Sugarcane Bioenergy Inquiry 2025

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Inquiry into Sugarcane Bioenergy Opportunities in Queensland

Nufarm Submission

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Executive Summary

Nufarm welcomes the opportunity to contribute to the Queensland Parliament's inquiry into sugarcane bioenergy opportunities and presents a comprehensive, multi-pathway approach to developing Queensland's bioenergy sector.

Nufarm is a globally recognised crop protection and seed technology company, headquartered in Australia. As an ASX-listed company, we play a leading role in supporting sustainable agriculture, carbon reduction and the growing global bioeconomy. Through Nufarm's innovative seed technologies we are advancing the next generation of sugarcane-based bioenergy crops — Energy Cane — as part of our broader bioenergy innovation platform. We emphasise that Queensland should pursue a diversified portfolio of bioenergy technologies operating across different timeframes, rather than selecting a single pathway.

Nufarm brings unique perspective to this inquiry:

- Extensive experience in oilseed agriculture through our canola seed business, understanding both food and fuel crop economics
- Development of Nuseed Carinata, a dedicated winter biofuel feedstock crop already contributing to the world's renewable fuel supply and currently in field-trial phase in Australia.
- Development of Nufarm's Energy Cane breeding program, offering both medium-term conventional varieties and longer-term Biomass Oil trait technology

This submission focuses specifically on sugarcane-based bioenergy opportunities while acknowledging their place within Queensland's broader renewable fuels landscape.

Nufarm's Energy Cane is developed through conventional breeding, combining the high sugar productivity of commercial cane with the resilience and biomass potential of wild *Saccharum spontaneum*, enabling higher yields of sugar, fibre, and oil per hectare. This innovation creates the foundation for a multi-output renewable energy system — producing electricity, ethanol, biogas, biomethane, bio-oil, and ultimately renewable diesel and Sustainable Aviation Fuel (SAF) — from a single, long-lived crop grown on Australian soil.

While early in the development of the crop in Australia, Energy Cane can offer Queensland a pathway to:

- Expand sugarcane's role in the renewable energy mix through high-biomass, low-cost feedstocks;

- Enhance energy security by enabling domestic biofuel and SAF production;
- Deliver new value streams and diversification opportunities for cane growers;
- Improve soil carbon, water retention, and biodiversity outcomes through perennial cropping systems;
- Strengthen regional economic development and mill utilisation across sugar-growing regions.

In parallel, Nufarm is separately conducting R&D with CSIRO on a Biomass Oil Trait technology, which has the potential to transform plant cells into "oil factories." While distinct from Energy Cane, this work signals the next phase of innovation that could eventually enable oil production from vegetative biomass, unlocking new pathways for renewable diesel and sustainable aviation fuel (SAF).

Together, along with our other biofuel seed innovations such as Carinata, these projects demonstrate Nufarm's commitment to Australian seed innovation, sustainable intensification, and sovereign energy capability.

Positioning within the renewable fuels landscape:

We acknowledge that Hydroprocessed Esters and Fatty Acids (HEFA) technology using vegetable oils, fats, and dedicated oilseed crops represents the most immediately deployable pathway for renewable diesel and Sustainable Aviation Fuel (SAF) production. Our own Carinata seed program demonstrates the viability of dedicated biofuel feedstock crops.

However, sugarcane-based bioenergy grown in Queensland offers unique and complementary advantages:

- Increases both food (sugar) AND fuel/energy production from existing agricultural land
- Leverages Queensland's established sugarcane infrastructure and expertise
- Provides distributed, regional energy and fuel production supporting rural communities
- Creates new revenue streams for sugarcane growers without displacing food production
- Offers soil carbon sequestration and sustainability benefits from perennial crop systems
- Can be deployed progressively as technology matures without disrupting existing operations

Our key recommendation: Queensland should pursue a technology-neutral, feedstock-diverse bioenergy strategy that simultaneously supports:

- Immediate deployment of proven technologies (such as HEFA)

- Medium-term development of enhanced sugarcane varieties (Nufarm's conventional Energy Cane)
- Long-term development of advanced technologies (Biomass Oil trait, advanced biofuels)

This portfolio approach maximises Queensland's total bioenergy contribution, creates diverse opportunities for different agricultural sectors, and positions the State as a comprehensive renewable energy and fuels leader rather than betting exclusively on any single pathway.

Context and Submission's Focus

Queensland faces significant opportunities to develop domestic renewable fuels production, reducing reliance on imported fossil fuels and contributing to national decarbonisation objectives. Multiple technology pathways are emerging, each with different characteristics, timelines, and feedstock requirements.

Nufarm is a globally recognised crop protection and seed technology company, headquartered in Australia. As an ASX-listed company, we play a leading role in supporting sustainable agriculture, carbon reduction and the growing global bioeconomy.

Nufarm is actively engaged in renewable fuels development through multiple channels:

- Extensive canola seed business providing feedstock for both food uses and HEFA renewable fuel production
- Research, development and extension of Nufarm's Carinata, a winter Brassica crop specifically bred to enable farmers to produce biofuel feedstock on land otherwise fallow or in winter rotations
- Nufarm's energy cane breeding program (conventional Type1 varieties)
- Deep understanding of oilseed crop economics, agronomy, and supply chains
- Partnership with CSIRO on Biomass Oil trait technology development

This multi-pathway engagement provides us with unique perspective on how different bioenergy technologies can complement rather than compete.

While we acknowledge and support HEFA technology as the most immediate pathway for renewable diesel and SAF production, we believe sugarcane-based bioenergy deserves dedicated policy attention and investment for several compelling reasons:

- Complementary, not competitive: Portfolio approach reduces risk and maximises total renewable energy production

- Unique multi-product capability: Increases total value from existing sugarcane land without displacing food production
- Regional economic benefits: Strengthens specific coastal regional economies dependent on sugar industry
- Leverages existing infrastructure and expertise
- Perennial crop sustainability advantages

This Submission's Scope

This submission focuses specifically on sugarcane-based bioenergy opportunities as requested by the Committee's terms of reference. We address:

- Current and potential role of sugarcane in Queensland's energy mix
- Multiple pathways for sugarcane bioenergy development
- Policy and investment mechanisms specific to sugarcane technologies
- Integration of sugarcane bioenergy with broader renewable fuels strategy

We explicitly acknowledge that:

- HEFA should be Queensland's priority pathway for immediate renewable diesel and SAF production
- Our Carinata and canola businesses contribute important HEFA feedstocks
- Policy support for HEFA (blending mandates, capital support, certification frameworks) should proceed urgently
- Sugarcane bioenergy development should complement, not delay or compete with, HEFA deployment

1. Role and Benefits of Sugar Cogeneration in Queensland's Electricity Generation Mix

Queensland's sugar industry already contributes renewable energy through bagasse-fired cogeneration. However, traditional sugarcane varieties are optimised primarily for sugar content rather than total biomass yield, limiting cogeneration potential.

Near-term Opportunity: Nufarm's Energy Cane Type 1 (Conventional Breeding)

Nufarm's Energy Cane Type 1 varieties build on this foundation by providing:

- Greater height and higher biomass yield per hectare compared to traditional sugarcane (up to 250cm+ versus 150cm for conventional varieties), increasing feedstock supply to mills and extending cogeneration output seasons;
- Longer ratooning cycles (up to 8 cuts versus 4-5 cuts for conventional sugarcane), lowering replanting costs and providing continuous biomass flow;
- Stronger root and rhizome systems, improving soil structure and resilience against erosion;
- Improved fibre quality for cogeneration (combustion and fermentation); and
- The potential to support expanded bagasse-based generation capacity using existing mill infrastructure.

By improving productivity and reliability of supply, Energy Cane can significantly contribute to Queensland's renewable electricity generation share while supporting regional grid stability.

In addition to enhanced electricity generation from increased bagasse, conventional Type 1 energycane's elevated sugar content enables increased ethanol production. This provides near-term liquid fuel opportunities through proven ethanol-to-jet (AtJ) and ethanol-to-gasoline pathways, as well as premium beverage alcohol production for export markets.

Nufarm's Energy Cane breeding program at Barra de São Miguel, Brazil, demonstrates a systematic approach to:

- Elevating sugar content while preserving high biomass
- Reducing fibre content in ways that optimise processing
- Improving pest and disease tolerance
- Leveraging both above and below-ground biomass for soil health

Queensland context:

- Approximately 365,000 hectares currently under sugarcane[1]

[1] ABARES (2024). *Agricultural Commodities: September quarter 2024*. Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra

- If even 50% converted to Type 1 Energy Cane, bagasse availability could increase by 50-100%
- Corresponding increase in renewable electricity generation without new mill construction
- Existing mill cogeneration capacity could be enhanced to utilise additional bagasse

Long-term Opportunity: Biomass Oil Trait Technology (Biotech Breeding)

Looking longer-term, beyond conventional Energy Cane, the Biomass Oil trait technology (originally developed by CSIRO) represents a next-generation enhancement that could be integrated into Energy Cane varieties. The Biomass Oil trait technology (originally developed by CSIRO) enables plants to create and store oil in vegetative tissues (stems and leaves), with targets of 10% oil content in above-ground dry matter biomass.

Recommendations

1. 1 The Queensland Government should fund multi-location trial programs to evaluate conventional Type 1 Energy Cane varieties under local growing conditions to quantify electricity generation potential from increased bagasse yields (deployment within 5-7 years).

1.2 Support Federal OGTR pre-commercial trials of Biomass Oil trait Energy Cane in Queensland (deployment 10+ years)

1.3 Support research partnerships between Queensland sugar mills, growers, and Energy Cane breeding programs to:

- Model economic returns from enhanced cogeneration capacity;
- Assess mill infrastructure requirements for maximising electricity generation from increased bagasse;
- Evaluate longer-term integration of oil extraction technology when Biomass Oil trait varieties become available.

2. Market, Regulatory, and Infrastructure Barriers

Nufarm's seed breeding program includes both conventional and biotech breeding pipelines. Developing Queensland's sugarcane bioenergy sector requires addressing barriers specific to each technology pathway. These barriers differ significantly in nature, jurisdiction, and timeline for resolution.

Despite Queensland's advantages, several constraints currently limit sugar-based bioenergy growth:

- Lack of stable policy signals such as renewable fuel mandates or feed-in tariffs;

- Limited biorefinery and oil extraction capacity, restricting diversification beyond ethanol and electricity;
- Unclear pricing mechanisms for increased bagasse value;
- Unclear certification frameworks for sustainable feedstocks under national schemes;
- Lengthy biotech regulatory approval timelines for Biomass Oil Traits: Biotech breeding pipelines require 5+ years for governmental approvals before commercial deployment
- High capital costs for new cogeneration or biorefinery investment; and
- Fragmented incentives between State and Commonwealth levels.

Recommendations

2.1 Queensland should establish clear pathways for State-level approvals (e.g., biosecurity, land use planning) that complement Federal OGTR processes, ensuring efficient coordination and avoiding duplicative regulatory burdens for bioenergy technologies.

2.2 The Queensland Government should actively support and facilitate Federal OGTR pre-commercial field trials of biotech Energy Cane varieties within Queensland, including providing access to state research facilities and coordinating with industry stakeholders.

2.3 Fund feasibility studies for mill infrastructure modifications required to extract vegetative oil alongside traditional sugar processing.

2.4 A consistent, technology-neutral national certification system recognising lifecycle carbon intensity and sustainability outcomes would enable Energy Cane to compete fairly with other renewable feedstocks and attract private capital.

2.5 Queensland should establish policy supporting all viable biofuel pathways appropriately, recognising that multiple feedstock sources strengthen rather than weaken biofuels industry.

3. Opportunities to Align Sugar Biofuel Production with National Security and Defence Fuel Needs

Australia faces significant liquid fuel security challenges, with heavy reliance on imported petroleum products, limited domestic refining capacity, and supply chain vulnerabilities.

Queensland sugar mills already generate renewable electricity from bagasse, contributing to grid stability and reducing fossil fuel dependence. However, this contribution is currently limited by:

- Modest bagasse quantities from conventional varieties
- Most mills generating primarily for own use with limited export
- Short-term generation (crushing season only, with bagasse storage limitations)

Queensland's sugarcane industry can play a strategic role in supporting Australia's liquid fuel resilience. Multiple bioenergy pathways can contribute to addressing this challenge across different timelines.

Energy Cane, and in the longer-term Nufarm's Biomass Oil Trait, can produce vegetative oil (up to 10% of dry biomass) suitable for refining into renewable diesel and Sustainable Aviation Fuel (SAF)

Domestic production of renewable fuels from sugar-based feedstocks offers:

- Reduced reliance on imported petroleum and feedstocks;
- Decarbonisation of Defence operations through locally sourced SAF; and
- A sovereign, traceable, and auditable fuel supply chain aligned with national security objectives.

Queensland's existing sugar milling network provides a ready-made platform to demonstrate Defence-aligned biofuel supply chains with minimal infrastructure duplication.

Recommendations

3.1: Position enhanced sugarcane cogeneration as contributing to Defence energy security:

- Include sugarcane cogeneration in Defence renewable energy procurement strategies;
- Establish power purchase agreements between mills and Defence facilities where feasible.

3.2 Coordinate Energy Cane biofuel development with broader Defence renewable energy initiatives:

3.3 Coordinated approach and integration with HEFA: Market development should create demand certainty for future feedstocks; Avoid creating policy that inadvertently favours one feedstock over others

4. Policy and Funding Mechanisms to De-risk Investment

Investment in Energy Cane requires different support mechanisms for the two technology pathways, reflecting their different maturity levels, timelines, capital requirements, and risk profiles.

The commercialisation of conventional Type 1 Energy Cane in Queensland presents several early-stage investment challenges. Access to finance for variety changeover may be constrained until yield and market performance are validated, creating natural caution among early adopters.

From a mill perspective, expanding cogeneration or processing capacity involves substantial upfront capital investment. Mills need confidence that growers will adopt higher-biomass cane varieties at scale and that electricity or bioenergy markets will deliver stable, long-term revenue. Connection to the grid can involve regulatory and cost challenges, while aligning grower and mill incentives is essential to ensure feedstock availability and shared value creation.

A split-incentive issue exists across the supply chain. Growers make planting and management decisions and bear establishment risk, while mills realise most of the downstream energy value from additional biomass. Clear, transparent value-sharing frameworks will be important to support equitable participation and trust across the industry.

The timeline to commercial returns is also extended. Field evaluation and local variety trials may take several years before commercial deployment, and adoption is expected to scale gradually. Upgrading or adapting mill infrastructure would require further planning and capital lead time.

Advancing Energy Cane with a Biomass Oil Trait represents a long-term, high-investment innovation pathway. The development timeline from research to commercial deployment could extend over a decade or more, requiring sustained commitment. Achieving success will therefore require coordinated effort, stable policy settings, and sustained investment continuity over the long term.

To unlock sugar bioenergy's potential, the Queensland Government should implement:

1. State-level R&D and Innovation demonstration funding for Energy Cane–based biofuel and cogeneration projects in existing sugar regions;
2. State-Level Production and Adoption Incentives such as a Grower Transition Support Program to help accelerate adoption of bioenergy crops such as Energy Cane while managing risk for early participants;

3. Loan guarantees or concessional finance (through CEFC) to support mill and refinery upgrades;
4. Advocate to Federal Government for renewable fuel policy framework that creates demand certainty, provides tradeable certificates, integrates with corporate emissions reporting and compliance, and supports pre-commercial demonstration projects.
5. Crop certification recognising verifiable Australian-grown, low-CI biomass; and
6. Government and Defence offtake commitments to de-risk early-stage projects.

These mechanisms mirror successful international models, including Brazil's Proálcool program and the U.S. Renewable Fuel Standard, both of which used early policy certainty to catalyse private investment.

5. R&D Agenda for a World-Leading Sugar Bioenergy Industry

Queensland has a strong foundation for agricultural and bioenergy research, supported by several well-established institutions. **Sugar Research Australia (SRA)** provides industry-led research and development expertise across sugarcane agronomy, genetics, and processing. The **Department of Primary Industries, Queensland (DPI)** contributes significant public-sector capability in crop research, field trials, and regional extension. Queensland's universities — including the **University of Queensland (UQ)**, **James Cook University (JCU)**, and **Queensland University of Technology (QUT)** — bring complementary expertise in plant science, engineering, and bioenergy systems. In addition, the **CSIRO** maintains a strong presence in tropical agriculture and bioenergy research, particularly in trait development and sustainability assessment. The state's network of sugar mills also contributes substantial technical and engineering expertise, particularly in processing efficiency, cogeneration, and biomass utilisation.

Nufarm's Energy Cane program demonstrates a comprehensive breeding and innovation platform:

- Conventional breeding pipeline: crossing and clonal selection to optimise sugar yield, pest tolerance, and ratoon performance;
- Biotech pipeline: integration of CSIRO's Biomass Oil Trait to convert plant cells into oil factories, achieving up to 25% oil in leaf and stem tissue
- Longevity: 8 harvest cycles versus 4–5 for traditional cane, improving economics and reducing soil disturbance;

- Resilience: enhanced mechanical tolerance and regrowth rates, allowing harvesting in wetter seasons;
- Soil and carbon outcomes: deeper roots improve carbon sequestration, nutrient cycling, and erosion control.

Further R&D priorities include oil extraction optimisation, local environmental trials, and full lifecycle carbon analysis under Queensland conditions.

Recommendations

5.1 Fund applied agronomic research through Queensland DAF and Sugar Research Australia, with strong grower involvement ensuring practical relevance.

5.2 Support the Federal OGTR pre-commercial trial process by providing State research facilities and coordinating grower participation, accelerating the pathway to commercial deployment.

5.3 Establish a Queensland Sugarcane Biorefinery Research Facility (potentially co-located with an existing mill) serving as a pilot-scale demonstration plant for processing technology development.

6. Strategic Land Use and Regional Development

Nufarm's Energy Cane offers superior land-use efficiency and sustainability compared to conventional sugarcane and many alternative land uses.

Multiple products from same land:

- **Food (sugar)**: Maintained or increased production
- **Energy (electricity)**: Enhanced cogeneration from increased bagasse
- **Biofuel (ethanol)**: Higher yields increase ethanol production serving both biofuel markets (ethanol-to-jet for SAF, fuel blending) and premium beverage alcohol markets.
- **Biofuel (future)**: Vegetative oil from Biomass Oil trait for renewable diesel and SAF
- **Carbon sequestration**: Soil carbon accumulation from enhanced root systems
- **Ecosystem services**: Erosion control, year-round ground cover

This multi-product capability means Energy Cane increases total output per hectare without displacing other agricultural production or competing for land.

Energy Cane delivers significantly enhanced productivity compared with conventional sugarcane, producing 50–100 per cent more total biomass per hectare while also targeting higher sugar content through breeding. Its extended crop life of up to eight ratoons (versus four to five for traditional cane) increases total production from each planting, while its greater photosynthetic efficiency allows more effective conversion of sunlight, water, and nutrients into usable energy and sugar. These characteristics offer the potential to increase both mill throughput and grower returns without expanding the cultivated area.

As a perennial, high-biomass crop, Energy Cane also offers substantial sustainability and resilience benefits. Its deep root systems enhance soil carbon sequestration, reduce erosion, and improve soil structure and biology through less frequent tillage. Longer crop cycles reduce input intensity per tonne produced and support more efficient water and nutrient use, making the crop better suited to water-constrained regions such as the Burdekin. Breeding targets for pest, disease, and climate tolerance, together with the genetic diversity derived from wild *Saccharum spontaneum* lines, provide additional resilience to drought, wind, and variable seasonal conditions, contributing to long-term system stability and lower environmental impact.

Queensland's sugar regions face economic challenges including commodity price volatility, climate variability, and competition for labour and capital. The support of biofuel crops such as Energy Cane offers pathways to strengthen regional economies through:

- Economic diversification
- Value-adding in regions
- Employment creation (direct and indirect)
- Regional resilience
- Attraction and retention of population

Investing in biofuel crop innovations such as Energy Cane can strengthen Queensland's agricultural economy while contributing to net-zero goals and energy transition priorities.

Recommendations

6.1 Develop regional bioenergy transition plans for each major Queensland sugar region:

6.2 Include bioenergy in State and regional planning frameworks

6.3 Protect agricultural land from inappropriate development

7. Grower Diversification and Benefits

Energy Cane creates new opportunities for cane growers:

- Multiple revenue streams — sugar, fibre, oil, electricity, and carbon credits;
- Reduced production costs from extended crop life;
- Compatibility with existing harvesting and milling systems;
- Participation in verified supply chains offering traceability and ESG credentials.

This diversification model helps stabilise grower incomes and revitalise regional sugar communities.

Recommendations

7.1 Develop comprehensive grower extension program to support requirements for successful adoption of bioenergy crops

7.2 Create grower recognition and incentive programs

8. Food vs Fuel Considerations

The food-versus-fuel debate has been significant in global (mainly European Union) biofuel policy, particularly regarding crops competing with food production for agricultural land.

From a national perspective, Australia's food security situation differs significantly from that of the European Union. Australia produces far more produce than it consumes, exporting around 70 per cent of its agricultural output, and therefore faces relatively low risk of domestic food shortages. This export-oriented production base, combined with large areas of underutilised or lower-quality land, provides flexibility to expand bioenergy feedstock cultivation without compromising food availability. In contrast, the EU's biofuel debates are shaped by land constraints, higher population density, and greater competition between food and energy uses. Consequently, while safeguards remain important, Australia's agricultural structure allows initiatives such as Energy Cane to advance renewable energy goals in a manner that complements — rather than competes with — national food security.

Energy Cane avoids the perception of food-versus-fuel trade-off by utilising non-food vegetative biomass rather than edible sugar or seed oil. The crop grows effectively on marginal soils that are generally unsuited to food production, helping to expand productive land use without displacing existing food crops. Its deep perennial root systems improve soil carbon storage, structure, and

biodiversity, while its co-products — including ethanol, biogas, and renewable feedstock for industrial use — contribute to a more circular and resource-efficient agricultural economy.

Energy Cane avoids any perceived food-versus-fuel trade-offs by:

- Utilising non-food vegetative biomass rather than edible sugar or seed oil;
- Growing effectively on marginal soils unsuited to food crops;
- Supporting soil carbon and biodiversity gains through perennial root systems; and
- Producing co-products (ethanol, biogas, feedstock) that strengthen the circular agricultural economy.

Recommendations

8.1 Require sugar bioenergy projects to adopt third-party verified sustainability assurance covering land use, biodiversity, and community engagement, aligned with the national certification program being developed for feedstock crops.

8.2 Advocate for the integration of sugarcane feedstocks into the National Energy and Climate Plans, ensuring federal-state alignment on emission targets, certification, and Defence fuel strategy.

9. Key Recommendations Summary

Section	Recommendation	Purpose / Expected Outcome
1. Role and Benefits of Sugar Cogeneration	1.1 Fund multi-location trial programs to evaluate conventional Type 1 Energy Cane varieties under Queensland conditions to quantify electricity generation potential.	Generate region-specific agronomic and yield data; validate bagasse potential for cogeneration.
	1.2 Support Federal OGTR pre-commercial trials of Biomass Oil Trait Energy Cane in Queensland.	Accelerate regulatory readiness and technology validation for long-term deployment.
	1.3 Support research partnerships between sugar mills, growers, and Energy Cane breeding programs to model economic	Enable mill planning and shared data on profitability and infrastructure needs.

	returns, infrastructure requirements, and future oil extraction integration.	
2. Market, Regulatory, and Infrastructure Barriers	2.1 Establish clear State-level regulatory pathways that complement Federal OGTR processes and reduce duplication.	Streamline bioenergy project approvals and reduce regulatory burden.
	2.2 Actively support and facilitate OGTR pre-commercial trials within Queensland by providing access to State research facilities and coordinating industry participation.	Accelerate field-testing and evidence generation.
	2.3 Fund feasibility studies for mill infrastructure modifications to support oil extraction alongside sugar processing.	Inform capital investment pathways for future integrated mills.
	2.4 Advocate for a consistent, technology-neutral national certification system recognising lifecycle carbon intensity and sustainability outcomes.	Ensure Australian-grown biomass competes fairly with imported feedstocks.
	2.5 Support all viable feedstocks and pathways (HEFA, sugarcane, lignocellulosic) through balanced State policy.	Encourage a diversified biofuel industry portfolio.
3. National Security & Defence Fuel Alignment	3.1 Position enhanced sugarcane cogeneration within Defence renewable energy procurement strategies; establish PPAs between mills and Defence facilities.	Strengthen energy security using Queensland-sourced renewable electricity.
	3.2 Coordinate Energy Cane biofuel development with Defence renewable energy and logistics initiatives.	Enable sovereign SAF and renewable diesel supply chains.
	3.3 Ensure market development and policy frameworks support feedstock diversity, avoiding preferential treatment of a single crop.	Maintain fair, competitive biofuel development across sectors.
4. Policy & Funding Mechanisms to De-risk Investment	4.1 Establish State-level R&D and demonstration funding for Energy Cane-based bioenergy and cogeneration projects.	De-risk early investment and showcase feasibility.

	4.2 Create a Grower Transition Support Program with $/ha establishment payments for first 3 years.	Offset establishment risk, support data collection, and accelerate adoption.
	4.3 Provide loan guarantees / CEFC concessional finance for mill and refinery upgrades.	Reduce cost of capital and improve bankability of projects.
	4.4 Advocate for a Federal renewable fuel framework with tradeable certificates, demand certainty, and compliance integration.	Stimulate investment via long-term demand and policy clarity.
	4.5 Introduce feedstock certification for low-CI Australian biomass aligned with national GO Scheme.	Support access to domestic and export fuel markets.
	4.6 Facilitate Government & Defence offtake commitments for renewable fuels.	Anchor demand and provide confidence for first movers.
5. R&D Agenda	5.1 Fund applied agronomic research via DPI and SRA with grower involvement.	Build Queensland-specific agronomic data.
	5.2 Support OGTR pre-commercial trials with State research facilities and grower coordination.	Accelerate biotech research readiness.
	5.3 Establish a Queensland Sugarcane Biorefinery Research Facility (pilot-scale, co-located with existing mill).	Demonstrate integrated processing and innovation.
6. Strategic Land Use & Regional Development	6.1 Develop regional bioenergy transition plans for major sugar regions (Burdekin, Mackay, Herbert, etc.).	Guide infrastructure investment and workforce planning.
	6.2 Incorporate bioenergy priorities into State and regional planning frameworks.	Align land-use policy with renewable fuel targets.
	6.3 Protect strategic agricultural land from non-agricultural encroachment.	Safeguard feedstock production capacity.

7. Grower Diversification & Benefits	7.1 Develop a comprehensive grower extension and training program for bioenergy crop adoption.	Build capacity and confidence in new varieties.
	7.2 Create grower recognition and incentive programs tied to sustainability metrics.	Reward early adoption and best practice.
8. Food vs Fuel & Sustainability Assurance	8.1 Require sugar bioenergy projects to adopt third-party verified sustainability assurance (land use, biodiversity, community engagement) aligned with the national feedstock certification program.	Maintain public confidence and international credibility.

10. Conclusion

Queensland stands at a pivotal moment in shaping the future of its sugar and bioenergy industries. The global shift toward renewable energy and sustainable fuels is accelerating, supported by strong policy drivers such as national emissions-reduction commitments, fuel-security objectives, and net-zero targets. Technologies are maturing while interest is growing across the supply chain from growers, mills, technology providers, and end users. Importantly, significant Federal funding programs such as ARENA, the CEFC, the National Reconstruction Fund, and Defence innovation streams are already in place to catalyse private-sector investment.

However, this opportunity will not remain open indefinitely. Other jurisdictions are moving quickly, with international competitors developing similar technologies and securing market positions. Without early action, Queensland risks losing its first-mover advantage in sugar-based bioenergy and missing the chance to anchor emerging intellectual property, processing capacity, and market share domestically.

At the same time, Queensland's sugar industry faces structural pressures — including fluctuating commodity prices, ageing infrastructure, and increasing competition for capital and labour. Growers are actively seeking new income sources and risk-management options, while mills require diversification and modernisation to remain viable. Bioenergy crops such as Energy Cane can help address these challenges, supporting both regional economic resilience and long-term industry renewal.

This agenda aligns directly with State and national priorities: renewable energy expansion, fuel and energy security, regional development, and agricultural innovation. Seizing this moment will allow

Queensland to position itself as a leader in next-generation bioenergy systems while revitalising its iconic sugar industry.

Queensland's sugar industry has a unique opportunity to contribute to Australia's bioenergy transition. Nufarm's Energy Cane research and development program — underpinned by Nufarm's investment in our Biomass Oil Trait — represents a proven, scalable pathway to produce more energy, more carbon value, and more grower income from each hectare of cane land.

With supportive policy, targeted investment, and coordinated industry collaboration, Queensland can position itself as a global leader in sustainable sugar-based bioenergy, delivering tangible economic, environmental, and security benefits for decades to come.