

# Scope Management Plan

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## Scope Management Plan

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## Scope Management Plan: Self-Charging Electric Vehicle (SCEV) Project

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### 1. Introduction

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This Scope Management Plan outlines the processes and procedures for managing the scope of the Self-Charging Electric Vehicle (SCEV) project. It

adheres to PMBOK Guide 7th Edition standards and provides a framework for planning, defining, verifying, and controlling the project scope throughout its lifecycle. The plan aims to minimize scope creep, ensure stakeholder alignment, and deliver a successful product.

## 2. Project Overview

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**Project Name:** Self-Charging Electric Vehicle (SCEV)

**Project Goal:** Develop a prototype self-charging electric vehicle that significantly reduces reliance on traditional charging infrastructure by harvesting ambient energy (solar, kinetic, thermal).

**Project Deliverables:** A functional prototype integrating advanced photovoltaic body panels, a regenerative suspension system, a thermoelectric generation (TEG) unit, and an AI-powered Energy Management Unit (EMU) capable of data logging (M1-M4). Subsequent phases (not included in this initial scope) would involve further EMU development (control logic), more comprehensive testing, and potentially a fully functional vehicle.

**Project Constraints:** Technological feasibility of components, budget limitations, available skilled labor, and regulatory compliance.

**Project Assumptions:** Successful research and development of core technologies, access to necessary testing facilities, and collaboration with relevant external partners.

## 3. Scope Planning

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### 3.1 Scope Planning Activities:

- **Requirements Gathering:** Detailed specifications for each energy harvesting system (photovoltaic, kinetic, thermal) will be defined, including performance targets and technical specifications. User stories will be developed to define the functionality and user interface of the EMU.

- **Scope Definition:** A comprehensive project scope statement will be created, clearly defining what is included (in-scope) and excluded (out-of-scope) from the project. This will include a detailed Work Breakdown Structure (WBS).
- **WBS Development:** The WBS will decompose the project into manageable work packages, focusing on the four core milestones (M1-M4) outlined in the project description. Each work package will have clearly defined deliverables and acceptance criteria.
- **Acceptance Criteria Definition:** Specific, measurable, achievable, relevant, and time-bound (SMART) acceptance criteria will be defined for each deliverable. This includes performance metrics for each energy harvesting system and functionality criteria for the EMU.
- **Scope Baseline Establishment:** Once the scope statement and WBS are approved, a formal scope baseline will be established. This baseline will serve as the reference point for managing future changes.

### 3.2 Scope Planning Inputs:

- Project charter
- Stakeholder requirements (gathered through interviews, workshops, and documentation review)
- Organizational process assets (templates, best practices)
- Expert judgment (from engineers, scientists, and industry experts)

### 3.3 Scope Planning Outputs:

- Project scope statement
- Work Breakdown Structure (WBS)
- WBS Dictionary
- Scope baseline
- Requirements traceability matrix

## 4. Scope Definition

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### 4.1 Project Scope Statement: (Detailed below in Section 5)

## 4.2 Work Breakdown Structure (WBS): (Detailed below in Section 6)

# 5. Detailed Project Scope Statement

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## 5.1 Product Scope Description:

### In Scope:

- **Milestone 1 (M1): Component Feasibility & Simulation:**  
Research, benchmarking, and simulation of photovoltaic, kinetic, and thermoelectric technologies. Creation of a digital twin for energy gain simulation under various conditions.
- **Milestone 2 (M2): Prototype Development:** Development and lab testing of functional prototypes for photovoltaic body panel section, a single regenerative shock absorber, and a TEG unit for a battery pack.
- **Milestone 3 (M3): Test Mule Integration:** Integration of the M2 prototypes into an existing EV ("test mule") for real-world data collection.
- **Milestone 4 (M4): Energy Management Unit (EMU) v1.0:**  
Development of the initial EMU hardware and software for data acquisition and logging.

### Out of Scope:

- Full integration of all systems into a complete vehicle.
- Development of the EMU control logic (postponed to future phases).
- Extensive road testing and performance validation beyond data collection from the test mule.
- Manufacturing and production processes.

## 5.2 Project Deliverables: (Detailed in the WBS, Section 6)

## 5.3 Project Constraints:

- **Budget:** [Insert Budget Amount]

- **Schedule:** [Insert Project Timeline] (Defined by milestone completion dates)
- **Resources:** [List available resources – personnel, equipment, software]
- **Technology:** Availability and performance of specific components.
- **Regulatory:** Compliance with all relevant safety and environmental regulations.

#### 5.4 Project Assumptions:

- Key technologies will achieve projected performance levels.
- Necessary resources (personnel, equipment, materials) will be available as planned.
- External collaborations will proceed as scheduled.

## 6. Work Breakdown Structure (WBS)

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The WBS will be a hierarchical decomposition of the project scope, organized around the four milestones. A sample structure is provided below. A detailed WBS with specific tasks and durations will be developed in a separate document.

### 1.0 Project: Self-Charging Electric Vehicle (SCEV) Prototype

- **1.1 Milestone 1: Component Feasibility & Simulation**
  - 1.1.1 Research & Benchmarking (Photovoltaic)
  - 1.1.2 Research & Benchmarking (Kinetic)
  - 1.1.3 Research & Benchmarking (Thermoelectric)
  - 1.1.4 Digital Twin Development
  - 1.1.5 Simulation & Analysis
- **1.2 Milestone 2: Prototype Development**
  - 1.2.1 Photovoltaic Panel Prototype
  - 1.2.2 Regenerative Shock Absorber Prototype
  - 1.2.3 TEG Unit Prototype
  - 1.2.4 Prototype Testing & Validation
- **1.3 Milestone 3: Test Mule Integration**
  - 1.3.1 Prototype Installation

- 1.3.2 Data Acquisition System Setup
- 1.3.3 Data Collection & Analysis
- **1.4 Milestone 4: Energy Management Unit (EMU) v1.0**
  - 1.4.1 EMU Hardware Design & Fabrication
  - 1.4.2 EMU Software Development (Data Acquisition)
  - 1.4.3 EMU Integration & Testing

## 7. Scope Verification

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### 7.1 Verification Activities:

- **Inspections:** Regular reviews of progress against the WBS.
- **Technical Reviews:** Peer reviews of design documents and code.
- **Testing:** Unit testing of individual components, integration testing of systems, and data validation of the EMU.
- **Acceptance Testing:** Validation of the prototype against the defined acceptance criteria.
- **Formal Acceptance:** Stakeholder review and sign-off of deliverables.

### 7.2 Verification Criteria: (Defined for each deliverable within the WBS)

## 8. Scope Control

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### 8.1 Change Control Process:

1. **Change Request Submission:** All changes to the scope must be submitted via a formal change request form.
2. **Change Request Evaluation:** The project manager will evaluate the impact of the change request on scope, schedule, cost, and risk.
3. **Change Approval:** The change request will be reviewed and approved or rejected by the Change Control Board (CCB).
4. **Change Implementation:** Approved changes will be implemented, and the scope baseline will be updated accordingly.
5. **Change Verification:** The implemented changes will be verified to ensure they meet requirements and do not negatively impact other

aspects of the project.

## **8.2 Change Control Board (CCB):**

- Project Sponsor
- Project Manager
- Lead Engineer
- Business Analyst

## **9. Stakeholder Engagement**

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Regular communication with stakeholders (engineers, investors, potential customers) will be maintained throughout the project lifecycle to ensure alignment on scope and address any concerns promptly. This will involve meetings, progress reports, and presentations.

## **10. Scope Performance Measurement**

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Progress will be monitored against the WBS and scope baseline. Key performance indicators (KPIs) will include:

- Percentage of completed work packages
- Milestone completion dates
- Number and impact of change requests
- Variance from the scope baseline

## **11. Risk Management**

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A dedicated Risk Management Plan will identify and address potential risks to the project scope, including technological challenges, budget overruns, and schedule delays. Mitigation strategies will be defined and implemented proactively.

## **12. Document Control**

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This Scope Management Plan, along with the WBS and other project documents, will be maintained in a central repository (e.g., SharePoint) and version controlled to ensure consistency and accuracy.

This Scope Management Plan serves as a living document and will be reviewed and updated regularly throughout the project lifecycle to reflect changes and maintain its effectiveness.