Define Scope

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Define Scope Process

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Define Scope Process: Self-Charging Electric Vehicle (SCEV) Project

1. Introduction

This document defines the scope of the "Self-Charging Electric Vehicle" (SCEV) project, outlining the project's objectives, deliverables, and boundaries. This project aims to develop a revolutionary electric vehicle that significantly reduces reliance on traditional charging infrastructure by harvesting ambient energy. The scope will be managed iteratively,

adapting to learnings and technological advancements throughout the project lifecycle.

2. Process Overview

This project utilizes an iterative scope definition process, incorporating feedback and adjustments at each milestone.

Key Objectives:

- Define the functional and non-functional requirements for the SCEV.
- Identify and document all project deliverables.
- Establish clear acceptance criteria for each deliverable.
- Define project boundaries and explicitly state exclusions.
- Create a baseline scope statement for project tracking and change management.

Process Flow:

1. **Initial Requirements Gathering & Analysis:** Detailed analysis of the provided project concept document, including the core technologies (advanced photovoltaic body panels, regenerative suspension system, thermoelectric generation, and AI-powered energy management unit).
2. **Scope Statement Development:** Creation of a comprehensive scope statement incorporating requirements, deliverables, acceptance criteria, constraints, assumptions, and exclusions.
3. **Stakeholder Review & Validation:** Presentation of the scope statement to key stakeholders (engineering, design, marketing, and executive leadership) for review and feedback. This will involve facilitated workshops to address questions and concerns.
4. **Scope Baseline Establishment:** Formal approval of the scope statement by the project sponsor, establishing the project's baseline scope. A change management process will be defined to handle future scope changes.
5. **Iterative Refinement:** The scope will be revisited and refined at the end of each milestone (M1-M4), incorporating lessons learned and

adapting to technological challenges or opportunities.

3. Inputs and Tools

Primary Inputs:

- Project Charter (to be created)
- Project Concept Document (provided)
- Stakeholder Register (to be created)
- Technology Feasibility Studies (to be conducted during M1)

Tools and Techniques:

- **Expert Judgment:** Leveraging expertise in automotive engineering, renewable energy, AI, and software development.
- **Product Breakdown Structure (PBS):** Decomposing the SCEV into its constituent components and subsystems.
- **Work Breakdown Structure (WBS):** Decomposing the project into manageable tasks and sub-tasks.
- **Prototyping:** Developing and testing prototypes to validate design choices and technological feasibility.
- **Simulation:** Utilizing digital twin modeling to simulate energy harvesting and management under various conditions.
- **Facilitated Workshops:** Engaging stakeholders in collaborative sessions to review and validate the scope.

4. Scope Definition Activities

4.1 Requirements Analysis: This phase will meticulously detail the functional and non-functional requirements for the SCEV, encompassing:

- **Functional Requirements:** Specific functionalities the SCEV must perform (e.g., energy harvesting from solar, kinetic, and thermal sources; efficient energy management; user interface displaying energy generation and consumption; integration with existing EV systems).

- **Non-Functional Requirements:** Performance characteristics (e.g., energy efficiency, range extension, safety, durability, reliability, maintainability).
- **Constraints:** Limitations imposed by budget, technology availability, regulatory compliance, and time constraints.
- **Assumptions:** Underlying assumptions made regarding technology maturity, component availability, and market conditions.

4.2 Scope Boundaries: This section clearly defines what is included and excluded from the project.

- **Included:** Development of the core energy harvesting technologies (photovoltaic panels, regenerative suspension, TEG), the AI-powered energy management unit (EMU), integration of these systems into a test mule vehicle, and data collection and analysis.
- **Excluded:** Full-scale manufacturing, mass production, marketing and sales, long-term field testing beyond the initial test mule phase, development of a complete consumer-ready vehicle. These will be considered in future phases.

4.3 Deliverables: This section outlines the key deliverables for each milestone:

- **M1:** Feasibility reports, simulation results, technology selection documentation.
- **M2:** Functional prototypes of the three core hardware systems (photovoltaic panel, regenerative shock absorber, TEG unit).
- **M3:** Integrated test mule vehicle, real-world performance data.
- **M4:** Functional v1.0 EMU prototype capable of data acquisition and logging.

5. Project Scope Statement (Template)

A formal Project Scope Statement will be created and approved, including the following sections:

- **Project Goal:** To develop and demonstrate a functional prototype of a self-charging electric vehicle system.
- **Project Objectives:** Specific, measurable, achievable, relevant, and time-bound objectives aligned with the milestones.
- **Product Scope Description:** Detailed description of the SCEV system, including its features and functionalities.
- **Project Deliverables:** List of all project deliverables, organized by milestone.
- **Acceptance Criteria:** Specific criteria for accepting each deliverable.
- **Project Constraints:** Resource limitations, regulatory compliance requirements, and technological limitations.
- **Assumptions:** Assumptions about technology availability, development timelines, and external factors.
- **Exclusions:** Clearly defined activities and deliverables that are explicitly excluded from the project scope.

6. Validation Process

The scope statement will undergo a rigorous validation process involving:

- **Technical Review:** Assessment by engineering and technology experts.
- **Business Validation:** Review by business stakeholders to ensure alignment with business goals.
- **Sponsor Approval:** Formal approval by the project sponsor.
- **Baseline Establishment:** The approved scope statement will be established as the project baseline, forming the basis for future project management and change control.

This Define Scope process provides a robust framework for managing the SCEV project. The iterative nature of the process allows for flexibility and adaptation as the project progresses and new information becomes available.