

# ET Summit 2019

Presented by



## Agriculture technology solutions

Technology to help growers  
manage water and energy

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## Farming is different than other sectors

Pests



Source: <https://gardenerspath.com/how-to/disease-and-pests/diatomaceous-earth/>

Disease



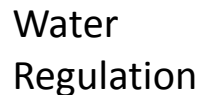
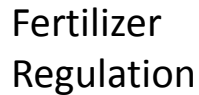
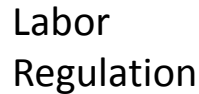
Source: <https://pixabay.com/photos/tomato-blight-disease-garden-608290/>

Weather



Source: Don Cameron, Terranova Ranch

## 1. Agriculture Regulation



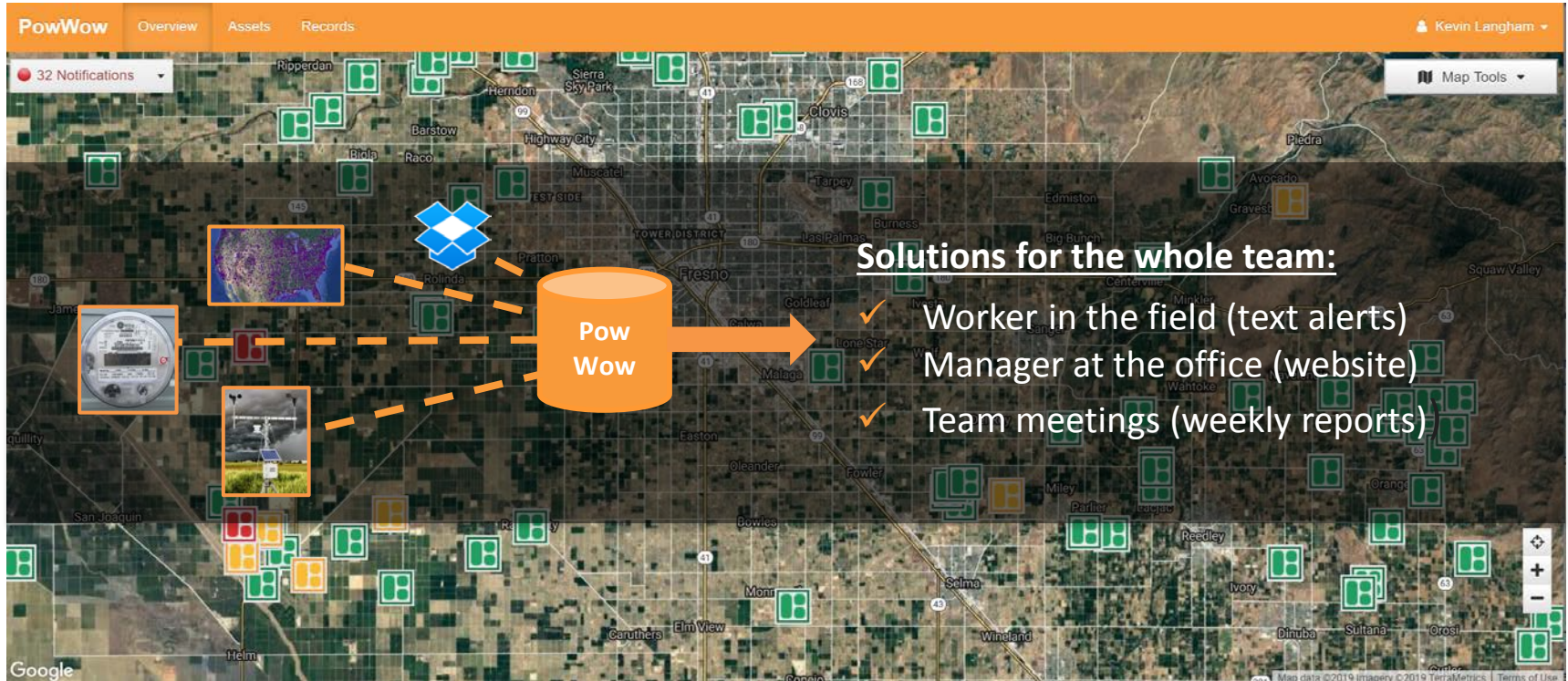
## Energy statements

	<b>ENERGY STATEMENT</b> www.pge.com/MyEnergy	
<b>Details of Electric Charges</b>		
03/29/2018 - 04/29/2018 (32 billing days)		
Service For Service Agreement ID Rate Schedule: A050 Large Time-Electricity/Power		
03/29/2018 - 04/29/2018		
Customer Charge	72.00 @ \$0.15446 =	\$38.22
Demand Charge		
Non Demand	38.240000 kWh @ \$0.75500 =	\$54.08
Non Demand		
Part Peak	5.713 000000 kWh @ \$0.1143 =	\$0.65
Off Peak	4.237 000000 kWh @ \$0.08513 =	\$0.36
Electric Commission Tax		2.00
<b>Total Electric Charges</b>		<b>\$1,622.80</b>

### Detail of Bill (NEMA)



## We turn data into answers



## One platform, three solutions



Water

Pump  
Monitor

Assets: Pumps & fields  
Value: manage water  
demand and supply



Energy

Ranch  
Monitor

Assets: pumps, solar & buildings  
Value: optimize energy cost and  
solar generation



Food

Crop  
Monitor

Assets: crops  
Value: increase profits  
with better crop yield

## Innovation to manage water



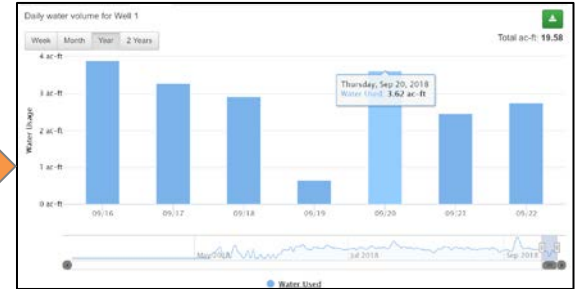
Well Pump



Utility smart meter

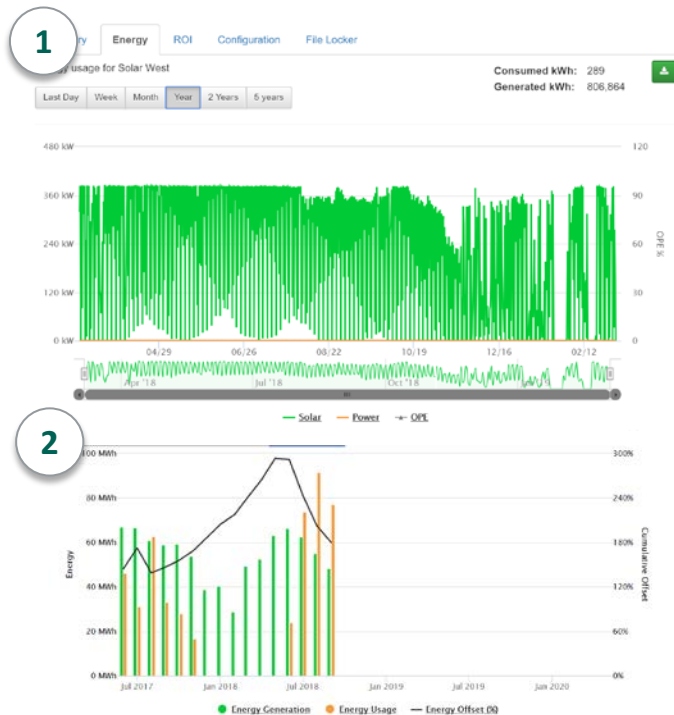


Energy data + pump test

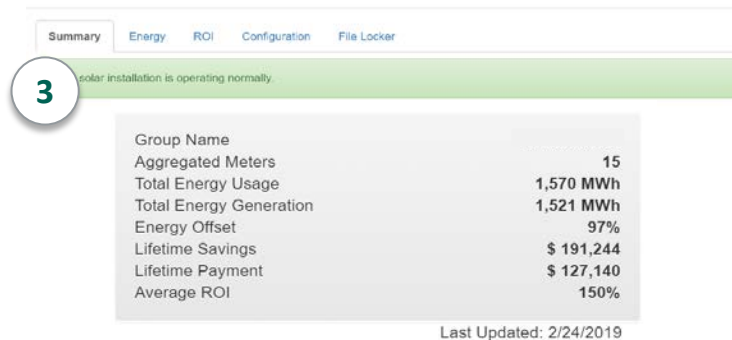


Water use records  
(example from small farm)

# Innovation to manage solar



1. Track solar energy generation and alert when its time to clean the panels
2. Track energy balance so no credits go unused
3. Track return on investment



**Solar ROI (example from large farm)**



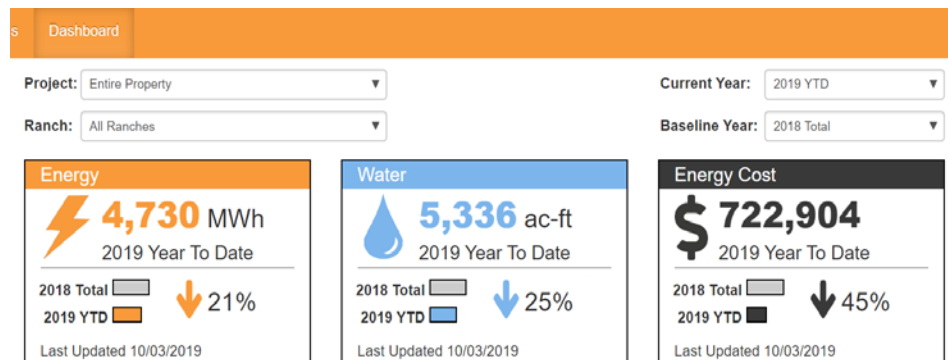
## Innovation to bring it all together

- Report that provides a wholistic picture to the farming team
  - Cost of pumping, pump efficiency, Time-of-Use losses

Ranch: Test Ranch							Ranch Pumping Hours:		161.16	
Pump	Water Source	Pump Hours	Pump kWh	Est. Energy Cost (\$)	Est. Water (ac-ft)	1	2	3		
						Cost per ac-ft (\$)	Avg OPE (%)	Excellent OPE (%)	Peak Hours	Lost ToU (\$)
Pump 1	Well	31	1,492	\$ 243.82	4.84	\$ 50.38	63%	59%	19	\$ 30.24
Pump 2	Well	13	729	\$ 214.07	2.75	\$ 77.84	59%	63%	6	\$ 10.68
Field Booster North	Booster	41	1,515	\$ 216.14	9.17	\$ 23.57	70%	59%	26	\$ 31.20
FieldBooster South	Booster	56	2,722	\$ 336.68	14.44	\$ 23.32	67%	63%	40	\$ 63.90
Deep well 3	Well	21	4,615	\$ 984.93	6.94	\$ 141.92	39%	63%	19	\$ 124.77

## Do these innovations work?

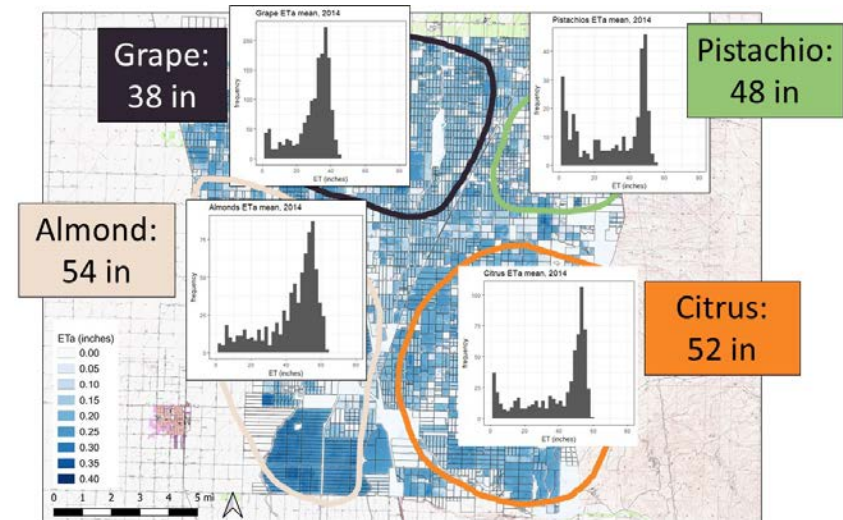
- Example from large farm management firm
  - 200+ pumps
  - ~7000 acres
- Reduction in energy use and cost
  - Leveraging surface water and rain
  - Irrigating off-peak hours



**\$320,000 less**  
(from off-peak operation)

## Current research (EPIC project)

- Funded by California Energy Commission (EPC 16-051)
  - How far can we push water/energy efficiency in commercial agricultural operations by integrating new data and technology?
  - Can we track the impact of the digital transformation on disadvantaged communities (role of new education programs)?



Delano area (SCE and PG&E)



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