



# Apex Energy Replaces End-of-life System for Improved Data

*StrataVu and groov EPIC secure a  
flexible future for Oil & Gas production*

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# APEX ENERGY REPLACES END-OF-LIFE SYSTEM FOR IMPROVED DATA

## *StrataVu and groov EPIC secure a flexible future for Oil & Gas production*

### END OF LIFE

When the hardware for the automation system you've deployed throughout your entire installed base is suddenly declared end-of-life, you're faced with a problem.

That's what happened to [Apex Energy LLC](#). A natural gas exploration and production company, Apex is headquartered just outside Pittsburgh, Pennsylvania. Working with midstream gas companies and gas utilities, they invest in unconventional oil and gas properties in the Appalachian Basin, with a focus on proven Marcellus and Utica horizontal well development.

As a longtime customer of systems integrator [Strata Innovative Solutions](#) (formerly Flow Data), Apex had used Strata's field-proven PadPro automation solution starting with their second drilling site, or well pad. They were happy with the solution.

But in 2019-2020, manufacturers of the hardware components began to end-of-life their products. For their planned growth, Apex needed a new solution that would offer as seamless a transition as possible.

### HARDWARE CHOICES

Coincidentally, Strata was running into memory and processor speed limitations in the current hardware, and they needed to find a more capable system to automate well pads for all their customers.

As a systems integrator primarily for upstream and midstream Oil & Gas, Strata also handles renewables, manufacturing and supply chain, and utilities. They have a breadth and depth of knowledge and

experience, especially in the O&G industry, and offer a one-stop-shop solution with electricians, panel shop, automation technicians, and engineers.

Ninety-five percent or more of all upstream O&G well pads are automated, notes Richard Best, Strata's Eastern Region Operations Manager.

"Generally, a company standardizes on a solution—programming, hardware, etc.—across a region. The solution selection is based on the requirements of the O&G play: whether it's an oil field or a gas field, whether it's wet or dry, the type of formation (Marcellus, Permian, etc.), the type of drilling used, and the company's operating practices."

For years Strata's proprietary C/C++ software PadPro provided monitoring, HMI, and control to well pad operators. PadPro ran on the Schneider® 300 series SCADAPack, which supported C/C++ programs and worked in conjunction with an Android HMI with PostgreSQL database. But now the Schneider hardware



**An Apex well pad**

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was no longer available, and Strata looked for a replacement.

“We evaluated other controllers, but the *Opto 22 groov EPIC® system* won by a long shot, based on capabilities, availability, and pricing,” says Richard. “Also, our Product Development team recommended Opto.”

Strata was already familiar with Opto 22. “We have actually been using Opto 22 platforms on Oil and Gas projects dating back to the late ‘90s, several of which were international projects,” notes Paul Brennan, a founding member of Strata. “With the release of the EPIC system, the Opto 22 became an even stronger candidate for Oil and Gas solutions.”

In 2021 Strata decided to migrate their solution to the Opto 22 platform, for several reasons:

- Linux OS
- Competitive price
- Robust memory and processor
- Numerous I/O (much more than an RTU)
- Multiple protocols and programming techniques
- UL Hazardous Area Class 1 Div 2 rating
- Wide -20 to 70 °C operating temperature

**“We evaluated other controllers, but the *Opto 22 groov EPIC system* won by a long shot, based on capabilities, availability, and pricing.”**

**- Richard Best, Strata Innovative Solutions**

## STRATAVU SOFTWARE

As they chose *groov EPIC*, Strata also revised their PadPro application to match the new hardware capabilities, releasing it under the name *StrataVu*.

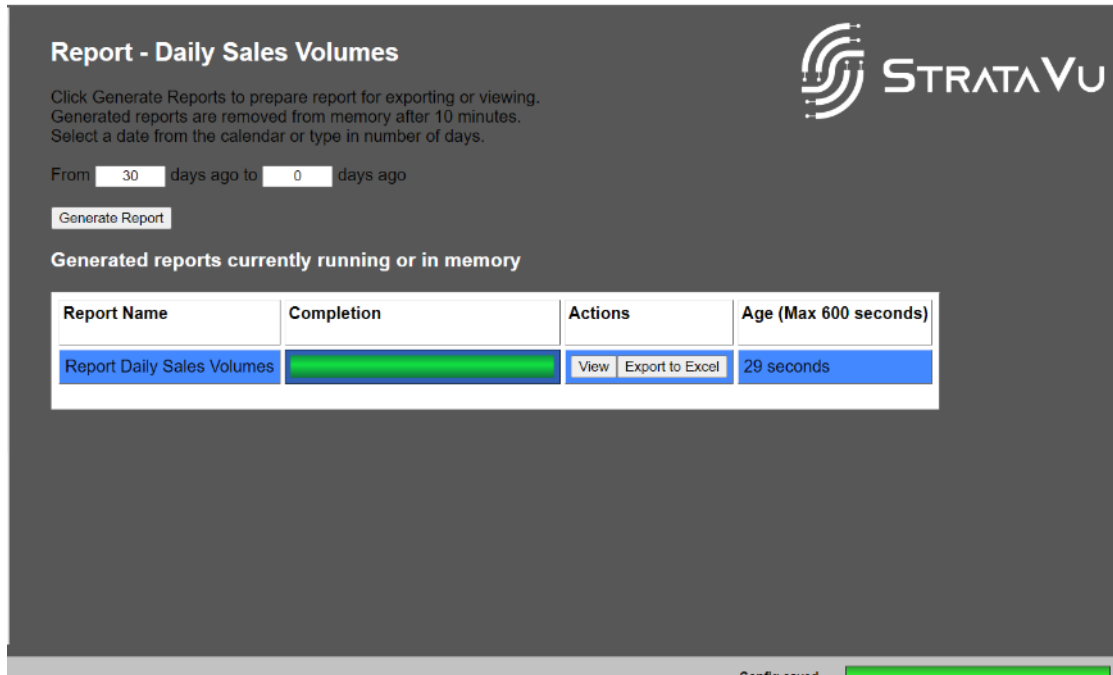
Tailored to upstream O&G, StrataVu solves multiple problems for operators in the industry with a collection of pre-built modules that handle well pad-related tasks. Customers choose and configure the StrataVu modules they need. This modularity lets customers choose functions specific to the tasks they’re trying to perform.

“A good example is the Cause & Effects module,” says Keith Thomson, StrataVu lead development engineer. “It’s a simple way for a nonprogrammer to create a familiar event-driven system that acts on events for site and process safety. A technician just fills in a web-based chart

**StrataVu’s Cause & Effects module:**  
**This configuration interface lets customers easily configure an event-driven system.**



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StrataVu's daily volume report for business use

of inputs & outputs. It's a no-code approach, configured rather than programmed, with standardized pieces so you can build out more easily."

Strata uses Secure Shell access (SSH) to load StrataVu on the EPIC's Linux operating system, where it runs. Typically StrataVu handles 90% of control and data acquisition, but perhaps 10% may be customized using CODESYS for IEE 61131-3 compliant languages, Node-RED, or Opto 22's PAC Control programming on the EPIC. Reports and trending data for operations are in StrataVu's web interface, and customers can add items to a database historian for long-term storage.

### SYSTEM ARCHITECTURE

Apex uses a distributed architecture for their well pads. Each well pad has two wells running through a Gas Production Unit (GPU) with a pad control panel on the GPU. They find this architecture is more easily expandable than a centralized architecture. It also reduces points of failure and saves on wire and conduit.

At each well pad is a groov EPIC model [GRV-EPIC-PR1](#), mounted on an 8-module GRV-EPIC-CHS8 chassis with the following I/O.

*For the main pad control panel:*

- [GRV-CSERI-4](#): 4-Channel RS-232 or RS-485 serial communication
- [GRV-OMRIS-8](#): 8-Channel Digital Output Module
- [GRV-IMAI-8](#): 8-Channel Analog Input Module
- [GRV-IDC-24](#): 24-Channel Digital Input Module

*For the GPU (2 wells):*

- [GRV-OMRIS-8](#): 8-Channel Digital Output Module
- [GRV-IMA-24](#): 24-Channel Analog Input Module
- [GRV-IDCS-24](#): 24-Channel Digital Input Module
- [GRV-OVMALC-8](#): 8-Channel Analog Output Module

The well pad I/O:

- Serial modules communicate with tank level probes using Modbus
- Digital inputs report the status of level switches, pressure switches, and safety shutoffs (ESD)
- Digital outputs control valves
- Analog inputs report data from pressure sensors and choke valves
- Analog outputs control choke valves

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### Communications

A cellular modem is also on the main control panel, and the system is securely connected to the internet. Flow computers communicate with the StrataVu application via standard Modbus RS-485 and TCP.

“We are now able to communicate via Modbus across cellular modems,” notes Richard. “We were not able to do this with our previous platform.”

“Modbus covers pretty much everything in O&G,” Keith says, so it’s ideal for adding data from brownfield devices, via either Ethernet or serial. In StrataVu’s Modbus Reader/Writer module, customers can add as many devices as they like, choose data registers, and pull the data into their Cause & Effects module.

StrataVu sends system data to a PostgreSQL database. Data from flow computers is also stored in Modbus registers in the EPIC, and a SCADA system pulls data from the EPIC for the business side: volumes, tracking for contractual obligations with buyers, and so on.

### HMI

Strata was able to save significant costs on HMI programming and hardware by using *groov View*®, which is built into the *groov* EPIC. A simple-to-use program for building and viewing operator interfaces, *groov View* securely serves the interface to large and small screens via a web browser.

For local viewing, technicians use an industrial HDMI-capable touchscreen plugged into the EPIC. The same HMI is available remotely to authorized users on any mobile device. Richard says, “The client loves it and it has provided cost savings for both hardware and HMI development time.”

### RESULTS

The StrataVu solution was deployed on Apex’s Graham pad in the beginning of 2023, the second customer deployment for StrataVu. The Graham pad is currently a 6-well pad and is slated for a 9-well addition by the end of the year, making it one of Apex’s largest to date.

The transition to the new system has gone well. Both Apex and Strata are pleased with the ease of integration and new capabilities for communicating data.

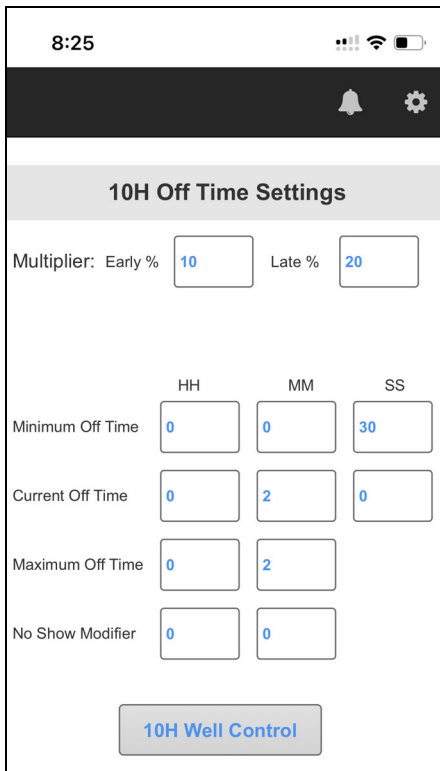
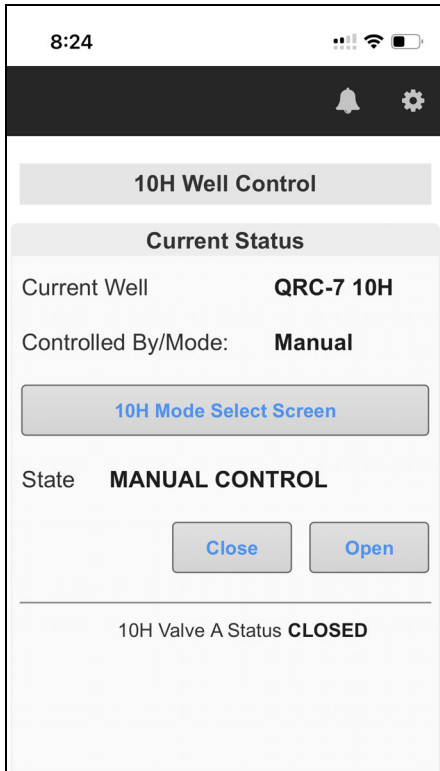


Pad control panel



The *groov* EPIC (upper left) controls the well pad

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Strata used *groov View* to provide an operator interface locally and for mobile devices.

“The implementation was seamless and Apex’s operators really appreciate the *groov View* local and mobile interfaces,” says Richard.

### FUTURE

Moving forward, Strata expects to use StrataVu with Opto 22 *groov* EPICs in all Apex pads and for their other customers as well. Richard notes that Strata will support customers with their older system as long as they can, although ultimately they will need to migrate away from PadPro and the older hardware.

“Many of the legacy PadPro sites will be turning over to plunger lift in the coming months,” says Richard. “This feature is inherent in both the legacy PadPro product and the new StrataVu product. Well control is simply switched from “Manual” to “Plunger” and the desired settings are entered.

“As these sites are turned to plunger, we will be adding an EPIC controller in order to provide a more up-to-date *groov View* mobile interface.”

### ABOUT STRATA INNOVATIVE SOLUTIONS

The capacity to make confident decisions begins at data collection across platforms, even as circumstances change rapidly. Strata Innovative Solutions leverages Industry 4.0 principles to deliver key integration technologies and connected solutions that scale across your organization. For more information, visit <https://www.strata-is.com/>

Or contact Richard Best, Eastern Region Operations Manager

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### ABOUT APEX ENERGY LLC

An upstream oil and gas company focused on the development of unconventional resources, Apex combines technical and operational expertise to safely and responsibly develop oil and gas assets. Learn more at <https://apexenergyllc.com/>.

### ABOUT OPTO 22

Opto 22 was started in 1974 by a co-inventor of the solid-state relay (SSR), who discovered a way to make SSRs more reliable.

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Opto 22 has consistently built products on open standards rather than on proprietary technologies. The company developed the red-white-yellow-black color-coding system for input/output (I/O) modules and the open Optomux® protocol, and pioneered Ethernet-based I/O.

Famous worldwide for its reliable industrial I/O, the company in 2018 introduced *groov EPIC*® (edge programmable industrial controller). EPIC has an open-source Linux® OS and provides connectivity to PLCs, software, and online services, plus data handling and visualization, in addition to real-time control.

*groov RIO Ethernet-based edge I/O* modules, introduced in 2020, include I/O and IIoT software in a compact industrial package that goes anywhere.

All Opto 22 products are manufactured and supported in the U.S.A. Most solid-state SSRs and I/O modules are guaranteed for life.



The company is especially trusted for its continuing policy of providing free product support, free online training, and free pre-sales engineering assistance.

For more information, visit [opto22.com](http://opto22.com) or contact **Opto 22 Pre-Sales Engineering:**

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