IMPROVED GRID RELIABILITY BY FAULT ANTICIPATION TECHNIQUES

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ABSTRACT : The aim of this research work is to devise intelligent fault anticipation algorithms to predict an upcoming fault and perform corrective switching/control actions to prevent the fault from occurring. The research would increase the reliability of the grid and reduce the possibility of prolonged power outages. The European grid is quite old and increased penetration of the renewable systems will require it to be more immune to equipment failure. It also requires optimisation of the injection of newer renewable sources of energy into the existing grid infrastructure. The scope of fault anticipation techniques is quite broad as it can also address these issues and maintain grid stability.

GRAPHICAL REPRESENTATION
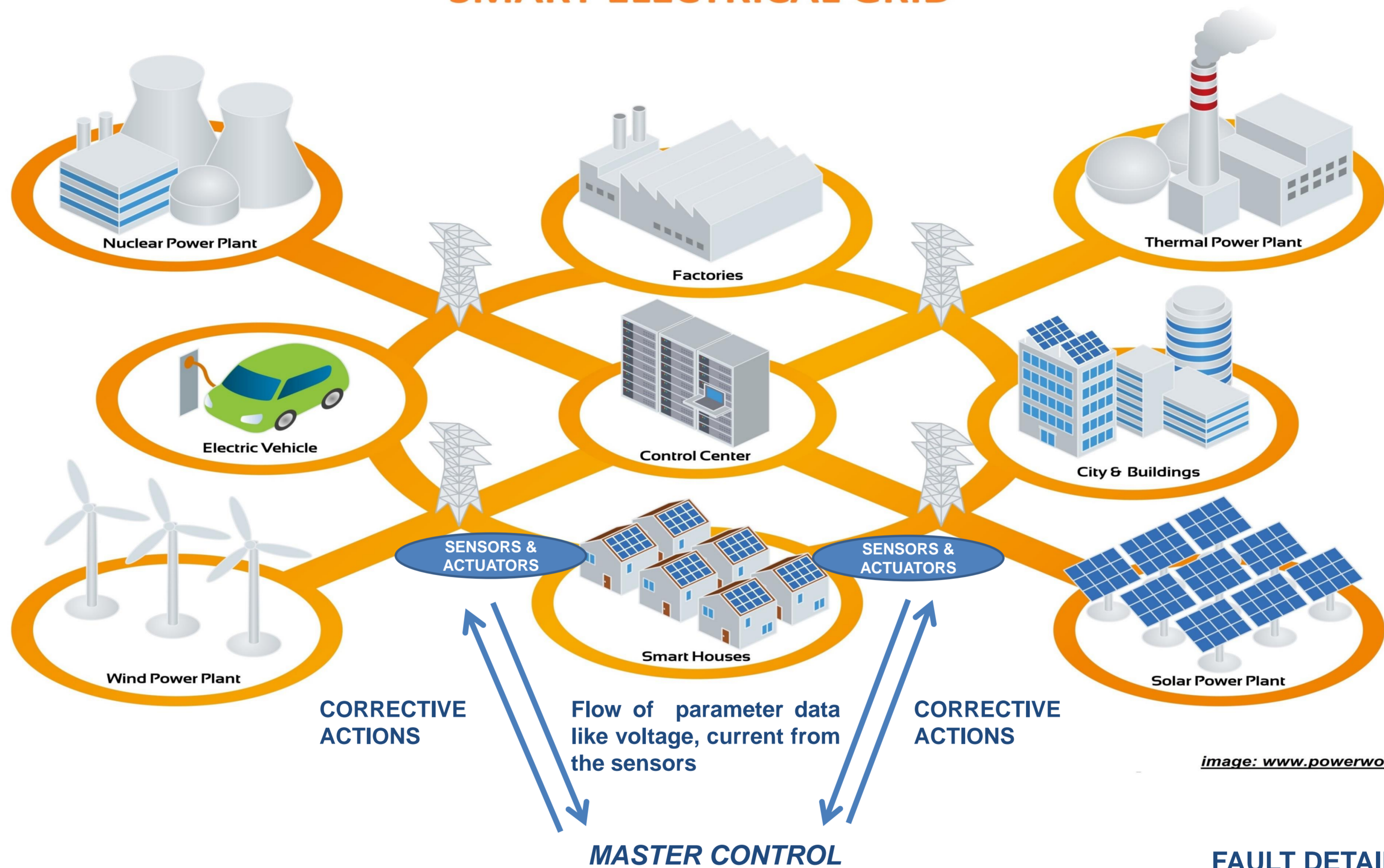
SMART ELECTRICAL GRID

image: www.powerworld.net

MASTER CONTROL

FAULT DETAILS

LIBRARY

REFERENCE DATA

- Analysis of parameter patterns to identify faults.

- Corrective actions taken by algorithm and relayed back to the grid.

- All actions taken to be stored in library for quick reference and response in future for similar faults.

METHODOLOGY

Identifying faults which can be anticipated.

Simulating specific scenarios on standardised test cases like IEEE 9,14,32 buses.

The control mechanism will be triggered if a fault is anticipated to prevent it.

ERIGRID PROJECT

The research work in the testing phase would use real time simulator like RTDS and other important software's like PowerFactory, MATLAB, etc. The aim is to couple and encapsulate these software's using FMI (functional mock-up interface). *Co-simulation* is the technique used for coupling different simulation packages. This idea is in alignment with the *European Commission Horizon 2020 project: 'ERIGRID'*, where the idea is to develop a single testing and validating platform for future smart grids using the co-simulation technique. *ERIGRID* aims to create a flexible toolset/library to couple simulation packages for Smart Grids by using both existing tools and developing new ones to bridge the gap.