Software Requirements Specification
for Solar Power System

Version 1.0

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1. Introduction

1.1 Purpose

This document specifies the software requirements for the Solar Power System.

It outlines the functions, constraints, and interface requirements to support the development process.

1.2 Document Conventions

This document follows IEEE SRS guidelines.

1.3 Intended Audience and Reading Suggestions

This SRS is intended for developers, testers, project managers, and stakeholders.

1.4 Product Scope

The system will monitor and manage solar energy generation, storage, and distribution to optimize efficiency.

1.5 References

[List relevant references such as standards, guidelines, and related documents.]

2. Overall Description

2.1 Product Perspective

The system integrates with solar panels, inverters, and energy storage units, providing real-time monitoring.

2.2 Product Functions

- Real-time solar energy monitoring

- Automated energy distribution

- User alerts and notifications

2.3 User Classes and Characteristics

- Homeowners

- Industrial energy managers

- Government regulatory agencies

2.4 Operating Environment

The system runs on cloud-based and on-premises servers with mobile and web-based applications.

2.5 Design and Implementation Constraints

- Compliance with energy regulations

- Integration with existing solar hardware

2.6 User Documentation

- User manuals

- Online help documentation

- Video tutorials

2.7 Assumptions and Dependencies

- Availability of internet connectivity for cloud-based services

- Compatibility with existing solar panel manufacturers

3. External Interface Requirements

3.1 User Interfaces

- Web-based dashboard

- Mobile application (iOS and Android)

3.2 Hardware Interfaces

- Solar panels

- Energy storage batteries

- Smart meters

3.3 Software Interfaces

- API for third-party integration

- Database for storing solar energy data

3.4 Communications Interfaces

- Wi-Fi and Bluetooth connectivity

- IoT integration for smart devices

4. System Features

4.1 Real-Time Energy Monitoring

Description and Priority

High-priority feature to track energy generation and consumption.

Stimulus/Response Sequences

- User logs into the system.

- System displays real-time energy metrics.

Functional Requirements

- REQ-1: System shall display energy generation metrics.

- REQ-2: System shall send alerts on abnormal energy consumption.

4.2 Automated Energy Distribution

Description and Priority

High-priority feature to optimize solar energy utilization.

Stimulus/Response Sequences

- System detects surplus energy.

- System redirects excess energy to storage.

Functional Requirements

- REQ-3: System shall automatically store excess energy.

- REQ-4: System shall notify users of energy status.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

- System shall provide real-time data updates within a maximum delay of 5 seconds.

5.2 Safety Requirements

- System shall prevent overload conditions by shutting down components safely.

5.3 Security Requirements

- System shall require multi-factor authentication.

5.4 Software Quality Attributes

- System shall have 99.9% uptime reliability.

5.5 Business Rules

- Energy consumption data shall be stored for a minimum of 12 months.

6. Other Requirements

- Support for international energy policies.

- Multi-language support.

Appendices

Appendix A: Glossary

[List definitions of key terms used in the document.]

Appendix B: Analysis Models

[Include diagrams such as data flow and state-transition diagrams.]

Appendix C: To Be Determined List

[Track unresolved issues or pending decisions.]

End of Document