



Case study: Example of PV Solar Field in NOVO PRO[®] Expert Program

This case study compares simulation results from NOVO PRO[®] with the plant actual performance for five solar plants. These plants have their actual operating data available to the general public on-line, courtesy of the plant owners.

Solar Plant	Commissioning	Capacity (MWac)	AC to DC Ratio	Tracking	Solar Panel Module
Northwest Jacksonville Solar	2017	7.06	80.0%*	North-South rows ⁺⁺	Hanwha Q.Plus L-G4.2 330
Old Plank Road Solar	2017	3	80.0%*	Fixed tilt	Hanwha Q.Plus L-G4.2 330**
Mount Signal Solar 1	2014	206	77.5%	North-South rows	FS-6420***
Solar Star 1	2014	314	78.9%	North-South rows	LG360Q1C-A5***
Solar Star 2	2014	266	76.0%	North-South rows	LG360Q1C-A5***

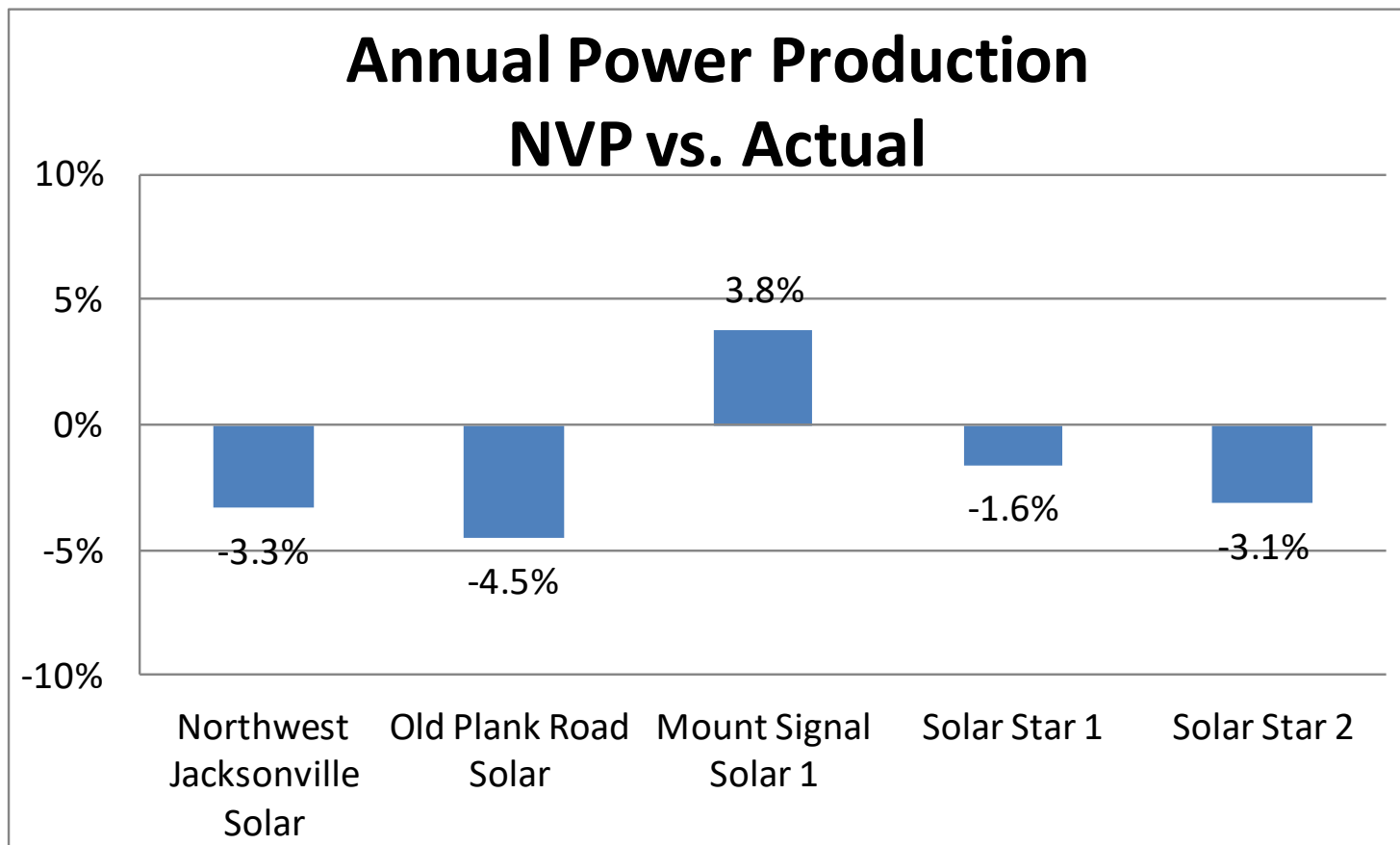
* Assumed according to the common practice in the industry

** Assumed to be same as Jacksonville Solar as both of them are belong to JEA

***Assumed based on the information available on the web

⁺⁺The tracking axis is aligned parallel to longitude lines.

Executive Summary



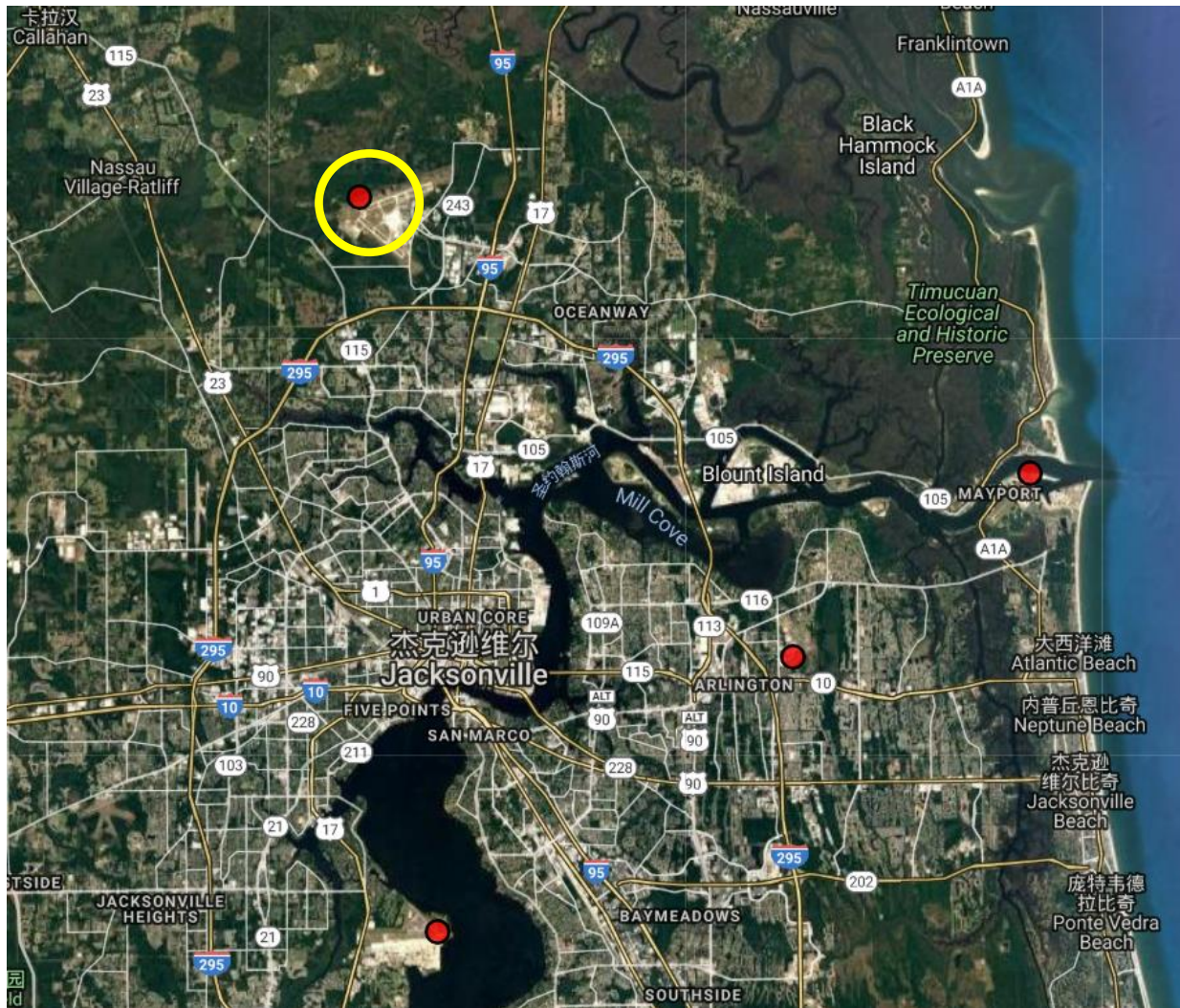
With maximum 6 inputs for each model, annual yields predicted by NOVO PRO[®] match with the real plants average annual outputs within $\pm 5\%$ for all the five cases.

Inputs to NOVO PRO® Models



NOVO PRO® Inputs	Northwest Jacksonville Solar	Old Plank Road Solar	Mount Signal Solar 1	Solar Star 1	Solar Star 2
Select Irradiance Data from NVP database	✓	✓	✓	✓	✓
Select Ambient Data from NVP database	✓	✓	✓	✓	✓
Input Inverter rated AC power output	✓	✓	✓	✓	✓
Input Desired Inverter AC rating / Nominal panels DC rating	✓	✓	✓	✓	✓
Select Row Tilt / Tracking	✓		✓	✓	✓
Select PV Panel Model from NVP Library / Set User-defined Panel	✓	✓	✓	✓	✓

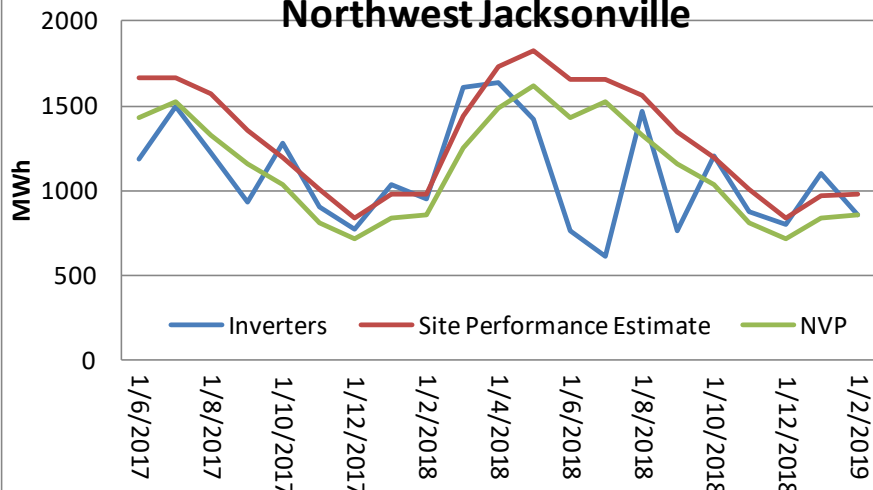
Northwest Jacksonville Solar plant



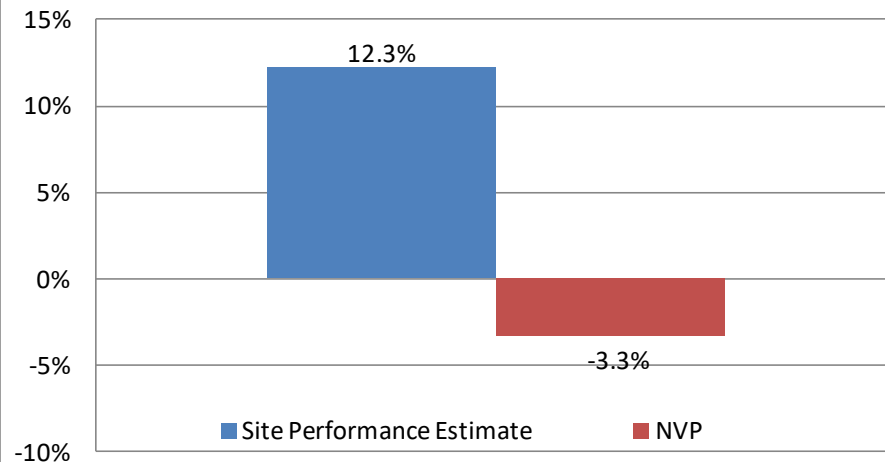
Yellow circle: JACKSONVILLE INTL ARPT, FL (# 722060) and the plant.



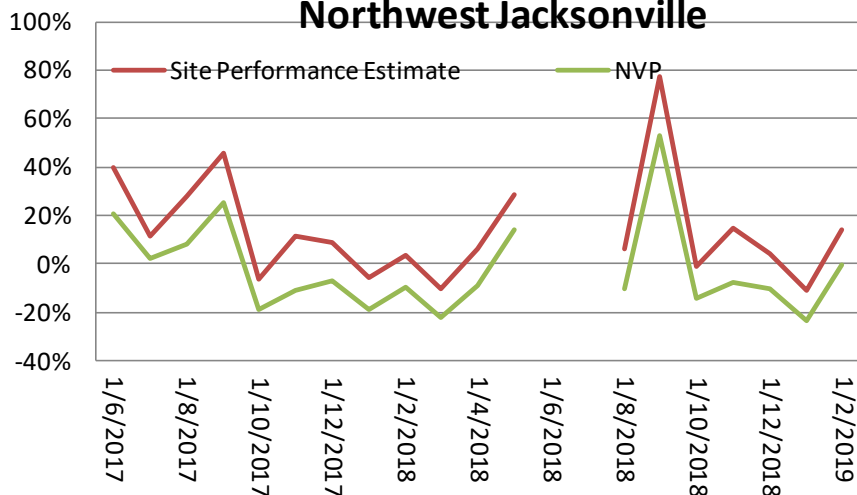
Monthly Power Production (MWh) Northwest Jacksonville



2018 Power Production vs. Actual Northwest Jacksonville

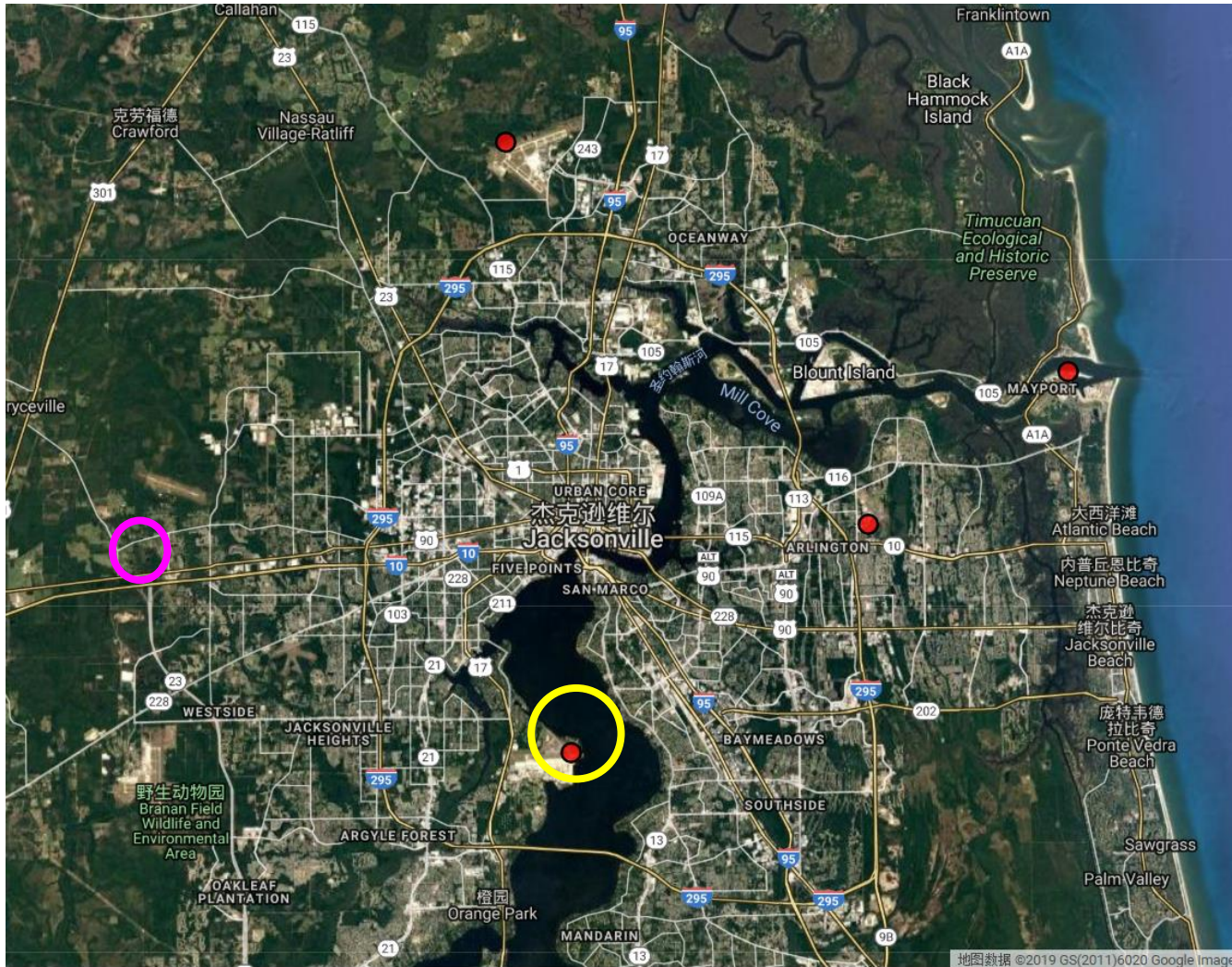


Monthly Deviation of Predicted Power Northwest Jacksonville



➤ NOVO PRO[®] is able to predict the plant annual yield nicely, better than the onsite prediction program which might have used the onsite weather data.

Old Plank Road Solar Plant

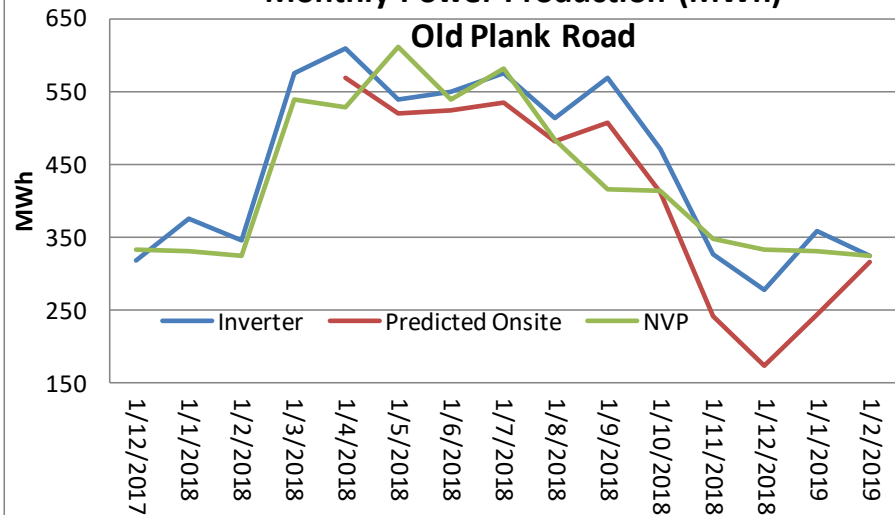


Purple circle: the plant; yellow circle: JACKSONVILLE NAS, FL (# 722065)



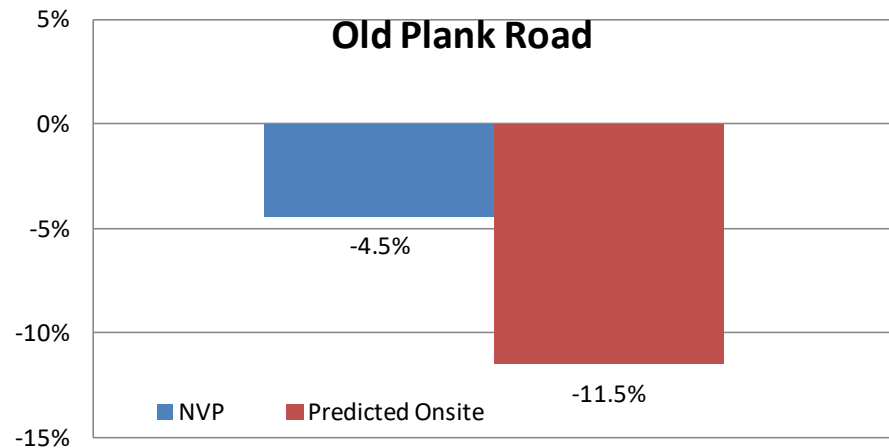
Monthly Power Production (MWh)

Old Plank Road



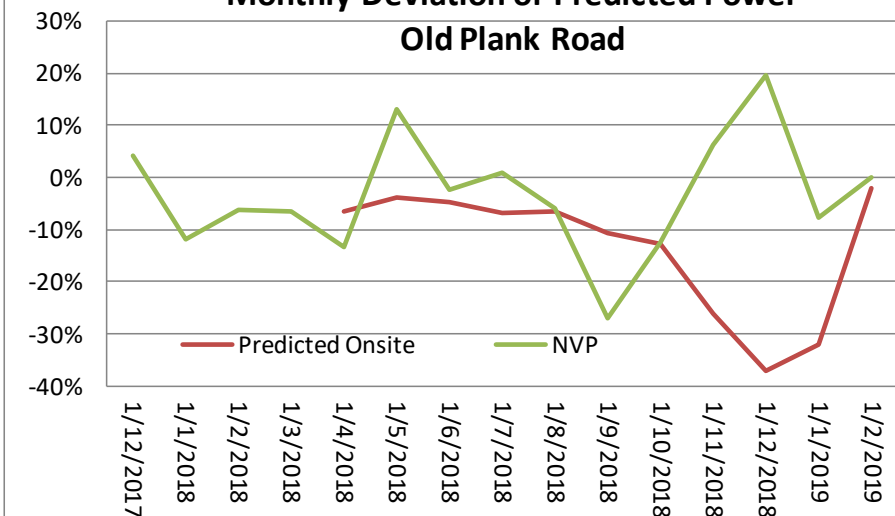
2018 Power Production vs. Actual

Old Plank Road



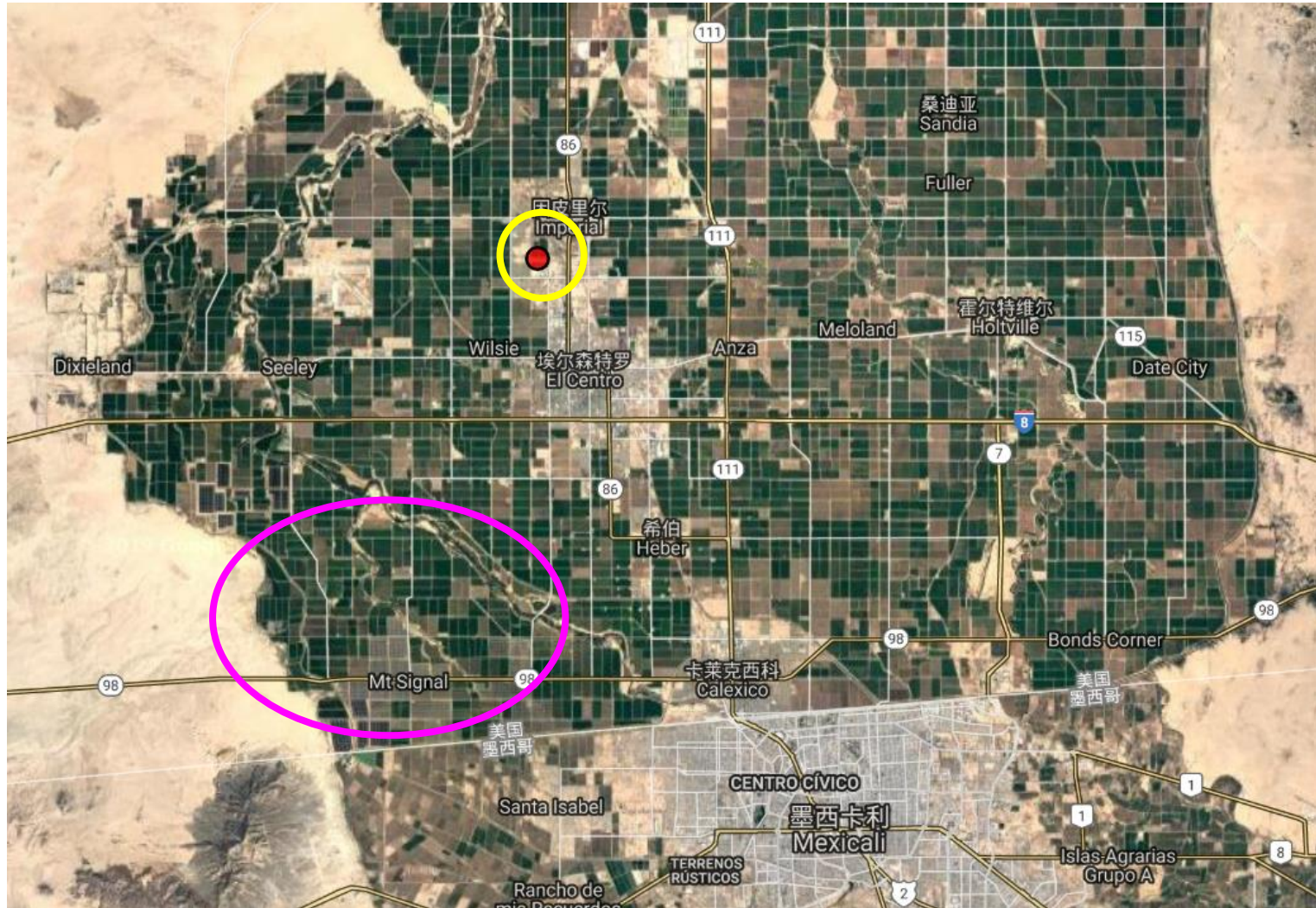
Monthly Deviation of Predicted Power

Old Plank Road



➤ Similar to Jacksonville plant, NOVO PRO[®] is able to predict the plant annual yield nicely, better than the onsite prediction program which might have used the onsite weather data.

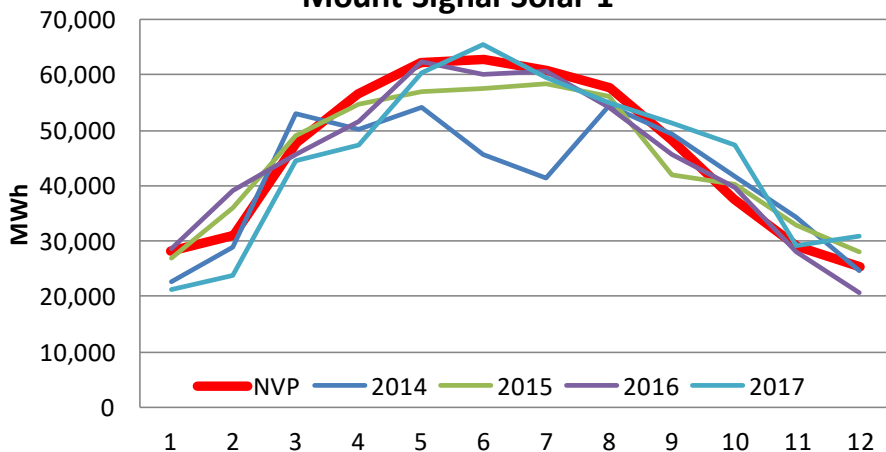
Mount Signal Solar 1



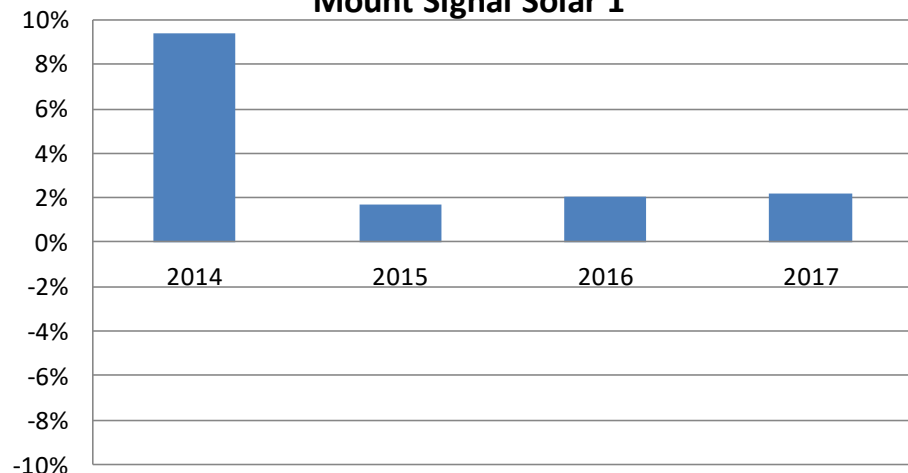
Purple circle: the plant; yellow circle: yellow circle: IMPERIAL, CA (# 747185)



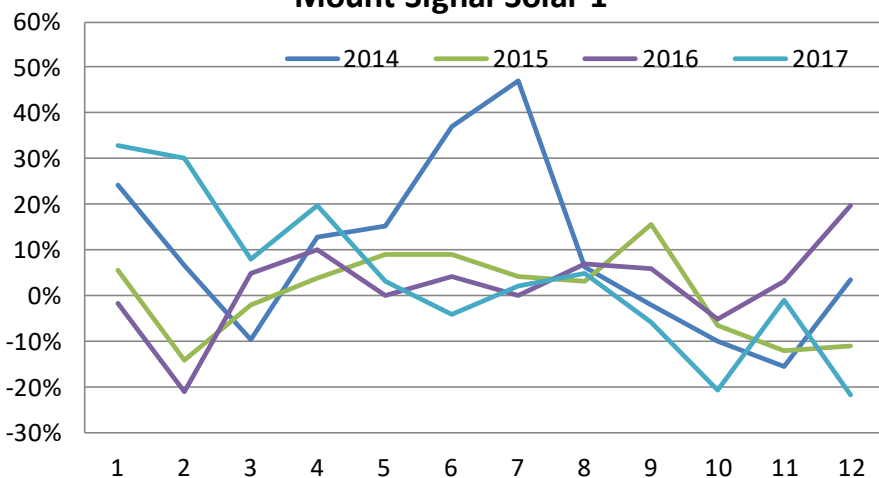
Monthly Power Production Mount Signal Solar 1



Yearly Power Production Deviation Mount Signal Solar 1

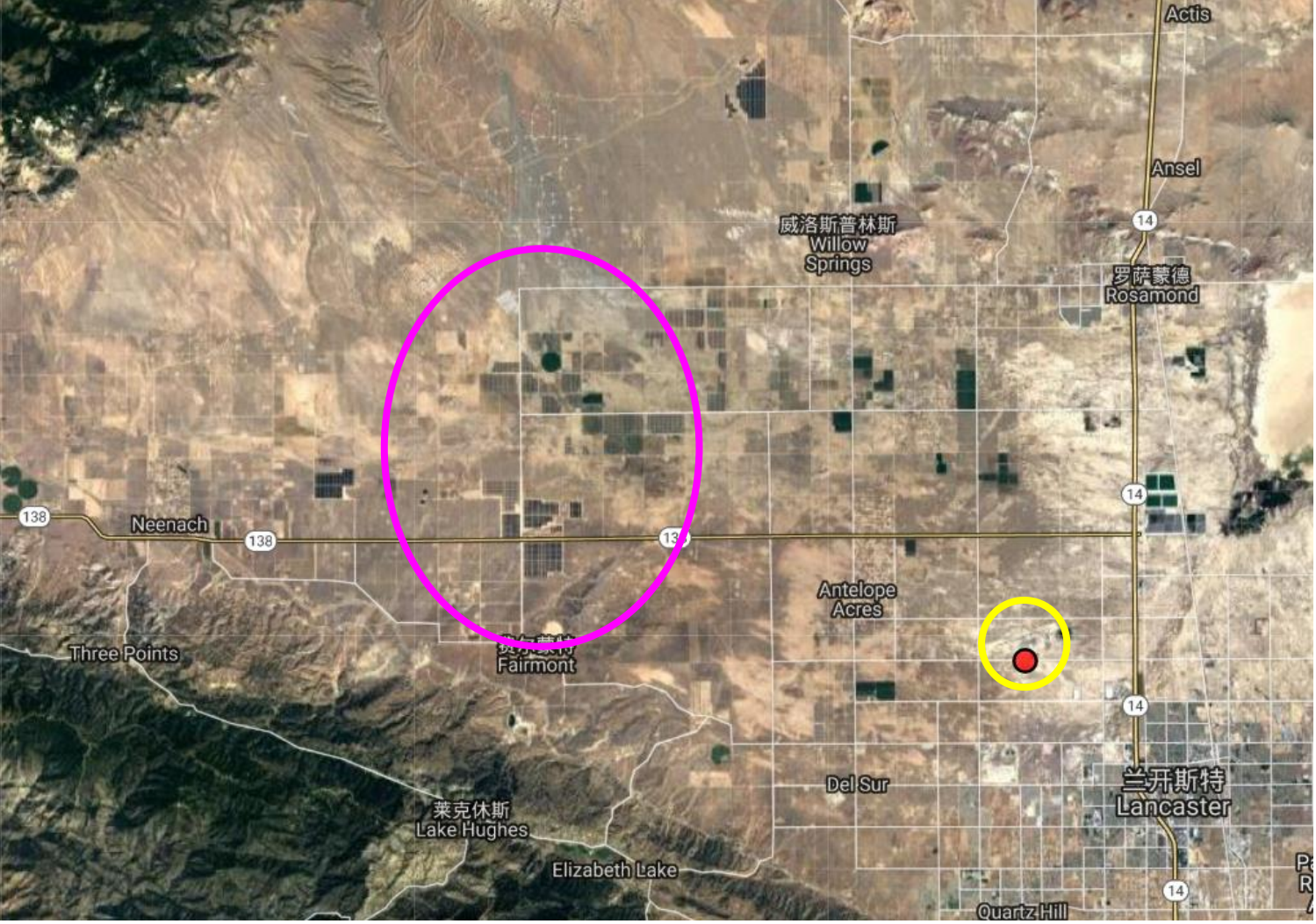


Monthly Power Production Deviation Mount Signal Solar 1



- Results from NOVO PRO[®] match with real plant outputs very well.
- The biggest deviation in 2014 could be due to plant instability at its commissioning stage.

Solar Star Plants

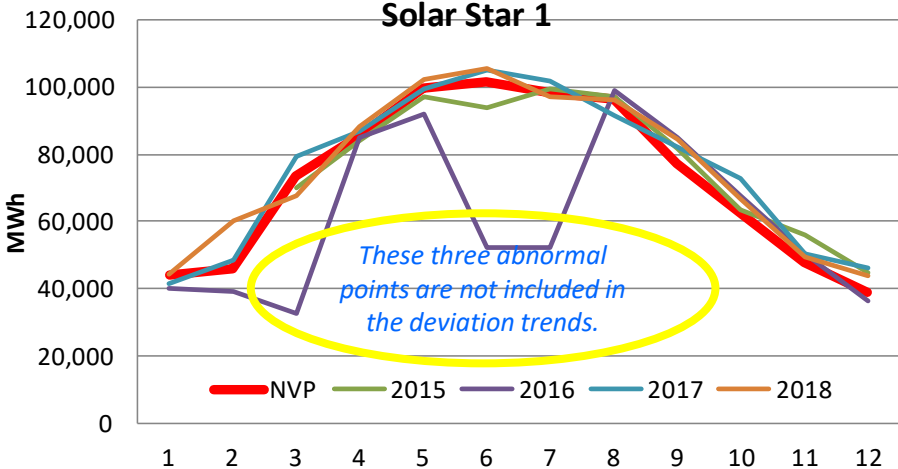


Purple circle: the plants; yellow circle: LANCASTER GEN WM FOX FIELD, CA (# 723816)



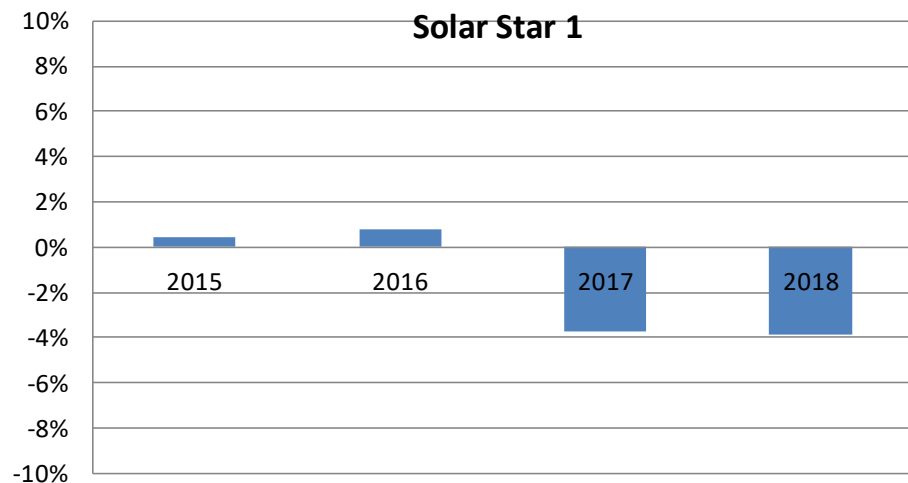
Monthly Power Production

Solar Star 1



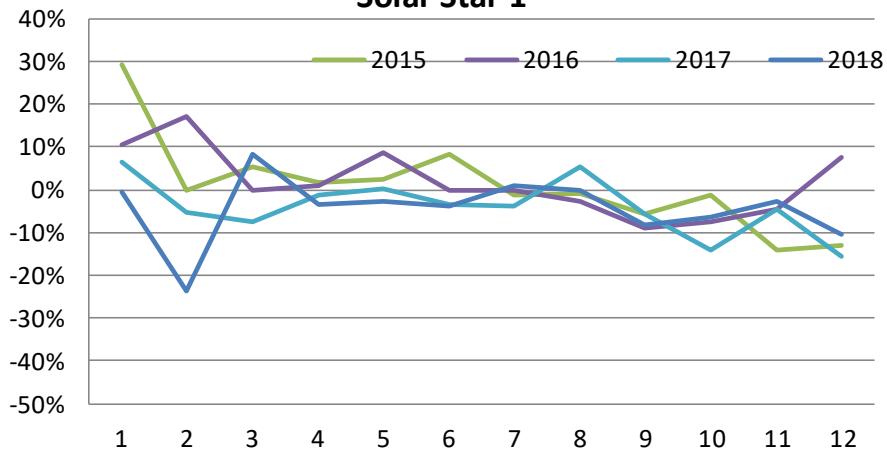
Yearly Power Production Deviation

Solar Star 1



Monthly Power Production Deviation

Solar Star 1

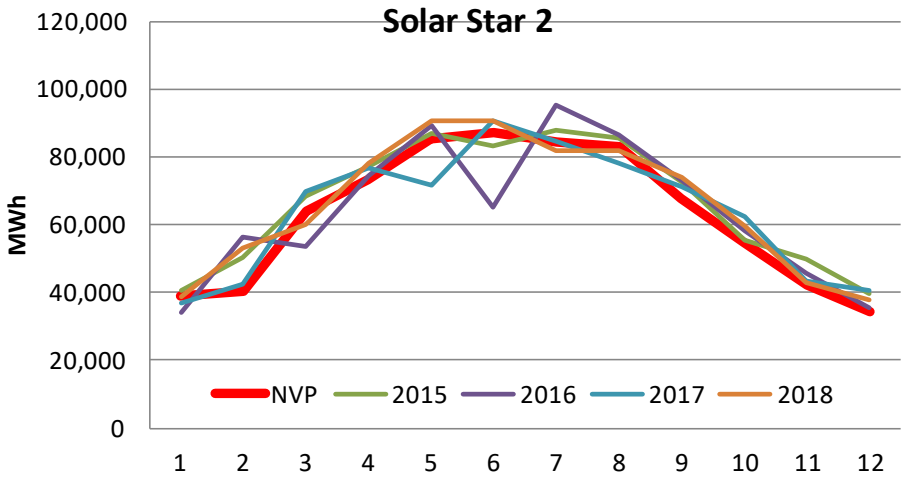


➤ Results from NOVO PRO[®] match with real plant outputs very well.



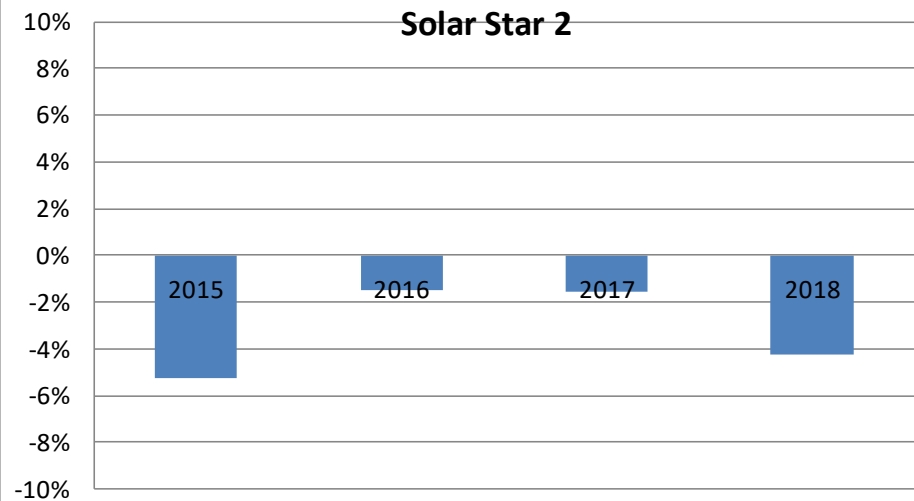
Monthly Power Production

Solar Star 2



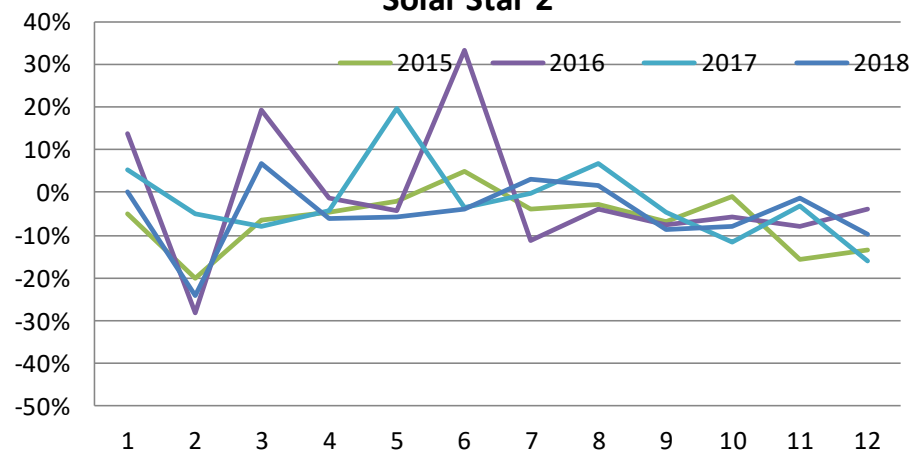
Yearly Power Production Deviation

Solar Star 2



Monthly Power Production Deviation

Solar Star 2



➤ Results from NOVO PRO[®] match with real plant outputs very well.

Conclusions



1. PV Solar Field in NOVO PRO[®] is very user-friendly.
2. Only six inputs by the users each of the five plants.
3. Built-in databases (weather database, irradiance database, PV panel library, etc.) are all available within the program.
4. Annual yields from NOVO PRO[®] match with plant actual figures very well (within $\pm 5\%$) for all the five plants.
5. NOVO PRO's results are even better than the onsite programs' estimation for the first two plants, in which onsite prediction data are available.