

Research for lithium ion batteries that can assist in utilising wind and solar energy

March 7 2016, by Belinda Lee

"The issue is that solar energy is only produced during the day, and wind energy only on windy days. It's not always in sync with consumers' demands of electricity and unused energy has nowhere to go."

That, says Katja Kretschmer, "is where my batteries would jump in."

Kretschmer, an Industry Doctoral candidate with the Automotive Australia Cooperative Research Centre (AutoCRC) in UTS's Centre for Clean Energy Technology, explains: "The problem, at the moment, with those [energy](#) sources is that we can't store them efficiently and economically. The batteries I'm developing would store energy as it's produced at a wind or solar farm and release that energy into the power grid as it's needed."

The process is similar to our water supply where rain water is collected at Warragamba Dam and then distributed across a large, populated area.

"Rechargeable batteries today are not yet suitable to do that," says Kretschmer. "They are too expensive, too heavy, not long lasting enough and too small in capacity."

Kretschmer's research, which is sponsored by AutoCRC, is trying to address these issues. Her aim is to create advanced lithium ion batteries that can assist in utilising wind and [solar energy](#) more efficiently.

"We are making our materials from scratch using a number of different

chemical, thermal and mechanical synthesis procedures to create super-efficient electrode materials, which will hopefully power our everyday lives in the future.

Kretschmer believes that in 10 to 20 years, "There will be enough wind and solar farms connected to smart grids and smart homes to power our cars, buses, motorbikes, trains, bicycles, and even household items like computers, TVs and fridges.

"Large battery storage systems will create a buffer for those times when solar and [wind energy](#) aren't being produced, so that it can be fed into [smart grids](#) and homes as needed.

"And I'm making sure the technology is ready when that happens."

Kretschmer's doing this by, "improving existing and discovering new rechargeable battery systems to promote electromobility and the transition to [renewable energy](#)."

Electromobility is the same kind of electric powertrain technology used in electric or hybrid cars. It negates the need for fossil fuels and eliminates carbon gas emissions. While Kretschmer says electromobility is becoming more affordable and practical, the materials and designs of batteries need to be improved to compete with the conventional combustion engine.

"Most of the materials I use in my research are considered 'green'," she says. "I use common food additives as my starting materials and if I can, I always choose the least hazardous chemicals."

In a recent publication in *Green Chemistry*, Kretschmer writes about a microcrystalline cellulose derived hybrid electrode. "It sounds fancy", she says, "but it's really only cheap paper towel combined with relatively

harmless chemicals and converted to a very efficient electrode material. If my materials eventually make their way into commercialisation the facilities are already widely available."

Kretschmer believes it's only a matter of time before Australia shifts from [fossil fuels](#) towards renewable energy. "I'm trying to help us get there a bit faster."

Provided by University of Technology, Sydney

Citation: Research for lithium ion batteries that can assist in utilising wind and solar energy (2016, March 7) retrieved 3 May 2024 from <https://phys.org/news/2016-03-lithium-ion-batteries-utilising-solar.html>

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