
ISTOCK.COM/F9PHOTOS

for California's "duck curve," discussed by Kramer.

As California and Germany have demonstrated, renewables can't replace grid-scale dispatchables, of which there are just two, hydrocarbons and nuclear. It appears that fusion will enter the market in the same time frame as molten-salt fission reactors, but it is unlikely to be cost competitive. Fission has an attractive safety record, and molten-salt reactors are both safer still and cheaper than existing reactors. A plausible future is fusion for the rich and fission for the rest. An especially good discussion of the inadequacy of both energy storage and renewables generally is available at https://jackdevanney.substack.com/p/nuclear-and-windsolar.

There are only four fundamental forces in nature, and their strengths differ dramatically. Those differences are manifest in the energy density and footprint of competing energy technologies. For example, the relative strength of nuclear forces allows hydrocarbon furnaces to be "surgically" replaced by nuclear reactors, leaving turbines and other infrastructure in place. Conversely, the extreme weakness of gravity makes storage based on raising and dropping weights unpromising.

Grid-scale renewable energy is a distraction, one that is delaying productive action on an important problem. Physics Today can play an important role here.

Arthur R. Williams
(artwconsult@gmail.com)
Princeton, Massachusetts

Correction

April 2022, page 8—Cornell University is incorrectly described as Richard Feynman's alma mater. He was a professor, but never a student, at Cornell. PT