

Peer-to-peer Energy Trading

The global economy is in the midst of a transition to clean and renewable energy sources. Power companies face massive disruption, and they must adopt new business models to avoid irrelevancy. AGL, a major Australian energy company, approached The Data Guild with a simple request: to help explore the potential for peer-to-peer energy trading between residential customers.

How We Engaged

We were brought in by the leader of the company's New Energy group, the division responsible for "future-proofing" the business model under conditions of disruptive change. While our partners knew the basic space they wanted to explore – **p2p energy trading for residential power customers** – we were given little guidance on intended customer benefits, features, or the eventual business model. Given this greenfield setting, we proposed a two-month **exploration, conceptualization, and scoping phase** in order to understand the customer context and pains before diving into implementation.

Once we had found our bearings and achieved conceptual buy-in from our partners, we executed a **four month implementation phase**: we built a fully-functional pilot, rolled it out to a population of test users, and collected feedback along the way.

We worked closely with our partners throughout, including constant discussions and several on-site visits; in effect, we joined forces as a single agile product team. AGL provided market expertise, business guidance, and access to customers, while the Guild set overall product strategy, chose the technologies, architected the system, performed user research, and designed and built the product. Our team comprised a project lead, project manager, lead designer, front-end engineer, a back-end engineering team, and support on overall strategy from Guild leadership.



A residence with both solar PV and dispatchable storage

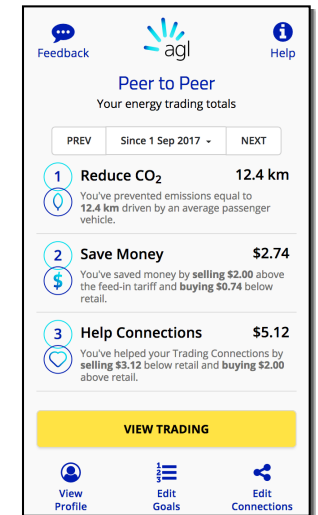
What We Made

During the implementation phase, **we architected, designed, built, and launched a fully-functional pilot energy trading system**. In light of the research from our exploratory phase, we adopted the following design principles:

- ▶ **Set and forget**: users specify general preferences, and then trading proceeds automatically
- ▶ **Feedback**: users see at a glance, in real-time what the system is achieving on their behalf
- ▶ **Recognition**: users receive credit and attribution for their contribution to the community's well-being

Major software components included:

- ▶ User-facing HTML5 **web app**
- ▶ Cloud-based, **distributed system** for data ingestion and control orchestration
- ▶ **Energy market** for matching sellers and buyers to create trades in a utility-maximizing fashion
- ▶ **Intelligent agents** to trade under user priorities
- ▶ Residential battery **dispatch controller**
- ▶ **Ingestion and storage components** for battery system and solar PV operational metrics, local weather, and wholesale energy price data



A screen from the user-facing web app

In the final phase of our engagement, we **deployed the pilot** to a test population, observed their usage of the system, and gathered feedback from participants.

Outcomes

At the earliest stages of product development, **learning about the market – user pains, preconceptions, and personas – is even more important than pure technical execution**; after all, it's easy to do an excellent job of building the wrong thing. In this case, The Data Guild worked closely with our partners to **balance research, design, and development**. As a result, we learned quite a bit about how retail power customers would value and respond to this new kind of offering, and we also implemented a flexible, scalable platform as a basis for further development.

In the end, our partner organization adopted a new strategic direction, which removed further support for this and other innovation initiatives. Our organizational learning from this effort was substantial, however, and the Guild is currently exploring pathways to apply our substantial learnings from this project in other markets and settings.