

TISED-GERAD Research Workshop on sustainable energy storage in electricity grids

Electricity storage as an enabler for the integration of distributed generation based on renewable energy

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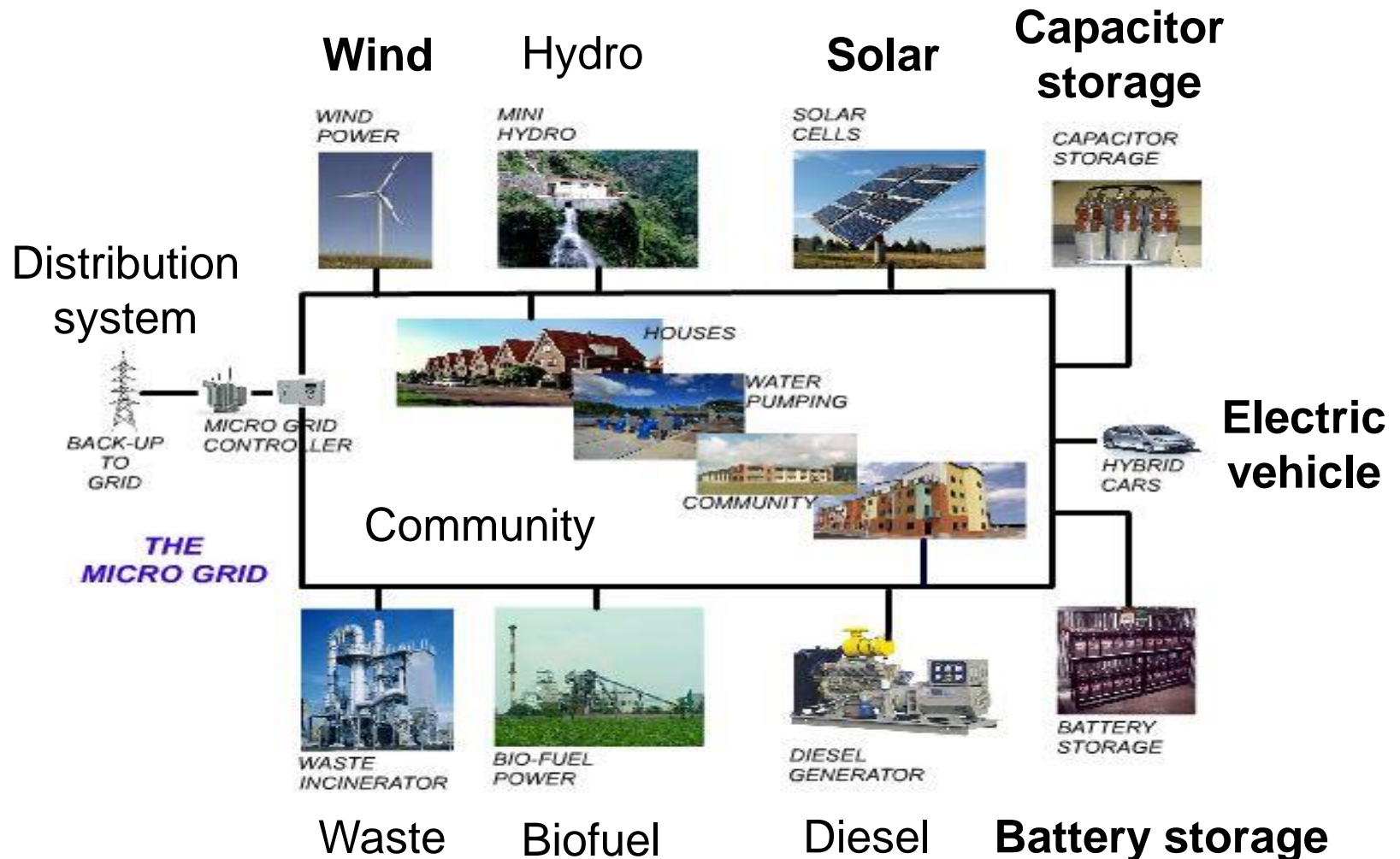


New developments – opportunities for storage

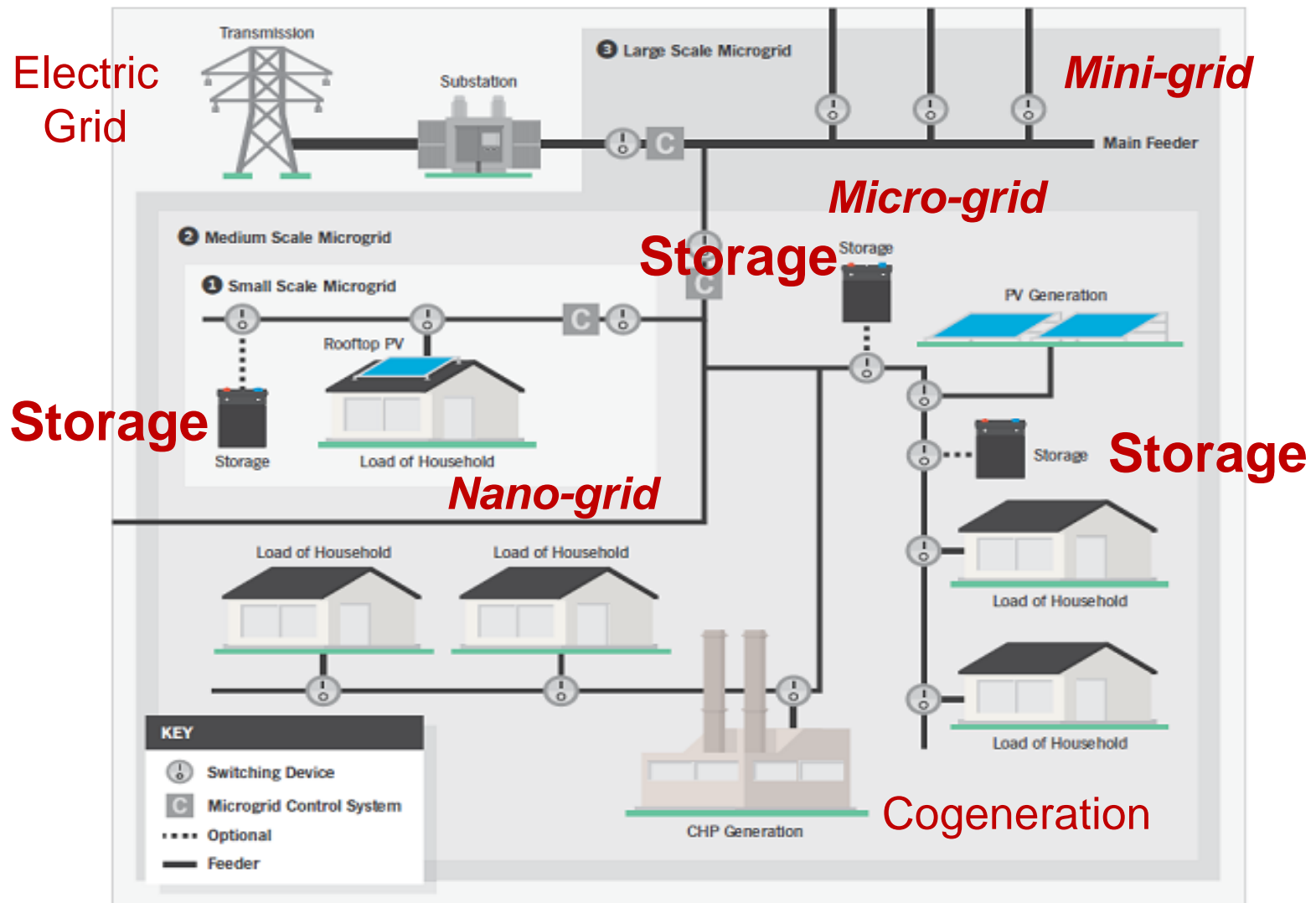
- Renewable energy and GHG reduction – solar and wind, available locally, no fuel and transportation costs
- Storage as a means of balancing/averaging variable/intermittent energy resources, load leveling
- Microgrids as a distribution system modernization approach – local energy management of generation, load and storage
- Electrification of road transport, notably electric/hybrid vehicles – role of storage as load and generator (V2G)
- Remote/isolated grids – balancing renewables
- Net zero green communities – role of energy storage



Microgrid – configuration, storage and elements



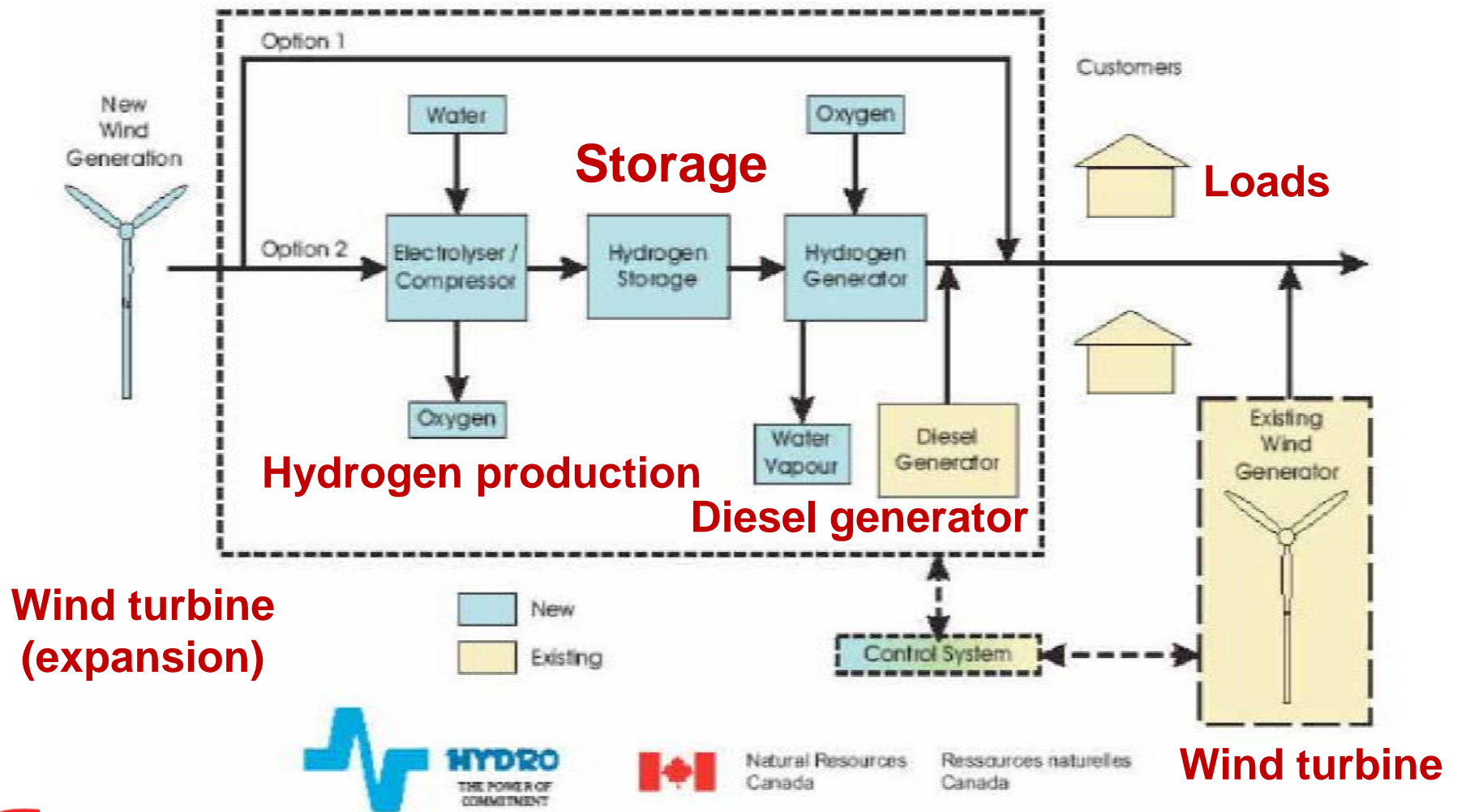
Intelligent grids – importance of battery storage



SOURCE: GTM RESEARCH, DOE



Remote community grid – hydrogen storage



Storage and microgrids – business cases

- Existing opportunities – considering the low cost of electricity
 - Remote communities in Quebec and Canada – replacing high cost diesel-based electricity generation
 - Installation requiring high reliability and resiliency – military bases, government compounds, sensitive manufacturing installations, data centers – premium power
- Potential developments – current demonstration projects
 - Net-zero communities – energy independence
 - Fast EV charging stations – including storage
 - Electrified transportation – fast charging systems with storage
 - Self contained entities – university campuses, government laboratories and entities



Microgrids and storage – enabling technologies

■ Enabling technologies

- Reduction in the cost of battery and storage devices
- Development and standardization of energy management systems
- Development of affordable and suitable sensor, information and communication technologies
- Development and standardization of microgrid controllers and energy management systems

■ Other requirements – evolution of the regulatory context

- Defining the role and relationship between distribution system operators and local autonomous microgrids
- Allowing microgrids to enter the energy market – producing and selling electricity

