CSCI 765

Project Overview - IX Portal

Project Overview

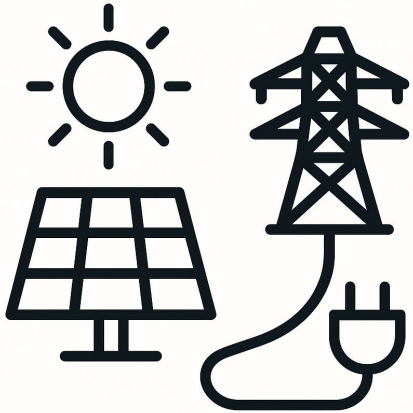
Main Objective

- **Build a database-driven interconnection portal** that models how electric residential utility customers apply to connect solar panels to the grid.

Final result

- https://ixport.vercel.app/

What is “Interconnection”?



Interconnection

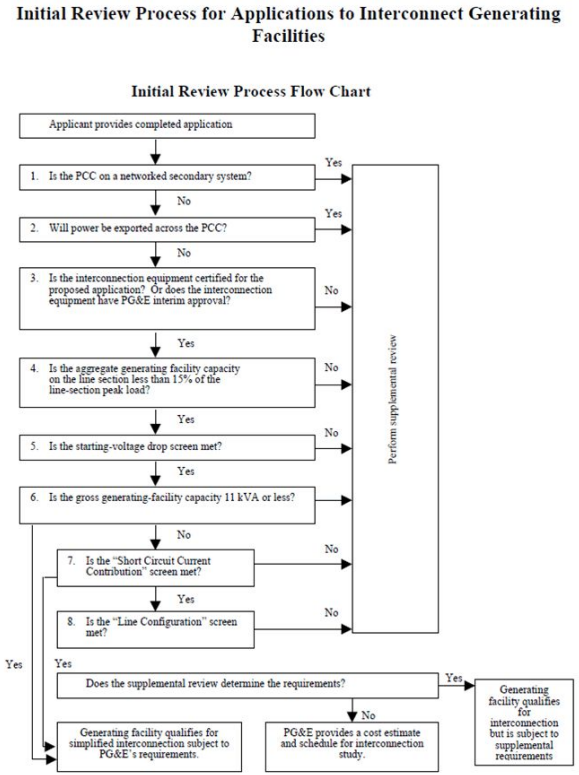
- **Solar interconnection is the process of connecting a solar energy system to the electricity grid,** allowing homeowners to both use the power generated by their solar panels and export excess energy back to the grid.

- This **process involves submitting an application online** to the local utility, getting approval for installation, and finally, receiving permission to operate the system

What is an “Interconnection Portal”?

The Interconnection Portal refers to the website (i.e. IX portal) that tracks the interconnection process. The portal is accessible by *both* the customer and utility provider, as well as any third-parties including solar developer installers (i.e. companies that are contracted for hire to install rooftop panels)

What's the Problem??



- **Interconnection Process IS COMPLICATED!**
- **Current problem: interconnection applications often are "withdrawn" due to the complexity and delays the process.** Ideally an application completes in 2-3 months, but often times can take over a year.
- **Interconnection portals can be difficult to use for communication and capturing vital data.** It's hard for both customers/utility providers to understand the different approval stages. IX apps often get "stuck" in the queue and don't progress past certain stages.

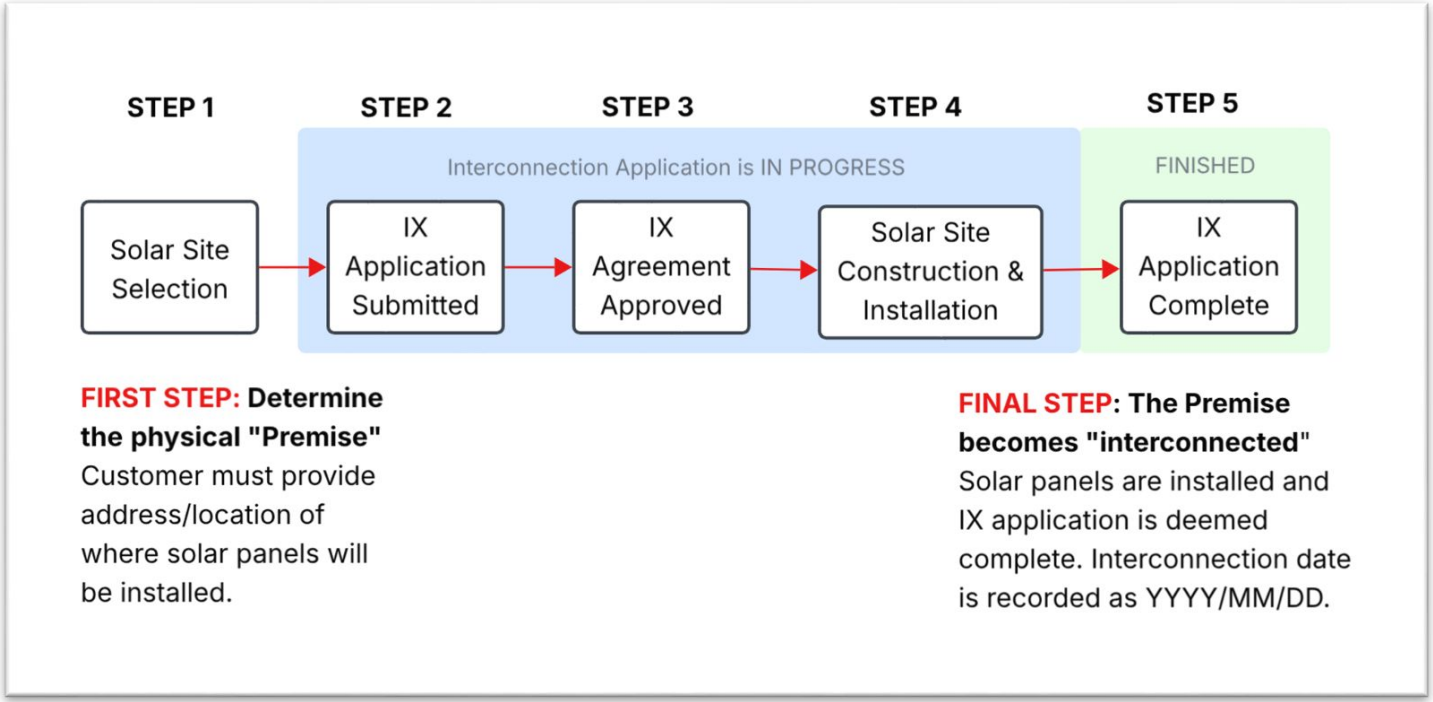
Concept

- **Concept is very simple: make a *simplified* interconnection portal (IX portal).** The solution would model key entities: customer applicant, installer, application, solar system specs, etc.

- **The IX portal would allow visualization of interconnection approval process, using a database to track all information.** This would be more useful than cumbersome processes, like customers sending emails to utilities and not getting a timely response, or trying to manage all this through sharing timelines in spreadsheets.

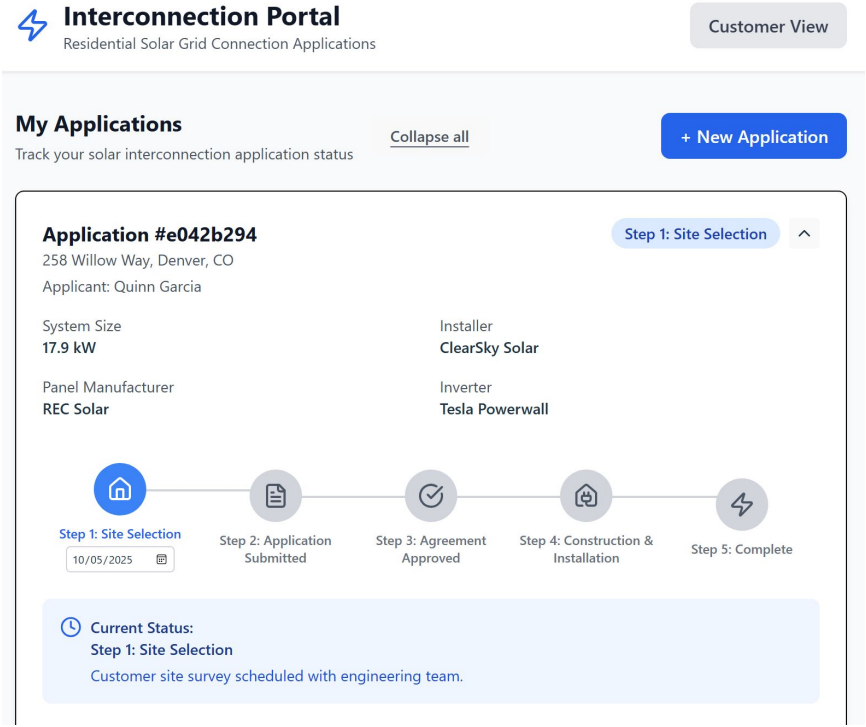
Simplified Interconnection Process

IX App Process: Application Stages broken into 5 Main Steps

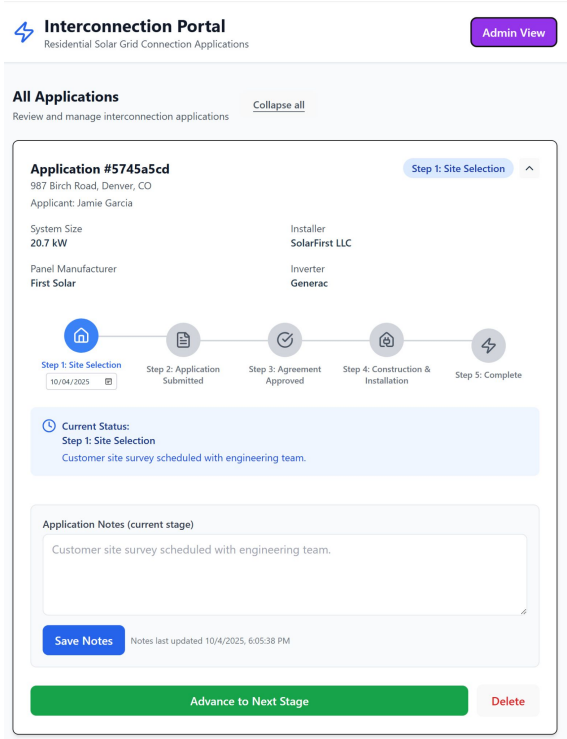


2 Main Views

Customer View



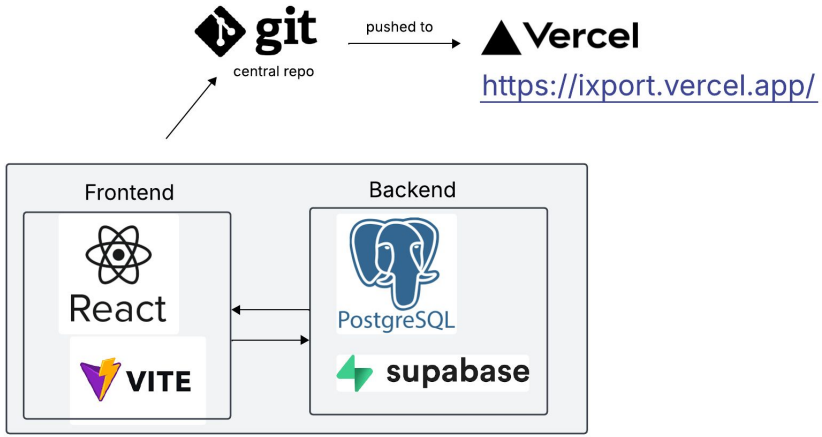
Admin View



Implementation

Tech Stack Overview

- Frontend
  - **React** (using Vite)
- Backend
  - **PostgreSQL** (using Supabase)
- Deployment
  - **Git** (Github linked with Vercel)



Key Topics

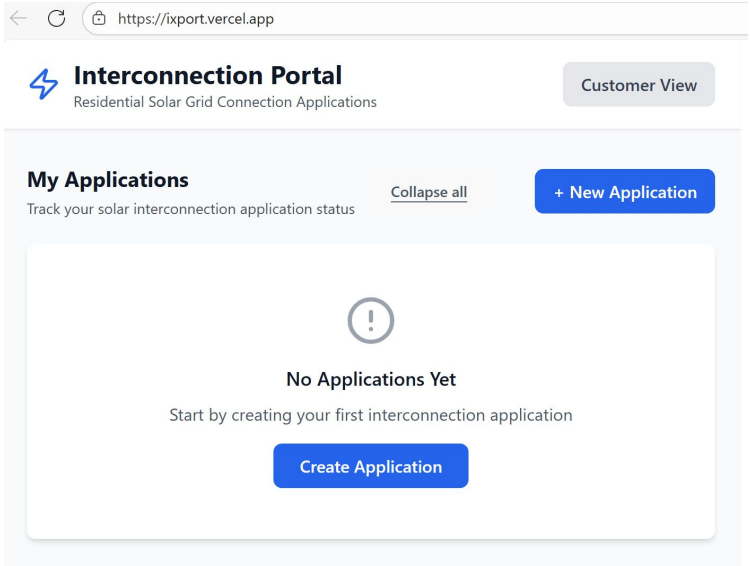
- **ER Modeling & Relational Mapping**
  - ER diagram helps represent and reflect real-world interconnection process
  - Relational Mapping crucial in defining PK/FK relationships

- **SQL DDL and Schema Design**
  - SQL Data Definition Language (DDL) enforces constraints (UNIQUE, NOT NULL)

- **Information Retrieval**
  - Ability to see all IX app information in UI and run queries on backend
  - Answer questions like “how many applications are completed?”

Try it out - Interactive Demo

https://ixport.vercel.app/



- **Final result - live demo, try it out, create an interconnection application!**
- Note: no information is real, this is all dummy data and for illustrative purposes