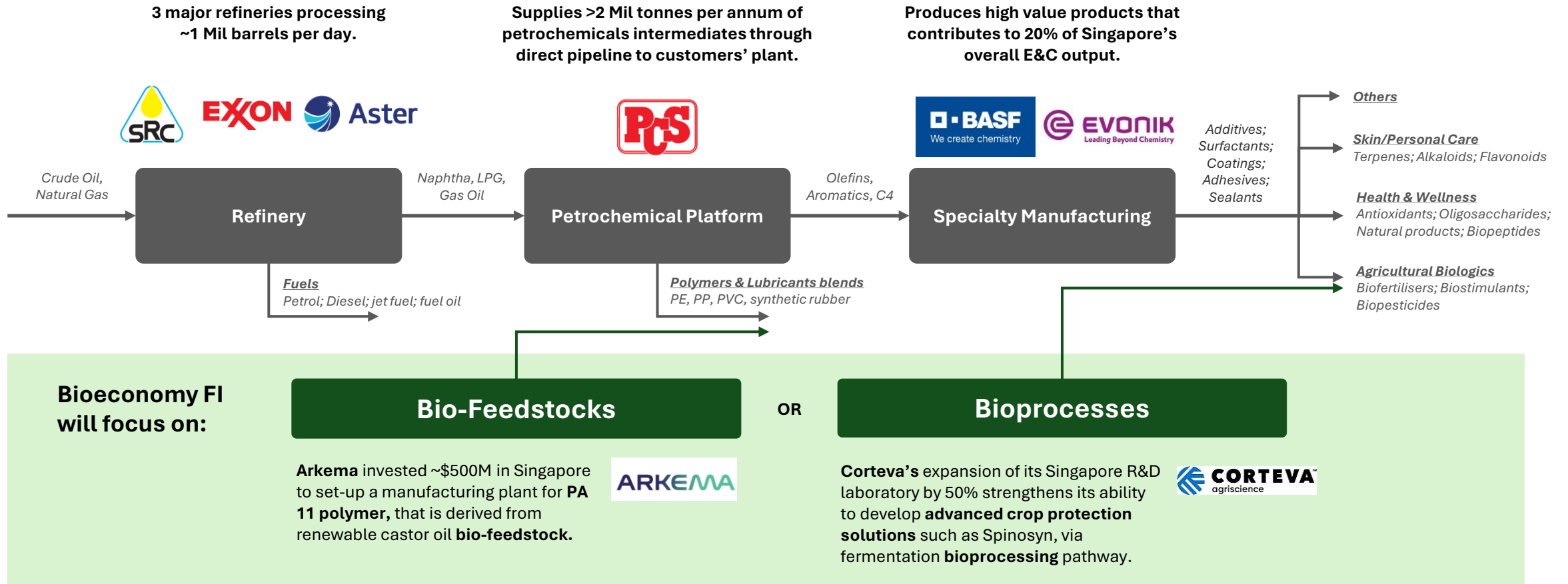


TRL 3 – 7

Experimental Proof-of-Concept to
Pilot system/prototypes translatable to industry

Bioeconomy uses Bio-feedstocks or Bioprocesses to complement existing chemical production

Existing chemical production



Bioeconomy FI has 4 R&D Focus Areas

Focus Area (A): Unlocking new carbon sources from sidestreams

- Enable low-cost regional sidestreams (palm residues, crude glycerol, agricultural waste) as alternative carbon sources
- R&D targets feedstock pre-processing, impurity management and microbial adaptation to overcome heterogeneity and inhibition
- Unlocks value from Southeast Asia's abundant, underutilised biomass



Focus Area (C): Optimising bioprocessing and recovery

- Targets the largest cost bottleneck: process scale-up and downstream recovery, beyond fermentation alone
- Builds AI-driven process control, digital twins, advanced sensors and downstream processing innovations
- Improves yield, reduces losses, lowers cost of goods for industrial competitiveness

Focus Area (B): Engineering next-generation strains and enzyme pathways

- Engineer non-traditional strains and advanced enzyme pathways with superior tolerance, productivity and functional capabilities
- Applies AI-enabled design, biofoundries and Design-Build-Test-Learn workflows
- Unlocks molecules infeasible with today's industrial strains

Focus Area (D): Product-focused, pathway-agnostic projects

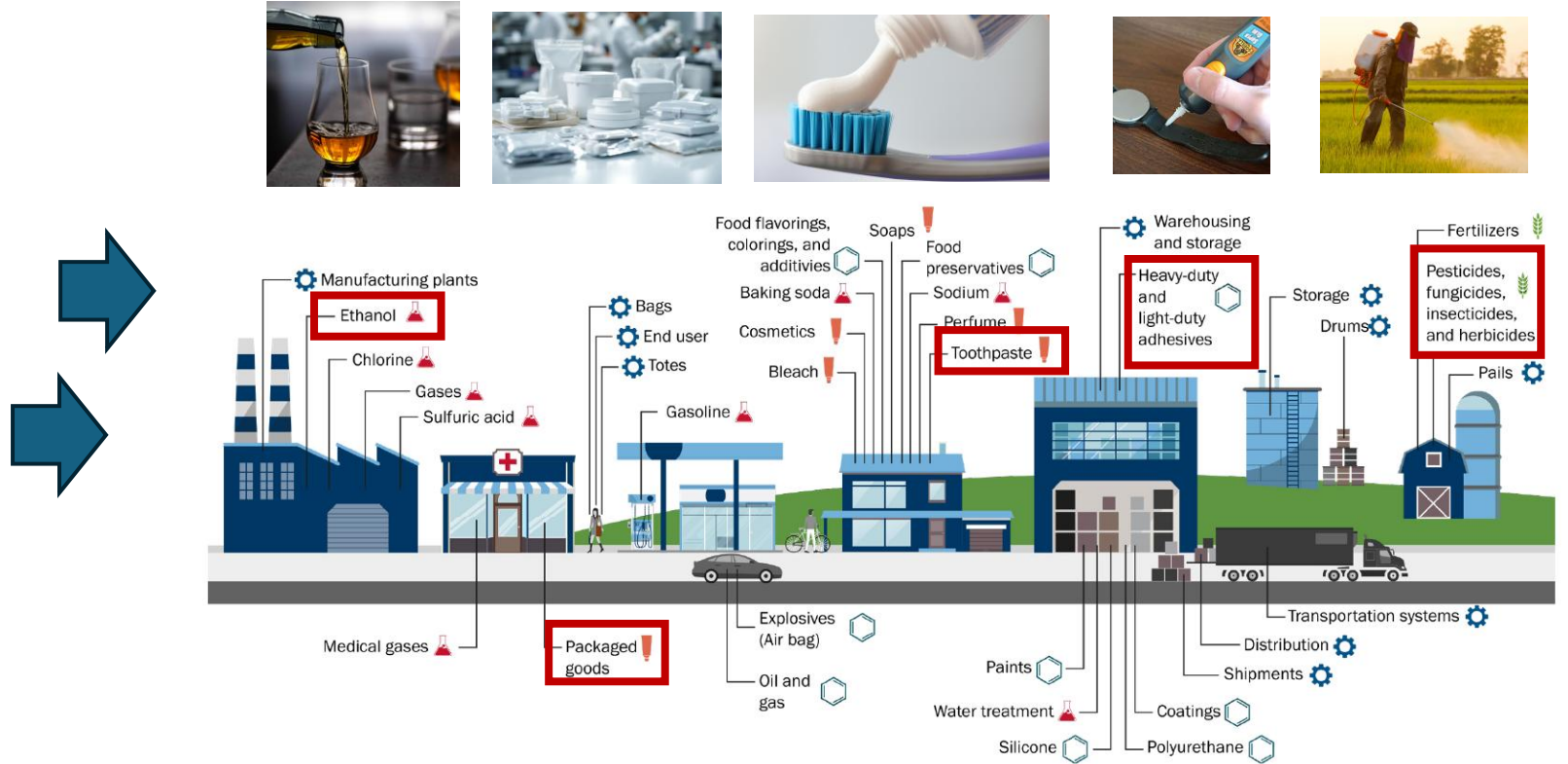
- Demand-led, product-anchored approach that de-risks industry partnerships, without funding last-mile commercialisation
- Integrates multiple pathways: biological, chemical or hybrid
- Generates decision-grade techno-economic and performance data for priority products (bio-specialties, drop-in chemicals)

Focus Area (A): Unlocking new carbon sources from sidestreams Open Grant Call



Overview of Focus Area (A)

- Southeast Asia (SEA) generates vast underutilised biomass sidestreams, which could serve as cheaper and more sustainable alternative feedstocks.
- Challenges such as feedstock recalcitrance and industrial impurities preclude its cost-effective utilisation for manufacturing of specialty and drop-in chemicals.



This grant call focuses on 2 key aspects

1) Regional feedstocks of industrial volumes

2) Scalable and cost-effective methods to high-value chemical targets

EMPTY FRUIT BUNCH



CRUDE GLYCEROL



CASSAVA PULP



FEEDSTOCKS
PREPROCESSING



MICROBES THAT
TOLERATE HARSH CONDITIONS



TEMPERATURE



SALINITY



ACIDITY



* These are illustrative examples and not exhaustive for this grant call.

Proposal requirements

- Each project will be funded **up to SGD 6M (inclusive of 30% overheads)**, over a period of **up to 3 years**. This grant is not intended to fund large CapEx projects.
- To support a focused and competitive evaluation process, an institutional application quota will be imposed:

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

Eligibility criteria

- The Lead PI should:
 - Lead a laboratory or research programme in a Singapore publicly funded research organisation or Institute of Higher Learning (IHL);
 - Have an exemplary track record of leadership ability in coordinating research programmes, mentoring research teams, and achieving highly productive research outcomes;
 - Have a strong track record of translational outcomes, either through entrepreneurship activities and/or industry engagement.
- Co-I(s) and Team PI(s) must hold an appointment in a Singapore publicly funded research organisation or IHL.
- 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.

Proposal requirements

- Proposals are to include a **preliminary technoeconomic analysis (TEA)** of the proposed research approach.
- At the end of the project duration, proposals must target a **Technology Readiness Level (TRL) of 5 or above**.
- Projects **must propose quantitative metrics** for Key Performance Indicators (KPIs) from the following list below:



No. of Research Collaboration Agreements (RCAs) signed with total value of S\$_____



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

Application process

Milestones	 Grant call launch & deadline for submission	 Technical Review	 Programme Committee Review	 Project endorsement	 Project commencement
Description	Applicants will submit proposals for review	International Peer Reviewers will evaluate proposals based on: 1) Relevance of technical capabilities to be built. 2) Scientific quality and novelty. 3) Likelihood for industry adoption. 4) Relevance and strength of prior work. 5) Potential for subsequent follow-on funding.	Shortlisted proposals will be evaluated by FI's sector lead and technical lead on R&D relevance to FI's objective. Project team may be asked to present on their proposal.	Finalists will be put up for endorsement by the FI Governance Board, consisting of Snr. management from EDB and A*STAR, advised by an international advisory panel consisting of industrial and academic members.	Catered for post-award processes including pre-award changes, preparation of letter of allocation (LOA) etc before project kick-off.
Tentative dates	26 Oct 2026 to 4 Jan 2027	Jan-Feb 2027	Feb-Mar 2027	Target Apr 2027	Target Jun 2027

Post Award Management

Regular review meetings with frequency to be later determined dependent on the quantum awarded and project progress.

Minimally, review process to include:

- Mid-term review (For project of 3 Year duration)
- Yearly iGrants reporting
- End of project iGrants reporting
- End of project iGrants FSOA

Other administration matters

Further information will be made available once the grant is launched officially.

Please contact the MTC Bioeconomy IO at Bioeconomy@a-star.edu.sg.

THANK YOU

