Solar Dashboard Web Tool

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Key Assumptions

- Electricity prices fixed at **Sept 2025 U.S. averages**.
- System size in **kW DC** (direct input or roof-to-density conversion).
- **Panel efficiency & density** treated as constants
- **Customer types** (residential, commercial, average) use different baselines but the same model.
- System lifetime assumed at **25 years**.

Financial Model

Inputs: System size, state, customer type, constants.
Core Calculations:

- Upfront Cost = Size × State Price/kW
- Annual Generation = Size × Sun Hours × Performance Ratio
- Annual Savings = Generation × Electricity Rate
- Cash Flow = Annual Savings – O&M
- Cumulative Flow = Σ Cash Flows – Upfront Cost
- Payback = Year when cumulative > 0
- IRR = Discount rate where NPV = 0

Outputs:

- **KPIs**: Upfront Cost, Annual Generation, IRR, Payback
- **Visuals**: 25-year cash flow table & chart

Technical Architecture

- **Framework**: React + Vite
- **Components**:
  - *Inputs* (user values)
  - *SummaryCards* (KPIs)
  - *CashFlowChart* (25-year chart)
  - *CashFlowTable* (financial breakdown)
- **Utilities**:
  - *finance.js* (calculations)
  - *statePrices.js* (state costs)
  - *priceTool.js* (helpers)
- **Testing**: Jest / React Testing Library

Deployment: `npm run dev`, deployable to Netlify/Vercel