Contribution ID: **9**   Type: **Impulse talk**

Sustainability, Lancium, and HEP

Monday 5 September 2022 17:20 (40 minutes)

Wind and solar are now the least expensive way to produce electricity at scale. Tens of gigawatts of new capacity are coming on-line every year. In Texas alone 6-7 GWs come on-line every year. There are two significant challenges to using them: they are intermittent, and they are often located far away from population centers and their electrical load. What is needed are industries that can control their load and locate near the energy sources. Computation is just such an industry. Computation, particularly computations that can be paused, can play a significant role in accelerating the deployment of renewable energy. By building controllable-load data centers in proximity to the source, we eliminate the line "congestion"bottleneck and the need to move the energy to population centers. Lancium is building controllable load data centers with direct access to gigawatts of power in west Texas. The first 500MW will be available in Q1 2023. In this talk I begin with some electrical grid basics, stability, primary frequency response, ancillary services, and the Texas CREZ line. I then show how computation can be used as a variable and controllable load to stabilize the grid, consuming energy when it is inexpensive, and dropping load and releasing electricity back to the grid (i.e. humans) when energy prices are high. Further, buying TWhs of otherwise unused energy causes renewable energy generation to become more profitable by providing a stable base load, spurring further renewable energy projects.

I conclude with a discussion of short- and long-term options available to the High Energy Physics community at Lancium Clean Campuses. Specifically, we will introduce our HTC PaaS that has already been demonstrated to work for CMS jobs, and introduce options for customer-designed and operated clean energy data centers.

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Yes, I will register before the Call for Abstracts deadline.

Author: GRIMSHAW, Andrew (Lancium Compute)

Presenter: GRIMSHAW, Andrew (Lancium Compute)

Session Classification: Impulse talk