

Belgians to build prototype nuclear reactor with particle accelerator to reduce waste threat

September 27 2012, by Bob Yirka

(Phys.org)—Researchers at the SCK CEN Belgian Nuclear Research Centre have announced that they are going to build a Multi-purpose hYbrid Research Reactor for High-tech Applications (MYRRHA) which is an experimental way of producing electricity via a nuclear reactor using a particle accelerator as a neutron source. The benefits of such an approach would mean spent nuclear fuel would have a far shorter half-life than conventional reactor technology methods and increased safety as runaway chain reactions cannot occur.

As most everyone knows, the modern world is facing the daunting prospect of having to choose between continuing to burn fossil fuels to create the electricity we need to keep on with our way of life, or switching to other means, such as [renewable resources](#), or of course resorting to nuclear reactor technology. The sad fact is, none of these approaches is not without some serious problems; continuing on as we are means adding to global warming, and having to deal with the fact that some day, we'll eventually run out of sources. [Renewable sources](#) sound great, but thus far, none of them have shown an ability to replace coal and/or oil. And nuclear energy, well, there is the always present risk of a meltdown, ala Chernobyl, Fukushima, Three Mile Island, etc. and of course all that super hazardous spent [fuel waste](#) that must be stored safely somehow for hundreds of thousands of years.

For these reasons, the SCK CEN center was established over a half

century ago to perform research into peaceful ways of using nuclear energy. This new effort extends that goal to include finding ways to make the creation of energy via nuclear power safer both in the process and in the [waste materials](#) produced. To that end they have chosen to embark on a study that will likely cost hundreds of millions of dollars and take years to carry out; the construction of a nuclear reactor [test facility](#) that uses a particle accelerator to provide a [neutron source](#). The idea is to build a nuclear reactor that relies on a neutron spallation source (the particle accelerator) for its reactions, rather than the fuel itself. Doing so would mean the chain reaction could only continue if the [particle accelerator](#) continued to operate, which means it could be stopped immediately if there are any signs of trouble. But, more importantly, the neutrons could be used to transmute the fuel waste into fissionable material that has a half life of just a couple hundred years, thereby greatly reducing the toxic threat.

It's still not a perfect solution of course, as it still means relying on nuclear energy for the foreseeable future, but it's obviously a far better approach than continuing on with what is happening now. If the new approach pans out, it could mean a far safer future for generations to come. If not, it might provide a means for carrying on until something better can be found.

More information: www.sckcen.be/

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