

CSCI 765

Project Overview - IX Portal



Project Overview



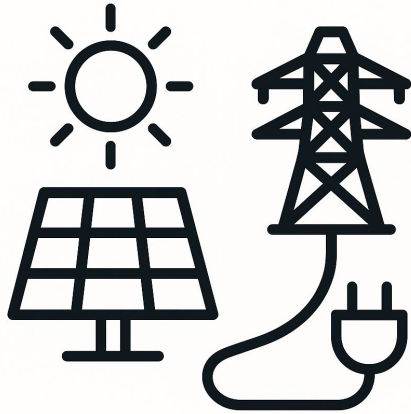
Main Objective

- **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

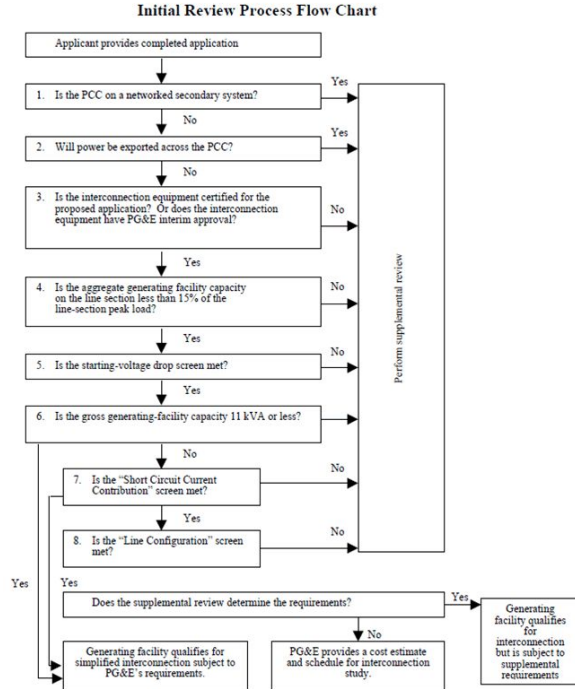
What is an “Interconnection Portal”?



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??

Initial Review Process for Applications to Interconnect Generating Facilities



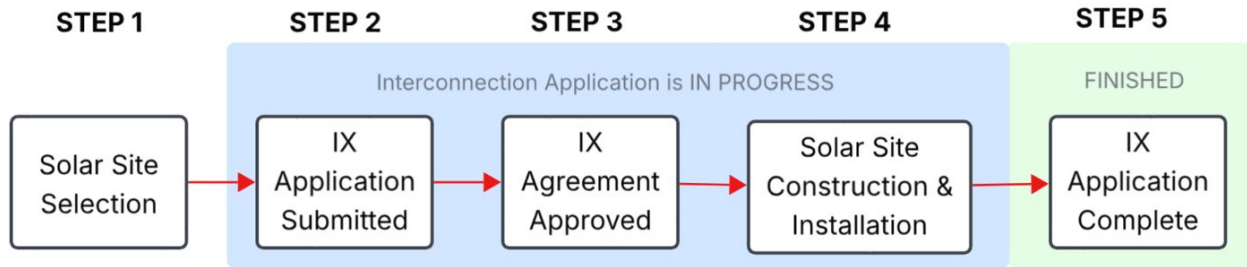
- **Interconnection Process IS COMPLICATED!**
- **Current problem: interconnection applications often are “withdrawn” due to the complexity and delays the process.** Ideally an application completes in 2-3 months, but often times can take over a year.
- **Interconnection portals can be difficult to use 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



FIRST STEP: Determine the physical "Premise"

Customer must provide address/location of where solar panels will be installed.

FINAL STEP: The Premise becomes "interconnected"

Solar panels are installed and IX application is deemed complete. Interconnection date is recorded as YYYY/MM/DD.

2 Main Views

Customer View



Customer View

My Applications

Track your solar interconnection application status

[Collapse all](#)

[+ New Application](#)

Application #e042b294

258 Willow Way, Denver, CO
Applicant: Quinn Garcia

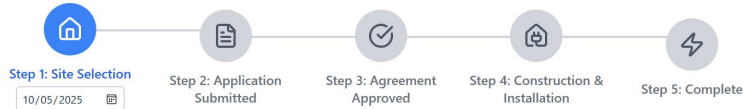
System Size
17.9 kW

Panel Manufacturer
REC Solar

Installer
ClearSky Solar

Inverter
Tesla Powerwall

Step 1: Site Selection



Current Status:
Step 1: Site Selection
Customer site survey scheduled with engineering team.

Admin View



Admin View

All Applications

Review and manage interconnection applications

[Collapse all](#)

Application #5745a5cd

987 Birch Road, Denver, CO
Applicant: Jamie Garcia

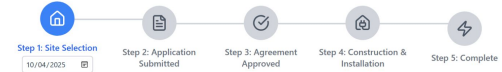
System Size
20.7 kW

Panel Manufacturer
First Solar

Installer
SolarFirst LLC

Inverter
Generac

Step 1: Site Selection



Current Status:
Step 1: Site Selection
Customer site survey scheduled with engineering team.

Application Notes (current stage)

Customer site survey scheduled with engineering team.

[Save Notes](#)

Notes last updated 10/4/2025, 6:05:38 PM

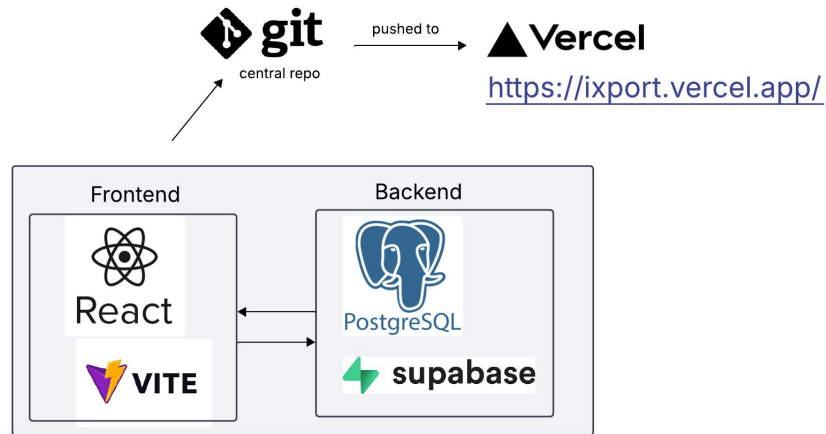
[Advance to Next Stage](#)

[Delete](#)

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**

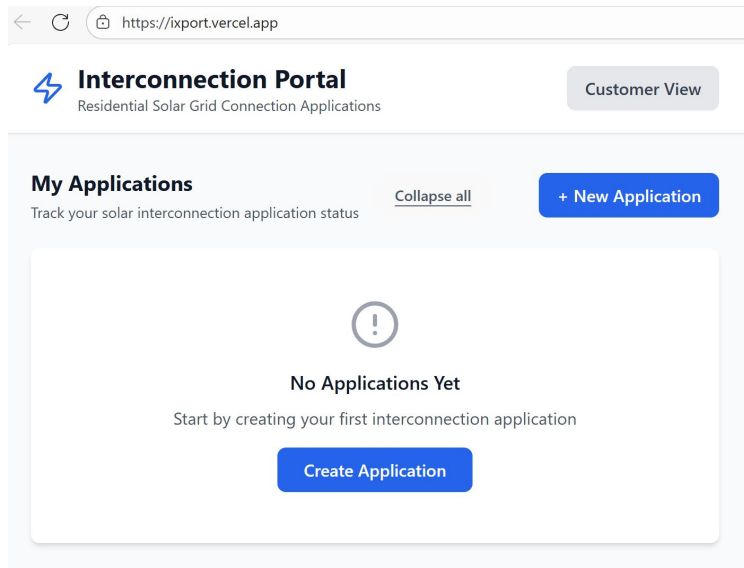
- SQL Data Definition Language (DDL) enforces constraints (UNIQUE, NOT NULL)

- **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