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Public Comments: Input to CEC following Workshop on Research into Clean Energy Alternatives to Diesel Backup Generator Systems

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Comment Title: **Green Hydrogen Energy Storage using Wasted Resources**

Role in This Proceeding: Public

1. One opportunity for clean backup power is to use hydrogen fuel cell modules available from kW class to larger sizes.
2. The challenge is availability of green hydrogen. Conventional water electrolyzers need 50-70 kWh/kg of hydrogen - expensive to operate. The co-product oxygen utilization is a unique opportunity for CEC investment to improve overall economics of green hydrogen production.
3. Another pathway for green hydrogen is biomass gasification, followed by cost-effective purification to produce hydrogen.
4. California has potential of 100 million tons of biomass per year. Specifically, forestry waste is a fire safety hazard and has recently caused huge economic losses. Forest fires have also caused disruption in power supply and grid stability problems. This biomass waste can be converted to higher value hydrogen using excess renewables. Hydrogen storage can provide electricity for short-term as well as long-duration shortages.
5. The green hydrogen storage is beneficial for back-up power, base-load power as well as demand response.
6. Advanced hybrid energy storage cycles based on batteries, fuel cells, electrolyzers and waste biomass are emerging opportunities to meet multiple mandates by the California legislature.