



Russell Energy Corporation

Energy Security Through Innovation
An American Company

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Executive Summary

The Russell Energy Corporation has 6 U.S. patents, 25 active patents in 17 countries, and 18 foreign patents pending on the revolutionary shaftless Stationary Block Rotary Engine/Generator technology.

1. Description of Technology

The Russell Engine/Generator (Eng/Gen) is the first and only combination of a unique new engine design that offers extreme power density and unusually high efficiency, united with a built-in, large diameter, high efficiency electric generator. Integrated in a single waterproof and dustproof housing, this exceptionally compact, lightweight and vibration free unit will efficiently transform any liquid or gaseous fuel directly into clean, powerful and dependable electrical energy for any portable or stationary application. The Eng/Gen provides extreme scalability, modular design compatibility, system expandability and plug-and-play functionality in a durable one piece unit.

The shaftless Eng/Gen produces more power than a conventional engine of equivalent displacement. A conventional four cylinder engine produces only two combustions per revolution; a four cylinder Eng/Gen produces eight, 4 times the combustion events per revolution. Integration of the engine and generator eliminates bearings, shafts, couplings and the cases that are required by all typical units with a separate electric generator. This greatly reduces the overall size, weight and the parts count of the unit while increasing system efficiency. Southwest Research Institute (SwRI) studied the original design and predicted a power density of 100 kW/liter which compares with 50-60 kW/liter for typical four stroke automobile engines. Improved power density predictions are expected for the new "Stationary Block Rotary Eng/Gen" design.

2. Business Objective

The Russell Energy Corporation (REC) strives to provide the benefits and security of electrical power to all people in the most dependable, affordable and environmentally considerate manner possible. Suitable for all portable and stationary applications REC seeks to promote the design, manufacture and marketing of the Eng/Gen technology worldwide. Our goal is to be a world leader in electric power generation technology.

3. Opportunities

Portable Applications: The example of the Eng/Gen (as seen in the presentation at www.russellenergy.com) has only 1/4th the parts required in a conventional two piece engine and generator set, yet produces four (4) times the firepower. It is the only design which is

both small enough and light enough to be considered for all, unlimited range, electric vehicle applications. These applications include, but are not limited to, use in all land vehicles, most water and many air transportation vehicles. This simple system provides greater power, dependability, durability, a longer service life, reduced fuel costs, reduced pollution emissions and reduced maintenance requirements. It is our aim to completely replace current drive systems with electrical drive systems supported by the Eng/Gen. Furthermore, we intend to open the door to new applications that have not been possible with current technologies. The Eng/Gen's ability to more efficiently use the current fuel infrastructure is of great significance. This allows a seamless transformation from the wasteful conventional vehicle drive systems to this highly efficient technology with no infrastructure development delay.

Stationary Applications: Any Eng/Gen used in the previously noted electric vehicle applications will also be capable of producing electrical power for emergency or full time use at your home or business (i.e. construction sites) or to support the nation's electrical grid. Dedicated full time or emergency power generation applications, can utilize increasingly larger models or multiple unit modules containing several Eng/Gen units of varied sizes. Stationary power is essential for many applications such as airports, hospitals, police and fire stations, cold food storage facilities, data storage and all foreign and domestic military facilities. Similar to portable systems, the larger stationary systems provide greater power, dependability, durability, a longer service life, reduced fuel costs, reduced pollution emissions, reduced maintenance requirements plus the added benefit of unlimited expandability. We believe that the Eng/Gen will completely replace current remote and stationary on site electrical power generation systems once their useful life is over. Since the design allows multiple combustions per revolution, and as the number of combustions are only limited by the overall size and practicality issues, larger units may produce 3, 4 or more combustions per revolution. This feature greatly increases power density and efficiency. The Eng/Gen simply gets better as it gets bigger.

4. Target Market Descriptions

The great cost in lives and national treasure associated with bringing fuel to our military demands the most efficient use of our fuel resources. As the Eng/Gen technology will reduce the logistical burden of supplying fuel to our service men and women, all branches of the military will be considered primary markets for the Eng/Gen technology. Use of the Eng/Gen as a primary drive in military vehicles also eliminates the need for trailerable generator units. The Eng/Gen transforms every vehicle into a portable power generating asset.

As our national security and the security of our citizens rely on and demand a constant supply of electrical power, especially in times of disaster, the Eng/Gen and a network of distributed power generation facilities and portable power generation units are of primary national importance. Whether brought on by natural causes or from an act of terror interruption of electrical power is unacceptable. Dependable electrical power is a universal requirement for the health and well being of our nation and its population. Homeland Security will be another primary area of development interest.

94% of the transportation sector is fueled by petroleum products therefore an early target market will be in automobile as well as light and heavy truck applications. Adoption of the highly efficient Eng/Gen will conserve more fuel for later generations while reducing pollution. A network of vehicles such as trucks, busses and cars that can be used as portable power generation stations will also add to a national security network for the Homeland Security Administration.

5. Sustainable Competitive Advantages

REC's primary advantage lies in an extensive patent portfolio. There have been several patents issued in the US and foreign countries on component parts related to the Eng/Gen technology. The original "Engine Generator" patent for a one-piece combination of an engine and generator unit was granted in the US and subsequently granted in 48 foreign countries. This patent is still active in the US and 16 foreign countries. The new "Stationary Block Rotary Engine/Generator" patent has been granted in the US and is currently pending in 18 additional foreign countries. In addition to the extensive Patent protection the Eng/Gen offers;

- **Fewer Parts-** 1/4th the parts required in a comparable, two-piece conventional engine and generator unit (lower material, production, assembly and shipping costs)
- **Efficient:** greater combustion efficiency, fewer moving parts and low friction losses
- **Power Dense:** the current design produces four times more combustions per revolution than any conventional two-piece engine and generator combination, and larger designs are capable of even greater power density
- **Highly Scalable:** small increases in the Eng/Gen's physical size will provide significantly greater increases in output power and efficiency
- **Smaller & Lighter:** these advantages increase as output increases, and they offer an expanding field of new applications not possible with current technologies
- **Dependable:** lower, relatively fixed RPM and far fewer parts
- **Robust:** ideal for portable and heavy duty remote applications
- **Vibration free:** increases dependability, durability and personal comfort
- **Sealed:** waterproof and dustproof enclosure is ideal for outdoor use
- **Modular:** stationary power increased/decreased by activating/deactivating additional Eng/Gen units in an expandable multi unit assembly
- **Affordable:** far fewer parts, no exotic materials, automated manufacturing and assembly

6. Management Team

The inventor and President, **Bob Russell** co-founded Power Brake Dies, Inc, a leading and innovative press brake tooling design and manufacturing facility in the U.S. where he served as Vice President for 36 years. **Charles Padgurskis**, Vice President was the former Director of the Chicago Police Department's Information Services Division managing the information technology and infrastructure for 17,000 department employees.

7. Requirements for Success

FEV, an internationally recognized engineering company that specializes in research, design and production development of engines and powertrain systems, has after review submitted a proposal to do an eight week detailed "Concept Study for the Russell Eng/Gen". This study will be used to identify the possibilities offered by the Eng/Gen design and develop the engines performance characteristics.

FEV has also quoted a twelve month "Proof of Concept Development for the Russell Eng/Gen". This will include the prototype design, building and testing of Russell engines for the Russell Eng/Gen. Based on the above, the final complete Eng/Gen design will be completed, built and tested.

Strategic alliances with US companies, investors and/or governmental agencies are preferred, however, foreign companies and/or investors will be considered to promote the prototype development of the Eng/Gen technology.

REC's development strategy is that after a successful prototype is produced and proven, additional funding from strategic alliances will be raised to provide Eng/Gen units for field testing, and to complete the development to a production ready status. Additional size variations will be funded by expanding strategic alliances targeted in additional application venues. REC's intention is to seek US strategic alliances first and keep production in the USA if possible although all qualified participants will be considered. Global marketing will be encouraged.

8. Return on Investment

Strategic Alliances with Manufacturers and/or Marketers

REC will provide incentives to early strategic alliance participants through very favorable license agreements covering all foreign and domestic sales of Eng/Gen units.

Those who would like to establish strategic alliances after development has started will be granted less favorable license agreements.

Those who would like to establish strategic alliances after development is completed will not receive any special consideration with regard to their license agreements.

Strategic Alliances with Investors

Similar to manufacturers, strategic alliances with investors will be considered. REC will provide the greatest incentives to those who show early support when the need and risk is the greatest.

Contract Manufacturing

Another option for manufacture is to sub-contract the production of parts, quality control and the final assembly from independent suppliers. This may be a viable option for early stage development and/or lower production Eng/Gen applications.