*Rethink Energy monitors the transition to fully renewable energy markets*

While both Toyota and Honda have referred to the FIBs as "next generation" this strikes us more as them playing catch up with Chinese firms who have cornered the lithium battery market, so that when EVs are the main type of vehicles on the roads in 10 or 15 years, these Japanese brand leaders will not be over a barrel on the supply of the most important component part from their Chinese counterparts.

## Hydrogen

### Ways2H and Local Power plan hydrogen-producing microgrids

Hydrogen start-up Ways2H and Massachusetts-based municipal consultancy Local Power have announced a partnership aimed at integrating on-site renewable hydrogen within community microgrids. This represents an addition of hydrogen-fueled generators to Local Power's existing solar-plus-storage vision for Community Choice microgrids, as well as finding a use for municipal waste, plastics, and even medical waste in Ways2H's thermochemical processors.

Ways2H CEO Jean-Louis Kindler commented, "We are bringing an integrated approach and a concrete solution that we believe many municipalities are looking for, as they seek technology and resiliency they currently don't have. Our waste-to-hydrogen production units are modular, transportable and easily installed on-site, close to where waste is produced and where hydrogen fuel is needed for distributed power generation and mobility."

Under the current centralized model of waste disposal, some Californian waste is transported to Texas; processing waste for hydrogen production addresses another environmental concern besides emissions, and does it on a local level.

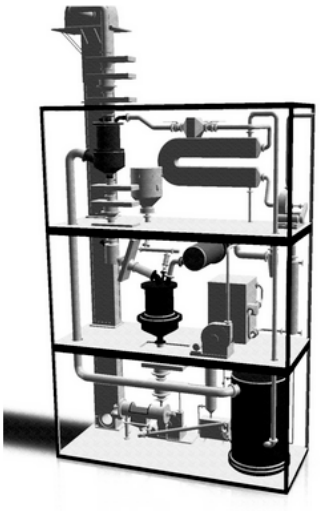
In May, we wrote about Ways2H's plans to extract hydrogen from municipal solid waste – its steam reforming process, carried out at 1,000°C, produces 50 kg from a tonne of typical waste, while waste with high water content such as sewage produces as much as 120 kg per tonne. Besides being net-zero for carbon, reusing waste promises reduction in methane emissions; and unlike conventional gasification, it's not an incineration process and as such doesn't produce tar or other pollution. Dependence on maintaining high temperature makes it a 24/7 process.

If this can be paired with carbon capture and storage (CCUS) down the line, the company claims the process – and thus the future hydrogen-based transport industry can become carbon-negative.

The start-up has been going for 16 years, and is a joint venture of Clean Energy Enterprises, which is an American holding company for waste-to-energy services, and Japan Blue Energy, a Tokyo-based company dealing in research and development for biomass gasification hydrogen production.

**1. AGM Model 5: a mobile solution that fits into 3 stackable 20' containers**

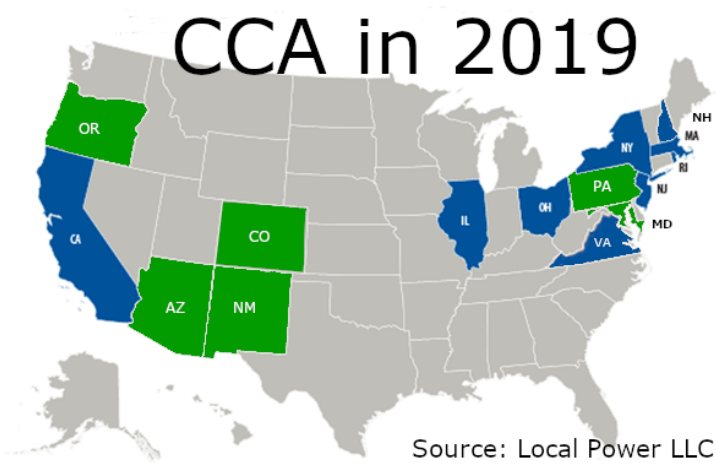
- Transportable.
- 1 ton per day biomass feedstock yield 50kg hydrogen per day.
- The equivalent of 12 full fuel cell vehicle tanks or;
- 40kw Power Generator (with an integrated fuel cell).



Another recent initiative involving the company was an agreement with EPC Ford, Bacon & Davis LLC to set up the USA's first modular waste-to-hydrogen facility in California by the end of this year; it will come shortly after a similar transportable modular waste-to-hydrogen unit the company is constructing in Japan.

As for Ways2H's partner, Local Power - its founder and President, Paul Fenn, drafted both the USA's first Community Choice Aggregator (CCA) legislation in Massachusetts in 1995, and later its most radical version in California. Since then, CCAs have risen to the point that they serve 5% of America's population as of last year, and are now in a period of rapid growth. In California, CCAs are expected to reach 60% of investor-owned utility customers this year, and have been involved in 3.6 GW of solar development so far.

CCAs are led by elected municipal authorities, and allow a group of electricity users to collectively bargain for cheaper prices – or for that matter, for more renewable generation. Membership occurs on an opt-out basis – usually opt-out rates of 15% are seen.

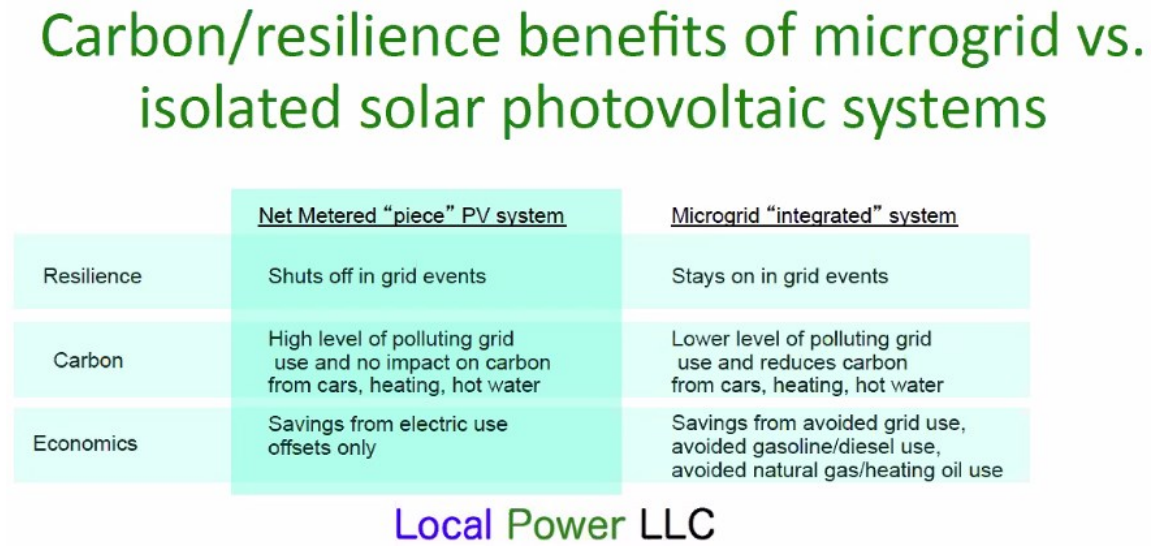



CCAs are a natural fit for small-scale distribution such as solar-plus-storage, so adding small-scale green hydrogen production and generation is the next logical step over the coming decade. It'll be a way to add dispatchable power comparable to natural gas generators, at the municipal level.

Besides being a vehicle to achieve a green agenda independent of state-level utilities, they also offer resiliency at a time when California's energy supply has faced challenges with blackouts - last year and likely this year, to avoid wildfires sparked by old, exposed transmission lines: besides this week's more complex problems.

Paul Fenn sees CCAs as an alternative to FiTs and Net Metering. As he sees it, the old approach centralized around state-level utilities can't meet necessary levels of emissions reduction because of a variety of factors, such as the model's reliance on gas peaking to deal with intermittency.

Distributed generation should be the solution, but then Fenn sees net metering as a distraction from emissions reduction, acting as a parasite of the existing state-level paradigm. Departing load charges have been a point of contention between utilities and the



new CCAs, and Fenn sees voltage issues that intermittent renewables cause for the grid as another. Net metering can impose costs on non-participating customers, who are on average a poorer demographic than those who install domestic solar.

Fenn dislikes batteries for their expense, lack of scalability and pollution concerns, and therefore sees localized hydrogen production as an alternative model to reward decentralized green power. For the sake of acting on climate change, Fenn wants to remove demand from the grid altogether, and calls the current net metering setup 'transactional parasitism'. He expects a hydrogen-based CCA arrangement to be set up as early as a two-year timeframe.

Ways2H and Local Power may rely on Green Bonds – another instrument which Fenn claims to have invented, which has since risen to prominence – or on other financing means for the hydrogen projects.

## Vehicle to Grid

### Ofgem's consumer obsession sidelines V2G for 2 years

The early uptake of vehicle-to-grid (V2G) chargers in the UK will be set back by policies designed to flatten the daily price variations in electricity. If such policies remain in place, or propagate across Europe, R&D companies like Indra will have to shift their focus to either smart charging or a vehicle-to-home offering.

The policies in question stem from Ofgem's Targeted Charging Review (TCR), which will run for two years from April 2021. The consultation aimed to address the uncertainty in forward-looking charges for electricity on the country's national grid, as well as 'residual charges,' which are essentially non-consumer related sunk costs. Any changes implemented, according to Ofgem, were to be "designed to remove any unintended distortions and improve fairness in a practical and proportional way."

Ofgem's outcome landed on introducing a fixed charge for transmission and distribution for all consumers. Domestic customers will be allocated a single residual charge, while non-domestic customers will be charged based on their specific band of operation. The consultation has also introduced a 'partial reform' to the use of balancing mechanisms within local electricity supply.

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