

Transformation

Competitive,
entrepreneurial, and
independent invention

Collaborative,
innovative, and
continuous innovation



Transforming into a Formalised

Innovation Eco-system

Clustering has been around forever

Companies group to best manage their challenges

Modern clustering builds around a 'Triple Helix'

1. Companies primarily and indirectly engaged in sector activities
2. Institutions sharing knowledge and innovation research
3. Government and other associations with special skills, interest, and support

Analyse and know characteristics, WIIFM needs and best engagement

Eco-systems are now more complex

More stakeholders engaged

Seeking broader platforms

Solving complex problems

Independent, industry led NFP management

Neutral (NFP) facilitators for collaboration projects

Develop trust between competitive actors

Building relevant skills and capability of participants

Increasing visibility and policy influence

Creating tangible value for 'customers'



Understanding and Engaging Audiences



Understanding the audience groups of an innovation eco-system

Accelerating their natural clustering behaviour

Building system capability through collaboration

Creating sustainable 'customer value' benefits

enviroMETS Qld Landscape

Concentration of Industry Interest

Six Audiences – Interested Groups

1. SME Vendors
2. Corporate Mining & METS Firms
3. Academia RD&D Org's
4. Government & SOEs
5. Capital Investment Providers
6. Industry Peak Bodies

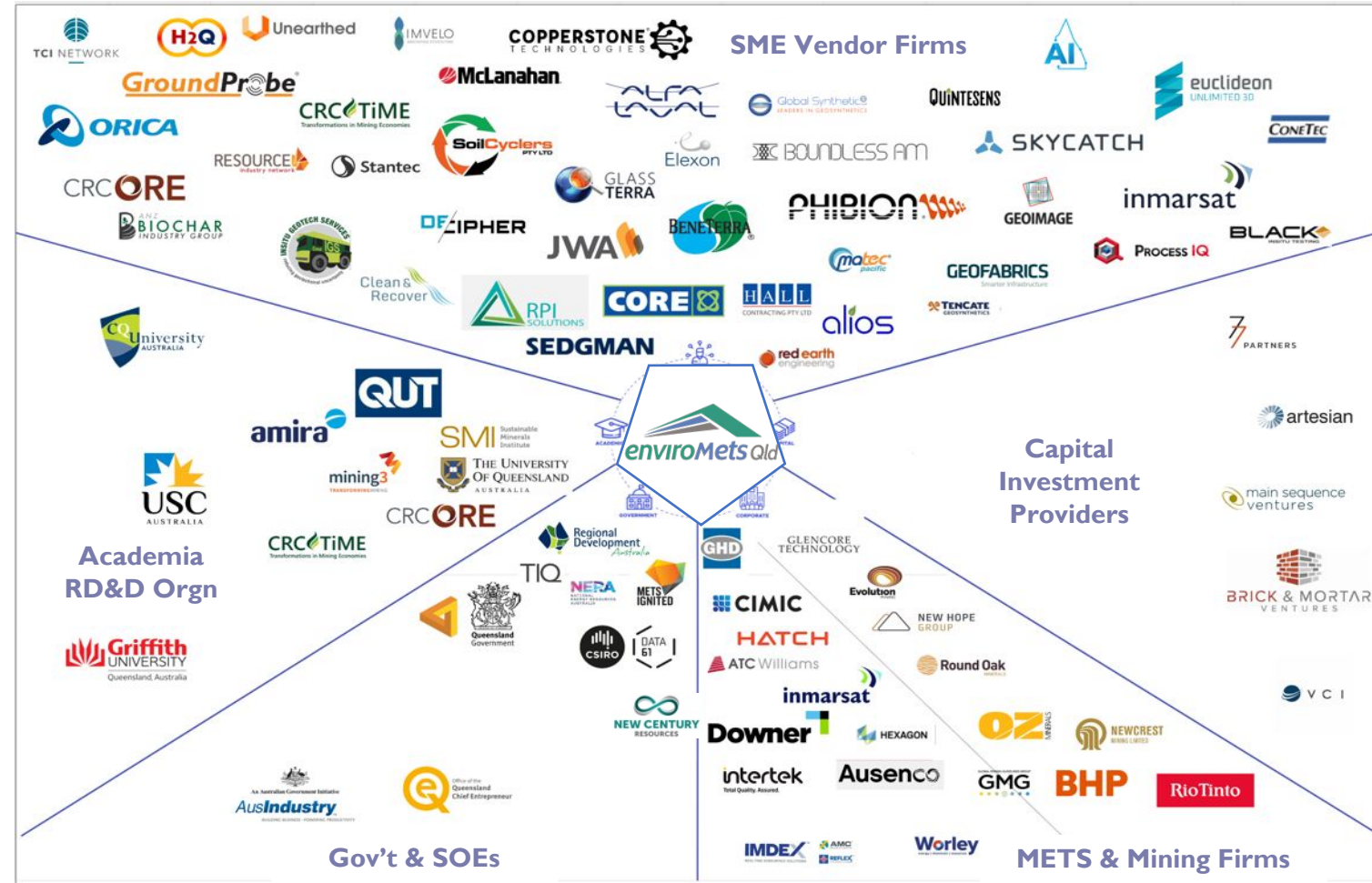
Analysed

Characteristics

WIIFM

Engagement Strategy

Regional



To be updated in 2022

I. SME Vendors

Characteristics

- Varying levels of business sophistication & capability (validate)
- Narrow perspective of Tier 1 firms and Government goals
- Commercialisation constrained by limitation on site access.
- Technology and operations driven
- Unfamiliar & sceptical of working with Uni researchers
- Independent, agile, risk takers

WIIFM ?

- Increase readiness and capability for growth
- Trusted links and support with Academia, Tier 1 firms and Government
- Promote to accelerate growth into new market sales opportunities
- Support entrepreneurial SMEs to pull ideas through innovation pipeline
- Broaden access to funding grants and venture capital

Engagement Strategy

1. Migrate informal (talkfest) alliance into enviroMETS (outcomes)
2. Reinstate collaboration, knowledge sharing events
3. Facilitate strategic project partnering opportunities



Soil Cyclers



Phibion

eMQ fosters interaction events to accelerate development of technology and business management capabilities.

2. Corporate METS & Mining Firms

Characteristics

- Huge capital investments, inci surety bonds.
- High public exposure. Sharemarket sensitive
- Risk averse, sceptical of unproven technologies
- Hold 'stranded technology' – restrict non-competitive access
- Capacity to invest in SMEs with potential
- Social licence target for 'politicised' environmental activists.
- Seek improved community recognition for ESG outcomes

WIIFM ?

- Offering proven technologies from SMEs via strategic partnerships
- SMEs are commercially stable and ready to scale
- Cluster can facilitate commercial solutions to high-risk issues

Engagement Strategy

1. Present eMQ as a collaborating 'business' with a workable plan
2. Pragmatic deployment of technical innovation
3. Demonstrate eMQ is tuned into their needs and opportunities



Tailings Dam Failures



Mine Affected Water Management

eMQ is sensitive to scope of corporate issues and seeks pragmatic solutions via research, technology and policy

3. Research and Academic Institutions

Characteristics

- Protective of their RD&D territory. Many operate as individuals
- Need external RD&D project funding to leverage
- Different approaches to pure vs applied research
- Insulated from pragmatic commercial needs and risks
- Uni's not incentivised for collaboration to commercialise

WIIFM ?

- Window to align R&D with industry issues, ideas and contacts
- Reduced risk and uncertainty in the costs, time and results inherent in R&D
- Part funded research project flow from industry
- Incubation facilities to test, pilot and commercialise technologies
- Business capability and collaboration support for spinoffs
- Public / industry recognition of RD&D, and its commercialisation

Engagement Strategy

1. Establish multiple contact engagement within UQ:SMI & JKMRC, QUT
2. Extract & commercialise 'stranded' technologies – Trailblazer – CRC-P
3. Facilitate an easier path to .gov action plan to commercialise Uni RD&D



QCAT



SMI @ UQ

QLD has well recognised world leading research facilities that an effective cluster ecosystem can enhance and expand.

4. Government & SOEs

Characteristics

- Politics, electorates and election cycles matter
- Intent on delivering good public outcomes
- Reduce negative attitude towards essential resource sector
- Risk averse, considered decision-making, territorial

WIIFM ?

- Addresses significant negative issues for resource industry
- Reduce or exit impost cost of legacy mine-site maintenance
- Trumpets 'innovation', 'critical energy minerals', 'ESG', 'rehabilitation',
- Jobs growth, new energy mineral projects, resources industry growth

Engagement Strategy

1. Understand key motivations within QLD DNRME, DSDIP, DES, TIQ, ...
2. Provide a skilled independent industry-led NFP organisation that can deliver policy intent.
3. Focus on ESG sustainability via innovative repurposing, remediation and re-commercialisation
4. Assist security and safe access to mine closure properties



MK !



Mt Morgan

Unlock QLD technologies for QLD SMEs to solve QLD tailings, mine affected water and other issues to benefit QLD, and world mining.

5. Capital Investment Funders

Characteristics

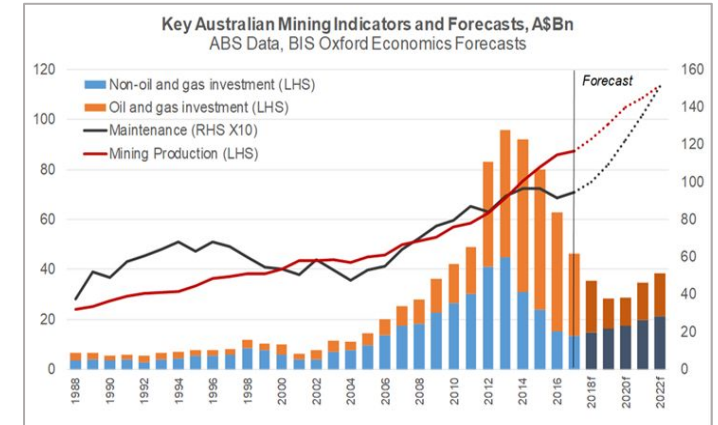
- Invest in 'proven' technology concepts. In tranches.
- VCs are driven by commercial returns.
- Limited loyalty to an organisation or interest in the technology
- Expect risk. Need deal flow.
- Make their money on the way in; % of business

WIIFM ?

- Cluster contact point for derisked investments
- Preferred status access to cluster SMEs
- Aggregation of opportunities

Engagement Strategy

1. Identify requirements for aligning with eMQ
2. Access to de-risked capable SME vendors and projects
3. Build a few close trusted VCs to actively support eMQ's goals



Old Mining investment



METS Ignited Support

eMQ will work with a select group of environmentally committed investors seeking sustainable ESG projects

6. Industry Peak Bodies & Others

Characteristics

- Non-competitive. Sensitive to perceived duplication of effort.
- Have own focus of operations;
 - Research Centre
 - Membership Organisation
 - Industry Association
 - Investment Fund
- May have own strategic agenda for parts of eMQ's plan
- Defensive of their funding relationships; incl membership base
- 'Own' their signature events and programs

WIIFM ?

- Look for eMQ outcomes that support their objectives
- 'Local' organisation to manage collaboration projects

Engagement Strategy

1. Build relationship with key people for mutual support
2. Expand access to projects, innovation, markets, people
3. Easier engagement with QLD METS SMEs

Peak Bodies



ASSOCIATION OF MINING AND EXPLORATION COMPANIES

Affiliates



International



eMQ will affiliate and support industry peak bodies to expand the knowledge, technology and commercial development of better remedial solutions.

Building Trusted Interactions

Challenging Eco-system Participants

- Establishing basis of mutual trust and confidentiality
- Create context for interaction
- Accommodate unique behaviours

Accelerating Natural Clustering Behaviour

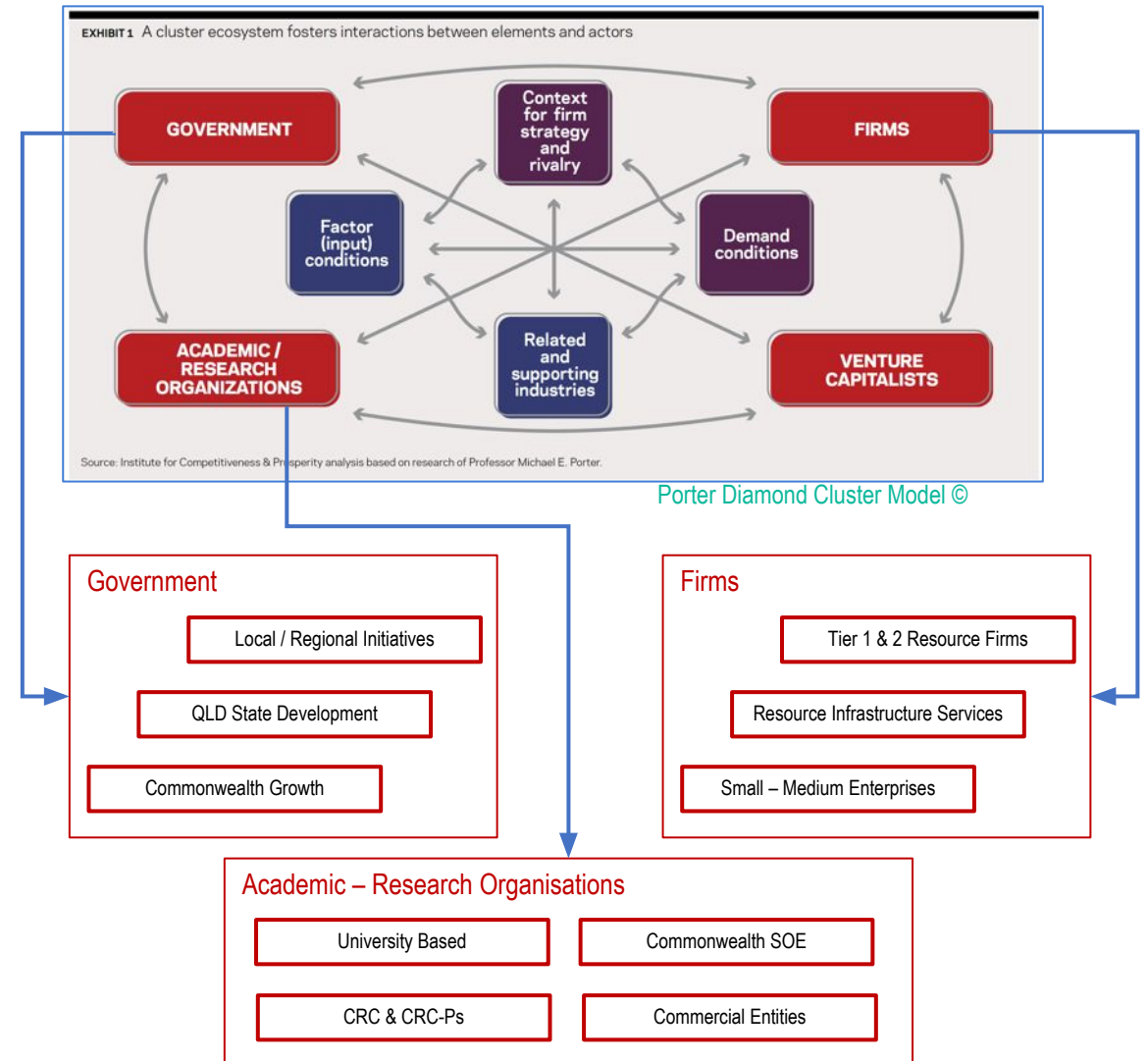
- Creating conditions for collaboration
- Inputs necessary to be competitive
- Pursue domestic demand before exports
- Integrate supporting industries, supply chains, proximity,

Building Participant Capability

- Identify firms needs, capabilities and aspirations early
- Develop a plan to upskill and open opportunities

Creating Binding 'Customer Value'

- Continuous improvement. Review regularly
- Promote participants and collaborative projects



Recognise that Complexity Demands Collaboration



The role of “Trust” in collaborative relationships.

Solving complex problems. Researching for innovations.

More stakeholders can bring more roadblocks and inhibitors

Filling the skills and knowledge gaps across broader platforms

Challenges That Can Affect Trust

SME Vendors

- Cautious of trusting, and committing to others
- Discomfort with collaborative relationships – protect “their” ideas

Researchers & Academics

- Continual pursuit for funding research. Competitive.
- Limited commercial nous. Esoteric vs practical pragmatic

Government

- Inflexible regulatory compliance, (too) many silos
- Insecure funding and ongoing support across political cycles
- Directing activities – preventing industry dependence
- Sensitivity to public activism

Corporate METS & Mining Firms

- Procurement processes and site risk management.
- Discontinuity due to frequent personnel changes

Capital Investors

- Deal driven behaviour



SME Vendor Entrepreneurs



SMI @ UQ

eMQ will build bridges of understanding to build trust

Solving Complex Problems

Easy mining is gone – need productive new processes

- Impact of declining grades.
- Improve the productivity, energy use and water quality

Community expectations are challenging

- Elevated environmental conditions
- Legal remedies supplanting practical achievable outcomes
- Ignorance of technical challenges in mining

Specialised knowledge silos

- Necessary specialisation undermines multi-facet solutions
- Overwhelming data requires BI analysis skills

Globalisation of issues

- Interconnectivity of everything
- Geopolitical influences
- Resource scarcity



VR Based Training



Seeking pragmatic achievable solutions in an increasingly complex environment

Inhibitors and Roadblocks

Knowledge & Imagination

- Establishing a collaborative innovation culture

Commercial Viability

- Encouraging alternate 2nd life solutions
- Leverage new knowledge

Regulatory Silos

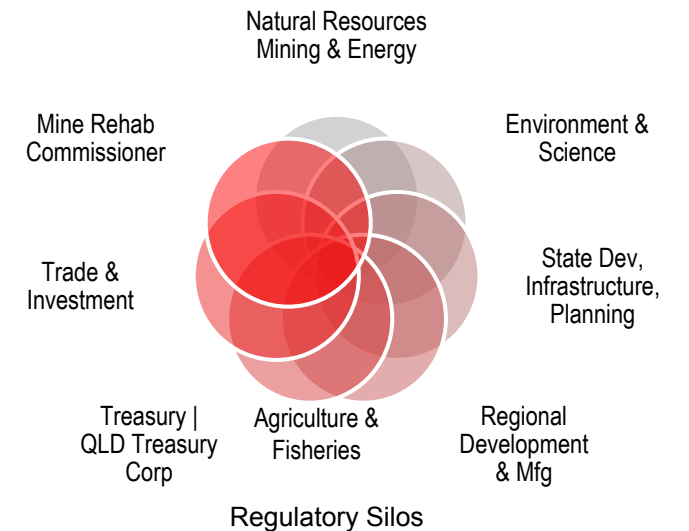
- Pursue a 'net better' or 'best' solution
- Whole of government oversight

Industry history and reputation

- Attract environmental expertise into mining
- Demonstrate higher standard of ESG citizenship

Short-term performance focus

- Business case is robust post mining



eMQ will build bridges of understanding to build trust

Filling the Knowledge Gaps

Knowledge sharing events

- Local and international expertise
- Links to like organisations and programs

Affiliations with technical interest groups

- Central Qld Mine Rehabilitation Group
- Qld Tailings Group

Mutually beneficial researcher relationships

- Research student 'cadetships' in SME Vendor companies
- Developing projects that have a researcher component

Working on mine sites

- Seeing and feeling reality – mine site, community, understanding people
- Closing the gap between theory and practice



QTG Profile



Students at Mines

Creating opportunities to meet and share knowledge

Organising and Managing – A Not-for-Profit entity



- Neutral (NFP) facilitators for collaboration projects
- Using events to develop trust between competitive actors
- Building relevant skills and capability of participants
- Increasing visibility and policy influence
- Creating tangible value for ‘customers’

Neutral (NFP) Collaboration

Not for Profit Facilitators

- Organisation structure has no profit motive taint
- Stated purpose is its only focus – industry sector

Built from the ground up – by industry

- Builds off the natural concentration of participants
- Strategic business plan documents its mission and goals

Supported by government

- Long term commitment (the 10-year METS Roadmap)
- Supports management function and administration
- Project support evaluated on a case-by-case basis

Outcomes must have tangible value

- Every participant group gains value when engaged
- Typical gain from active participation 15 - 25%



10-Year METS Roadmap

METS 10-year roadmap provides the foundation for METS Ignited to pursue this clustering strategy

Events Build Trust Between Competitors

Exposing ourselves

- Event encourage sharing technical and commercial intel
- Start small, test each other, build trust

Knowledge sharing seminars

- Becoming the 'go-to' for six technical streams
- 'Edgy' panel discussions to engage

Problem solving workshops

- Capability development
- Project opportunities

Collaboration Projects

- Facilitating and oversight of project specific collaborations
- Participants from within and beyond "mining".



Knowledge Sharing Seminars



Problem Solving Workshops

eMQ will utilise a variety on hosted , and co-hosted events to build trusted relationships

Building Relevant Skills and Capability

All groups have an incomplete skill set

- Recall the group characteristics (earlier slides)

Identify the generic gaps and fill or bridge them

- SME Vendors are typically technology driven > need commercial
- Tier 1 METS & Mining like to own “their” IP > unlock and share
- Academic / researchers need to publish “their” IP >

Develop individual capability development plan

- Onboarding may include quantifying areas for development
- Project collaborators guided in sharing and trusting

Investing in project team skills

- Upskilling teams on trust, collaboration & customer value



VR Training



SME Vendor Capability

Assessing and building skills and business capability expands project opportunities

Increasing visibility and policy influence

Events, participants and projects create marketing opportunity

- 'Member' events create industry exposure – contacts
- Projects with 'community' stakeholders have broad appeal
- Early win projects will build confidence

Small scale test of alternative regulatory regimes

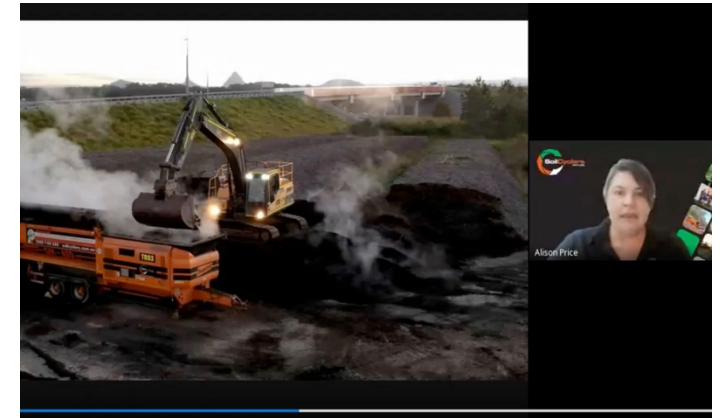
- Collaboration across current acts and regulations
- Small footprint, high stakeholder engagement

Empowers academic research/ers

- Deserve good commercial exposure or research
- Trailblazer opportunities

Offers VC investment 'certainty'

- Unknown = risk, Demo projects are essential
- Solutions from outside "mining" add value – renewables / decarb



Promote Participants



Re-commercialisation Investment

eMQ participants, events and projects gain from increased industry and public visibility

Creating Investible Value for ‘Customers’

Reducing equity (cash) locked in surety bonds

- Increased equity tied up in Financial Provisioning Scheme
- Elevated risk for junior mining, or late life takeover of leases
- Provide significantly net better outcome than abandonment

SME Vendors build portfolio of skills and experience

- Learning through collaboration and sharing
- Broader commercial skill base

Reducing costs for major METS & Mining firms

- Reducing risk of working with innovative SME Vendors & researchers
- Planning for repurposing – second life for mine site

Projects that are worthy of external VC investment

- “Environmental technology funds” – “Responsible ESG Investing”
- Reverse the negative attitude towards investing in mining assets



Repurposing and Remediate



Re-commercialise to Remediate

eMQ will work with a select group of environmentally committed investors seeking sustainable ESG projects

Innovation Through Trusted Collaboration

‘Audience’ groups come together but see issues differently

- Clustering is normal industry behaviour, anywhere.
- “enviroMETS Qld” is giving a name to what we have in Qld

The problems are complex and require collaboration to solve

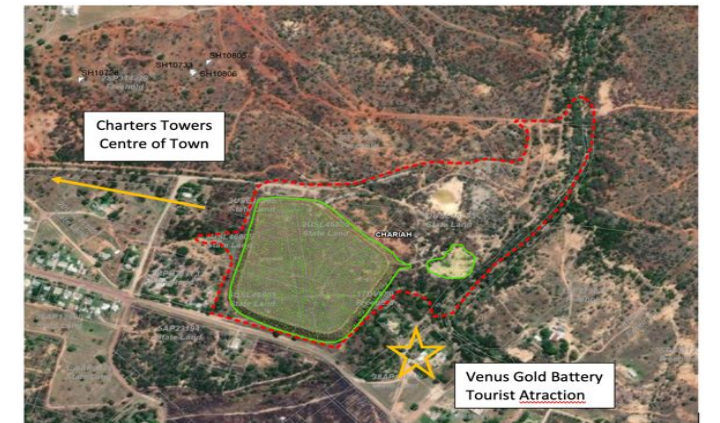
- Past behaviour and easy access to media make us very visible
- Easy extraction and refining are behind us – invest in research
- Renewables need more minerals by volume, and by range of elements
- Extraction and refining requires more energy per unit
- Technically doable projects are overwhelmed by regulatory interests
- Community expectations are now ahead of practical solutions

Managed innovation eco-system – trusted collaboration

- An independent, industry led, NFP Company is an effective structure
- Operates at arms length from any group or individual self interest



A ‘mine-field’ of regulatory best interests



Expand stakeholder collaboration and scope

eMQ vision is to create better residual ESG outcomes after mining operations close



- [Allan Morton](#)
- [M: +61 448 800 101](#)
- [enviroMETS Qld](#)
- [E: a.morton@metsigned.org](#)

Supported By



Queensland
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6 Key Success Factors for Innovation Eco-systems

	Key Element	
1	Strong Professional Cluster Mgt Team	<ul style="list-style-type: none"> • MD/CEO and staff with clear job roles and mandates. • Fostering close relationships & trust amongst the cluster's stakeholders. • A project orientated team with the relevant skills.
2	Governance for Impact	<ul style="list-style-type: none"> • Triple helix (at least) board, business in majority & in chair. • Members with leading positions in their own organisations. • Autonomous – Management independent of any group or member
3	Financial stability	<ul style="list-style-type: none"> • Clear financial commitment from businesses; sponsorships. • Long term public co-funding, from multiple sources. • Respected industry corporate sponsors
4	Unique Mission, Strategy & Roadmap	<ul style="list-style-type: none"> • Strategy & roadmap focusing on what matters for the cluster and can only be achieved through the cluster. • Marketable 'Reason for Being'
5	Broad Service Portfolio	<ul style="list-style-type: none"> • Identify difficulties, unlock assets; turn into opportunities. • Embrace a dynamic process. Needs evolve. • Partnerships with relevant industry stakeholders • Facilitating project collaborations.
6	Partnerships with Relevant Organisations	<ul style="list-style-type: none"> • Public agencies + Private sector + Academia • A hosting organisation for the cluster initiative can help in the early days. • To ensure long-term engagement, the cluster initiative needs to be neutral and independent.