

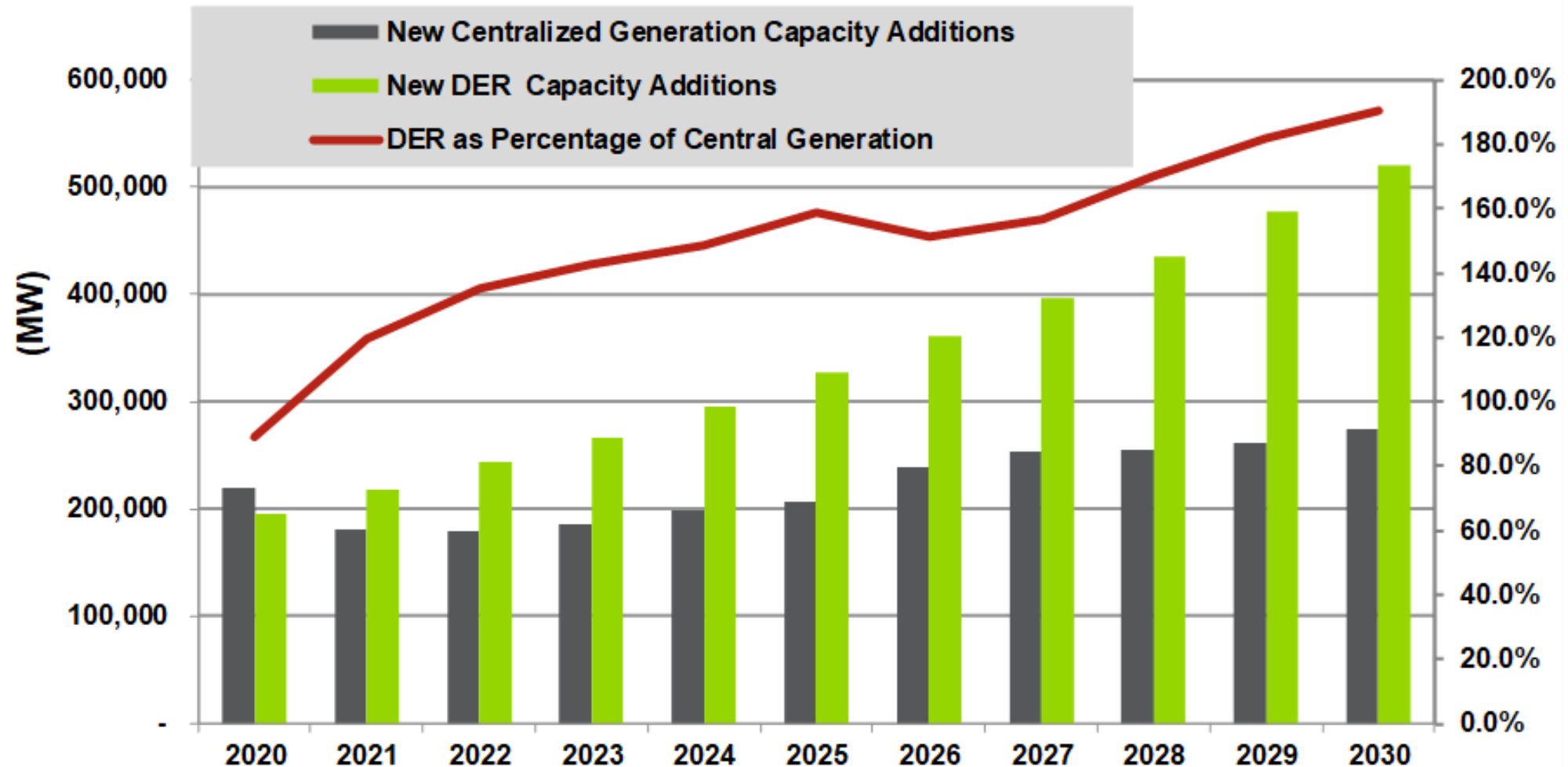
# Three Key Trends Driving Microgrids Today

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October 12, 2021



# Global Shift In Energy Sources Already Underway



(Source: Guidehouse Insights)

# Three Key Trends Driving Microgrid Adoption Today

## Energy as a Service

- One of the long-standing challenges facing microgrids is the ability of potential customers to pay the upfront capital costs.
- Though PPAs have been used for years, these contracts typically only addressed supply, not demand; new EaaS contracts take a more comprehensive view
- “Pay as you go” business models for remote microgrids have been a game changer

## Commercial & Industrial Customers

- C&I customers traditionally shun new innovations – microgrids -- due to risk and ROI
- Declines in solar PV and battery costs have made microgrids more attractive
- These customers know the true value of resiliency due to increasing outages
- C&I is now fastest growing microgrid market

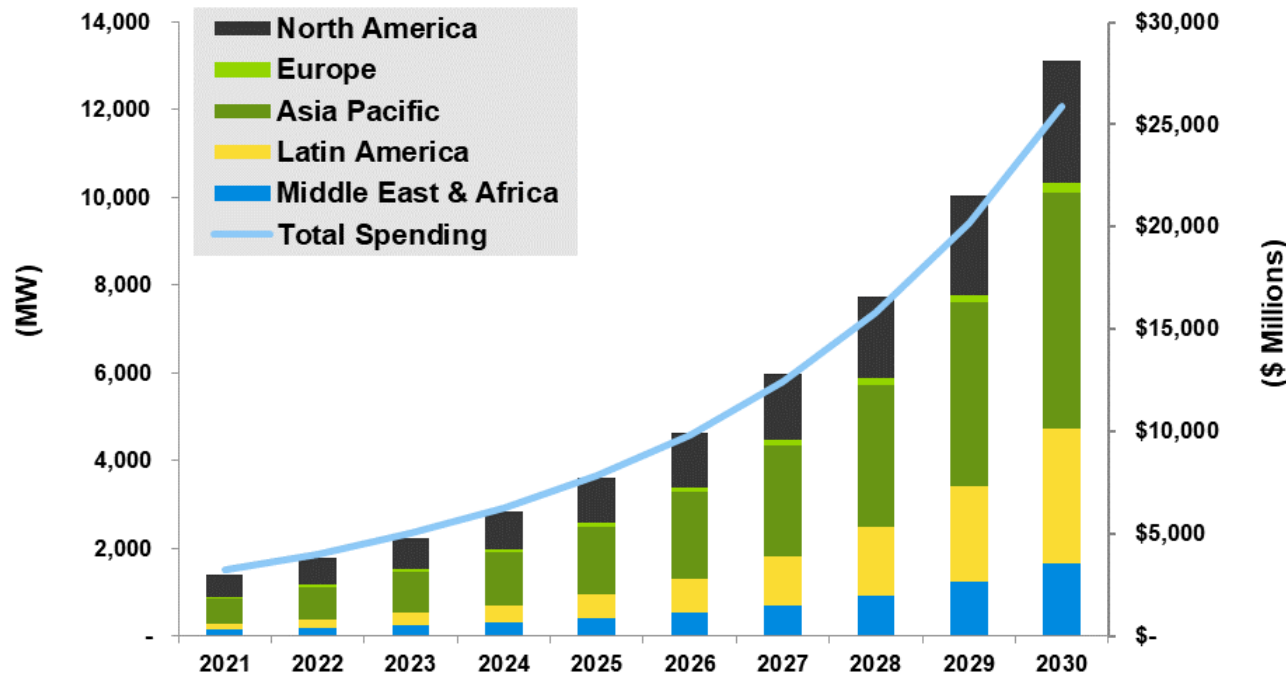
## Electric Vehicle Charging

- EV mandates and goals are being established by federal, state and local governments
- Climate change and increased grid outages threaten the transportation sector in new ways due to electrification
- Microgrids can provide the clean energy resilience EV charging systems need
- EVs can also serve as an energy storage resource for microgrids

# Energy as a Service Microgrids

## Vendor Offers Becoming Mainstream

### Microgrid EaaS Capacity and Spending by Region, World Markets: 2021-2030



(Source: Guidehouse Insights)

- The primary EaaS market segments included in this forecast are:
  - *Pay as you Go*;
  - *PPAs*;
  - *Advanced EaaS*;
  - *Energy savings performance contracts (ESPCs)/enhanced use leases*.
- The microgrid EaaS market represents a \$3.3 billion market in 2021. By 2030, annual spending is expected to reach \$25.9 billion. **Cumulative spending is \$110.5 billion globally between 2020-2030.**

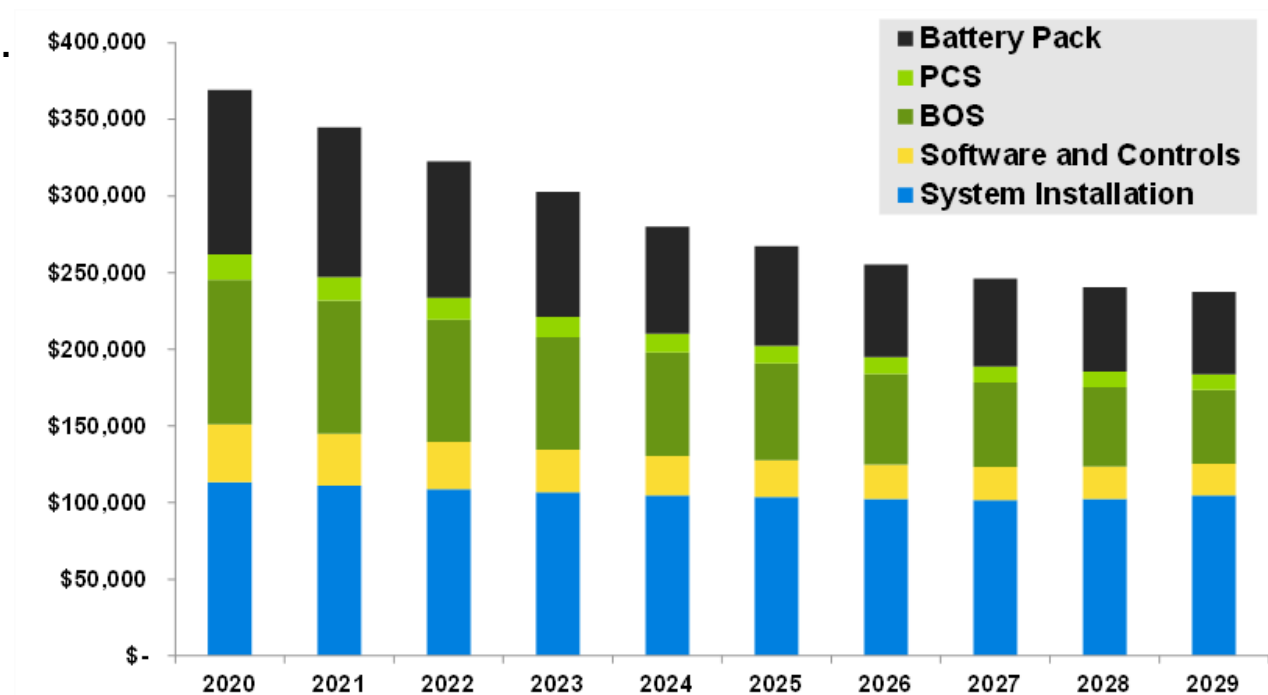
# C&I Microgrids Now Fastest Growing Segment Worldwide

## *Reduced Costs and Increased Outages Driving Adoption*

### Past Challenges for C&I Customers:

- Large industrials often pay the lowest electric rates of any customer class.
- This market segment often is required to make a valid value proposition in the absence of government funding.
- Internal competition for capital outlays is fierce within these companies and subject to intense scrutiny from CFOs.

### ***C&I Building Li-Ion Battery System Pricing, 250 kW/500 kWh System, US Base Case: 2020-2029***

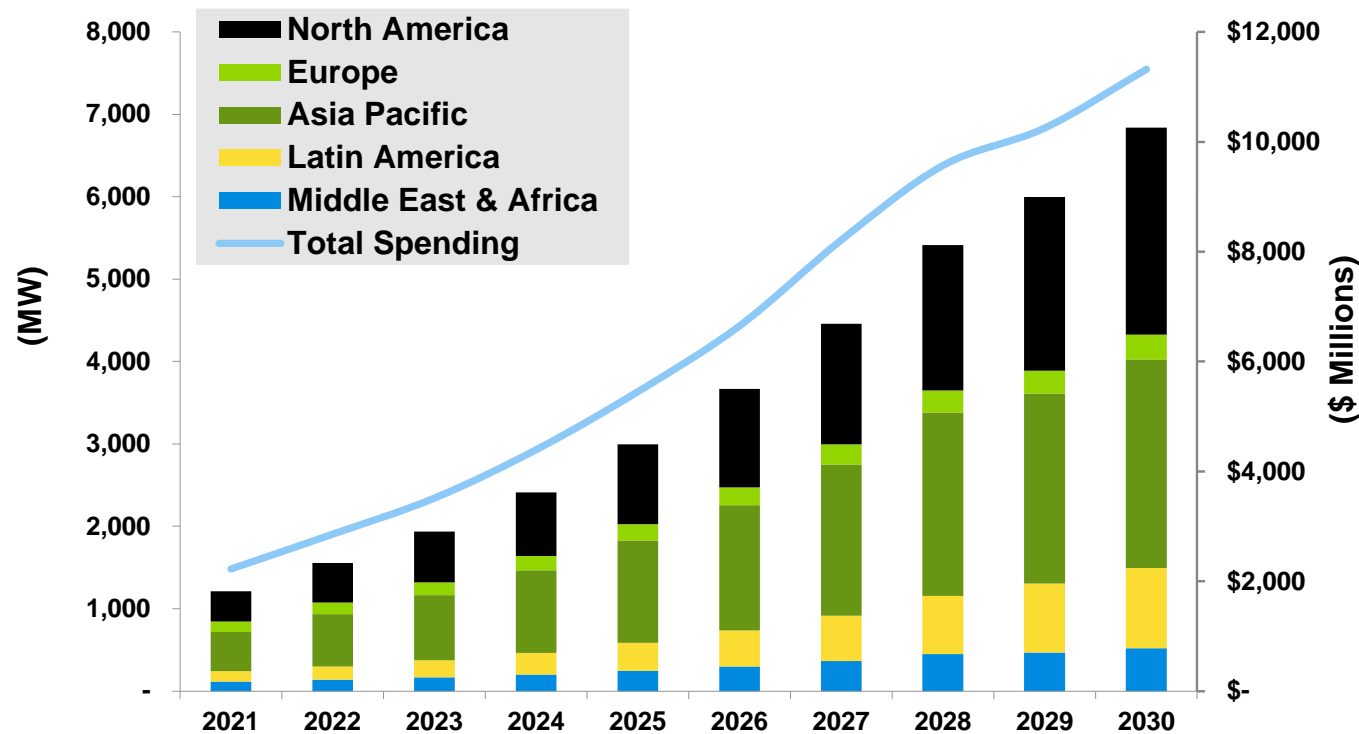


(Source: Guidehouse Insights)

# Investors Now Driving C&I Shift to Clean Energy

## *Sustainability and Resiliency Are Being Linked*

**Total C&I Microgrid Capacity and Implementation Spending, World Markets: 2021-2030**



(Source: Guidehouse Insights)

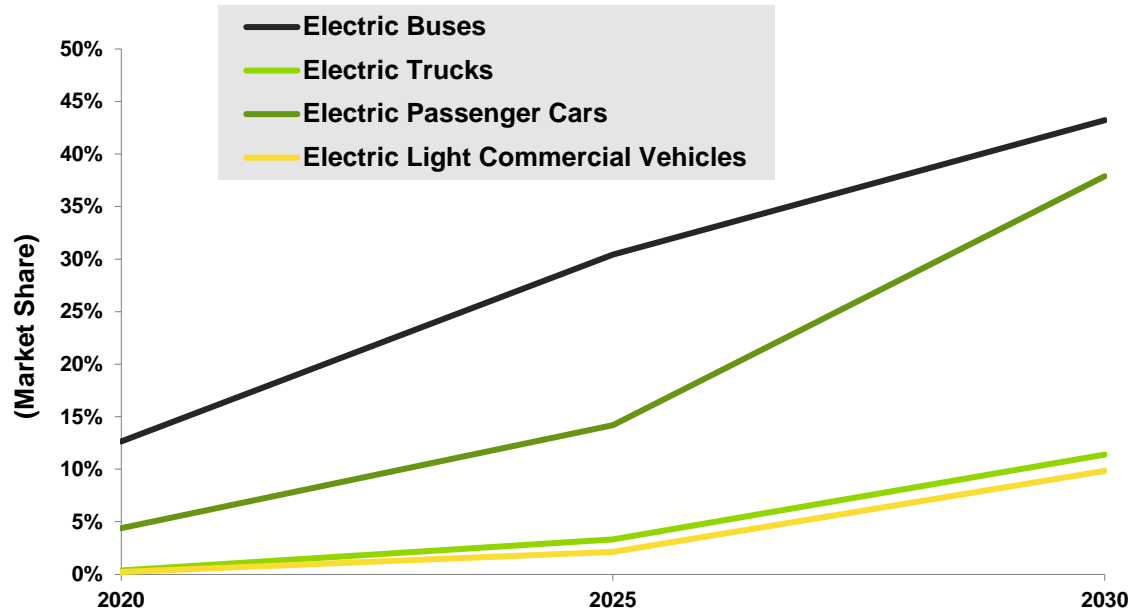
### Today's C&I Market Drivers:

- Clients are fiscally sound and value innovation in business models, especially EaaS.
- Reliability is highly valued in C&I—more so than in any other microgrid segment, with the exception of military projects.
- Project portfolios with a single client can scale up rapidly, replicating commercial success within shorter development cycles than slow-moving segments (utilities, military and community projects).

# EV Growth Requires Clean & Resilient Electricity Supplies

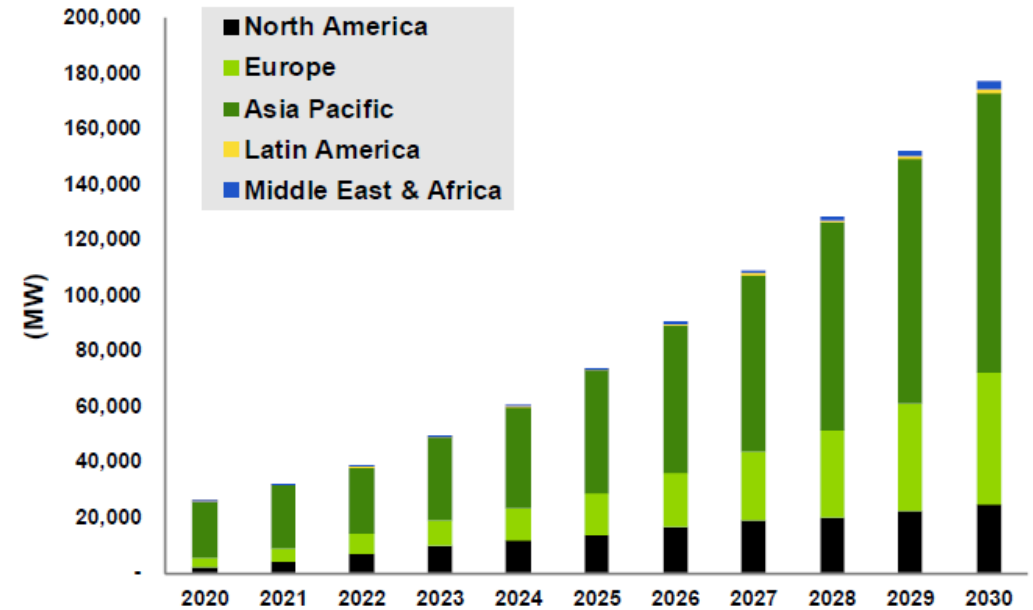
## *Microgrids are Perfect Solution for EV Charging*

**EV Market Share by Segment, World Markets: 2020, 2025, 2030**



(Source: Guidehouse Insights)

**EV Charging Load by Region, World Markets: 2020-2030**

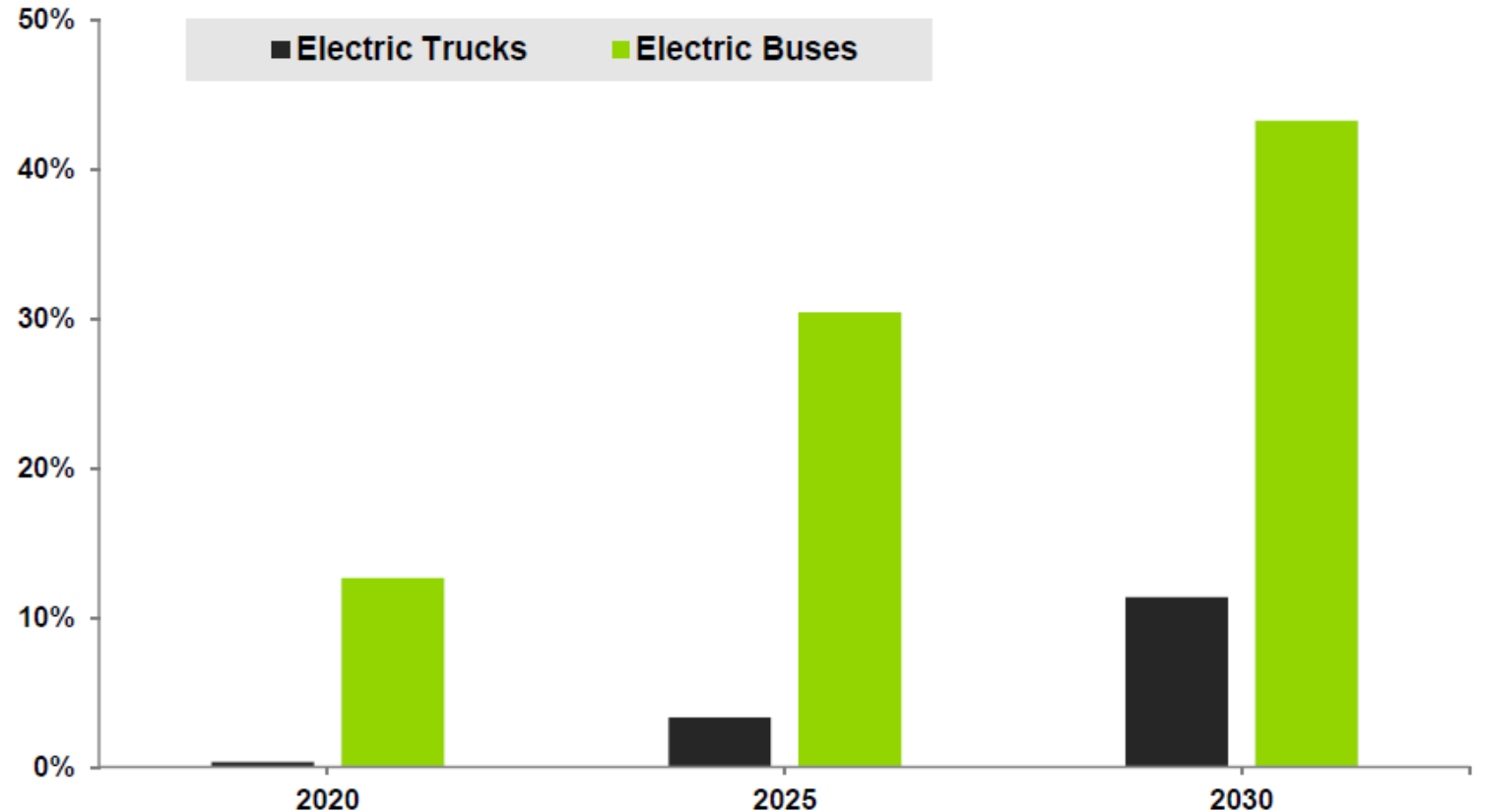


(Source: Guidehouse Insights)

# EV Fleets also a Resource for Microgrids

## *EV Batteries Can Serve as Stationary Energy Storage*

- Just as microgrids bolster reliability for EV charging stations, EVs can bolster resilience by modulating charging schedules or offering batteries as a stationary form of energy storage.
- Fleets are the focus today, especially of busses and trucks.
- With right market structures, EVs can benefit the larger grid via provision of grid services that move microgrid value proposition beyond resiliency.



(Source: Guidehouse Insights)



# Modular Systems, Distributed Controls & Hydrogen

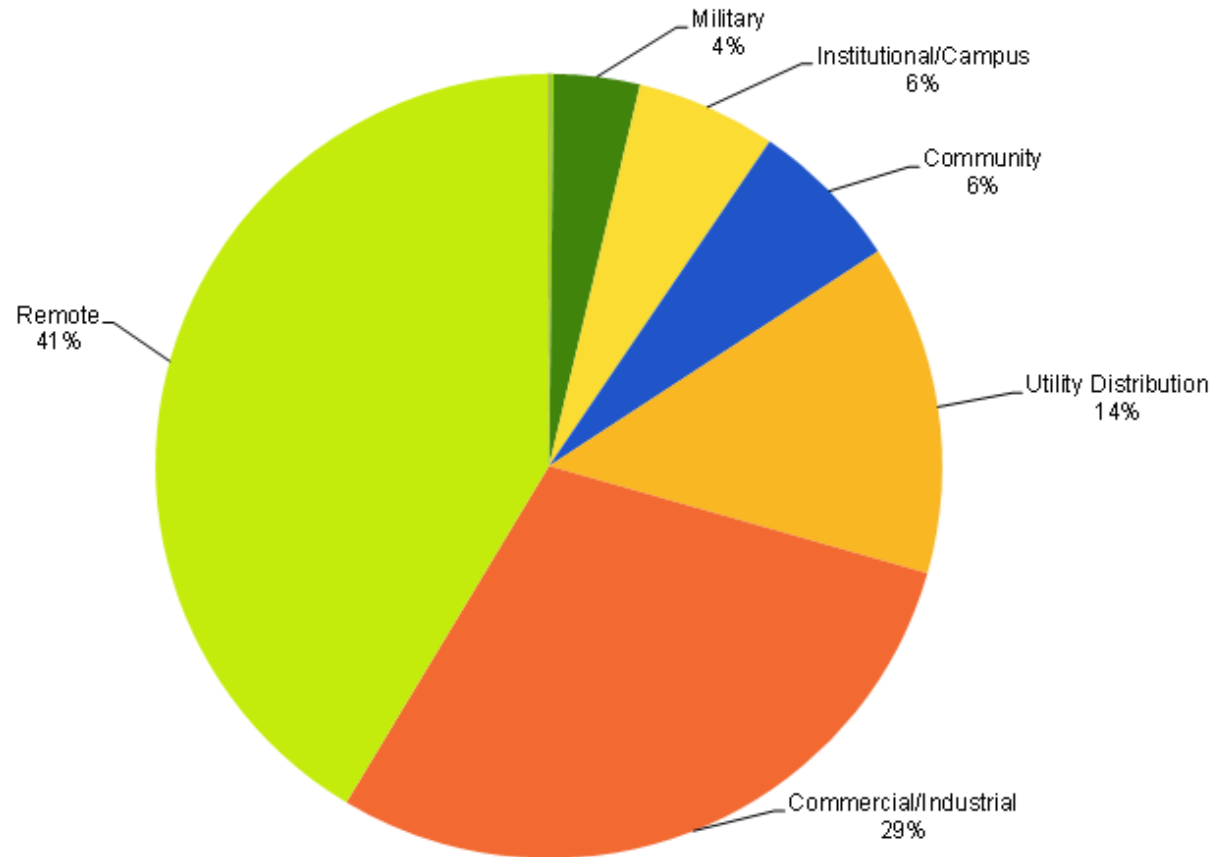
## *Three More Trends to Monitor*

- **Increased interest in modular, plug-and-play systems reduce customized engineering costs and could speed up deployments of microgrids (< 4 MW)**
  - Dovetails with EaaS and C&I trends
- **Shift in controls approach from top-down to bottoms-up reflect increased reliance on variable renewables**
  - Distributed or decentralized approaches push intelligence to devices and grid edge
  - Enhanced flexibility for microgrid designs
  - Innovators are start-ups but acquisitions and partnerships between large and small vendors are also increasing
- **Need for Long Duration Storage Growing with 100% Clean Energy Goals**
  - Most common battery deployed in a microgrid is lithium ion, which provides resilience for 2 to 4 hours
  - Flow batteries are one option, but many suppliers have gone bankrupt over the past 5 years
  - Distributed hydrogen being deployed in remote systems and Stone Edge Farm in Sonoma, California

# Conclusion: Microgrids Have Come of Age

## *Remote Microgrids Still Leading the Way*

***Microgrid Capacity by Segment, World Markets: 1Q2021***



(Source: Guidehouse Insights)

# Contact

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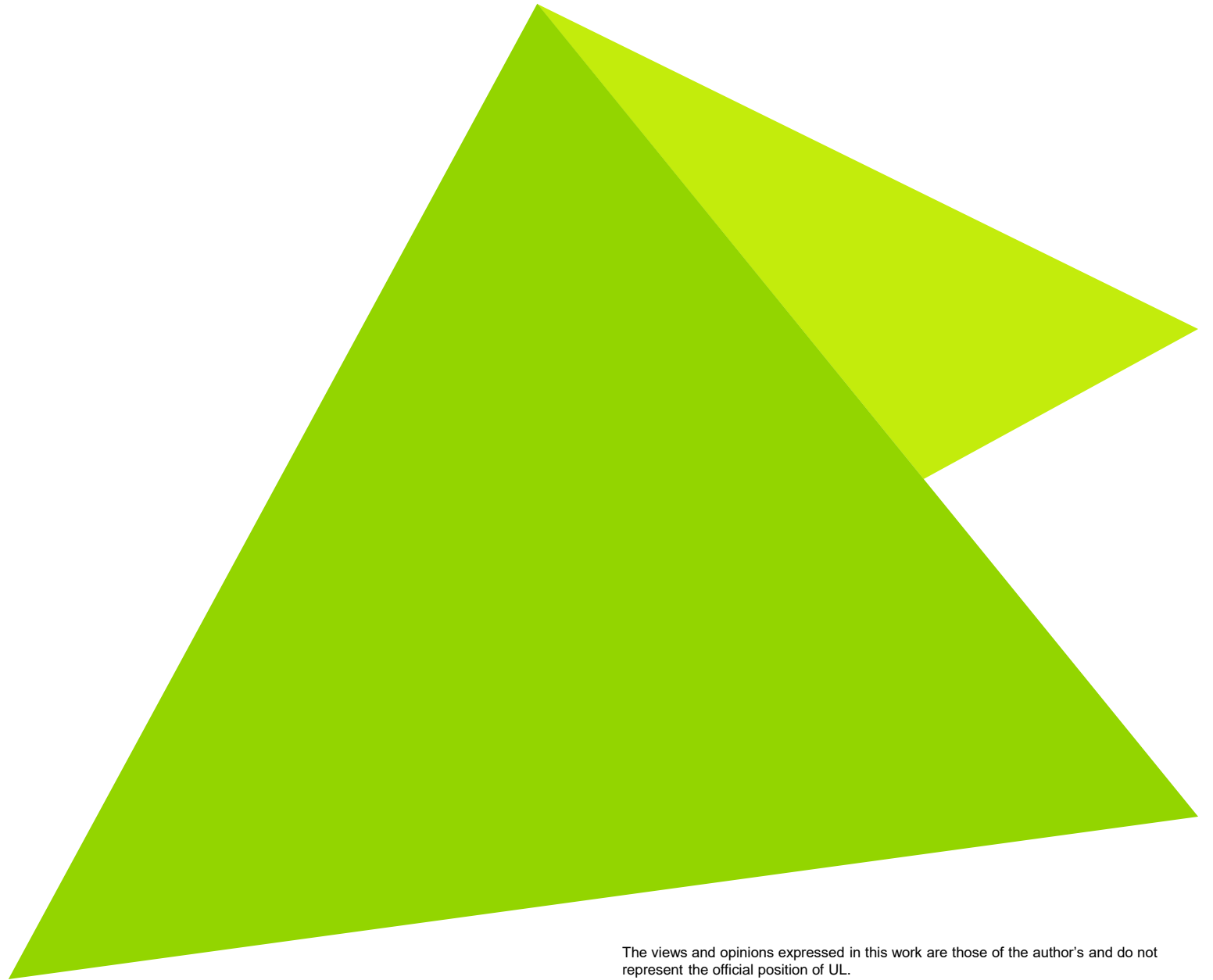
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