**MEASURE ENERGY CONSUMPTION**

**PHASE 2**

Predicting energy consumption using machine learning involves using historical data on energy usage along with other relevant features to build a model that can make accurate predictions. The following steps outline the process:

1. Data Collection and Preparation:
   * Gather historical data on energy consumption. This can include information like date, time, weather conditions, building type, number of occupants, etc.
   * Clean the data to remove any outliers or missing values.
   * Preprocess the data, which may involve normalization, scaling, or encoding categorical variables.
2. Feature Selection:
   * Identify which features (independent variables) are most relevant for predicting energy consumption. This may involve using domain knowledge or employing feature selection techniques.
3. Splitting the Data:
   * Divide the dataset into training and testing sets. The training set will be used to train the model, while the testing set will be used to evaluate its performance.
4. Choosing a Model:
   * Select a suitable machine learning algorithm for regression tasks. Common choices include Linear Regression, Random Forest, Support Vector Machines, Neural Networks, etc.
5. Model Training:
   * Train the chosen model on the training data. During training, the model learns the relationships between the features and the target variable (energy consumption).
6. Model Evaluation:
   * Use the testing set to evaluate the model's performance. Common metrics for regression tasks include Mean Absolute Error (MAE), Mean Squared Error (MSE), and R-squared (R²) score.
7. Hyperparameter Tuning (Optional):
   * Fine-tune the model's hyperparameters to improve performance. Techniques like grid search or random search can be used.
8. Model Deployment:
   * Once the model performs satisfactorily, deploy it in a real-world setting. This could be as part of an application or integrated into an existing system.
9. Monitoring and Maintenance:
   * Continuously monitor the model's performance in the production environment. If the model's performance degrades over time, it may need retraining or adjustment.
10. Predicting Energy Consumption:

* To predict future energy consumption, feed new data (e.g., current weather conditions, occupancy, etc.) into the trained model.