

Implementing a power monitoring and reporting system solution to achieve operational efficiency of wells and boosters

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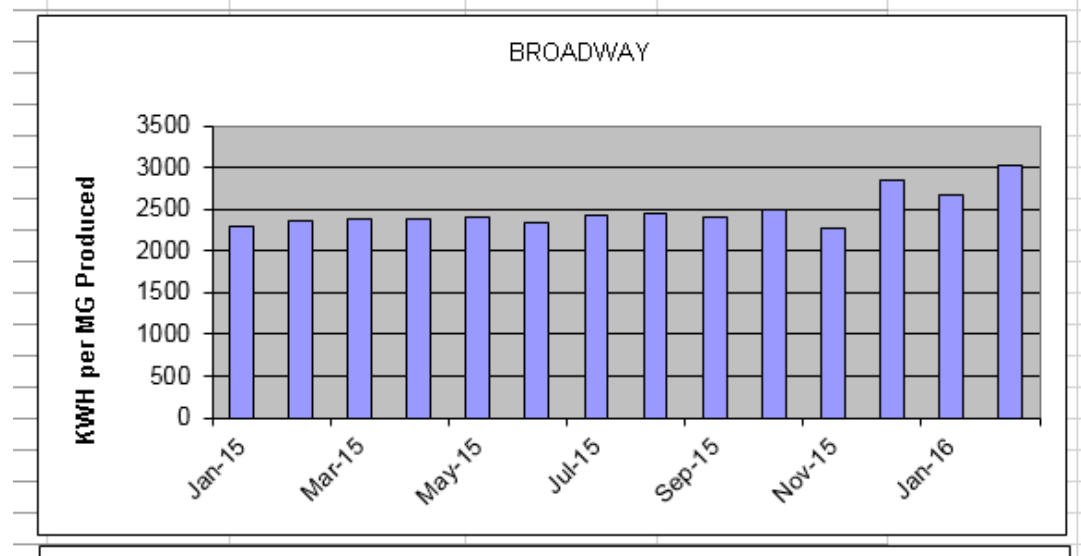
Suez



Power Monitoring

- **Project Goals**

- Control power costs
- Individual pump power cost
- Equipment performance
- Operational strategy
- Schedule maintenance
- See trouble starting
- Real time power demand
- Load shedding
- Preventative maintenance
- Pump Testing



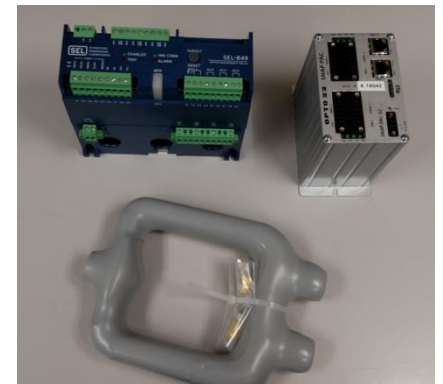
Power Monitoring

- **Inventory of your current monitoring capability**
 - Top 20 power consumption sites
 - Any existing monitoring ability
 - Utilize any existing monitoring equipment
 - Add-on cards for existing
 - Communication capabilities
 - Can we get data register mapping
 - Upgrade PLC to use MODBUS



Power Monitoring

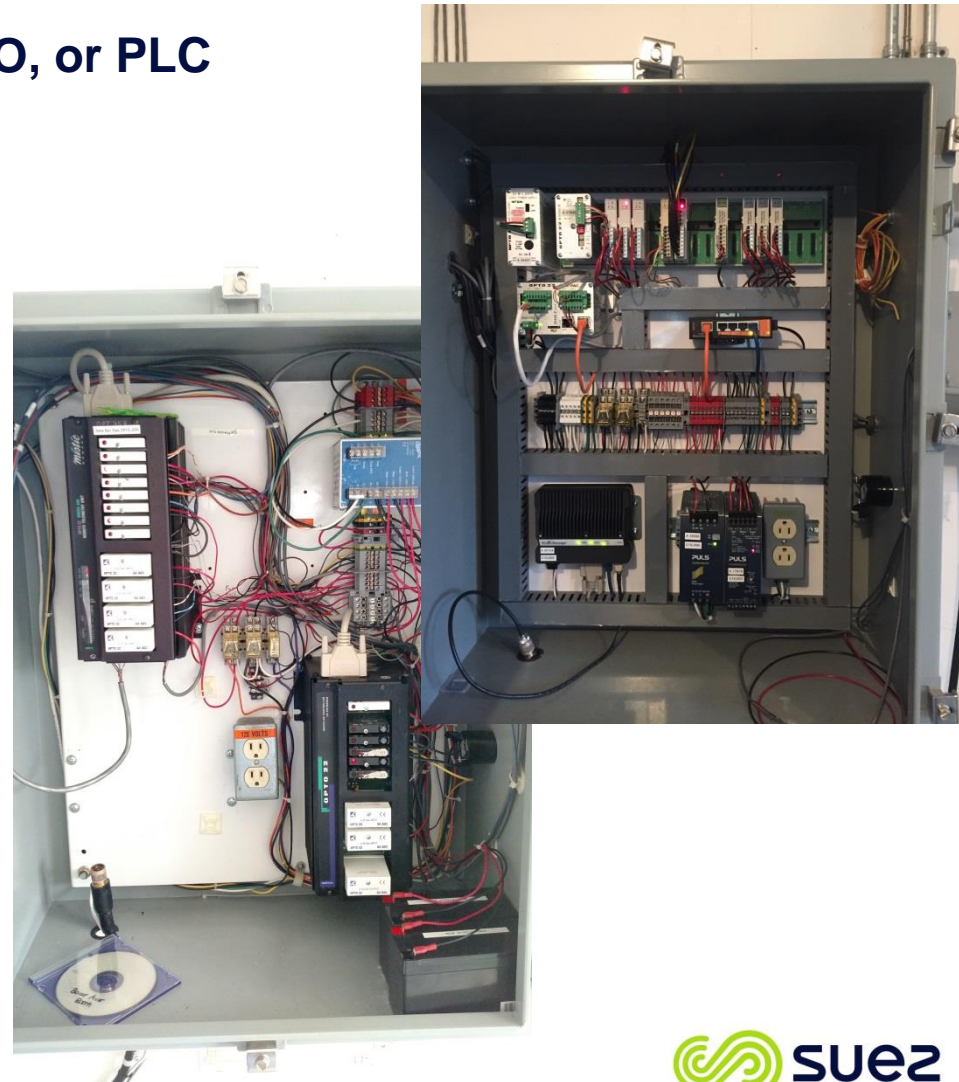
- **Specify new equipment purchases to provide monitoring**
 - Compatibility
 - Standardize
 - Spares
 - Any extra monitoring equipment that can be used elsewhere
 - Communications modules
 - Interface with existing equipment
 - PLC / RTU upgrade
 - Protocol cards



Power Monitoring

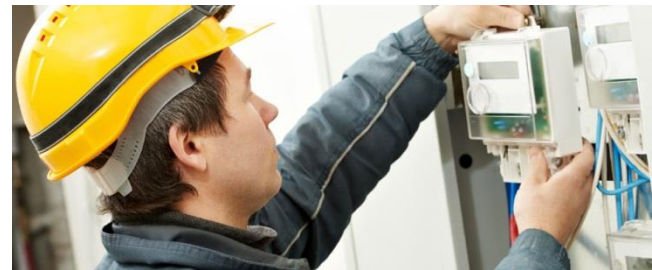
- **This there any communications, I/O, or PLC limitations**

- Old PLC / RTU
- Protocols
- Other upgrades
 - Power Supply
 - Ethernet Switch
- Some upgrades easier than others
 - Controller only
 - Confirm and modify programming
 - Complete build
 - Footprint of enclosure
 - New external enclosure



Power Monitoring

- **Contractors / in-house labor**
 - Do you have time, tools, capability
 - Do you need in-house support after the project
 - Conduit runs
 - Installation of monitoring equipment
 - In-house programming
 - In-house low voltage work
 - Electrician worked on high voltage
 - lump sum or formal site by site proposal



Power Monitoring

- **Arc Flash and other safety concerns**
 - Remote access
 - Opening electrical panels
 - Turned off power and locked out equipment for inventory
 - Coordination with other departments



Power Monitoring

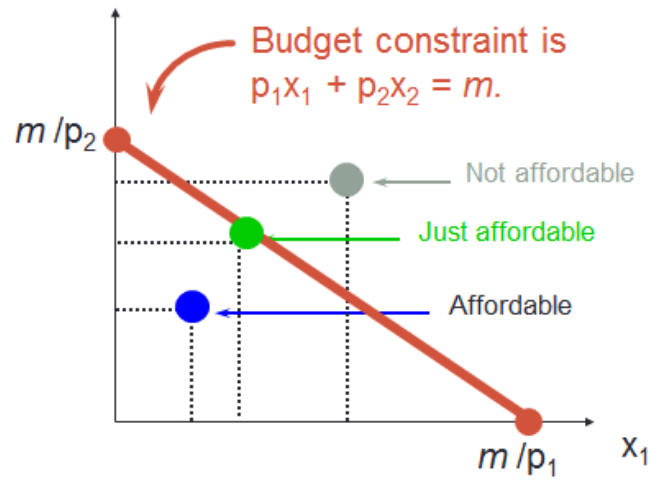
- **Operational constraints**
 - Coordination with other departments for when we could shutdown booster pumps and wells.
 - Equipment could be off for a hour to forty-eight hours
 - Testing of power monitoring data



Power Monitoring

- **Budget Constraints**

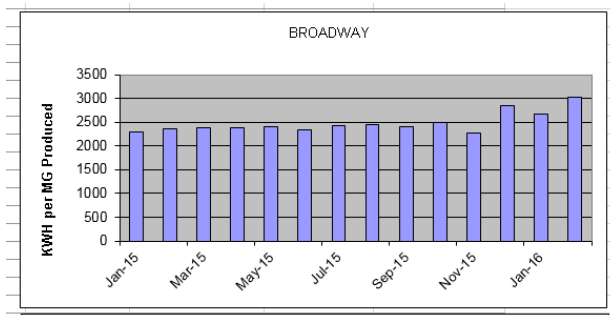
- Multiple year project
- 30 pumps 1st year
- \$1,200 - \$2,500 per site
- Priority installation by consumption, size, age, quick-wins.



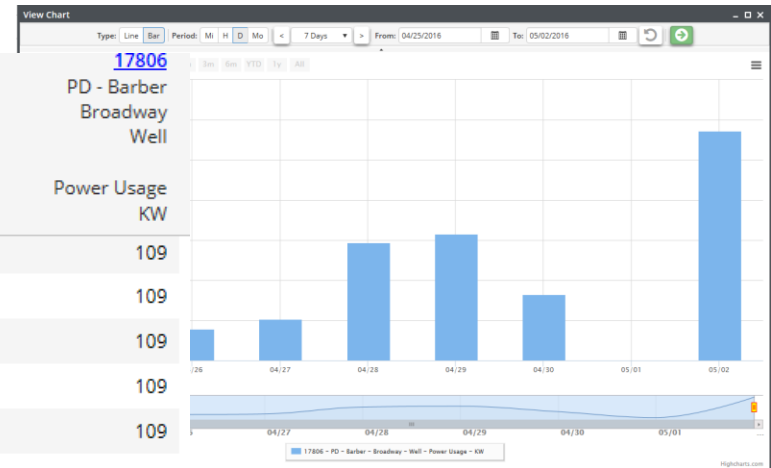
Power Monitoring

- **Data Data Data**

- Where to archive
- How to access
- How to retrieve
- What needs to be reported
- See trends
- Justification for projects
- Analysis for staging
- Modeling

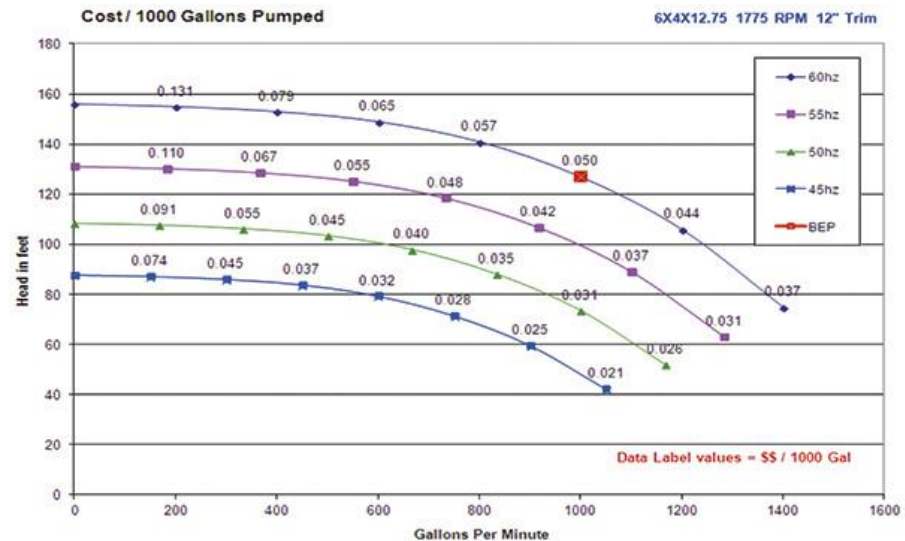


Date	Power Usage KW
04/18/2016 15:15	109
04/18/2016 15:16	109
04/18/2016 15:17	109
04/18/2016 15:18	109
04/18/2016 15:19	109
04/18/2016 15:20	109
04/18/2016 15:21	109
04/18/2016 15:22	109
04/18/2016 15:23	109
04/18/2016 15:24	109
04/18/2016 15:25	109
04/18/2016 15:26	109
04/18/2016 15:27	109
04/18/2016 15:28	109
04/18/2016 15:29	109
04/18/2016 15:30	109
04/18/2016 15:31	109



Power Monitoring

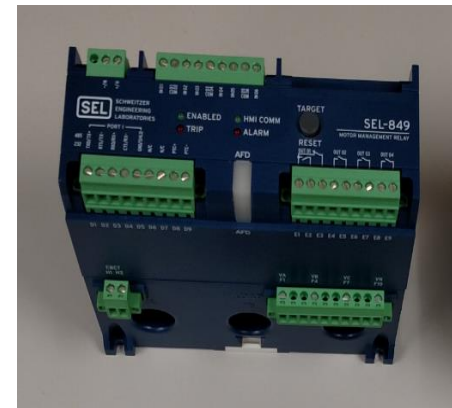
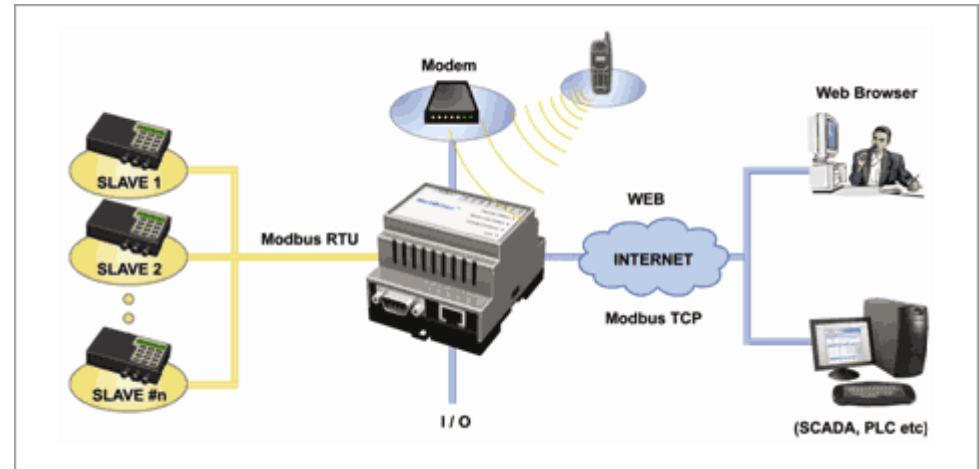
- **What parameters are needed**
 - What analysis or reports are needed
 - Real-time KW reading or totalized
 - KW / Mgal
 - Current, voltage per leg?
 - Where will parameter be processed
 - Could effect project costs



Power Monitoring

- **Standardization**

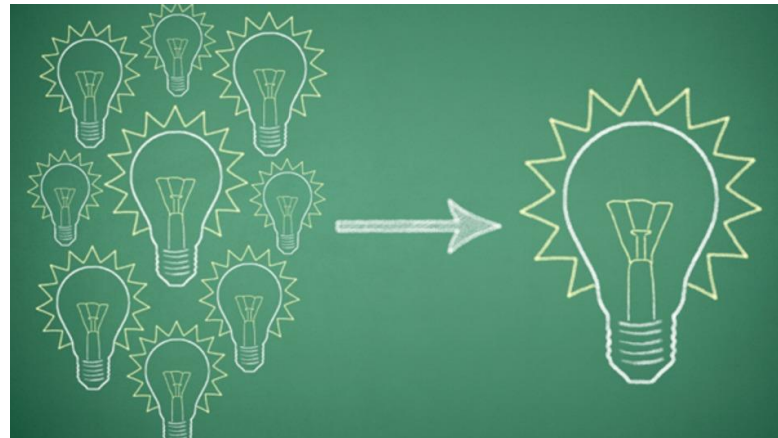
- Standardize on a protocol
- Add-on monitoring equipment
- Equipment
- Wire
- Design



Power Monitoring

- **Benefits**

- Pre-emptive maintenance
- Operational control
- Budget request justification
- Knowledge



Power Monitoring

- **Next Steps**

- Inventory monitoring capability for new installations
- 25 pumps this year
- \$400 - \$5000 /site

	E	G	H	I	J	K	L
	PLC Model	Rack Size	Number of Motors	Motor(s) HP	Number of EMONs	Number of VFDs	Modbus Available?
	SNAP_PAC		2	150;150	0	0	N
	LCSX	16	4	20;40;40;75	0	4	Y
	SNAP_PAC		3	125;125;125	0	3	Y
	SNAP_PAC		2	100;100	0	1	Y (1)
	SNAP_PAC		3	50;40;20	0	1	N
	LCSX	16	3	200;200;200	0	1	Y (1)

Power Monitoring

- **Questions**

