Project Report: EV Battery Explorer

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**Overview:**

"EV Battery Explorer" is a responsive, interactive web project designed to educate users about various types of electric vehicle (EV) batteries, major manufacturers, and comparison metrics. The project comprises three main HTML pages: index.html, brands.html, and learnmore.html, along with associated JavaScript and CSS files to enable dynamic features and a modern UI/UX.

**Software Tools & Technologies Used:**

* Languages: HTML5, CSS3, JavaScript
* Libraries/Frameworks:
  + Font Awesome for icons
  + Google Fonts (Roboto)
* Storage: LocalStorage (for dark/ light theme and video watched status)

**Functional Components:**

1. **Homepage (index.html):**

* Introduces users to EV batteries using descriptive content and animated image.
* Dynamically generates battery type cards via script.js, showing images, names and features.
* Each card is clickable to expand and show more details.
* JavaScript File: script.js

1. **Brands Page (brands.html):**

* **Displays leading EV battery companies (e.g. Tesla, CATL, LG Chem)**
* **Each brand is represented with a logo, summary, and expandable details section (Battery type, Market Share, Key Innovation and company website link)**
* **Functionality: Clicking “Explore Details” expands a card to reveal metrics like market share and innovations**
* **JavaScript File: brand.js**

1. **Learn More Page (learnmore.html):**

* Provides educational videos for each battery type using embedded Youtube videos
* Includes a filter feature to show videos by battery type.
* "Mark as Watched" button tracks watched videos using localStorage.
* Comparison Tool: Allows users to compare two selected battery types across energy density, cost, and cycle life.
* JavaScript File: comparison.js

**Styling and UX Enhancements:**

**style.css:**

* Sets a clean and modern design using the Roboto font and subtle animations.
* Implements a responsive grid layout for battery cards, brand sections, and video displays, adapting to different screen sizes.
* Adds hover effects, transitions, and box shadows to enhance card interactivity and depth.
* Supports dark mode styling by toggling a dark-mode class, changing background colors, text, and buttons for better night-time viewing.
* Ensures mobile-friendly layout using media queries, improving readability and navigation on smaller screens.

**JavaScript Files & UX Features:**

* script.js: Dynamically creates battery cards with expandable descriptions and smooth toggle animation.
* brands.js: Adds functionality to show/hide brand details with one open section at a time for cleaner interaction.
* comparison.js: Powers the battery comparison tool with clear metric display and validation to prevent duplicate selections.
* darkMode.js:
  + Handles light/dark mode toggle and saves the preference using localStorage.
  + Adds filtering and watched tracking features to video cards on the Learn More page.

**What was tried:**

* + **Responsive Card layout:** Grid layouts adapt well across different screen sizes.
  + **Expandable Brand Details:** Brand cards in Brands page expand to show hidden content on button click.
  + **Static Feature cards:** Battery type cards on the homepage show image and description after clicking on them immediately, they are styled as interactive but do not expand/collapse.
  + **Video Filter by Battery type:** Dropdown filter works correctly on the Learn More page.
  + **“Mark as watched” Feature:** Toggles watch status and save it with localStorage
  + **Battery Comparison Tool:** Effectively compares Energy Density, Cycle life and cost for any different battery types.
  + **Dark Mode Toggle:** Works across all pages and saves the loaded theme using localStorage.

**Challenges & Fixes:**

**Issues:**

* Overlapping open detail sections in Brand pages.
* Clicking a battery card moves the entire homepage down.
* Homepage cards were not behaving independently.
* Layout not responsive on real phones.

**Fixes:**

* Used logic to close all details sections before opening a new one.
* Set battery card dimensions and the inner content were hidden until clicked on the battery cards and then the description and the image appear.
* Ensured only inner content of battery cards toggled without affecting other elements.

**Failed:**

While the site resizes well on laptops where the layout is responsive when making the screen smaller but full responsiveness fails on actual mobile devices and needs improvements.

**Conclusion:**

This project successfully combines educational content with interactivity to help users explore EV battery technology. Despite some remaining responsiveness issues on mobile devices, most goals were met with clear structure, engaging visuals, and interactive elements.