Fat Spaniel™
T E C H N O L O G I E S

Solar Electric Systems: Monitoring and Reporting Services

Benefits

- **Manage solar electric systems more efficiently to increase energy output and reduce operations and maintenance**

- **Manage multiple vendors equiment, such as inverters from SMA, Xantrex and others, through a single management system**

- **Around the clock remote monitoring of Solar Electric Systems**

- **Track production, usage, and environmental statistics with real-time and historical data – via online reports and Web views**

- **Increase customer satisfaction with improved service and greater uptime**

- **Educate customers through Web views and use these views as effective sales tools to sell more systems to new customers**

- **Access system data anytime, from any Web browser**

Fat Spaniel Technologies, Inc.
2 West Santa Clara Street
5th Floor
San Jose, CA 95113-1824
USA

Tel: +1 408 279 5262
Fax: +1 408 516 9111

www.fatspaniel.com
sales@fatspaniel.com

Overview

Fat Spaniel Technologies offers monitoring and reporting services for solar electric systems. Engineering, Procurement and Construction firms (EPCs), banks and private investors, Operations and Maintenance (O&M) Providers and manufacturers look to us for information services to maximize system energy output and deliver the highest possible return on investment.

Pricing

Our service pricing is based on system size, duration of service subscription, type of monitoring (inverter-direct or independent energy meter with a separate meter), and optional add-ons. Contact one of our sales representative at sales@fatspaniel.com or call +1 408 279 5262 to get a price quote.

Base Systems

Independent Energy Meter Base System

This Base System includes the basic hardware for independent energy meter monitoring that meets accuracy provisions of IEC 60687. Hardware includes:

- Gateway for datalogging and communications

- Outdoor-rated IP 65 enclosure

- Independent energy meter

Available in the following service configurations:

- Single-phase, 120 or 240 VAC, 5A

- Split phase, 120 / 240 VAC, 5A

- 3-Phase, 208 VAC, 5A

- 3-Phase, 480 VAC, 5A

- Single-phase, 120 or 240 VAC, mA

- Split phase, 120 / 240 VAC, mA

- 3-Phase, 208 VAC, mA

- 3-Phase, 480 VAC, mA

Base System Hardware Specifications

Enclosure

- Dimensions
    15.24cm x 15.24cm x 10.16cm or
    30.48cm x 25.4cm x 10.16cm or
    30.48cm x 25.4cm x 15.24cm
- Material
    Polycarbonate
- Rating
    IP 65

Communication Gateway

- Operating Temperature: -10° to 60°C
  (14° to 140°F)
- Relative Humidity: 5 to 95%
- Storage Temperature: -20° to 85°C
  (-4° to 185°F)
- Power Consumption: 340mA @ 12Vdc

Independent Energy Meter

- AC Voltage Error: +/- 0.5%
- AC Current Accuracy: +/- 0.5%
- Power Accuracy: +/- 0.5%
- Energy Accuracy: +/- 0.5%
- Power Consumption 100mA max
- IEC 60687
- Operating Temperature
  0° to 60°C (32°F to 140°F)
- Relative Humidity
  20% to 90% non-condensing

Inverter-Direct Base Systems

Inverter-Direct Base Systems connect directly to the inverter to capture inverter performance data as well as event codes (such as faults). Can be used alone or in combination with independent energy meter Base Systems. Hardware includes:
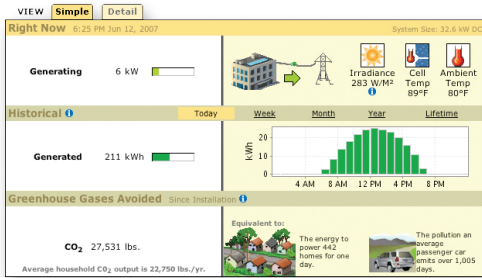
Outdoor	Indoor
• Gateway for datalogging and communications	• Gateway for datalogging and communications
• Conduit-ready power	• Wall Adapter Power Supply
• Outdoor-rated IP 65 enclosure	

Inverters supported:

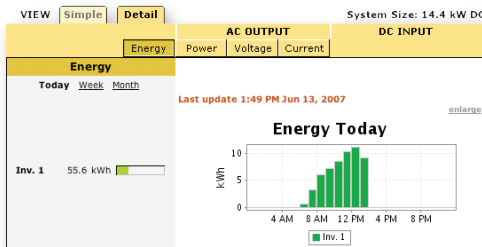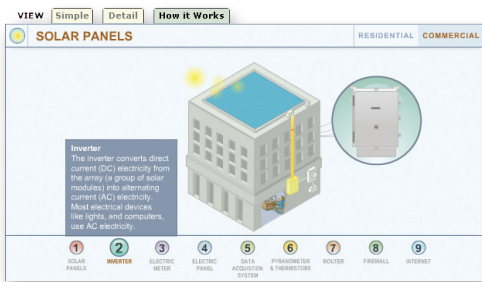| Inverter	Notes	Events
Fronius	• Max 9 per gateway • Requires Fronius Com Card and Datalogger Interface Box • 1 inverter on a gateway can use interface card easy P/N 4, 240, 013Z	
SatCon PowerGate	• Max 1 or 2 per gateway	
SMA SunnyBoy	• Max 9 per gateway • Requires SMA RS485 card	
SMA Sunny Central	• 1 per gateway	
Xantrex GT2.5 – 5.0	• Max 1 per gateway	
Xantrex PVS, GT100, GT250, GT500	• Max 1 per gateway • Requires Xantrex communications module P/N 1-152658-01, dropped shipped by Xantrex to Fat Spaniel for conversion	X

For further details on added inverter hardware required, see document: "Inverter Manufacturer Prerequisite for Inverter Direct Monitoring". Download the PDF document at http://www.fatspaniel.com/services/solar_electric.html.
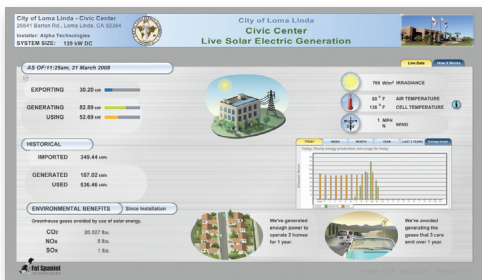
Simple Web view showing current and historical power generated along with greenhouse gases avoided. On the top right is the optional Basic Weather Station data: irradiance, cell temperature, and ambient temperature.

Detail Web view of Independent Energy Meter Monitoring showing today's energy generated from inverter. To the right is a chart showing the system's energy production.

Custom Web view showing Simple, Detail, and How it Works demo which explains how a solar electric system produces energy, providing valuable marketing and educational benefits.

Standard Flash view of Independent Energy Meter Monitoring showing today's energy generated from inverter. To the right is a dynamic chart showing the system's energy production.

Capacity License

Maximum system size DC kW capacity license

As the capacity of a solar electric system increases so does the value of ensuring maximum ROI. Fat Spaniel monitoring makes system performance more efficient, raising energy output, cutting costs, decreasing your risk and increasing your rate of return. As system size increases this increased return becomes even more valuable.

Each monitored system requires a capacity license

The capacity license is designated by maximum DC kW system rating, based on Standard Test Condition (STC) Rating. System capacity license sizes are scaled in the same maximum kW ratings as the monitoring services and ensure that the value of the information processed for you is supported by a secure and lasting data infrastructure.
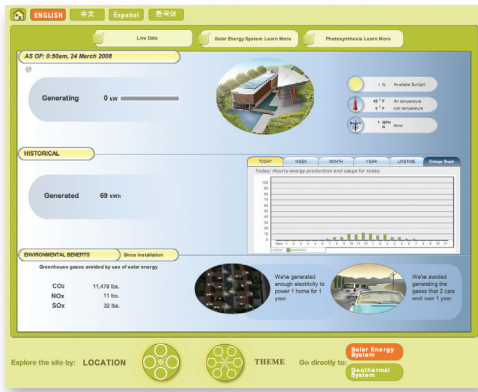
License Configurations

Maximum System Size for Capacity License and Monitoring Service price calculations based on kW DC (STC rating):

10	1,000
20	1,500
30	2,000
50	3,000
75	4,000
100	5,000
250	10,000
500	

Monitoring Services

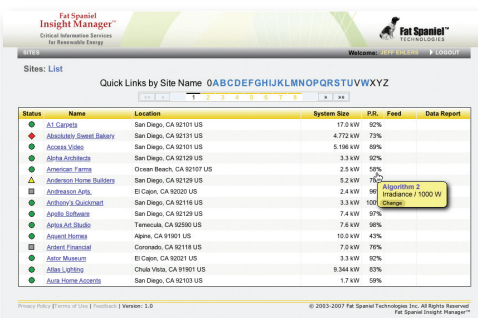## 1-Year and 5-Year Monitoring Services

Fat Spaniel provides monitoring services on a subscription basis for each monitored site. This includes the following standard set of features:

- 24x7 monitoring service for your grid-tie or off-grid systems
- Secure data storage at a SAS-70 certified data center
- Simple and Detailed web-based views
- Alerts via Email and SMS
- Basic data downloads in CSV format (see table below for variable details)
- Supports independent energy meter and/or inverter-direct base systsm
- Supports weather station for measuring environmental variables

Data Variable	Required Hardware at Site
Incremental PV Energy (kWh)	Inverter-direct system or Independent energy meter
Incremental Insolation (Wh/m2)	Irradiance meter
Last PV Energy (kWh)	Inverter-direct system or Independent energy meter
Average PV Power (kW)	Inverter-direct system or Independent energy meter
Average Irradiance (W/m2)	Irradiance meter
Average Ambient Temperature (C)	Ambient Temperature Sensor
Average Cell Temperature (C)	Cell Temperature Sensor

Custom Flash view for marketing and educational purposes for Queens Botanical Garden. View is translated in 3 different languages and is part of interactive kiosk solution.

Get an overview of your system's health by checking on their status. A "Green" status means that your system's operation is normal. "Red" means there is a system performance issue.

Insight Manager™ Benefits

- **Manage all your sites using a common site manager, across many different manufacturers' inverters**

- **Gain quick access to simple or detailed Web views of each site**

- **Efficiently monitor system health and performance remotely**

- **Receive automated email notification when system faults occur**

- **Increase customer satisfaction**

- **Reduce support costs with fewer truck rolls**

- **Increase site uptime and long-term energy output**

Communication Hardware Specifications

Cellular Wireless Modem

- Operating Temperaturez: -30° to 70°C
  (-22° to 158°F)
- Modem Type: GSM / GPRS Class 10
- SIM Connector: Standard 3V SIM receptacle
- Relative Humidity: 20% to 90% non-condensing
- Storage Temperature: -40° to 85°C
  (-40° to 185°F)
- Power Consumption: 1A peak @ 5V
  400ma Average @ 5V

Options

Web Views

Standard Web views (Simple and Detailed) are included with Monitoring Services. Fat Spaniel also provides custom HTML Web views, standard Flash views and custom Flash views at additional cost. Please call for further information and a quote.

1	Standard Simple Web View, HTML
2	Standard Detailed Web View, HTML
3	Custom Web View, HTML
4	Standard Flash View
5	Custom Flash View

Insight Manager™

This multi-site management portal enables you to see all of your managed sites at-a-glance, determine their current state of health, see aggregated production and greenhouse gas avoidance data, look at event logs and fault details, plus drill down for more detailed views of each site.

- Insight Manager for Service Providers, Standard Edition: Multi-Site Management Portal, 1 year subscription supporting up to 25 sites, supports 5 user accounts

- Insight Manager for Service Providers — License upgrade: 1 year subscription supporting 25 additional sites

- Insight Manager client: Single user account license, one year

Technical Training

Register for Standard and/or Advanced technical training course to get hands-on training on Fat Spaniel installation, networking and system troubleshooting. Get a demonstration of Insight Manager and more.

- System Installer Technical Training Course — Duration: One day, one attendee

- System Installer Technical Training Course — Duration: Two days, one attendee

Internet Access Communications

The Fat Spaniel gateway communicates system performance to our data center via the Internet. Select from three types of Internet access options:

- Broadband Internet Access (for configuration purposes only — hardware and service must be ordered from 3rd party)

- Cellular Modem add-on (GPRS data service must be ordered from 3rd party)

Irradiance
- Type: Silicon Pyranometer
- Directional Accuracy: +/- 5%
- Sensitivity change per year: < 2%

Ambient Temperature Sensor
- Type: K-type thermocouple
- Accuracy: +/- 2° C

Module Temperature Sensor
- Type: K-type thermocouple
- Accuracy: +/- 2° C

Wind speed
- Type: Direction and Speed Anemometer
- Range: 4.8 - 281 km/h
- Accuracy: +/- 5%

Wind direction
- Accuracy: +/- 7°

DC Monitoring Hardware Specifications

String Monitoring
DST Controls' Fat Spaniel Enabled
smart combiner boxes include:
- Touch Safe™ fuse holders
- Centrally positioned terminals for large
  diameter wires
- Available in the following configurations:

Model	8	16	24
Number of Inputs (Pos. & Neg.)	1 - 8	9 - 16	17 - 24
Max DC Voltage	600 VDC	600 VDC	600 VDC
Max Fuse Size	20 amps	20 amps	20 amps
Max Rated Output Current	160 amps	320 amps	350 amps
Source Wiring Range	10-6 AWG	10-6 AWG	10-6 AWG
Output Wiring Range	6 AWG – 350 mcm	6 AWG – 350 mcm	6 AWG – 350 mcm
Enclosure Type	IP 65, steel	IP 65, steel	IP 65, steel
Unit Weight	16 kg	16 kg	16 kg
Dimensions	50.8cm x 40.64cm x 20.32cm	50.8cm x 50.8cm x 20.32cm	60.96cm x 60.96cm x 20.32cm

Weather Station

Monitoring environmental conditions along with performance data is important to understanding the operation of the solar electric system. Various configurations are offered through these weather station options:

- Basic Weather Station: ambient temperature, module temperature and irradiance monitoring
- Full Weather Station: air temperature, module temperature, irradiance, wind speed and wind direction monitoring

DC String or Sub-Array Monitoring

String monitoring enables you to remotely monitor individual string performance in a solar electric system to maximize system performance and return on investment. Sub-array monitoring delivers a more cost-effective solution to understand system performance at the module level using the sub-array combiner which means you don't have to install additional boxes or to run wires in the field. The following options are available for String and Sub-Array monitoring:

String Monitoring

- String Monitoring, Service only, for One Year or Five Years
- String Monitoring Communications Unit
- String Monitoring Setup

Data Reports

Receive data reports for analysis or billing purposes. Access to data in different formats is achieved through Data Downloads and Data Feeds. Data Downloads provide an interface to access site data by choosing the time interval and historic time period. Data Feeds are set up to send automatically.

- Data Feed for One Year or Five Years — Non-billing
- Data Feed for One Year or Five Years — Billing-grade
- Data Feed and Flash View Maintenance for Flash view — for One Year or Five Years
- Custom Data Feeds and Reports for One Year or Five Years