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Docket Number:	17-MISC-01
Project Title:	California Offshore Renewable Energy
TN #:	243139
Document Title:	Mark Roest Comments on Advanced technologies for wind turbines can raise total potential
Description:	N/A
Filer:	System
Organization:	Mark Roest
Submitter Role:	Other Interested Person
Submission Date:	5/18/2022 6:04:30 PM
Docketed Date:	5/18/2022

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Submitted On: 5/18/2022
Docket Number: 17-MISC-01*

Advanced technologies for wind turbines can raise total potential

Utilization can extend to around 200 ft diameter, 2MW average output, floating gear-less wind turbines, 6 to 8 diameters apart laterally, 12 to 16 diameters apart in the direction of the wind. Use Bosch Captive Columns, US Patent 3,501,880 in basalt composite (impervious to UV and salt spray, comparable to carbon fiber yet lower in cost) for columns, beams and torsion members, including towers and blade spars. Use Asante' basalt-fiber-reinforced Ultra-High-Performance-Concrete (UHPC) for floats and tower fairings -- maybe blade shapes as well. It was developed by reverse-engineering the Roman concrete used for the Pantheon, aqueducts and wharves, which have lasted 2,000 years, so it will last for hundreds of years. It is more than 5 times stronger than ordinary concrete; it sets and cures in water; it typically sets to self-supporting in 15 to 25 minutes and cures in 48 to 56 hours.

The total system, including gearless generator, will cost much less than today's designs and materials, and will be easier to install, so it will be cost-effective to use more of them, closer together, than is typical for today's practice. Thus total field production can be multiples of what would be optimal for today's commercialized technology.