From the desk of

Michael J. Fournier

April 8, 2018

Via Email

Hon. Kathleen H. Burgess, Secretary to the NYS PSC Siting Board

> Re. Case No. 17-F-0602: Application of Franklin Solar, LLC, for a Certificate of Environmental Compatibility and Public Need Pursuant to Article 10 of the Public Service Law for Construction of a Solar Electric Generating Facility Located in the Town of Malone, Franklin County.

Dear Hon. Burgess,

On behalf of Friends Against Rural Mismanagement (FARM), I would like to submit this comment as a filed document to the DMM, responding to the PIP filed by Franklin Solar (Geronimo Energy) for case no. 17-F-0602, hereafter referred to as Geronimo.

As mentioned in previous correspondence, I head Friends Against Rural Mismanagement (FARM), being a group of individuals who live either within the boundaries of the project or within 5 miles of the Town of Malone.

On page 7 of its revised PIP, dated November 2017, Geronimo writes:

> *The Project will sit on approximately 950 acres of private land. With extensive experience developing solar projects in agricultural areas and in and adjacent to communities, Franklin Solar carefully considers the size, location, and environmental impact of the project, as well as local politics, landscapes, and land uses. Franklin Solar anticipates that the Project will have minimal impact on its neighbors, nearby communities, and surrounding landscapes. The proposed Project will be*

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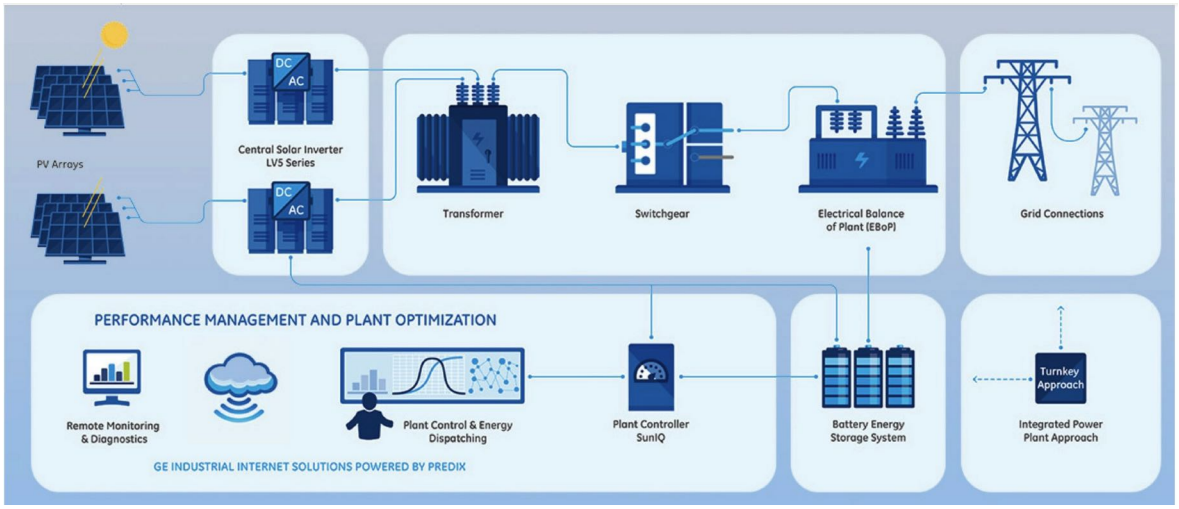
relatively low in height, estimated to be no more than 15 feet, will not emit air or water pollution, will have no odors, and will produce minimal noise.

Amid yards of self-congratulation and sanguine assurances, most of it dissected and discredited in our previous submissions, there is the vague promise: "The proposed Project . . . will produce minimal noise."

"Minimal noise." What's this supposed to mean? Let's take a closer look. Here's a schematic by GE of a solar project with all the latest, state-of-the-art whistles & bells:



Notice all that power conversion equipment in the top row: inverters (DC to AC), transformers, switchgears, electrical balance of plant, plus battery energy storage systems in row 2. All this apparatus makes noise. Complicated noise.

Consider the inverters. I am attaching a paper on inverter noise, "Harmonics & Noise in Photovoltaic (PV) Inverters and the Mitigation Strategies."[1] Start reading. Even a layman immediately realizes that inverters generate high frequency noise of various sorts and complexities, often with weird harmonics. In another article the German inverter manufacturer SMA Solar Technology describes its experience sleuthing out persistent inverter noise emissions, analyzing:

- structure-borne noise transfer paths
- transfer of airborne noise and its effects
- noise caused by vibrations

[1] Soonwook Hong & Michael Zuercher-Martinson, "Harmonics & Noise in Photovoltaic (PV) Inverters and the Mitigation Strategies," Solectria Renewables, n.d. One can find innumerable such papers on the Web.

- resonance frequency testing[2]

And that's not even considering the other machinery, including the transformers and ESS (Energy Storage Systems).

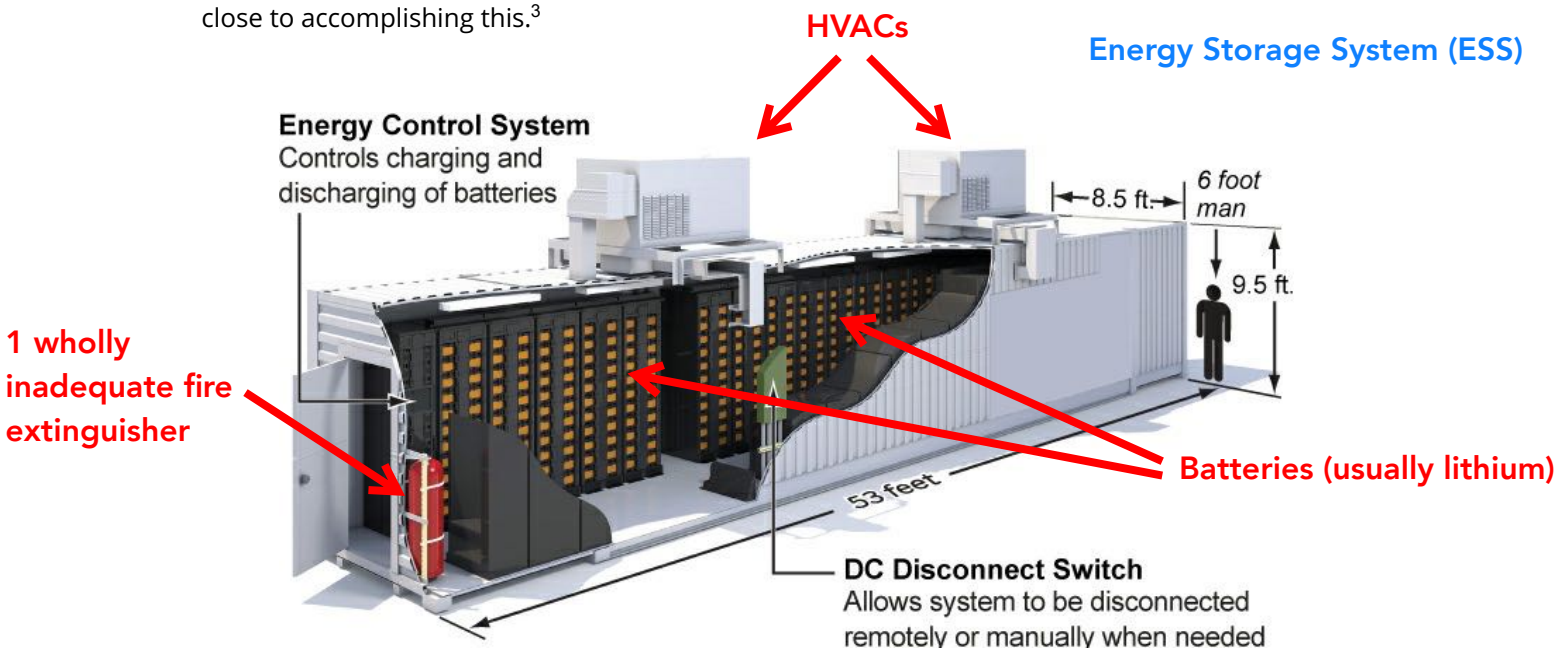
The take-home message being: It requires a lot of tinkering and fine tuning on a regular basis to dampen, shield, cancel, suppress, filter, or otherwise get rid of this (mostly) electrically-generated cacophony. When industrial-scale PV plants are built far from homes, nobody cares about the noise. The problem is, Geronimo wants to build its huge plant next to homes, including mine, and my neighbors and I don't wish to be guinea pigs for its intractable and elusive noise emissions.

Inverter Noise

A few words about ESS (Energy Storage Systems). Geronimo holds open the option of including ESS modules in its project (pp. 7-8 of the rev. PIP). So-called energy storage systems are large storage containers housing racks of (generally) lithium batteries (famous for being temperamentally combustible), with the container heated or cooled, depending on the season, by large HVACs (Heating, Ventilation, Air Conditioning). HVACs are notorious for their infrasound and low frequency noise. Noise engineers seem agreed they are the source of what's often called Sick Building Syndrome. The ESS, by the way, are used to smooth the flow of power to the grid. Wind and solar companies hope for the day when ESS can store large quantities of electricity and release it over days or weeks, but all this is far in the future, if ever. Right now, ESS are not even

[2] SMA Solar Technology, "Reducing Noise in PV Power Plants: Comprehensive Testing Points the Way to Significantly Reducing Noise from Central Inverters," attached.

close to accomplishing this.[3]



Take a look at this table showing inverter noise emissions in dBA from 4 inverters at a solar plant near West Linn in Clackamas County, Oregon. The noise level at 50 feet is well above ambient noise on a typical summer day. At greater distances (see rows 4 & 5), the noise emissions are still over ambient levels.[4]

Table 3. Inverter Noise Levels at Various Distances with Four Inverters at IM7

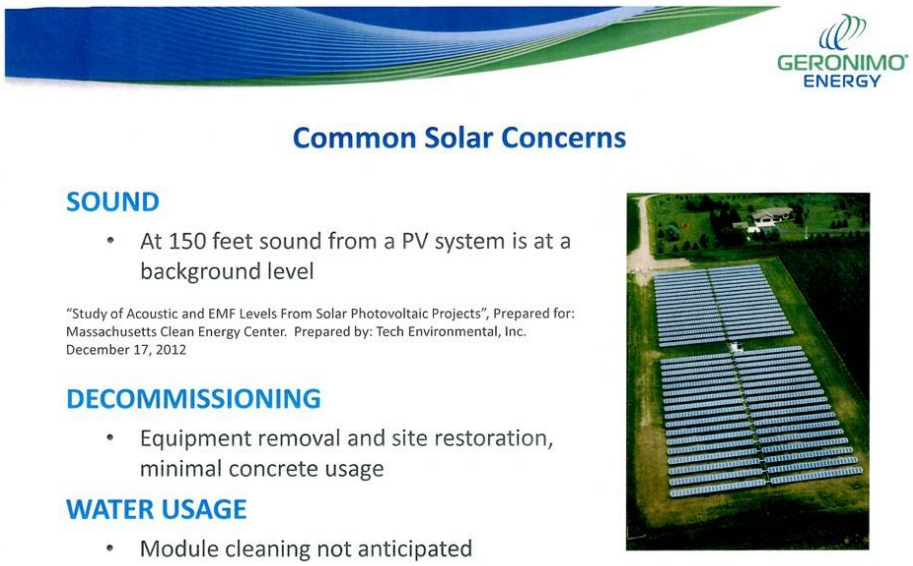
Location of Source (number of inverters)	Noise Level at 50 Feet	Receiver Location	Distance from Source to Receiver	Noise Level from Inverters at Receiver
	dBA		(feet)	Leq/dBA
I10 (3)	64	RM6	800	40
IM5 (3)	64		360	47
IM7 (4)	65		2040	33
I10 (3)	64	RM8	1280	36
IM5 (3)	64		1800	33
IM7 (4)	65		216	52
I10 (3)	64	R11	224	51
IM5 (3)	64		544	43
IM7 (4)	65		1336	36

"At 150 feet," declare the Geronimo salesmen, "sound from a PV system is at a background level," citing a 2012 report by Tech Environmental. (We have our doubts about Tech Environmental, whose wind turbine noise predictions for Wellfleet MA were thoroughly discredited some years

[3] See, for instance, Roger Andrews, "Is Large-Scale Energy Storage Dead?" www.Euanmearns.com (April 8, 2016).

[4] Damian Waco, "Electrical Noise Emissions from a Solar PV Inverter/Charger, www.CivicSolar.com (2012).

ago.[5]) Background level on Geronimo's 950 leased acres in Malone is typically 20-25 dBA.



Residents on Martha's Vineyard were given the same assurances that Geronimo is peddling to us:

> *Smith Hollow is a quiet neighborhood in Edgartown [MA] where the ambient sounds include distant traffic and breeze moving through the trees.*
>
> *But this past summer [2014], the installation of a new municipal solar array added a new sound to the mix: incessant humming that all but drowns out the other sounds at some Smith Hollow residences.*
>
> *As soon as the solar project went live, inverters, the part of the system that converts direct current from the sun to alternating current, began emitting noise on sunny days. Neighbors complained, and the town hired an expert to investigate.*
>
> *The inspection revealed that the sound coming from the inverters exceeds ambient sounds in all eight octaves by a significant margin, according to a report discussed by the town selectmen Monday.*
>
> *"The sound from the inverters is clearly in violation of the Mass. DEP Noise Policy, and also constitutes a noise nuisance, in my opinion, based on the sound level measurements reported here," wrote Lawrence G. Copley, a sound engineer, in the noise assessment he presented to the town.*

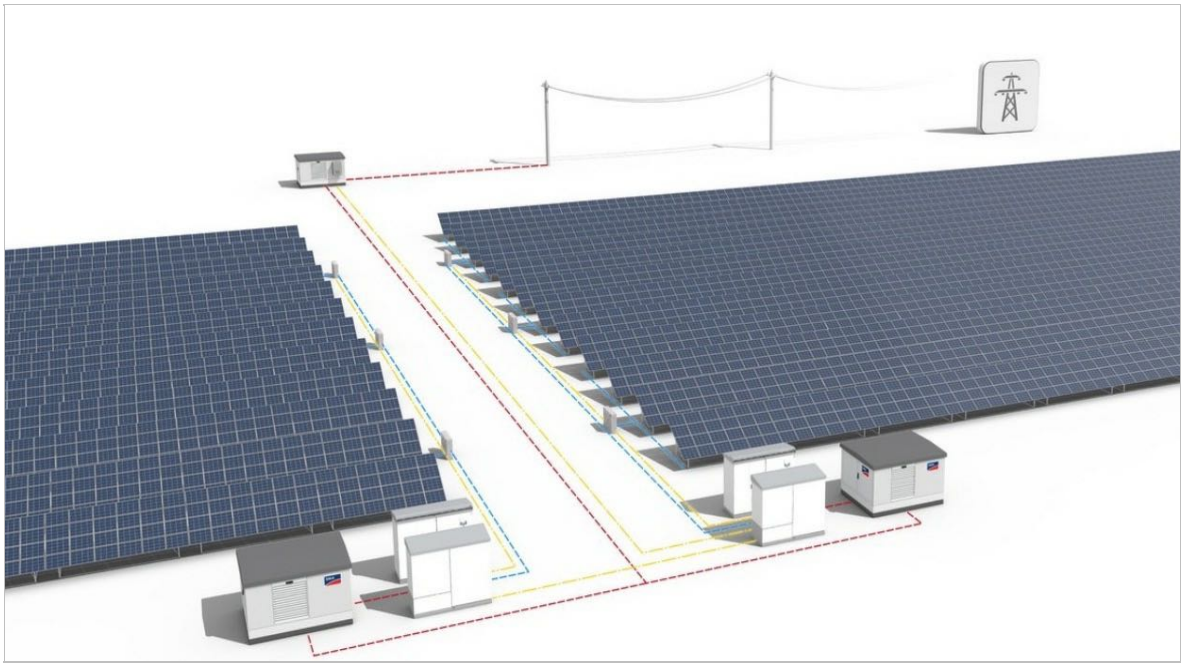
[5] Calvin Luther Martin, "Why Wellfleet Will Get Wind Turbine Syndrome," www.WindTurbineSyndrome.com (Nov 7, 2010).

CVEC [Cape & Vineyard Electric Cooperative] says they did not anticipate a noise issue. . . . "I feel a little bit embarrassed for not knowing that this was going to be a problem because they are classically not very noisy but we clearly have a noisy inverter or more than one that we need to remedy," said Liz Argo, special projects coordinator at CVEC. "So I just wanted to let you know that there are situations where this is not a problem."

But resident James Cimeno said Monday that he and others did raise sound as a possible concern, but were assured that it would not be a problem. "Right from the start I suggested that they move them because of noise," he said. "We were told they weren't going to make any noise."[6]

Liz Argo and CVEC are the same gang who told Falmouth MA residents that industrial wind turbines would be noiseless, despite repeated warnings from town residents and outside experts that turbines make unbearable infrasonic noise—unbearable for migraineurs. After years of town hearings and court cases, and a number of people being forced to leave their homes, the courts have shut down the turbines for this very reason.

Those of us living cheek-by-jowl with Geronimo's solar project, with its inverters, transformers, switchgears, electrical balance machinery, and possibly HVAC cooled/heated electric storage systems, don't want to go through what «les miserables» on Martha's Vineyard experienced.



[6] Olivia Hull, "Solar Panels Create Noise Nuisance in Edgartown," Vineyard Gazette (Martha's Vineyard), Sept 24, 2014.

Finally, consider this from Ontario, Canada in 2011:

> *There wasn't an open chair at the Simcoe Solar Farm Awareness Project (SSFAP) symposium held at the Coldwater community centre on Saturday. Approximately 200 people packed into the upper hall to hear the SSFAP presentation on the importance of preserving agricultural land from large-scale solar farms and issues surrounding the construction of these projects.*
>
> *There are 10 large-scale solar panel projects proposed by Recurrent Energy, a San Francisco-based power producer, in Simcoe County, located in Oro-Medonte, Severn, Springwater and Tay townships.*

> *Frank Coyle, retired civil engineer and former general manager for Simcoe Hydro [Ontario, Canada], spoke about his experience building municipal substations for the production of electricity. He said the proposed transformers on these solar panel farms are basically like a big substation. The concept is the same, they are moving electrons down the wire to produce energy, and with that process comes noise. "There's an awful hum to it," he said. "If you put that hum in a rural territory, you will hear it for miles. It becomes the most annoying sound that you will ever experience. . . . It's a constant hum that you will always hear."*[7]

Sincerely,

Michael J. Fournier

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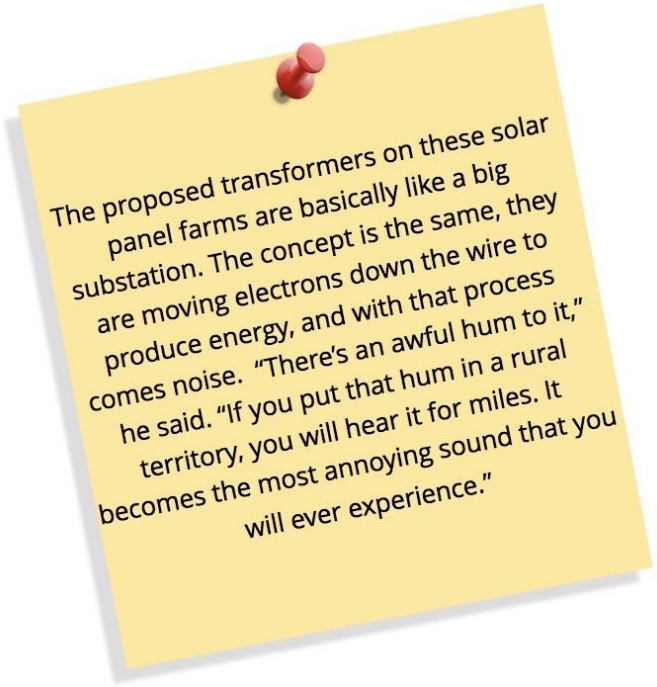
President of FARM and party to case no. 17-F-0602

Calvin Luther Martin, PhD
Member of FARM and party to case no. 17-F-0602



[7] "Solar Farm Forum Gets Heated," Orillia Packet & Times (Ontario), Jan 31, 2011.