

Production of a UPS



RdYgYDXb

Application details

| | |
|--|--|
| Lead Applicant's legal or registered entity name | XYZ Pty Ltd |
| Lead Applicant ACN | 279874871 |
| Lead Applicant ABN | 81279874871 |
| Is your company registered for GST | Yes |
| National Manufacturing Priority | <input checked="" type="checkbox"/> Resources Technology & Critical Minerals Processing |
| Checklist - Documents you will need to attach on the Attachments Page in order for your application to proceed | <input checked="" type="checkbox"/> P&L Statement for last 3 completed financial years (if available) <input checked="" type="checkbox"/> Balance Sheet for last three completed financial years (if available) <input checked="" type="checkbox"/> Letter from your accountant confirming financial viability (required) <input checked="" type="checkbox"/> Strategic Plan (if available) <input checked="" type="checkbox"/> Investor Deck (if available) |
| I confirm that this application meets the above eligibility criteria for the commercialisation grant. | <input checked="" type="checkbox"/> |
| Business/Trading Name | XYZ |
| What is the business structure? | Private Company |
| What was the percent of foreign ownership of this business as of last fiscal year? | 0% |
| Is this business Indigenous-owned? (This information is for government statistical purposes only.) | No |
| Office Address (Street Name/Number) | 123 Right Street |
| Suburb/City | Melbourne |

| | |
|---|---|
| Postcode | 3001 |
| State/Territory | VIC |
| Website URL | https://XYZProducts.com.au |
| Annual Revenue | \$5M to less than \$10M |
| Company Size | 11 to 50 |
| Lead Applicant Contact Name | John Smith |
| Project contact e-mail address | john@xyz.com.au |
| Project contact telephone number | +61400125456 |
| Which sub-industry(ies) does your company belong to? Please tick all that apply | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Electrical/Electronics <input checked="" type="checkbox"/> Machinery & Equipment <input checked="" type="checkbox"/> Metals (Primary & Fabricated) <input checked="" type="checkbox"/> System Design |
| In which geographic market(s) does this business sell goods or services? Please tick all that apply. | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Outside of local area, but within the state/territory <input checked="" type="checkbox"/> Outside of state/territory but within Australia <input checked="" type="checkbox"/> Overseas markets |
| Have you applied for any grant funding, or are you currently acquitting grant funding, on any of the grants listed below? | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Modern Manufacturing Initiative, <input checked="" type="checkbox"/> Manufacturing Modernisation Fund Round 2, |
| How much grant funding are you seeking in this application? | A\$500,000.00 |
| Expected project duration - in months | 18 |
| Project Postcode | 3001 |

Summary: How would you describe the project in a concise way?

XYZ Pty Ltd has patented, designed and developed a proof of concept uninterruptible electric power supply (UPS) for underground mining and hazardous environments. With no moving or maintainable parts, the product uses hydrogen to produce an electrical power supply with battery backup, for powering modern monitoring, communications and Wi-Fi network equipment, in hazardous and non-hazardous environments used in underground mining.

Embedded with Wi-Fi and Bluetooth capabilities, the device can communicate its functional and operational data over the mine Wi-Fi network that it powers, giving an intrinsically safe, uninterruptible power source, requiring no mains electrical input power, or wired data cabling for the operational monitoring of the unit.

The Volts device supports whole of mine digitisation for the monitoring, communication and control of people, equipment, environment and activities within the mine. The project will support the final stages of commercial design, development, certification and commercialisation of an Intrinsically Safe Ex ia Group 1, UPS certified for use in underground coal mines.

The device is a disruptive technology, with potential growth within the underground mining sectors set to lead the path, for not only whole of mine connectivity, but also safely powering monitoring and communications devices underground, in areas normally geographically too remote or costly, to consider electrical reticulation for the traditional method of powering such devices.

What is the industry problem being addressed by this project?

Underground coal mining has gone through many rapid changes in the last 20 years, with the introduction and revision to Safety & Health Legislation, the advancement of technology supporting this legislation and operational progressions incorporating technological advancements. Geographically this has seen mine designs:

- Become more complex
- Increasing in physical size with life of mine extensions
- Increasing development roadway lengths up to 4km for longwall block extractions
- Increasing longwall face widths with an increased depth of cover

With the increase in mine size comes an increase in mine activities and ultimately an increase in exposure to principle hazards, which are defined as hazards with the ability to cause multiple fatalities. Such principle hazards include, but are not limited to:

- Emergency response
- Gas management
- Methane drainage
- Mine ventilation
- Strata control
- Spontaneous combustion

Legislative requirements mandate that there are many and varying monitoring and communication controls required to manage these principle hazards. These controls can range from real time monitoring with fixed equipment, periodic monitoring with handheld devices, administrative controls or simple visual and/or physical inspection techniques.

With the advancement of modern wired and wireless sensor technology comes the ability to more effectively monitor, control and acquire real time data on the state or status of all of these hazards and more, without putting people in harm's way, improving overall mine safety, compliance, operational efficiency and production.

To achieve this level of real time data acquisition and control through wired and wireless sensors and networks, a robust and extensive electrical reticulation system supporting its operation is essential. This is essential not only when the normal electric power supply is available underground, but also when the power is lost, faulted or during emergency or abnormal environmental conditions.

What is the proposed solution?

Harnessing a mine's widespread and reliable compressed hydrogen supply for energy conversion, Volts uninterruptible power supplies (UPS) offer an inexpensive and reliable solution for supplying intrinsically safe power to critical and non-critical mine environmental monitoring, communications and control systems. Volts is a convenient, reliable and uninterruptible power supply for underground roadways geographically too remote for electrical reticulation, or areas without ease of access to electrical reticulation, or as a more reliable and economically viable solution to powering monitoring and communications equipment in today's smart mines.

Volts is a platform technology employing two phenomena that when combined, controlled and applied, create electrical energy through the energy conversion and harvesting of a hydrogen supply.

The first phenomenon is creating a stream from the kinetic energy off the hydrogen, without any moving parts, gasses or electricity used in the process - a phenomenon well known to XYZ as the developer and manufacturer of The Drum® patented technology. This allows for the second phase of energy conversion within.

The second phenomenon is known as the "Reebeck effect". This is achieved with components known as "Thermoelectric Generators (TEGs)", that harness and convert a difference (delta) in temperature to generate electric current. The power ratings of these TEGs that are available commercially are also a well-known predictable energy source, when the temperature differentials are controlled to set values.

To achieve the required delta temperatures within the unit, additive manufacturing techniques are required in the form of 3D metal printing. The complexity of design of the mechanical portion of Volts can only be achieved through the adoption of these emerging manufacturing technologies.

XYZ has patented and completed a Stage 1 Concept Design of the development of Volts which involved:

- Project planning
- Feasibility study and standards report
- Specification and preliminary electronics design
- Preliminary design and experiment report of prototype 1

With Phase 1 completed and successful, this project will deliver XYZ with:

- Detailed industrial design and test (mechanical and electrical)
- Final prototyping of industrial design
- Pre-certification trials, non-destructive and destructive tests
- Certification and documentation
- Pilot sites validation trials and review
- Commercialisation

What is the Value Proposition of the proposed solution and how unique and different is this to competing alternatives?

The Volts platform technology has no direct competing products. The distinguishing points of difference can be defined as

- Harnessing the underutilised energy source of hydrogen in underground mining in replacement of expensive and complicated HV electrical reticulation to power low energy devices for monitoring and communications.
- A solid-state hydrogen powered UPS, segregated from the surface main power nuisance tripping, or the controlled maintenance and test tripping of the underground electric power reticulation.
- Volts, is the only I.S. power supply / UPS that can be installed and fully operate in an explosion proof atmosphere.
- Extended operation of critical monitoring and communications devices in an underground mine when electric power is lost.
- Allows for whole of mine connectivity.
- Reduced activity installing HV cables and transformer substations with people exposed to unnecessary risk.
- Reduced risk of electrical hazards with intrinsically safe power.
- Reduced capital and operational expenses with the costs associated with electrical reticulation and equipment, installation and maintenance.
- Reduced mine unscheduled downtime due to lack of 2-way communications ability with key mine maintenance or statutory personnel during operational breakdowns or mine statutory inspection.
- Increased capability and capacity to better monitor and control mine infrastructure, services and environmental conditions.
- Future proofed capability for the expansion of the onboard wired and wireless communications protocols, to receive and transmit data from monitoring devices and broadcast that data via Wi-Fi to a mines wireless network from the remotest of geographic locations.

What manufacturing advanced techniques does your company currently practice? (tick all that apply)

✓ Lean Manufacturing

What manufacturing advanced techniques will your company introduce during the project? (tick all that apply)

✓ Additive Manufacturing /3D Printing

✓ Advanced Composites /Materials

✓ Nano-, Micro-, and Precision Manufacturing

✓ Digital Data (Sensors, IoT, I4.0 etc)

✓ Digital Design and Rapid Prototyping

Will this project result in the reshoring of manufacturing to Australia or replacing imports?

Yes

If Yes, please describe the nature of the reshoring

UPS devices used in the Australian mining industry are currently imported from US companies such as Texan and cost \$100 million annually. This project, if successful, will provide an opportunity for a local manufacturer to reshore a portion of this market back to Australia.

In addition, Australia is the only country in the world that has all the mineral components required for LiB manufacture, namely:

- Lithium – Australia is the lowest cost producer and has 20% of worlds reserves. Lithium carbonate is now being manufactured in Perth and in NT within 18 months.
- Battery Grade Graphite – Concentrate manufactured in South Australia
The following items are mined in Australia but sent overseas for processing: Copper, Cobalt, Nickel, Aluminium, Manganese.

When demand by Australian LiB manufacturers is sufficient, these minerals will be processed in Australia. At that point, input costs for the manufacture of LiBs in Australia will be considerably reduced and as a result, it is conceivable that Australia will become a manufacturing powerhouse for LiBs.

Projected number of additional jobs created during the project

5

Please list position titles for jobs created during the project

Sales engineer
Data engineer
NBD Manager
Plant operators (2)

Projected number of jobs created within one year of project completion

20

Please list position titles for jobs created within one year

Plant operators (15)
Admin staff (3)
CFO
COO

Number of existing employees to be upskilled during the project | 10

Please list position titles for jobs to be upskilled during the project

| Plant operators (10)

Number of additional employees with STEM skills employed during the project | 5

Please list position titles for STEM jobs created during the project

| Data engineer
| Mechatronic engineer
| Systems analyst
| Additive technician
| Automation technician

Technical Readiness Level (TRL) at start of project | 4

Expected TRL at end of project | 9

What market research has been conducted to verify potential markets for your product or service?

The Australian Space Agency is predicting the space industry to be worth \$12 billion per annum by 2030. (<https://www.industry.gov.au/news-media/australian-space-agency-news/growing-the-space-industry-through-cutting-edge-downstream-capabilities>).

The market of the near term will have room for solid rocket motors and liquid engines. <https://www.popularmechanics.com/space/rockets/a19724715/liquid-solid-rocket-fuel-spacex-orbital-atk-blue-origin/>

There will be significant requirements for launch services that are reliant on XYZ Volts and XYZ estimate they will generate \$25-30 million revenue per annum. Currently there is a known backlog of companies and researchers from the USA requiring sub-orbital launches in the Southern Hemisphere worth an estimated AU\$324 million. XYZ estimates that half of this backlog can be converted into launch contracts.

XYZ has consulted with Defence Science Technology (DST) who are seeking industry relationships to develop and commercialise a sovereign UPS. It is estimated this research will generate \$5-10 million revenue per annum. This is an estimate based on discussions with DST during the consultation/discovery period for their Collaborative Research Agreement (expected to be in place in March 2020). One of the discussions has been about XYZ sending a team member to Edinburgh RAAF Base in Adelaide to work directly with DST for R&D.

Through discussions with foreign launch entities, XYZ has found there is an appetite, like Australia, to source UPS devices from outside of the USA. From initial discussions (to be entered into further as per milestone 3), it is estimated the international market could generate a further \$25-\$30 million per annum within the next five years. This is primarily from discussions with UK, Sweden and Japan. There is a similar appetite to launch in these countries who are seeking XYZ Volts. XYZ have estimated this based on the same revenue opportunities as Australia mentioned above.

The strategic objectives identified by confidential Defence Primes acknowledges support to work with XYZ. Currently they have three NDA's with Defence Primes and discussions centre around what XYZ can provide once the Volt manufacturing is running in its entirety. They do not have a Letter of Intent as they expect to see a contract once operational.

Other rocket launch providers have sought XYZ technology and services for testing and capabilities e.g. Volt boosters. Based on their predicted market opportunities, XYZ could see revenue generated in excess of \$10 million dollars.

What business model will the company use as a pathway to commercialisation?

With the final detailed industrial design underway, XYZ will negotiate with their extensive underground mining customer base in Australia and abroad. It will conduct high level discussions with multiple mining houses, mining support companies and their key management for the Volts solution. These customers have written letters and emails expressing their enthusiasm to introduce the product into their operations as soon as obtainable (see attached).

Additionally, leading underground mining personnel / equipment tracking and Wi-Fi communications company ABC Australia have expressed in writing their interest in partnering for the manufacture and global commercialisation of the Volts product through their major branches in Australia, Canada, Germany and Chile.

What is the expected revenue growth, as a direct result of this project, over the next five years?

| | | Additional Revenue |
|---|--------|--------------------|
| 1 | Year 1 | A\$2,000,000.00 |
| 2 | Year 2 | A\$5,000,000.00 |
| 3 | Year 3 | A\$10,000,000.00 |
| 4 | Year 4 | A\$20,000,000.00 |
| 5 | Year 5 | A\$30,000,000.00 |

Please provide evidence to establish the validity of these sales projections.

The company expects to retail it's Volts device at \$2500 and based on discussions with its existing customers and distributors it confidently predicts unit sales of:

- 2021 - 800 units
- 2022 - 2000 units
- 2023 - 4000 units
- 2024 - 8000 units
- 2025 - 12000 units

Exports % of current revenue | Less than 10%

Expected exports % of revenue one year after project completion | 50% to 70%

Describe the history of the Lead Applicant, demonstrating a track record in managing similar projects with the required skills.

XYZ Pty Ltd was established in 2016 to develop, design, produce and sell unique equipment for underground mining operations to reduce stress for mine employees and ensure equipment is kept at optimal operational temperatures. XYZ has gone on to develop these products:

- Mine® MKII - a lightweight portable system, that can rapidly and effectively reduce stress to substantially improve mining conditions, by

maintaining compliant and acceptable stress levels for heat management and /or equipment overheating.

- Aag® - a non-reversible, single use, disposable first warning indicator system, to assist in the early visual detection of conveyors rotating mechanical components such as idlers, rollers and pulleys, in the early stages of bearing failure reducing unscheduled downtime, non-compliance to safety obligations and uninformed statutory inspections.
- VOLTS (this project) - hydrogen powered, intrinsically safe, uninterruptable power supply (UPS), for underground mining and hazardous environments. It is a convenient reliable power supply for underground roadways geographically too remote for electrical reticulation or areas without ease of access to electrical reticulation, or as a more reliable and economically viable solution to powering monitoring and communications equipment, in today's smart mines pursuing whole of mine underground connectivity for IIOT.

XYZ is located in regional Queensland at Toowoomba, where it produces, assembles and tests its products and then distributes them globally.

Describe the Lead Applicant's contribution to the project.

The company will contribute \$500,000 in cash and \$25,800 in-kind to the project to develop and commercialise the VOLTS product. The company will support AMGC in the development of a case study and media opportunities and will participate as an AMGC project reference site.

Detail the financial viability of the Lead Applicant, including details of access to capital to fund the project.

A review of the financial results of the company for the 2 ½ years to December 2019 indicates that the company has the cash flow to execute the project milestones and implement project outcomes. In addition their external accountant has provided a letter of financial viability as attached, showing access to over \$800,000 in funding and lines of credit for the project.

Does your company hold patents for your existing products/services? Please list these patent numbers. In addition, please describe your continuing IP strategy going forward for products developed during this project.

The product Volts has had its name and logo trademarked by XYZ Pty Ltd and also engaged Halfords IP Attorneys to prepare a comprehensive provisional patent for the product which was submitted in October 2018. Additional to this, an "International Patent Search and Written Opinion" was filed for examination and completed in December 2018.

Subsequent updated claims on novelty, inventive steps and industrial application were made to the provisional patent before being submitted for the international PCT in October 2019, protecting the product and claim globally until expiry in March 2021 by which time an application is to be made to the nominated countries for patent protection. Updates to the PTC are expected to take place during 2020, prior to the expiry to include protective claims over manufacturing techniques employed, product appearance, industrial application, novelty and further inventive step claims arising from the final development.

Product licencing and distribution arrangements with globally positioned companies currently operating within the industry and product space, is a strategy to

- Have the protection of contractual and non-disclosure agreements in place.
- Have business partners with the financial ability, interest and benefit in the protection of the IP.

Further IP protection is assisted with the extensive development and certification processes required to have a product of this complexity market ready.

Any competing similar product that navigates around XYZ's IP protection would still require two to three years for development and certification, allowing XYZ's first to market readiness with a market-trialled and adopted product, an

advantage in a market where product trust and familiarity hold greater value than price.

Budget

| | | AMGC Grant Amount | Participant Contribution | Cash Sub-Total | In-Kind Contributions | Milestone Totals |
|---|---------------------------------|-------------------|--------------------------|-----------------|-----------------------|------------------|
| 1 | Milestone 1 | A\$100,000.00 | A\$100,000.00 | A\$200,000.00 | A\$25,000.00 | A\$225,000.00 |
| 2 | Milestone 2 | A\$100,000.00 | A\$100,000.00 | A\$200,000.00 | A\$50,000.00 | A\$250,000.00 |
| 3 | Milestone 3 | A\$150,000.00 | A\$150,000.00 | A\$300,000.00 | A\$0.00 | A\$300,000.00 |
| 4 | Milestone 4 (if needed) | A\$100,000.00 | A\$100,000.00 | A\$200,000.00 | A\$25,000.00 | A\$225,000.00 |
| 5 | Milestone 5 (if needed) | A\$50,000.00 | A\$50,000.00 | A\$100,000.00 | A\$0.00 | A\$100,000.00 |
| 6 | Milestone 6 (if needed) | A\$0.00 | A\$0.00 | A\$0.00 | A\$0.00 | A\$0.00 |
| 7 | Milestone 7 (if needed) | A\$0.00 | A\$0.00 | A\$0.00 | A\$0.00 | A\$0.00 |
| 8 | Totals (please check additions) | A\$500,000.00 | A\$500,000.00 | A\$1,000,000.00 | A\$100,000.00 | A\$1,100,000.00 |

Milestone 1 Start Date | 2021-02-01

Milestone 1 End Date | 2021-02-28

Milestone 1

| | Supplier | Activity | Cost | In-Kind |
|---|----------|--|---------------|---------|
| 1 | XYZ | Project Manager – Site inductions, development, pre-sales and pilot strategy | A\$100,000.00 | A\$0.00 |
| 2 | Design | Systems development, | A\$100,000.00 | A\$0.00 |

Electronic development

| | | | | |
|---|----------|-----------------------|---------------|--------------|
| 3 | Griffith | Pilot site facilities | A\$0.00 | A\$25,000.00 |
| 4 | TOTAL | | A\$200,000.00 | A\$25,000.00 |

Milestone 2 Start Date | 2021-03-01

Milestone 2 End Date | 2021-03-31

Milestone 2

| | Supplier | Activities | Cost | In-Kind |
|---|----------|--|---------------|--------------|
| 1 | XYZ | Final design mechanical components supplied by XYZ (6 sets) for certification destructive and non-destructive tests. | A\$100,000.00 | A\$50,000.00 |
| 2 | Design | Embedded development | A\$100,000.00 | A\$0.00 |
| 3 | | | A\$0.00 | A\$0.00 |
| 4 | TOTAL | | A\$200,000.00 | A\$50,000.00 |

Milestone 3 Start Date | 2021-04-01

Milestone 3 End Date | 2021-06-30

Milestone 3

| | Supplier | Activities | Cost | In-Kind |
|---|----------|---|---------------|---------|
| 1 | XYZ | Engage Industry contract Business Development Manager – Commercialisation strategy execution, marketing plan and execution. | A\$150,000.00 | A\$0.00 |

| | | | | |
|---|--------|-----------------------------------|---------------|---------|
| 2 | Design | Intrinsically safe product design | A\$150,000.00 | A\$0.00 |
| 3 | | | A\$0.00 | A\$0.00 |
| 4 | TOTAL | | A\$300,000.00 | A\$0.00 |

Risks

Risk Management - Please complete the table below

| | Identified Risk | Risk Rating - Low, Medium or High? | Strategy for Managing risk/ issue (please add risk management comments) |
|---|---|------------------------------------|--|
| 1 | Project scope may creep | Low | Project to be closely monitored by the National Director- Projects to ensure the project sticks to the original scope |
| 2 | Project schedule may slip | Low | Project to be closely monitored by the National Director – Projects to ensure the project stays on the projected timeline |
| 3 | The company may not achieve the desired technology results | Mediu | National Director – Projects to review technical progress at each milestone particularly the results of Milestone 1 where successful resin formulations need to be developed. Failure to do so will result in the project being abandoned. |
| 4 | The company is unable to fund their contribution to the project | Medium | Project to be closely monitored by the National Director – Projects to ensure the project leader has been reimbursed by MT and then has the available cash to proceed with the next milestone before payment of that milestone. |

Project Collaborators

Design Group Pty Ltd, 29621019163, Design, Professional Services, 123 Right Street, Melbourne, VIC, 3001, Design was founded in 2011 and is ISO9001 and ISO13485 certified. Design provides professional and comprehensive design, commercialization and manufacturing services and specialises in the development of electronic products., Design will be paid \$414,000 for industrial design, development, testing, and specifications on the Volts product. The participant will support AMGC in the development of a case study and media opportunities and will participate as an AMGC project reference site., <https://design.com.au>, Not Indigenous-Owned, No risks, Barry Jones, barry@design.com.au, +6142689712

Anglo Australia Ltd, 47048923712, Kingswood Coal Mine, Manufacturing Company, 123 Right Street, Melbourne, VIC, 3001, Anglo Australia has four underground coal mines in Queensland's Surat Basin. The Kingswood underground metallurgical coal mine in Moran is a longwall operation with associated development works with an anticipated life of mine in excess of 30 years., The participant will contribute \$24,000 in-kind to the project to be Pilot site A for the Installation and maintenance of Volts in its intended environments and application. The mine will supply infrastructure and resources for the trials of Volts in their pilot form, supported with pre-market sales commitments. Kingswood Coal mine utilises the MST Global range of products for their mine Wi-Fi, tracking software/hardware and communications underground network. The participant will support AMGC in the development of a case study and media opportunities and will participate as an AMGC project reference site., <https://anglo.com.au>, Not Indigenous-Owned, No risks, Barry Jones, barry@anglo.com.au, +61427863214

Griffith University, 1234546789, GU, Education/Research Institution, 123 Right Street, Melbourne, VIC, 3001, Griffith University started teaching over 40 years ago and are an integral part of the community and heavily industry focused. They have also become a comprehensive, research-intensive university, ranking in the top 2% of universities worldwide. Their teaching and research spans six campuses in South East Queensland and all disciplines, while their network of more than 200,000 graduates extends around the world., Griffith University aims to develop resin formulations ideally suited for the IMCDP system and target applications. GU will be purchasing a Synthesiser required for the task at an estimated price of \$50,000 as an in-kind contribution to the project., <https://Griffith.org.au>, Not Indigenous-Owned, No risks, Barry Jones, barry@cleaveruni.org.au, +61416789532

Log in to amgc.grantplatform.com to see complete application attachments.