Microgrids are a critical resource in a resilient grid system. During power outage if a particular section is experiencing blackout, microgrids can be used to restore power to that section or emergency responders can connect to the microgrid before power is restored in the affected area.

For everyday use Microgrids and play an important role in integrating Distributed energy resources (DERs) into the main grid. In this case energy is used and generated locally by households or communities and the excess energy is sold into the grid system thereby acting as a source of income for households and small communities [1]. Towns can have their own microgrids with energy storage systems that will help the town function during emergency power outages.

Integrating microgrids to the current grid system will require hardware updates and data analysis of the local energy demand and sensors to help analyze when to store the excess energy from DERs to batteries and when to send the excess power to the main grid. Since DERs cannot always meet the local energy demand the hardware updates on the grid system should also control how much power is drawn from the main grid to supplement the local energy deficiency.

Overall Microgrid will provide a Flexible reliable local energy supply especially for residential areas while the main power generation can primarily be for industry and commercial buildings [2]. This will help reduce carbon footprint since most new DERs are based on solar and wind power.

[1] [Microgrids as a Building Block for Future Grids (energy.gov)](https://www.energy.gov/sites/default/files/2022-09/4-Microgrids%20as%20a%20Building%20Block%20for%20Future%20Grids.pdf)

[2] [Microgrids | Veolia North America](https://www.veolianorthamerica.com/what-we-do/energy-capabilities/microgrids)