

# The Vortex Engine Research Plan

## Project purpose:

To develop and market the technology for sustainable generation of electrical power by means of the atmospheric vortex engine.

## The Problems:

1. Renewable energy is critical to our environmental, economic, and national security. Demand for energy is on the rise, as is our national reliance on fossil fuel-based power plants for the bulk of our electricity generation.
2. Development of sustainable energy systems is mandatory in order to reduce and eventually reverse global climate change.
3. Particulate discharge from fossil fuel combustion and burning of rainforests is responsible for the unprecedented and unsustainable 'Atmospheric Brown Cloud' over much of the Inter Tropical Convergence Zone including the Middle East, India, southeast Asia and China. This cloud is contributing to Global Warming and Climate Change including drought.

## The Solution:

- The vortex engine can generate power by using relatively 'low grade' heat, through tapping into the temperature differential between the top and bottom of the troposphere (~100C). Examples of this otherwise waste heat would be low grade geothermal (50 –90°C) or thermal power station flue gas and condenser cooling water
- The Atmospheric Brown Cloud can be reduced and eventually eliminated by using a system such as the vortex engine which
  - Has no particulate emissions
  - Can help to 'scrub' the atmosphere through enhanced local precipitation
- The vortex engine will make it more attractive for third world nations in tropical regions to retain rainforests and utilise their natural features in synergistic partnership for power generation.

## Why now?

- We are in a race against time to prevent irreversible damage to our global environment
- We are in a race against other nations to develop this technology:
  - Canada - AVETec
  - The US - GATECH consortium
  - New Zealand - University of Auckland

## Research and development program:

The plan offered here is for a phased, accelerated, research and development program designed to produce a commercial-scale power generating Vortex Engine in approximately 10 years, and a commercial waste-gas disposal system within four years. The reason for an accelerated program, in addition to the great need for this technology, is the lack of IP protection – the basic physics and engineering have been in the public domain for decades. Therefore a first-to-market position, and a commanding lead in development, are best obtained by an accelerated program. Opportunities will certainly arise to patent or otherwise protect improvements and ancillary inventions during the program.

Phase 1 of four years duration would develop and test a generic technology demonstrator, fully instrumented. This would be a small Vortex Engine to use as a test bed and proof of concept. Phase 1 would begin with a discovery and due diligence process, plus detailed budgeting.

Preliminary budgeting for Phase 1 suggests a total cost of USD\$5M. Completion of Phase 1 would allow detailed cost modelling for Phases 2 and 3.

Phase 2 of three years would develop a waste gas Vortex Engine which would carry industrial waste gases toward the tropopause. This would contribute to overcoming Asia's (and the World's) smog problem, and would generate a return on the R&D investment.

Phase 3 of six years duration in parallel with phase 2 would be to develop a larger scale Vortex Engine for power generation. This more expensive undertaking would be partly funded from the commercialisation of Phase 2.

It is not yet possible to meaningfully cost Phases 2 and 3, particularly given the commercialisation opportunities that can be expected once Phase 2 is demonstrated.

### **How can a small-scale prototype be built?**

The research-scale prototype should arguably be energised by the following:

- Utilisation of waste gases from industrial processes, particularly those containing high water vapour content
- Injection of high velocity gases into a vortex chamber

This would facilitate demonstration of the principle of the updraft vortex, while eliminating the need for a relatively expensive heat exchange system. It would also demonstrate the viability of the concept for application as an efficient waste gas disposal system.

### **Proponent:**

Donald Cooper is a mechanical engineer and inventor strongly interested in alternative energy and the implications of climate change.

See LinkedIn profile at: <https://au.linkedin.com/pub/donald-cooper/17/7ab/638>

See also:

<http://www.vortexengineer.com/atmospheric-vortex-engine.html>

<http://www.vortexengineer.com/application-of-vortex-engine-in-the-middle-east.html>

<http://www.vortexengineer.com/how-can-a-small-scale-vortex-engine-be-built.html>

<http://www.vortexengineer.com/vortex-engine-business-plan.html>

**APP-REP-2017-02746**

**Diagrammatic Representation of Proposed Research Rig:**

