Floating PV and the US Solar Market

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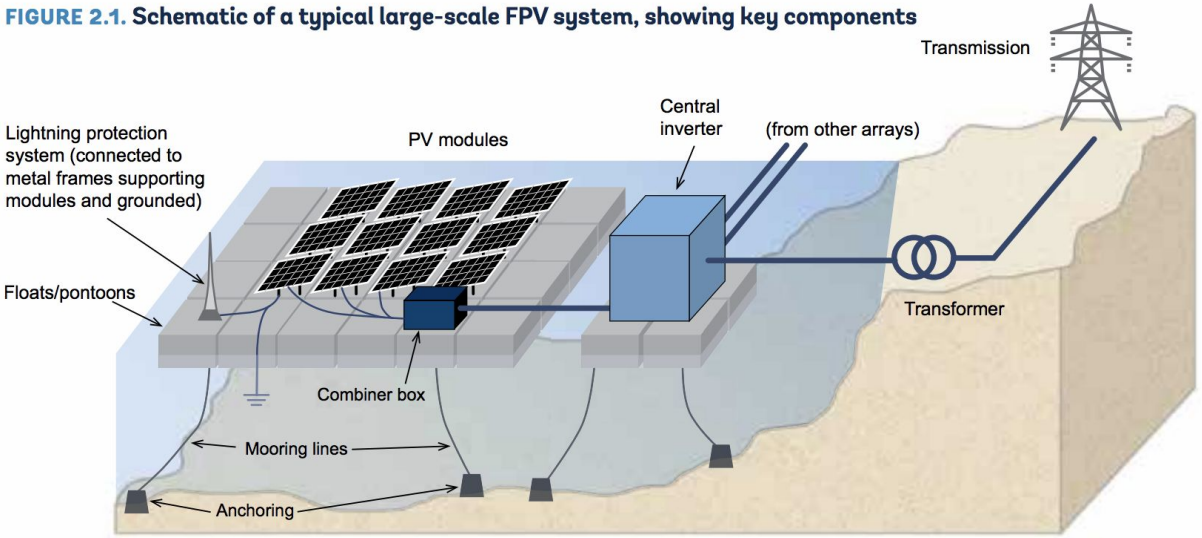
Agenda

- FPV Basics and US examples
- Past Massachusetts FPV Projects and the Obstacles Which Killed Them
- A New Project Idea
- Important Takeaways

FPV Basics

FIGURE 2.1. Schematic of a typical large-scale FPV system, showing key components



Source: SERIS.

A look at GPV and FPV projects

Similarities	Differences
1 - Strategic site selection for proximity to existing grid infrastructure 2 - Costs may be quite similar, but would take a different shape 3 - Projects can look attractive to property owners beyond just the financial benefit 4 - FPV should not feel like an entirely new venture	1 - FPV may not require as much/any property leasing fees, but would pose additional hurdles in regulation and permitting 2 - FPV is relatively new tech with few examples in our country, which could pose challenges for investors and insurers 3 - FPV could involve different electrical products which are more water/corrosion resistant. Would also have to involve new training for installers, O&M teams 4 - Massachusetts has an additional SMART incentive for FPV, a $0.03/KwH extra adder value 5 - Potential increases in energy yield and panel density

FPV projects in the US

Sayreville, NJ

-Created by SRE (Solar Renewable Energy), J&J solar and RETTEW

-4.4 Mw, Largest to date in US

-Pre-treatment drinking water storage pond

-Delivers power directly to water treatment equipment

Windsor, CA

-Created by Cielle et Tierre and town of Windsor (25yr PPA)

-1.78 Mw project

-Recycled water storage pond

-Projected to deliver 90% of energy needs for water treatment and pumps

Two Massachusetts Projects: What Happened?

Braintree Light and the Great Pond Reservoir

-Proposed in 2018/2019

-1 Mw project would cover 2.5 acres of water, as opposed to 5 acres of land

-Seems to have stalled because of chapter 91 and environmental impact

Solar Wolf Energy and the Quabbin Reservoir

-Proposed in 2018/2019

-1 Mw project

-Seems to have stalled because of poor proposal execution and unknown environmental impact

-SWE continuing to pursue

According to my correspondence with Daniel Padien, Massachusetts DEP Waterways Program Chief, “No FPV projects have been successfully permitted in Massachusetts…due to the difficulty in such projects demonstrating compliance with water-related statutes and regulations including, but not limited to

MGL Chapter 91, implemented under 310 CMR 9.00: limits projects on great ponds and other jurisdictional water bodies to uses which require direct access to the water. (Solar power generation does not require direct access to the water and therefore fails to meet the most basic criteria for a water dependent designation).

> The Massachusetts Protection Act (MGL Ch. 131, sec. 40) implemented under 310 CMR 10.00 by local Conservation Commissions strictly limits impacts to projects to protected wetland resource areas and the public benefits they provide.

A New Approach: FPV at Northfield Mountain Hydropower Pumped Reservoir

Advantages

-Proximity to grid connectivity

-Avoids complications which come with drinking water reservoirs

-Offers increased power supply resilience/reliability

Disadvantages

-Need to create interagency dialogue between regulators, energy authorities and water authorities

-Could pose challenges in anchor/mooring design

Important Takeaways

-Disadvantages of Getting into FPV

- -Lack of a robust track record / environmental impact
- -Additional challenges with design, investors and insurers
- -new and unfamiliar regulatory and permitting obstacles

-Advantages of getting into FPV

- -Extra adder value/Kw Hr in Massachusetts
- -Greater panel efficiency and density
- -Similar costs
- **-Being one of the first solar outfits in the US FPV game**