Health problem addressed

In many areas of the globe, especially Africa and Asia, many towns and communities are without electricity network, while in others it is very weak. This creates problems in the long-term storage of pharmaceuticals, reagents, blood, vaccines, samples, etc.

Product description

The product consists of a refrigerator powered by batteries which are continuously charged by a fuel cell. The fuel cell uses hydrogen produced on the spot from LPG (Liquefied Petroleum Gas) which is widely available, safe, easy to transport and handle, and with which nearly all people are familiar.

Product functionality

A power system of approximately 300 W consists of a fuel cell and a fuel processor. The fuel processor produces hydrogen by reaction of LPG with water (recycled) and feeds the fuel cell, producing the required power which feeds the battery. The system powers continuously the refrigerator and other applications, as needed (i.e., telephone center).

Developer’s claims of product benefits

The proposed system offers significant advantages over diesel generators (three times higher electrical efficiency, no noise or vibrations, low maintenance requirements, high reliability, etc.) or photovoltaics (continuous power supply, independent of weather conditions, more economical). The refrigerator - battery - fuel cell power system are highly integrated and controlled in an automatic fashion, while they can be monitored remotely. Maintenance is minimal (no moving parts) and is done in pre-defined intervals while reliability is high. The power system can be used simultaneously by other applications. The device is safe and requires no skilled personnel.

Operating steps

The system is autonomous, requiring only periodic supply of LPG. Water is recycled within the system. It operates with automatic control, requiring no personnel involvement. Maintenance is done at specific intervals, every few years. A plug power outlet (110 or 220 VAC) is available for other uses.

Development stage

Proof of concept has been completed successfully by prototype systems. Testing of the systems took place at normal as well as extreme conditions (of heat and humidity). The next step is field testing. It is proposed to build a number of such systems and place them in various locations. Furthermore, industrialization studies will be completed and regulatory approvals and permits will be obtained.

Future work and challenges

The next step toward implementation of the proposed system application is field testing. The challenge is to obtain the necessary funding and collaborating institutions to place units in remote locations in Africa and Asia. Successful field testing should be followed by mass production in order to decrease cost. For this step it is anticipated that investors will be found, especially since many other applications can be identified.

Use and maintenance

User: Nurse, physician, technician
Training: None
Maintenance: Technician

Environment of use

Setting: Rural. Primary and secondary health care facilities.
Requirements: System requires only supply of LPG.
Location of installation must be accessible by truck to transport LPG bottles.

Product specifications

Dimensions (mm): 600 x 600 x 1000
Weight (kg): 50
Consumables: Liquefied Petroleum Gas (LPG)
Retail Price (USD): 4000 - 4500 (at manufacturing stage)

List price of consumables (USD): 0.4 /kW-h or 2 /day
Other features: Not portable. Reusable.
Year of commercialization: 2012 (expected)

Contact details

Xenophon Verykios
Email: – Telephone: +30 694 756 4620 Fax: +30 261 0 91 1565

Disclaimer
Eligibility for inclusion in the compendium has been evaluated by EuroScan member agencies and WHO. However, the evaluation by EuroScan member agencies and WHO has been solely based on a limited assessment of data and information submitted in the developers’ applications and, where available, of additional sources of evidence, such as literature search results or other publicly available information. There has been no rigorous review for safety, efficacy, quality, applicability, nor cost acceptability of any of the technologies. Therefore, inclusion in the compendium does not constitute a warranty of the fitness of any technology for a particular purpose. Besides, the responsibility for the quality, safety and efficacy of each technology remains with the developer and/or manufacturer. The decision to include a particular technology in the compendium is subject to change on the basis of new information that may subsequently become available to WHO. WHO will not be held to endorse nor to recommend any technology included in the compendium. Inclusion in the compendium solely aims at drawing stakeholders’ attention to innovative health technologies, either existing or under development, with a view to fostering the development and availability of, and/or access to, new and emerging technologies which are likely to be accessible, appropriate and affordable for use in low- and middle-income countries.

WHO does not furthermore warrant or represent that:
1. the list of new and emerging health technologies is exhaustive or error free; and/or that
2. the technologies which are included in the compendium will be embodied in future editions of the compendium; and/or that
3. the use of the technologies listed is, or will be, in accordance with the national laws and regulations of any country, including but not limited to patent laws; and/or that
4. any product that may be developed from the listed technologies will be successfully commercialized in target countries or that WHO will finance or otherwise support the development or commercialization of any such product.

WHO disclaims any and all liability and responsibility whatsoever for any injury, death, loss, damage or other prejudice of any kind whatsoever that may arise as a result of, or in connection with, the procurement, distribution and/or use of any technology embodied in the compendium, or of any resulting product and any future development thereof.