# Milestone 1 - Identify a Problem to Solve

Milestone 1 is where you begin working on your course project, a proposal for your own autonomous AI. Your goal is to: propose a use case, describe the value of the problem, and analyze the current system and its limitations.

You may use one of the case studies presented in the course as examples, but we strongly encourage you to be innovative and curious enough to create your own.

## 1 | Use Case Title: Smart Energy Grid Optimization

## 2 | Use Case Overview *(<=100 words) Provide a brief description of the use case and the system that your autonomous AI will improve.*

Our autonomous AI aims to optimize the performance of a smart energy grid. The current system relies on traditional control methods, which may struggle with the dynamic nature of energy consumption and renewable energy sources.

## 3 | Use Case Value *(<=100 words) Explain the value of improving the performance of this system.*

Optimizing the smart energy grid will enhance energy efficiency, reduce costs, and promote the use of renewable energy. This is crucial for sustainability and meeting increasing energy demands.

## 4 | Current Methods *Select and explain the current methods used to control or optimize the system*

|  |  |  |
| --- | --- | --- |
|  | **Method** Check all that apply | **Description** |
|  | Human Operator / Engineer | Manages overall operations and intervenes in critical situations. |
|  | Expert System |  |
|  | Control Theory (PID, MPC) | Used for basic grid control |
|  | Optimization Techniques | Applied for resource allocation. |
|  | Other |  |

## 5 | Limitations of current methods *Select and explain the limitations of current methods*

|  | **Limitation**  Check all that apply | **Description** |
| --- | --- | --- |
|  | Ability to control well across scenarios / conditions | Difficulty adapting to changing energy demand and supply. |
|  | Multiple or changing optimization goals | Inconsistency across human operators in dynamic scenarios. |
|  | Human Operator /  Engineer Limitations  May include  · Difficulty managing many variables and dimensions  · Difficulty adapting to changing conditions  · Large performance discrepancy between novice and expert operators  · Inconsistency across expert operators | May include: Difficulty managing many variables and dimensions, difficulty adapting to changing conditions, large performance discrepancy between novice and expert operators, inconsistency across expert operators. |
|  | Uncertainty in the measurement of the inputs or the process make it difficult to control or optimize. |  |
|  | Time to develop control or optimization system is prohibitive |  |

**Milestone 1 – Ends Here**

The remainder of this worksheet (Part 2) can be completed after you have finished the “Learning the Solution” module (which includes course items 3.1 to 3.4).

# Milestone 2 - Identify Autonomous AI Components to Use

For this week’s milestone, we will continue working on the proposal for an autonomous AI that you began last week. This week, you will propose an autonomous AI solution, determine which of the components you’ve learned about the system will include, and explain the autonomous AI superpowers that your autonomous AI brain will exhibit.

*You may want to update Sections 1 & 2 with any new insights you’ve gained.*

## 6 | Autonomous AI Overview *(<=100 words) Provide a brief description of how your proposed autonomous AI would improve the process.*

The autonomous AI will revolutionize the smart energy grid, dynamically adjusting energy distribution, predicting demand patterns, and optimizing overall performance for reduced wastage, cost savings, and increased reliance on sustainable energy.

## 7 | Optimization Goal *List and describe the key performance indicators that will define control/optimization of the system (Example: maximize (throughput)*

Maximize energy efficiency while ensuring grid reliability and minimizing costs.

## 8 | Autonomous AI Components *Select and explain the automation methods your AI will use.*

|  | **Method**  Check all that apply | **Description** |
| --- | --- | --- |
|  | Math (control systems) |  |
|  | Menus (optimization) |  |
|  | Manuals  (expert rules and systems) |  |
|  | Machine learning | Predicting energy demand patterns. |
|  | Deep reinforcement learning | Adapting to changing scenarios in real-time. |

## 9 | Autonomous AI Superpowers *Select the superpowers that your autonomous AI brain will exhibit and explain how they will lead to an improvement in the process.*

|  | **Superpower**  Check all that apply | **Description** |
| --- | --- | --- |
|  | Makes human-like decisions | Adapting strategies akin to expert human operators. |
|  | Perceives, then acts | Utilizing machine learning for advanced perception. |
|  | Learns and adapts | Incorporating deep reinforcement learning for real-time adaptation. |
|  | Spots patterns | Identifying energy consumption patterns through machine learning. |
|  | Infers from experience | Learning from past scenarios to enhance decision-making. Outcome: The proposed solution addresses current limitations, promising a more efficient, reliable, and sustainable smart energy grid. |
|  | Improvises and strategizes |  |