Sunnova's Missing PV Systems

Abstract: **According to Department of Energy (DOE) data and SEC Filings, Sunnova appears to have taken Investment Tax Credits (ITCs) on approximately $4.5 Billion of rooftop solar systems that do not exist in its SEC Filings.**

This activity Inflates the ITCs that Sunnova monetizes through (i) partnership flip transactions, (ii) Sunnova's Earnings and (iii) the assets it reports in SEC Filings.

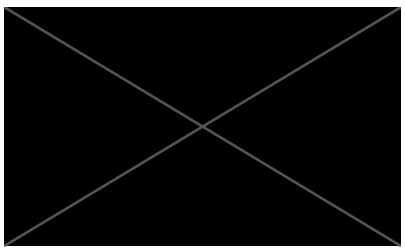
This is an operative document for several US Government whistleblower programs

Supplemental Whistleblower Submission Relating to the Following IRS Submissions:

2021-001504 and others

Submitted:

May 25, 2023



Executive Summary

I reviewed Sunnova's 1Q23 10-Q and noticed that the Company's system wide revenue was flat year over year even after its deployed megawatts had increased by ~20%. This did not make any sense to us. In response to questions on this point, Sunnova attributed the discrepancy to bad weather in California in early 2023, but as I demonstrate later, that variance is unsupported by a statistical review of solar variance over two decades in California.

Sunnova Revenue Growth*				
Revenue Category		1Q23	1Q22	YoY Growth (%)
PPA revenue	$	21,746	21,185	3%
Lease revenue		31,343	21,780	44%
Inventory sales revenue		59,914	—	
Solar renewable energy certificate revenue		7,791	6,244	25%
Cash sales revenue		16,819	11,348	48%
Loan revenue		7,143	3,376	112%
Other revenue		16,940	1,789	847%
Total	$	161,696	65,722	146%

* Source Sunnova 1Q23 10-Q SEC Filing

Cumulative MW deployed*			
As of	1Q23	1Q22	YoY Growth (%)
Lease	455.2	338.6	26%
PPA	626.2	523.7	16%
Loan	650.2	366.2	44%
Other	32.2	9.7	70%
Total cumulative MW deployed	1,763.80	1,238.20	30%

* Source: Sunnova 1Q23 Earnings Slides

For 1Q23vs 1Q2022, Sunnova's leased systems increased by ~120MW or 35% and the system count for leases increased from 50,060 to 71,789 (43% increase) while PPA systems increased by 100MW or ~20% and system count increased from 70,422 to 82,771 (18% increase), however, only the revenue from leased systems increased and PPA revenue was flat. This would imply that there was some sort of major production disruption in the PPA systems as 13k new systems added no additional revenue year over year.

I have reached out to Sunnova's Investor Relations Department and our queries have not been returned.

Why is Sunnova's PPA Revenue so Low?

I decided to look at the Company's solar system count to see if I could understand this anomaly. As I looked into the lack of production, I compared the statewide productivity in California (home to the Company's largest concentration of systems) and noticed that the system count seemed too high for what appears to be low productivity in that state.

I then reviewed the US Department of Energy Information Administration (EIA) database, which includes the location by state, production and number of systems for Sunnova. This data shows that there were material differences between the number of Sunnova systems reported by the EIA and the number that was reported by Sunnova to their investors, with the numbers reported to the EIA being massively higher. I can come up with only two logical reasons for this discrepancy:

1) The Government data are incorrect or have some shortcomings.
2) Sunnova is over reporting system count and may be improperly selling tax credits where the systems are not yet placed into service (or do not exist).

I spoke to Eric Harrison, an economist at EIA and he was unable to explain the difference. He did not have an explanation as to why there could be a difference. The reporting rules are very clear, these systems must be reported to EIA on a timely basis within 2 months. There is no acceptable lag beyond that period where the EIA is processing data prior to reporting. **Regardless of Sunnova's explanation, this seems like a major control failure for the company.**

I recently reviewed Sunnova's 10Q and the accompanying investor information presentation dated April 26, 2023. This report includes the productivity of Sunnova rooftop solar arrays that are subject to PPAs and leases. From that review, I are able to statistically conclude that the number of systems reported by Sunnova are either overstated or that they have made catastrophic errors in their installation processes (i.e., systematically mis-installed solar systems that are unlikely to ever generate meaningful amounts of energy). In further reviewing the Government databases I continued to find discrepancies between the reported number of customers or systems and the actual system detailed on the EIA database. If correct, it would be further evidence that many of the systems Sunnova reports to the EIA simply do not exist. This could be evidence of a very substantial fraud that could be consistent with other renewable energy frauds. In fact, the largest renewable energy failure today involved a company called DC Solar, which perpetrated a Ponzi Scheme that involved reselling tax equity multiple times where the count of actual solar systems was a fraction of the solar systems on which it sold tax credits.

I started investigating the number and productivity of Sunnova's arrays after observing a discrepancy between the increase in the number of systems from Q1 2022 to Q1 2023 and from Q4 2022 to Q1 2023, and the amount of revenue generated by these systems. Despite the rising electricity prices and increasing new PPA rates, the total revenue was almost flat year over year. In an email (Exhibit #1), Sunnova's CFO, Rob Lane, attributed this decrease to the rainy weather in California. While I acknowledge that solar panels produce less energy during cloudy weather, I believe that the underproduction of energy by Sunnova cannot be solely explained by the rainy 1Q 2023 in California, and I can demonstrate this with a high level of statistical confidence. This also led us to the EIA database that materially differs from Sunnova's system count.

In examining Sunnova's under production, I reviewed two US Government databases and applied what I believe is an objective statistical analysis to the data available from each of these sources to arrive at our conclusion that Sunnova may have reported systems to the EIA that simply do not appear to exist. While I cannot be 100% certain, I have not been able to even credibly speculate on another reason for the production shortfall. However, I believe and respect the informational advantage of the legal/regulatory enforcement bodies can figure out this problem in short order.

GFS Data Sources	
NREL	The National Renewable Energy Lab (NREL) maintains the National Solar Radiation Database (NSRDB), a collection of meteorological data and solar radiation measurements that accurately represent regional solar radiation climates for the United States and a growing subset of international locations. It enables users to see the amount of solar energy at a given time for a location and predict potential future availability based on past conditions.
EIA	EIA is a government agency responsible for collecting, analyzing, and disseminating energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment.

To Summarize Our Findings

I reviewed NREL data and looked at the mean and the standard deviation of the irradiation of the sun at various California locations. Sunnova has said in an e mail that the shortcoming was due to the storms in California. While I do not have the exact geographical distribution of Sunnova's systems, I can look at various spots on a north south line in California and see the probability that the shortfall was caused by storms and bad luck with the location of the systems and then look at the mean and the standard deviation of the irradiation for each location. Based on the standard deviation from the mean I can determine the probability that the shortfall was the result of chance. I will say right up front that the weather was bad in California, and I would expect to see a drop off in production, but knowing the standard deviation from the mean will let us determine the likelihood of that being a random event.

I have examined EIA data which has reported system count and production for Sunnova and other owners of rooftop solar. This is four years of ACTUAL data collecting during Sunnova's time as a public company. The comparison is to other solar installers. I have selected the largest, Sunrun. I can get head-to-head data comparisons. I do not consider the geographical distribution of the systems within California because the data are just not that robust. However, one can see the growth of the system bases and the change in production. These are actual figures and are current until the end of February 2023.

I utilized the EIA data to compare Sunnova's reported system count with the overall system count. As mentioned in the paragraph just above, I identified system count differences. Correspondingly, I observed that the number of systems reported by Sunnova in their Investor Presentation was lower than the EIA data. EIA form EIA-861M instructions specify that the report defines the "Behind the Meter" as follows:

Behind the Meter (B): Entities that install, own, and/or operate a system (usually photovoltaic), and sell, under a long-term power purchase agreement (PPA) or lease, all the production from the system to the homeowner or business with which there is a net metering agreement.

The only customer count that is relevant to this matter are the Lease and PPA customers.

The EIA customer count is considerably lower than the Investor reported system count. Therefore, the information presented in Sunnova's Investor Presentation contradicts the EIA data, and their reported EIA system count is substantially inflated.

Sunnova					
YE	2018	2019	2020	2021	2022
SEC Reports	54,195	67,545	86,844	113,504	145,761
EIA System Count	57,142	77,182	105,021	119,000	255,263
Delta	(2,947)	(9,637)	(18,177)	(5,496)	(109,502)
Delta (%)	-5%	-14%	-21%	-5%	-75%

While this may seem like a provocative statement, the history of solar companies is filled with spectacular failures and frauds such as DC Solar, which was a billion-dollar Ponzi scheme. SunEdison, generally considered to be another Ponzi scheme. Remarkably, the very same lawyers, bankers and appraisers who

(according to the Bankruptcy Trustee) knowingly guided the DC Solar Ponzi Scheme, continue to provide those very services to Sunnova and the rest of the residential solar industry.

After reviewing the data, I suspect that Sunnova may have created fictitious solar systems or sold the identical systems to multiple Partnership flips, similar to what DC Solar did. This occurred during a time when the company was struggling with higher interest rates, which reduced their funding from warehouse lines. I speculate that they may have resorted to this tactic to alleviate their funding issues, as they also inflated the fair market value (FMV) of their actual solar systems.

It's important to note that I cannot understand how Sunnova reported to EIA adding 136k lease/PPA systems for the year (40k systems in CA in September 2022 alone), when it only added ~32k lease / PPAs for the entire year per its SEC Filings. This difference represents approximately $4.5 billion (to Sunnova's valuation numbers) of systems that were reported to the government, but not to investors.

However, if these PPA assets (that I believe may not exist) were reported to the tax equity partner, it is highly likely that the Tax Equity investor would have funded their capital call with minimal due diligence (i.e., tax equity investors do not check rooftops to confirm installations). When the systems are funded with a Tax Equity partner, then typically the Sponsor Equity could go to the warehouse facility and on to an ABS. There is essentially NO independent check on the existence of the systems. I believe that reviewing data viewed in a number of different ways, one cannot exclude this as a possibility. In fact, I cannot come up with any other reasonable explanation. To be clear, Sunnova had the need, the skill and the opportunity to make systems up from whole cloth. Furthermore, it is possible Sunrun simply put the systems into the Tax partnership and did not put them into the ABS. This would have masked the cash shortfalls that would have occurred in the ABS if the assets pledged did not exist. The tax partnership does not create a corresponding cash drain in that most of the cash comes from the Treasury in the form of tax credits and partnership losses (through accelerated depreciation) for the Tax Equity partner.

One needs only view Exhibit 2 to see how easy it would be to deceive the bank arranging the tax equity transaction. All they have to do is sign their name and the money shows up. Funding problem solved.

Statement of the Problem

The table below shows that while Sunnova increased their SEC installed base, they did not have a corresponding increase in the power produced. In fact, the Company's overall PPA revenue was basically flat despite Sunnova's addition of ~20% more MW of generation capacity year over year and a substantially higher starting PPA price for new systems.

MW			
	1Q22	1Q23	% increase
PPA	524	626	19.6%
Lease	339	455	34.4%
Revenue			
	1Q22	1Q23	% increase
PPA	21,185	21,745	2.6%
Lease	21,780	31,343	43.9%

All data from Sunnova's 1Q23 10-Q

According to its SEC filings, only 31% of Sunnova's systems are located in California, so there will only be a small portion of the deviation in PPA revenue that could be attributed to bad weather in California. Given the inconsistency between the SEC and EIA data, no other inferences can be reasonably drawn.

I did perform statistical analysis on California solar radiation, which I have included below and helps to illustrate the lack of credibility in Sunnova's assertions that their generation decline was attributable to bad weather in California in 1Q 2023.

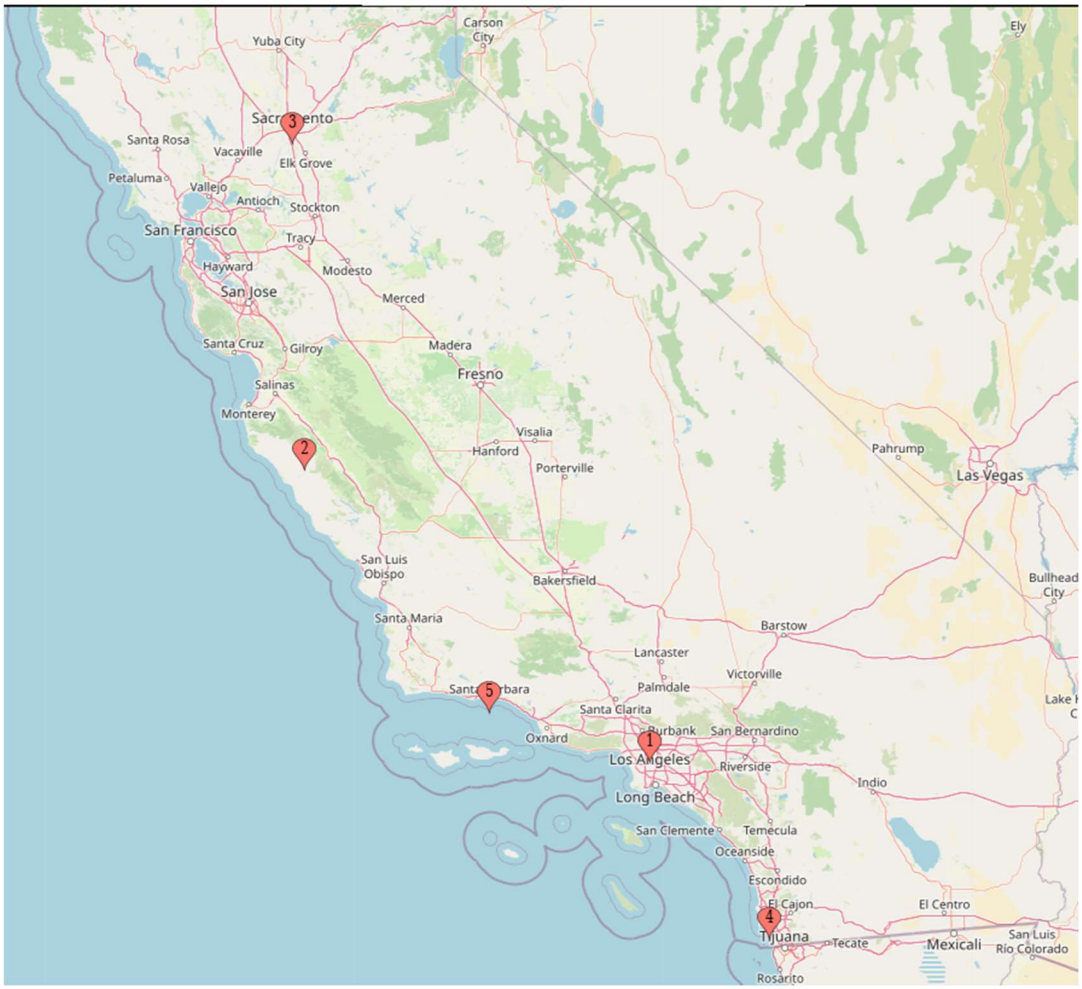
Details of Our Methodology

Our first test was to see if it was likely that Sunnova's systems underperformed by a reasonable margin and therefore could be attributed to chance.

I used publicly available information released periodically by the National Renewable Energy Labs (NREL) to calculate the statistical likelihood that Sunnova's Q1 2023 statements are correct.

I first set out to better understand the possible variability of the productive potential of the solar installations. Even on days that are not sunny, solar panels do produce some power. The productive capacity is very close to linear to the intensity of the sun or the irradiation factor of the sun. More irradiation, more power. I relied on NREL data downloaded from their web site to better understand irradiation variability.

I chose 5 major geographically dispersed cities in California.



1. Los Angeles
2. Monterey
3. Sacramento
4. San Diego
5. Santa Barbara

NREL has not yet released irradiation data for Q1 2023. Instead, I used a statistical distribution based on over two decades of NREL data to estimate the probability of the solar panels producing the amount of energy reported by Sunnova. Given that I do not have the exact locations of the Sunnova PV Systems, I settled on a sampling of locations and calculated the probability that the reported figured could be correct in ANY of the assumed locations.

City	GHI (20 YR Mean) *	St. Dev	St. Dev (%)
Los Angeles	365,569	24,335	7%
Monterey	326,052	22,476	7%
Sacramento	293,308	27,111	9%
San Diego	370,068	21,321	6%
Santa Barbara	357,214	20,575	6%

* Global Horizontal Irradience

All data from National Renewable Energy National Solar Radiation Database

The above information is drawn directly from NREL's database, and I calculated mean and standard deviations from those data. After consulting with NREL's own scientists, I believe that the GHI measure along with the multi-decade statistical analysis is the best way to calculate solar irradiation variability for any spot in the country. The lower the variance from the mean, the lower the statistical probability that a reported variance from the mean would be correct.

I simply calculate the probability of a given variance being due to random chance. I will say right up front that the rain was bad in California in Q1, but how bad? Furthermore, what can I conclude regarding the likelihood of this being a chance happenstance? Historical databases give us the information to determine historical patterns. Statistics lets us calculate those probabilities, based on certain assumptions.

However, Sunnova's portfolio of systems is geographically dispersed with only 31% being in California.

There are three ways to look at the deviation.

1) Assume that ALL of Sunnova's systems are in selected areas of California. This is obviously a silly assumption, but it does show that no matter what I do, I cannot explain away this deviation to chance.
2) Adjust the deviation to reflect the decrease in power just attributable to California. I are able to do this by accessing the USEIS database. This gives close to real time data on the productivity of Sunnova's systems as well as other installers. I can compare Sunnova to other installers relating to JUST their California portfolio.
3) Conclude that the data are obviously incorrect, and that any analysis would suffer from garbage in garbage out. The other conclusion is that with the SEC reported distribution that it would be impossible for this shortfall in PPA revenue for Sunnova's portfolio to be the result of reduced power generation attributable to 1Q23 California rain.

While Sunnova's solar systems are distributed around California and around the country, I have selected a variety of locations around California and estimated the likelihood of that area resulting in the stipulated shortfall.

Please keep in mind that Sunnova has reported the following system distribution of installed systems. This is according to their April 26, 2023, First Quarter 2023 Earnings Presentation. This is available on the Sunnova web site.

Below is the mix of Sunnova's product mix per its SEC Reports:

	12/31 21	3/31/2022	6/30/2022	9/30/2022	12/31/2022	3/31/2023
Lease	46,099	50,060	55,018	60,007	66,362	71,789
PPA	67,405	70,422	73,126	75,976	79,399	82,771
Loan	37,655	45,137	53,683	65,225	79,493	97,179
Other	41,465	42,230	43,131	45,379	54,105	57,550
Total	192,624	207,849	224,958	246,587	279,359	309,289

Below is the state distribution (again per SEC Reports) of the solar arrays that Sunnova has in its portfolio.

Deployment by State	2017 Total	2018 Total	2019 Total	2020 Total	2021 Total	2022 Total	Feb-23	% by State
CA	1,874	2,595	4,199	5,750	43,470	22,966	5,512	31%
NJ	5,327	3,761	2,951	3,403	3,874	5,838	1,501	10%
CT	397	2,102	2,749	3,196	3,773	3,868	1,387	6%
MA	567	1,244	1,444	2,284	2,941	4,188	1,245	5%
MD	290	497	840	1,094	1,123	1,015	373	2%
NY	855	1,447	1,372	1,078	1,482	2,356	650	3%
PA	2	431	945	1,341	1,705	3,553	1,505	3%
PR	2,752	1,649	1,338	5,850	10,365	18,144	5,006	16%
RI	7	148	476	496	493	887	392	1%
TX	174	309	566	1,734	3,548	8,289	3,077	6%
CO	-	-	-	1	6,132	1,585	466	3%
NV	-	-	-	482	2,323	1,084	294	2%
FL	-	-	-	455	3,956	3,990	3,829	4%
All others	608	403	1,459	1,351	2,005	8,972	4,693	7%
Total deployed by QTR:	12,853	14,586	18,339	28,515	87,190	86,735	29,930	
Cumulative Deployment	12,853	27,439	45,778	74,293	161,483	248,218	278,148	

*This information covers most of Sunnova's systems. However, prior to Sunnova going public the company had a small number of systems and the distribution of those systems has not been made public.

EIA Data: Another Way to Look at This Matter

Our Second way of looking at the matter is to look at actual data aggregated and reported by the EIA

The advantage of the EIA data is that it is based on feeds FERC receives directly from companies like Sunnova. This gives actual production data that is reported to FERC in accordance with their interconnection agreements with the grid. This data reports the number and productivity of the installed base, by state, for different installers. This is a database that has actual production of various installers across all states reported on a monthly basis. This is as close to real time data as possible. The 1Q 2023 data are actual data, not statistical projections. In contrast, Sunnova's publicly reported SEC numbers do not tie to the EIA data, which obviously is a problem on a number of levels.

In this case I calculated the mean and standard deviation for projects scattered around the State of California. While I have the mean and variance of the productive capacity, I also have the actual production of the facility for the 1Q 2023. While this will show that the productivity for 2023 was low, it was nowhere near the results reported by Sunnova.

The data also shows an enormous blip in September 2022 when it appears that Sunnova added over 41k systems in CA in a single month. This resulted in a near doubling of Sunnova's rooftop solar count in CA. This is highly anomalous given that on average during the period, the monthly increase in systems was between 1% and 4%. This could be a data or reporting error or it could be something much more nefarious where Sunnova needed cash and created a large number of phantom systems to monetize tax equity before actually having those systems built or at COD. To confirm the situation, additional investigation is required as the data is not definitive, but given previous bad actions of companies like DC Solar, this is essentially what those acts of malfeasance looked like.

Sunnova CA System Growth*

Month	Count	Monthly Change	Account Growth (MoM)
1/1/2022	34,818		
2/1/2022	35,687	869	2%
3/1/2022	36,654	967	3%
4/1/2022	37,644	990	3%
5/1/2022	38,385	741	2%
6/1/2022	39,308	923	2%
7/1/2022	40,156	848	2%
8/1/2022	41,609	1,453	4%
9/1/2022	82,970	41,361	99%
10/1/2022	84,800	1,830	2%
11/1/2022	85,934	1,134	1%
12/1/2022	87,683	1,749	2%
1/1/2023	88,879	1,196	1%
2/1/2023	91,834	2,955	3%

* Compiled from the EIA database.

The table below details the productivity of the Sunnova and Sunrun systems throughout California. What is clear is that there was a material drop off for Sunnova's systems productivity vs the drop-off for Sunrun's systems. Both portfolios of systems were down, Sunrun down 9% YOY for February while Sunnova's portfolio was down 30%. I cannot come up with any other explanation other than some of the Sunnova systems may not exist.

I have calculated that the standard deviation of power production in California is approximately 7%. So, the February Sunrun data are about 9% or 1.29 standard deviations below 2022. This makes sense given the heavy rains in California.

Sunnova's productivity is down 30%, which is 4.29 standard deviations, or 3 standard deviations greater than Sunrun's production. A 3 standard deviation difference has about a 99.7% chance of not being random or a 3 in 1,000 chance of being caused by the weather. The fact that Sunrun did not suffer anywhere near the same decline further decreases that chance of this event being random. While statistics deal in probabilities, this is as close to a certainty as possible.

Sunnova vs Sunrun CA 2022 vs 2023 YTD

	Sunnova			Sunrun		
2022	CA Sys Count	KWh / Sys	YoY Delta	CA Sys Count	KWh / Sys	YoY Delta
Jan	34,818	487		216,728	430	
Feb	35,687	616		222,409	540	
Mar	36,654	816		225,254	738	
Apr	37,644	948		229,489	851	
May	38,385	1,060		233,065	959	
Jun	39,308	1,051		236,743	925	
Jul	40,156	1,055		240,319	914	
Aug	41,609	953		245,275	822	
Sep	82,970	605		248,767	678	
Oct	84,800	523		252,805	720	
Nov	85,934	433		256,753	458	
Dec	87,683	305		262,880	326	
2023						
Jan	88,879	354	73%	266,575	371	86%
Feb	91,834	432	70%	269,054	489	91%

Sunnova more than doubled its systems from ~35k to ~92k from Jan 2022 to Feb 2023, but YoY KWh / Sys declined by 30%.

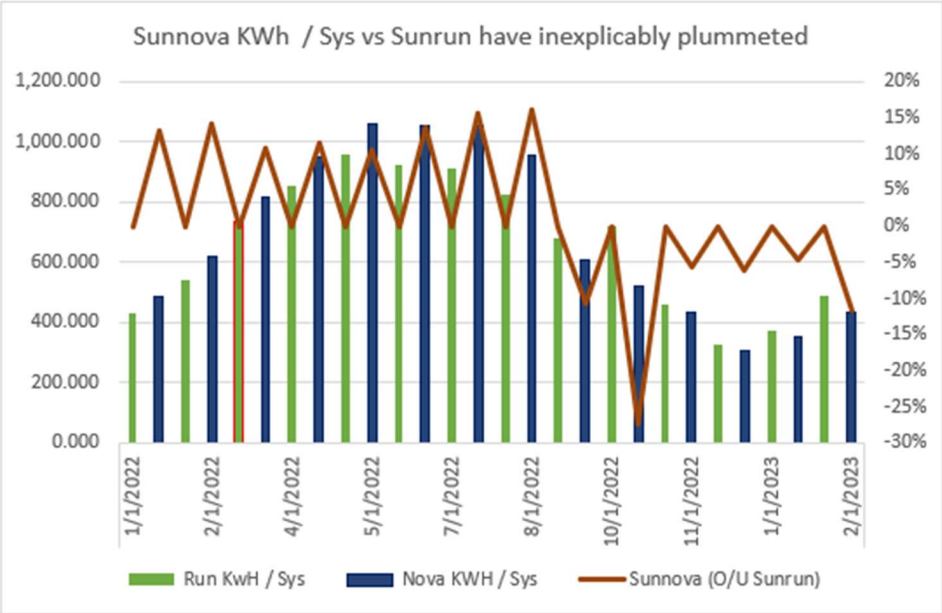
Compare to Sunrun's CA systems which declined ~10-15% for same period YoY.

Below is a graph I made that highlights two relevant metrics:

On the left axis is the KwH per rooftop system generated by Sunnova's portfolio versus Sunrun's portfolio.

On the right axis, I looked at the relative productivity of the two portfolios.

I see that until September of 2022, Sunnova regularly outperformed Sunrun's productivity, but beginning in September 2022, Sunnova's productivity relative to Sunrun declined precipitously. The data seems to indicate that Sunnova added a large quantity of rooftop systems but didn't get anywhere near the historic level of production of out of those systems. In fact, they appear to have gotten little or no production from those systems.



What Inference Can be Draw from These Data?

The Final Question is Why is Sunnova's Data Not Close to US Government Databases?

This is an interesting question and there is no reason I can come up with that involves Sunnova wanting their systems to underperform. So, I can discount intentional underproduction.

The second possibility is that there are wholesale errors in the US Government databases. While I are certain that any database has some errors, the magnitude of the errors here would have to render the databases useless. With a reasonably high degree of certainty, I discount this possibility. Furthermore, the data for the EIA database is sourced from Sunnova.

The only other possibility that I can come up with is that the number of Kilowatts or Megawatts reported as installed by Sunnova is simply overstated. I have asked several other industry experts for an alternative explanation and there was no other explanation.

Why and How Would Sunnova Overstate the Aggregate Size of the Facilities?

The answer to the question lies in the partnership flip transaction process where tax equity investors make a notional funding commitment and then fund their obligations over time upon receipt of funding requests from the partnership at the behest of the sponsor (I.e., Sunnova). The process does not include any material due diligence by the tax equity partner to confirm the systems represented as built are in fact built and / or sold (a single time) to its partnership. In the past, solar energy companies have exploited this lack of due diligence to the great detriment of tax equity investors. This was at the heart of the DC Solar matter.

The process consists of the installer aggregating the periodic installations into an excel spreadsheet and sending that spreadsheet over to the tax equity provider. The tax equity investors simply multiply the aggregate megawatts installed by the agreed upon appraisal per watt valuation and multiply that product by the agreed upon price for the tax equity share of the tax partnership. This is done 100% based on a representation from the installer, typically without third party confirmation of the facts represented within the spreadsheet.

The cash from the tax equity partner is then sent to the partnership, frequently within a day or day (i.e., insufficient time to confirm the data in the funding request).

The sponsor equity from that transaction can be pledged to secure a warehouse facility and the appropriate advance rate is applied to the FMV and the funds sent to the installer. Again, based on the representation of the installer.

What is missing from the process? Third party validation.

If the final link of pledging the Sponsor Equity to a warehouse and then to the ABS is completed, then the problems will likely show up in the future when the ABS securities underperform after issuance. Why would they underperform? Because if the represented systems are not actually there, then the deal will not have the modeled cash flows. If the installer is too greedy, then the ABS will simply collapse. If they

are not too greedy, then the collateral will simply be less than anticipated by the Rating Agency and investors and the ABS performs, but poorly.

What is the auditing process when systems are securitized?

When systems are securitized, the underwriter typically engages an accounting firm to audit certain aspects of the transaction's data tape of systems against a list of agreed upon procedures ("Agreed Upon Procedures" or "AUP"). Attached as Exhibit 3 hereto is a list of the AUP for a recent transaction where E&Y was engaged to perform diligence. Upon reflection, I do not believe that E&Y is validating the details or existence of Sunnova's systems beyond a small handful of systems in connection with ABS securitizations. As with many things in accounting, auditors often rely on representations that the systems exist. It may be possible to pick up on the PV system not existing but given the totally lax accounting with all other aspects of this industry, that seems to be a stretch. I see nothing to prevent Sunnova from creating a partnership flip transaction and selling the Tax Equity to multiple Tax Equity Investors. The Tax Equity investors I have spoken to do little to no due diligence. If this is the case, the E&Y opinion could be used with multiple tax equity partners or the tax equity partner would not even get an opinion.

Why is Sunnova doing this now?

Given that system underperformance seems to have exploded in 2022, the obvious question is WHY? Sunnova, as well as other installers, have a business model that relies on low interest rates to increase their FMVs and cheap funding to keep the advance rate high. The raw interest rates have been increasing and their spread to Treasuries has also increased. This increase in interest rates means that they are raising less money from their securitizations. This has been the subject of other work and whistleblower submissions done by us, but suffice to say, the financial laws of gravity do not seem to apply to these companies, Sunnova being prominent in that space. Sunnova considered its appropriate cost of capital to be 4% up until the end of 2022. This is interesting because they viewed their cost of capital to be less than the US Government. In Q4 2022 they raised their assumed discount rate to 6%. This is at a time when their senior collateralized ABS debt was trading at 7.5% and their unsecured corporate debt was trading at much higher yields.

It also appears that the system creation problem in California happened when long interest rates were at the recent peak. This would be when the financial stress on the company was the highest. Simply ***put, Sunnova needed the money.***

What is the Operational Flow of the Array Regarding TE approval

Once a tax equity partnership is established, the installer informs the Tax Equity partner when systems are ready to be placed into service and the Tax Equity partner then funds into the partnership. The form of a funding request is attached as Exhibit #2. While the TE partner has access to all of this information relating to the system, it is likely not requested. The tax equity partner simply funds its obligation to the partnership flip, when the partnership requests funding.

As a practical matter it would be easy to double count systems in that the cost of updating a UCC filing and the cost of filling out the paperwork is large relative to the average system size and would be a material reduction in the investor's return. In the aggregate, full due diligence of a partnership could be a multi-million-dollar expense. I strongly suspect that Sunnova could be assigning legitimate systems to one Partnership flip and selling the tax equity multiple times. This is a problem with low value consumer assets and the high cost of UCC liens.

Furthermore, when a tax Equity Partner has done several transactions with the same counterparty, the due diligence is likely to be less than for the first time. Issuers know which investors will and will not ask questions.

While there is an auditable trail, as a practical matter it is extremely difficult to audit and may just be accepted by the auditor. Furthermore, the auditor must have a reason to ask the question and to do that they must suspect that something is wrong. Essentially the accuracy of the systems regarding the actual existence is somewhat left to the installer and the installer's representations.

This trail can be audited and verified by simply having the Tax Partner or the warehouse bank ask for the Permission to Operate ("PTO") letter and comparing that to the funding request. Furthermore, I strongly suspect that that request is rarely, if ever, made and the accuracy of the funding request is solely based on the warranty of the Installer. The same person/organization that is getting the money for installing the system.

Conclusion

I end where I began. Sunnova is a public company that appears to lack the controls needed to provide consistent system counts to its investors and its energy regulators. Moreover, the Company's attempts to blame the gap on the weather in California do not withstand basic reviews of the actual weather in California during the period in question. I have basically argued that, even under the most unrealistically favorable circumstances I could imagine, there is statistically a 99.7% chance of this not being random.

For some reason, the gap between Sunnova's system count as reported to the SEC and the EIA has exploded recently and that gap should be extremely concerning to the SEC, the EIA, FERC, Sunnova's accountants and the IRS.

While I do not know why the gap exists, I think it could be caused by one of several things:

1. Sunnova's inability to report straight numbers to two regulators
2. Lack of corporate controls
3. Fraud
    a. Selling tax credits multiple times
    b. Selling systems prior to COD

Here I believe I have uncovered a situation where systems seem to be created from whole cloth in a manner similar to DC Solar. I think this is something that can be investigated quickly. There are several professional connections between Sunnova and DC Solar, namely both companies employed the same critical professional vendors, including:

1) Same bank – US Bank
2) Same law Firm – Nixon Peabody
3) Same Appraiser - Novogradac

Each of these entities has been previously accused of facilitating fraud in the nature of what could be occurring here and thus increases our view of the prudence of investigating this matter further.

Exhibit 1

FW: PPA

So you don't get paid cause they generate less electrcty>

From: Robert Lane <robert.lane@sunnova.com>
Sent: Thursday, April 27, 2023 3:12 PM
To: [redacted]
Subject: RE: PPA

CA was very poor performance. Lots of clouds and rain. Very heavy PPA market. Markets that were stronger were lease markets, but those are flat per customer.

From: [redacted]
Sent: Thursday, April 27, 2023 2:10 PM
To: Robert Lane <robert.lane@sunnova.com>
Subject: PPA

[EXTERNAL EMAIL]

Had a question on PPA revenue

So PPA revs flat YoY basically, but AVG PPA customers +18%
Implies price per AVG customer -26% YoY...

What am I missing??

SCHEDULE 1 to CONTRIBUTION AGREEMENT

No.	Description of Project	Transferred Customer Agreements	Name of Host Customer	Effective Date of Transfer
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.	**[Additional entries to be inserted as required]**			

Exhibit 3

Typical Agreed Upon Procedures for an ABS Securitization

For its securitization transaction called Sunnova Sol Issuer LLC 2023-1, the underwriter engaged E&Y to review a sample of 300 systems out of thousands of systems. The scope of E&Y's review is listed below:

"For the purpose of the procedure described in this report, the Originator, on behalf of the Depositor, provided us with:

a. Electronic data files:

i. Labeled "3.1.7 SNVA 2023-1_AUP_Data_Tape_v2.xlsx" and the corresponding record layout and decode information, as applicable (the "Sample Data File"), that the Originator, on behalf of the Depositor, indicated contains information as of 31 December 2022 (the "Cut-Off Date") relating to 300 photovoltaic systems installed on residential properties and the related customer agreements (the "Sample Solar Assets"),

b. Imaged copies of:

i. The customer lease agreement, power purchase agreement, prepaid benefits agreement, amendment and/or change order thereto or other related documents (collectively and as applicable, the "Agreement"),

ii. The work order, amendment and/or change order thereto (collectively and as applicable, the "Work Order") and

iii. Certain printed screen shots from the Originator's servicing systems (the "Servicing System Screen Shots," together with the Agreement and Work Order, the "Source Documents"), as applicable, that the Originator, on behalf of the Depositor, indicated relate to each Sample Solar Asset,

c. A servicing system extraction file labeled "3.1.2.2 Supplemental Sample Query_12.31.2022_v1.xlsx" and the corresponding record layout and decode information, as applicable (the "Supplemental Sample Query,"), that the Originator, on behalf of the Depositor, indicated contains information as of the Cut-Off Date relating to certain Sample Solar Assets,

d. Certain servicing system extraction files labeled "3.1.3.4 Incentives Sample Query_12.31.2022_v2.xlsx" and the corresponding record layout and decode information, as applicable (collectively, the "Incentives Sample Query," together with the Source Documents and Supplemental Sample Query, the "Sources") that the Originator, on behalf of the Depositor, indicated contain information as of the Cut-Off Date relating to certain Sample Solar Assets,

e. The list of relevant characteristics (the "Sample Characteristics") on the Sample Data File, which is shown on Exhibit 1 to Attachment A, and

f. Instructions, assumptions and methodologies, which are described in Attachment A.

The Originator, on behalf of the Depositor, indicated that the Sample Solar Assets on the Sample Data File were selected by ATLAS SP, on behalf of the Depositor. The Originator or ATLAS SP, on behalf of the Depositor, did not inform us as to the basis for how ATLAS SP, on behalf of the Depositor, determined the number of Sample Solar Assets or the methodology used to select the Sample Solar Assets. Additionally,

the Originator, on behalf of the Depositor, indicated that the Sample Solar Assets are expected to be representative of the Solar Assets."