ATTACHMENT B
Preliminary Assessment of VCE's
Agricultural Pumping Dynamic Rate Pilot

Key takeaways for two agricultural participants during PY2022.

- The pilot makes it simple for participants to decide when to purchase load based on price.
  - The pricing method had complex elements not fully reflected in the user interface.

- Automation enables load response for **BOTH** TOU and Dynamic Pricing tariffs.
  - On TOU with automation, participant response is concentrated during peak pricing hours.
  - On dynamic pricing with automation, participant response to high prices is spread out across more hours than TOU.
  - Both participants responded to TOU price signals when pumps were automated.
  - Under dynamic pricing, one participant responded more on high-priced days than low-priced days, while the other participant did not differentiate its response across those day types.

- Subscription pricing does not accurately reflect intermittent Ag pumping loads.
  - Can still provide a good hedge against persistent high prices.
  - May not provide a good hedge against more isolated price spikes.
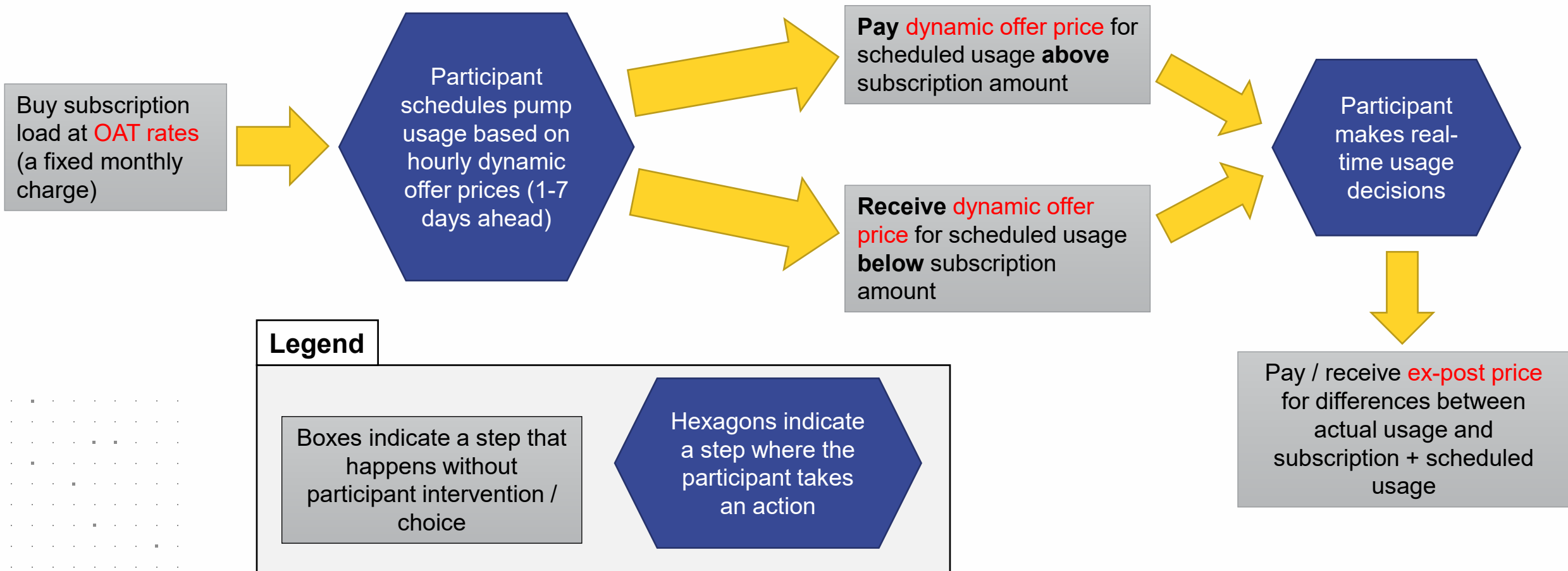
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AgFIT Pilot Description.

- Three-year pilot from 2022 through 2024.

- Large agricultural participants are given incentives to automate irrigation pumps.

- Participants on TOU are provided automation technology, then shift to dynamic pricing.

- There are no demand charges and participants have bill protection.

- Customer receives dynamic offer prices for 1 to 7 days ahead and can schedule pump run times accordingly.

- AgFIT participants had a subscription component to their 2022 bills based on 2021 usage.

Study Period.

- One month, 8/15/2022 – 9/15/2022, which is the first complete billing month in which dynamic prices were offered.

- The time period had low and high dynamic prices, which allows us to examine participant usage decisions at different price levels.

- Two participants were enrolled during the period, accounting for 19 service accounts (typically a service account is associated with one pump).

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Participants need only take two actions: schedule ahead of time and make day-of usage decisions.

Buy subscription load at OAT rates (a fixed monthly charge)

Participant schedules pump usage based on hourly dynamic offer prices (1-7 days ahead)

Pay dynamic offer price for scheduled usage **above** subscription amount

Receive dynamic offer price for scheduled usage **below** subscription amount

Participant makes real-time usage decisions

Pay / receive ex-post price for differences between actual usage and subscription + scheduled usage

Legend

Boxes indicate a step that happens without participant intervention / choice

Hexagons indicate a step where the participant takes an action

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Customers view a heat map of dynamic offer prices when scheduling load.

Hour Ending	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
12	$ 0.10	$ 0.10	$ 0.10	$ 0.10	$ 0.10	$ 0.10
13	$ 0.10	$ 0.15	$ 0.15	$ 0.10	$ 0.15	$ 0.10
14	$ 0.10	$ 0.20	$ 0.20	$ 0.10	$ 0.20	$ 0.10
15	$ 0.10	$ 0.30	$ 0.30	$ 0.10	$ 0.30	$ 0.10
16	$ 0.15	$ 0.40	$ 0.40	$ 0.15	$ 0.40	$ 0.15
17	$ 0.20	$ 0.50	$ 0.50	$ 0.20	$ 0.50	$ 0.20
18	$ 0.30	$ 0.50	$ 0.50	$ 0.30	$ 0.50	$ 0.30
19	$ 0.50	$ 0.50	$ 0.50	$ 0.40	$ 0.50	$ 0.50
20	$ 0.40	$ 0.40	$ 0.40	$ 0.40	$ 0.40	$ 0.40
21	$ 0.30	$ 0.30	$ 0.30	$ 0.30	$ 0.30	$ 0.30
22	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20
23	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20
24	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20

- Note: This figure is for demonstration purposes only and does not reflect actual dynamic offer prices.

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Automation enables participants to respond to TOU.

Program Average
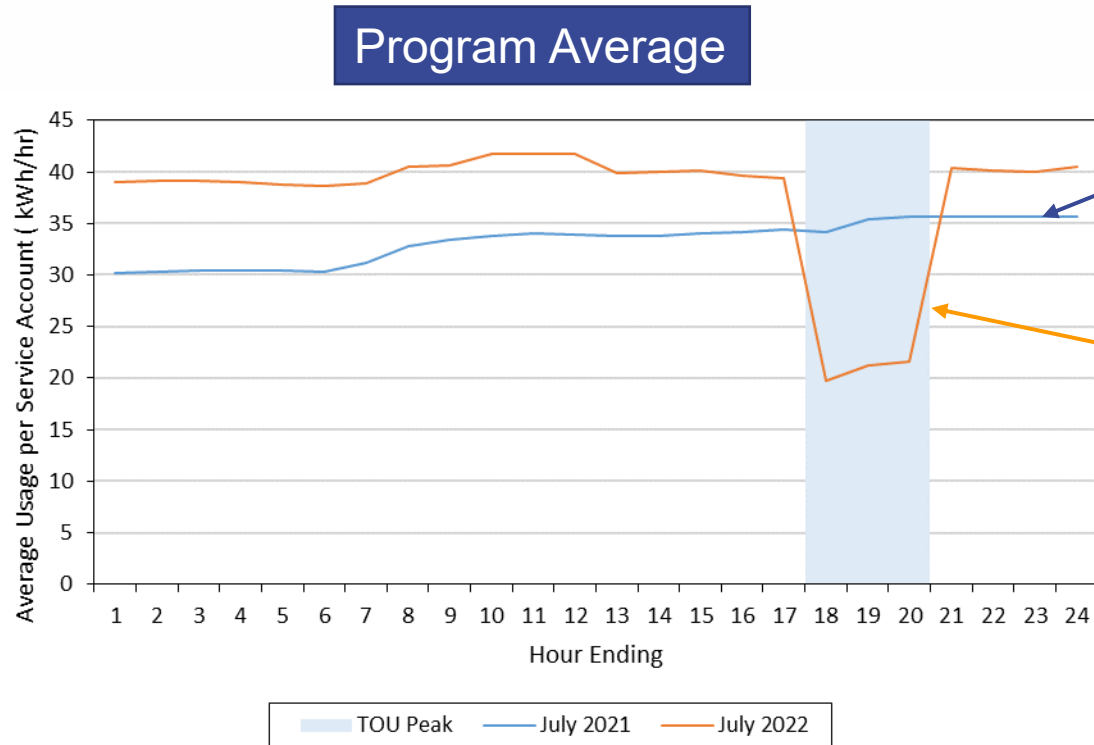
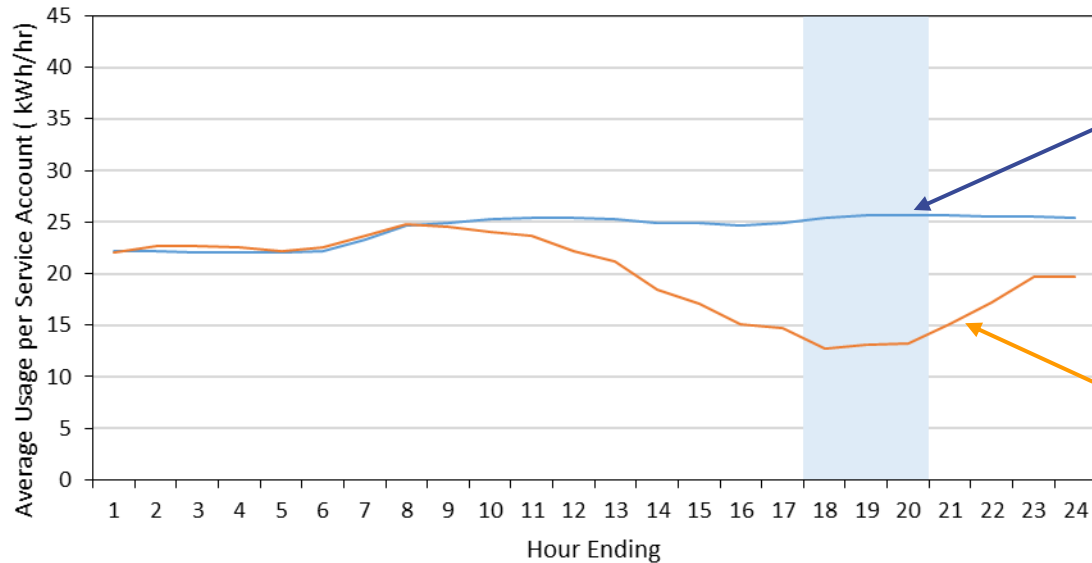Before automation technology, July 2021, usage shows *no reduction* in TOU peak period

After automation technology, July 2022, usage shows *reduction* in TOU peak period

- Higher usage in off-peak hours
  - More likely due to different overall pumping demand (i.e., based on weather and crops) than a shift from peak to off-peak hours

We don't have data to determine whether customers respond to dynamic pricing in the absence of automation.

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Dynamic pricing facilitates a load response outside of TOU peak period.


Program Average

Before automation technology **and** dynamic pricing, August 2021, usage shows *no reduction* in TOU peak period

After automation technology **and** dynamic pricing, August 2022, usage shows *reduction* in TOU peak period and surrounding hours

Figure Note: The August 2022 loads illustrate a partial month after dynamic pricing was in place on August 15th.

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Compared to TOU, dynamic pricing can improve price response outside of the peak period.
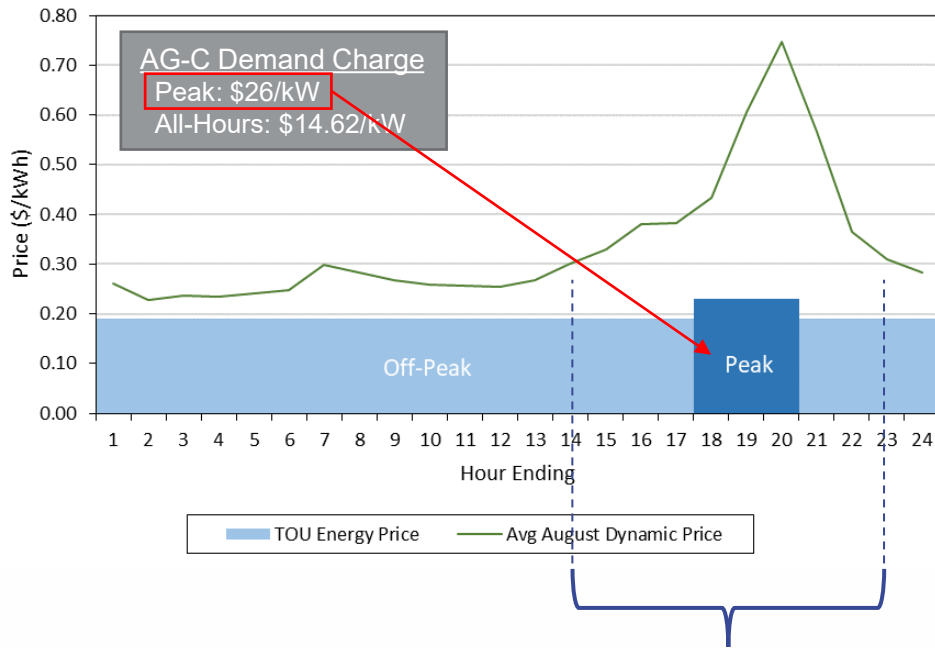
Note: Dynamic Price represents the ex-post (spot) price
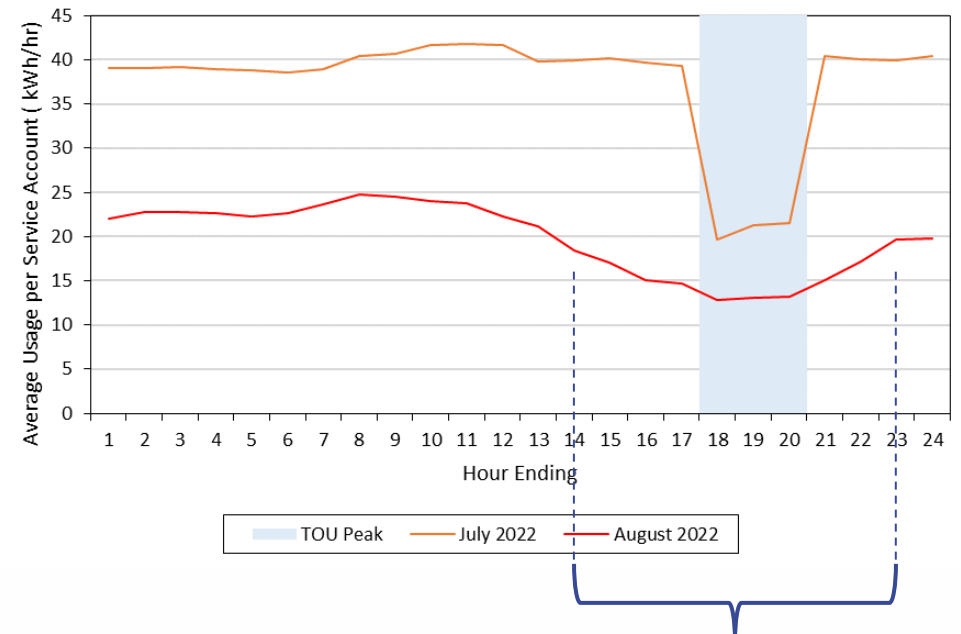
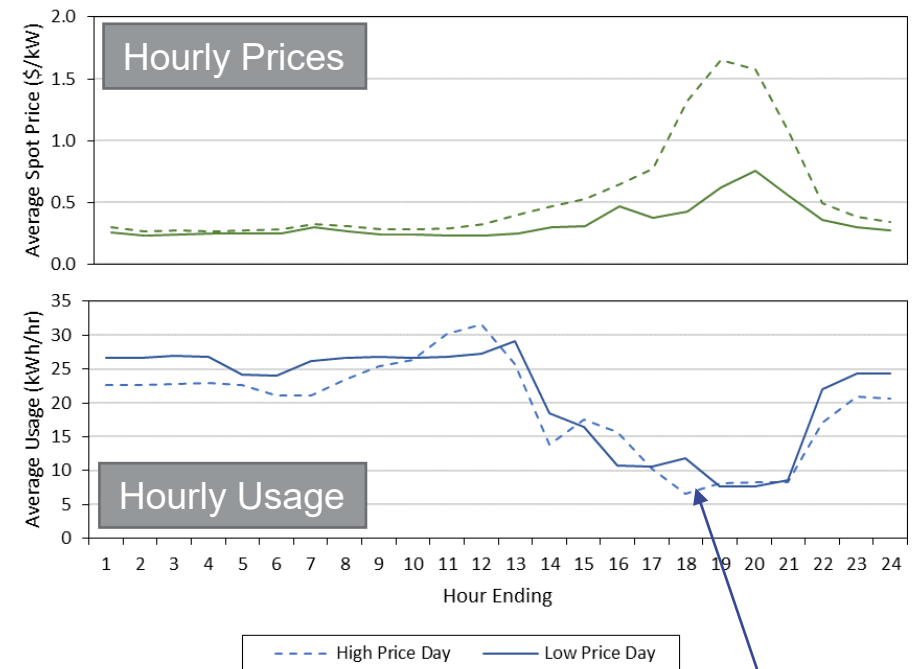Note: August irrigation demand was lower than July

Participant #2 did not differentiate its response on high- vs. low-price days.

Participant #1
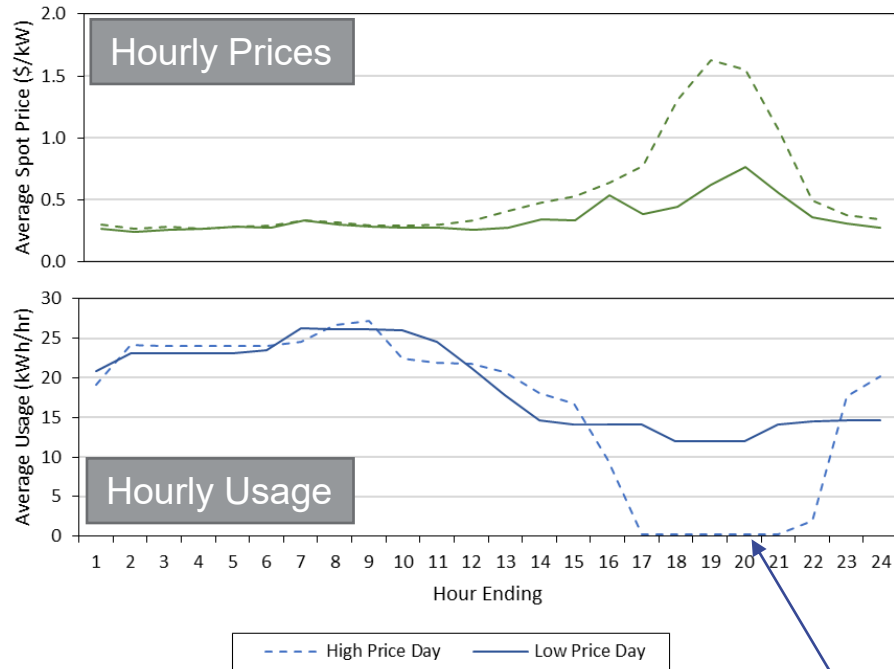
Participant #2

Peak usage reaches zero on high-priced day

Usage is similar between high and low-priced days

Figure Details:
- Low Price Days: August 23 – 25
- High Price Days: September 6 – 7
- Price indicates the ex-post (spot) price

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Observed transactions show that subscription quantity did not accurately track the intermittent demand of pumps.
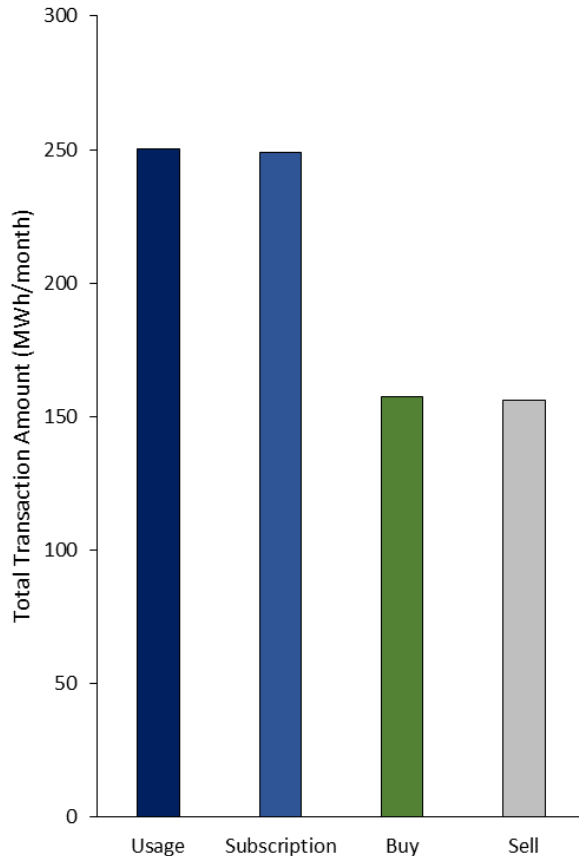

Figure Details:
- Program Total
- Period is Aug 15 – Sep 14, 2022

- Subscription load is an average of last year's monthly usage.
- Pumping loads are intermittent (i.e., running or not running) throughout each week.
- As a result:
  - *On average*, the subscription quantity is a good reflection of observed usage. (I.e., the figure shows that total Usage is close to the Subscription quantity.)
  - *In any given hour*, the subscription quantity is not likely to match observed usage. (I.e., the figure shows relatively high Buy and Sell amounts at the dynamic offer prices and ex-post prices.)

The subscription pricing model may not provide a good hedge against isolated dynamic price spikes but may provide a good hedge against persistently high dynamic prices (such as week-long heat waves).

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RECAP: Key takeaways for two agricultural participants during PY2022.

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- Automation enables load response for **BOTH** TOU and Dynamic Pricing tariffs.
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- Subscription pricing does not accurately reflect intermittent Ag pumping loads.
  - Can still provide a good hedge against persistent high prices.
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Recommendations.

- Automation technology facilitates participant response to TOU and dynamic pricing.
  - Incentivizing the adoption of automation technologies for agricultural customers may provide benefits under both rate structures.
  - It may be useful to compare the potential benefits from response to TOU pricing vs. dynamic rates.
    - E.g., TOU customers may reduce usage during all Peak hours, including when marginal energy costs are low.
    - The pilot is not designed to systematically test this comparison (i.e., no "control group" with automation and TOU rates to compare to customers with automation and dynamic pricing).

- Conclusions may evolve as more participants join the pilot, participants learn over time, and more price day-types are experienced.
  - The revised (2.0) pricing method may affect customer behavior and satisfaction. It replaces the subscription pricing model with a per-kWh adjustment to dynamic prices.
  - 6 customers are currently enrolled in the Pilot, accounting for 49 pumps.

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Questions and Discussion.

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(END OF ATTACHMENT B)