

ENERGY-EFFICIENT AND RENEWABLE TECHNOLOGIES

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Open source techniques are being employed in the development and provision of access to an increasingly diverse range of technologies. In this article we'll take a look at two comprehensive open source projects that incorporate elements of mechanical, electrical and software engineering. One that is concerned with building a hydrogen fuel cell electric car, and another with making wind turbine designs freely available to all.

A highly energy-efficient vehicle

Riversimple is a UK-based company that was founded with the aim of producing highly energy efficient vehicles for personal transport. In 2009 they unveiled a technology demonstrator for the Hyrban, a two seat car with a 240 mile range that achieves an energy equivalent of over 300 mpg. One year later securing a deal with Leicester City Council to deliver 30 vehicles as part of a pilot scheduled for 2012. With ambitious plans to have 84,000 cars in use across the UK by 2020.

The Hyrban is built around what has been termed a "network electric platform," consisting of a hydrogen fuel cell power source, a bank of ultracapacitors, 4 in-wheel electric motors and a control system. Regenerative braking is employed and recaptures around 50% of the energy that would have been lost as heat. This is stored in the ultracapacitors and provides in the order of 80% of the energy required for acceleration. Thus allowing the car to have a much smaller fuel cell than would otherwise be required in order to cope with peak energy demand.

The novel approach that Riversimple have taken extends beyond their choice of technology and to their business model and Intellectual Property (IP) strategy. Resolutely focused on reducing the environmental impact of personal transport, they have decided that the cars will not be for sale and will only ever be leased. In selling a service rather than a product they are motivated to build cars that are low maintenance and with a long operating life, in addition to being highly efficient.

Rather than taking the usual route of seeking to secure exclusive rights via patents, Riversimple have

opted for open licensing and the IP is held in trust by a non-profit organisation. Setting up the 40 Fires Foundation for this purpose, and operating it as a separate legal entity with a board of trustees that is two thirds independent.

Riversimple's open source approach allows them to focus on innovation, leads to simplified commercial relationships and encourages the creation of an ecosystem of parts, or even whole cars. Indeed their distributed manufacturing model is based on a network of small-scale factories, that will lead to greater resilience to deal with fluctuating demand and provide increased flexibility to enable vehicle customisation.



Image ©Riversimple LLP

Open renewables

UK-based non-profit organisation Onawi was founded by a team with a background in open source software and open knowledge. Its stated aim is to "directly contribute to a just transition towards climate change mitigation by making designs of wind turbines freely available to all". In support of this it has partnered with Danish research and development and technology transfer organisation, the Nordic Folkecenter for Renewable Energy. Entering into an agreement that will see Onawi release specific Folkecenter designs for 150kW wind turbines

This "medium sized" class of wind turbine is of particular interest due to its suitability for manufacture and use in low and middle income countries. Since the technology selected was developed in the 1980s it does not require advanced materials and difficult to manufacture components. Furthermore, time has proven it to be low maintenance and reliable, with turbines operating in the field for over 20 years.

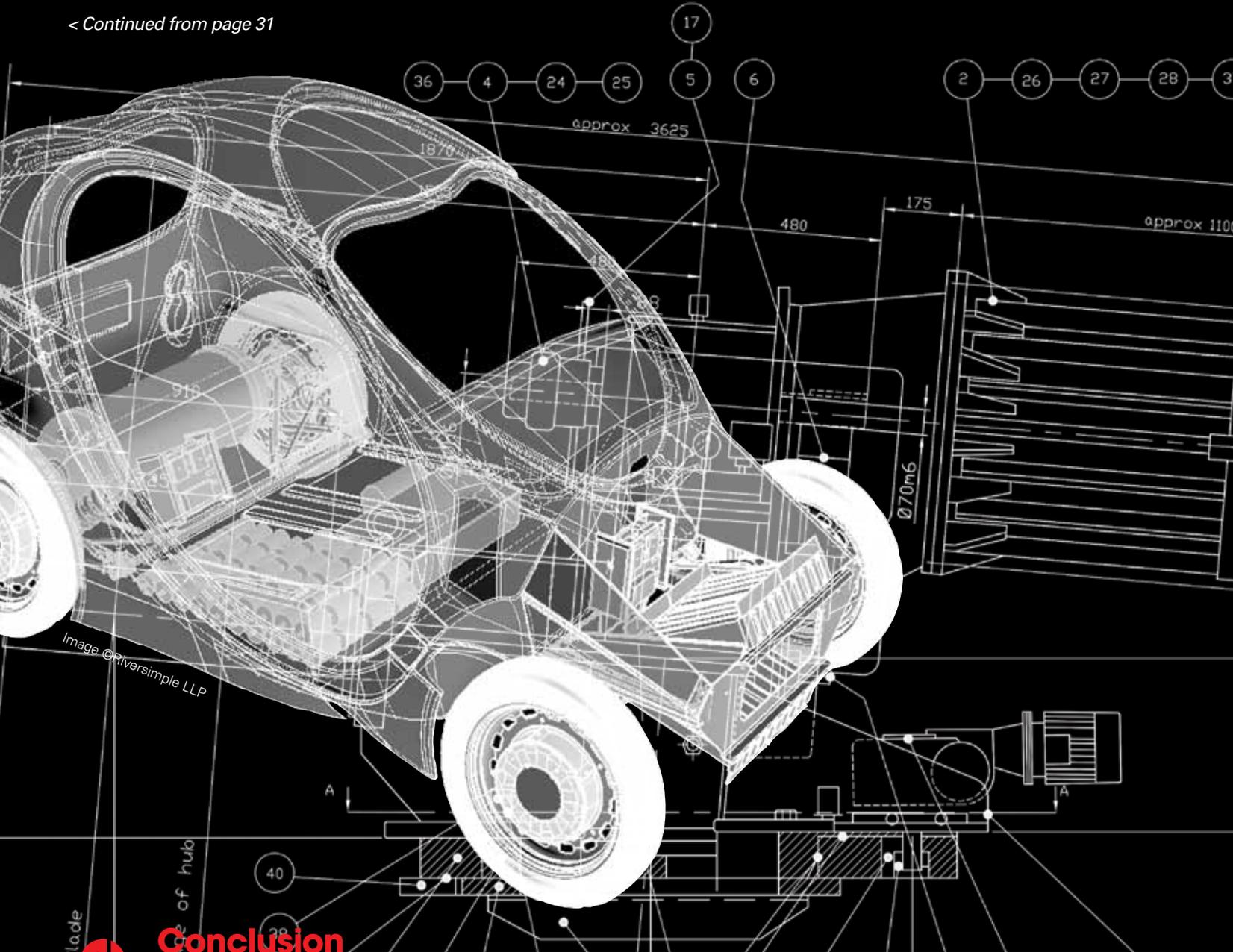
Onawi plan to release the designs under an open licence such as those from Creative Commons or GNU. Working with distributed teams and commercial and community partners, to develop transferable in-country skills. Fostering collaboration across projects and driving participation in the further development of designs.



Image ©Nordic Folkecenter for Renewable Energy

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Open Source

Conclusion

Riversimple are using open source as a means of facilitating a novel approach to manufacturing that will lead to business agility and reduced risk, whilst enabling external participation in the design process. Open source software has demonstrated how participation and a sense of shared stakeholdership drives the creation of technology platforms. As these grow and an ecosystem is established benefits accrue in the form of complementary technologies, shared maintenance overheads and reduced costs. Trust is fundamental to platform development and the creation of the 40 Fires Foundation will serve to build this.

Onawi represents a new breed of non-profit that is working to address global problems in a truly sustainable manner. With

a strategy of technology transfer that is underpinned by open licensing, online collaboration and the development of in-country expertise and manufacturing capabilities.

If successful Riversimple will create a new marketplace and will occupy a key position within this. Onawi have an opportunity to effect positive change on a global scale and in a manner that will provide the maximum benefit to local economies. In both cases a radical and potentially disruptive approach to a significant environmental challenge is being adopted. ◯

Share your views...

Got an opinion on how Riversimple are using open source techniques to develop energy efficient applications? Share it at www.designspark.com/etech