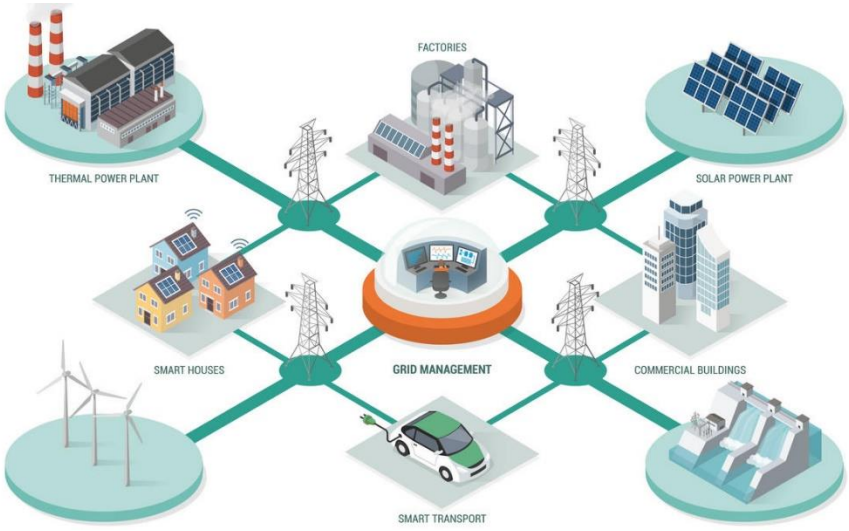
# Qpacity Participation in the New Energy Internet, VPPs and DERs

***How Qpacity will Slay the Monster Lurking in the Shadows***

2024

In only the last couple years there has developed a huge interest in concepts called Virtual Power Plants (VPP), Distributed Energy Resources (DER) and a newly applied term to this industry, "Prosumer."[1] What are these and what is Qpacity's interest in them?

As our electrical grid systems become aged, more and more taxed, and suffer more frequent outages due to insufficient power availability at peak times, solutions have been appearing for two primary reasons. That is, the surge in the installation of home solar systems and home solar energy backup batteries. It stands to reason people are going in that direction, not just for environmental reasons, but to avoid those pesky outages and reduce the cost of energy. It shortly became evident that thousands of those home systems could provide the utility companies with that extra energy they need during peak times. Tesla was one of the first to roll out a test of this theory in California. It was considered a smashing success when the first event occurred in 2022 and was solved with 2,342 Tesla Powerwall users sending energy over to PG&E.[2] Thus, the excitement for VPP and DER took off. The term prosumer (producer and consumer all in one) is now applied to those participating as VPPs.




We are now seeing many variations of the VPP/DER combination. These include commercial establishments building VPPs for the primary purpose of being an energy provider and VPPs generating energy through other means, not just solar, such as wind and natural gas generators. There are also micro-utility stations/companies/communities popping up.[3] These are usually solar or wind farms producing energy as an off-grid product for a small community or a commercial complex, and in other cases, on-grid for the purposes of selling power to the larger utility providers. The world of the "energy internet" has been born. It is destined to grow fast and furious.

## The Elephant (Monster) in the Room Nobody Wants to Acknowledge

Perhaps it is because VPP and DER are so novel, shiny and new that the proponents of VPP and DER do not want to recognize the potential big danger they are promoting. Lithium batteries are a primary

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[1] For an independent simple explanation see Reuters. 2023, Jan. 31. *Explainer: What is a virtual power plant?* Reuters.com. https://www.reuters.com/business/sustainable-business/what-is-virtual-power-plant-2023-01-31/

[2] Fred Lambert. 2022, Aug. 18. *Tesla's virtual power plant had its first event helping the grid – looks like the future*. Electrek.co. https://electrek.co/2022/08/18/teslas-virtual-power-plant-first-event-helping-grid-future/

[3] For a succinct micro-grid DER discussion between two Deloitte consultants see, *Five in 5: Microgrids and DERs, Explore key benefits and challenges around microgrids*. Deloitte.com. https://www2.deloitte.com/us/en/pages/consulting/articles/importance-of-microgrids.html

component to make the concept work. Only 4% of homes in the U.S. have gone solar and of those only 6% included batteries with their system (effectively, only one-quarter of 1% of homes). This means out of more than 140 million homes less than 400,000 have batteries. That number will skyrocket as the advantages of becoming a VPP are discovered by the masses. The media has already shown us the danger of lithium and lithium-ion batteries. We have seen the result of "thermal runaway" with lithium batteries in phones, cars, home wall batteries and even the large utility-scale batteries. Thermal runaway causes explosions and fires that are difficult to extinguish.

Since there has not been a widely known solution to the lithium battery dangers, perhaps that is the reason nobody wants to call a time-out on the massive push for developing the energy internet—the VPP/DER revolution. All it will take is a rise in home explosions and fires to dampen the excitement.

Fortunately, Qpacity is bringing the solution to the world. Qpacity is equally excited about participating in the VPP/DER energy industry disruption. However, we bring an even greater disruption. The battery solution the world has been looking for.

**The Qpacity Graphene Supercapacitor/Battery Solution**

In this paper we will highlight the advantages of the Qpacity battery that will be used in our participation in the VPP space, whether that be through home batteries, vehicle batteries or all the way up to shipping container size utility-scale batteries called ESS units. For a detailed explanation of our batteries in comparison to lithium and others, please see attached, our white paper entitled "Supercapacitor-Battery Breakthrough." Following are the highlights:

- Non-Toxic and Non-Flammable. Period!
- Can operate at extreme temperatures (-40$^{o}$C — 70$^{o}$C) (-40$^{o}$F — 158$^{o}$F).
- No overheating regardless of charging and discharging speed.
- More charging/discharging cycles than any comparable battery (nearly infinite cycles life).
- Deep Cycling. Depth of Discharge (DoD) is 100%. No other battery can make that claim.
- Charging time is faster than any comparable battery. For example, our home battery can recharge 8 times in one day (if demand calls for it), where comparable batteries take all day for one charge.
- No bell curve with a Qpacity battery. 100% of energy and voltage is available to a complete discharge. Bell curve applies to all other batteries on the market. This means as the discharge takes the battery down to a remaining 10 or 20% of energy the voltage drops off quickly to the point that energy is no longer usable, and the battery can be ruined with a 100% discharge. This in effect makes the battery's stated Amp Hours or Kilowatt Hours not really true since it cannot all be used.

**Several Energy Production and Battery Markets Make the Whole**

Virtual Power Plants can involve any method of producing power, which can be stored in multiple forms of batteries. As batteries are connected to the energy web, we now call the Energy Internet, each one becomes a potential storage center that can send power out to the network. For example, a battery in your electric vehicle sitting in the garage is hooked to the charging station which is linked to the home battery. That home battery, in turn, is linked to the utility grid or a micro-grid. Effectively, if the homeowner is not in need of energy at the moment, both power from the car battery and the home battery can be sold and sent onto the grid to be used by the current community energy demand. Using that example, we can see how any battery connected to

the system can be used as a Distributed Energy Resource (DER). This is the way of the future in decentralized energy production and distribution.

Our batteries of various sizes and for different applications have been produced and deployed for over five years, under other names. The list of specific battery models and uses will grow as capital is applied to their development and agreements are executed with market sectors in demand for a specific application.

Opacity's current focus is on batteries that can easily fit into the VPP/DER model. These include:

- Solar home batteries (multiple sizes rated by kilowatt hours and amp hours)
- Low Speed Vehicle (LSV) batteries (batteries for golf carts and other vehicles with max 25 MPH)
- Electric vehicle (EV) batteries.
- Energy Storage System (ESS) used for large applications such as utility-scale backup batteries and micro-utility use on or off-grid.

In addition to the batteries, Qpacity will include revolutionary graphene solar panels and EV station chargers in our product lineup.

As we fulfill these various battery market demands we will also be marketing turnkey VPP/DER solutions, whether that be complete home systems, self-sufficient EV stations, community micro-utility systems or large utility-scale grid solutions.

**The Qpacity Marketing Model**

Qpacity will ordinarily make dealer agreements and white label licensing agreements with companies that can market a large volume in their particular sector or region. Here are examples:

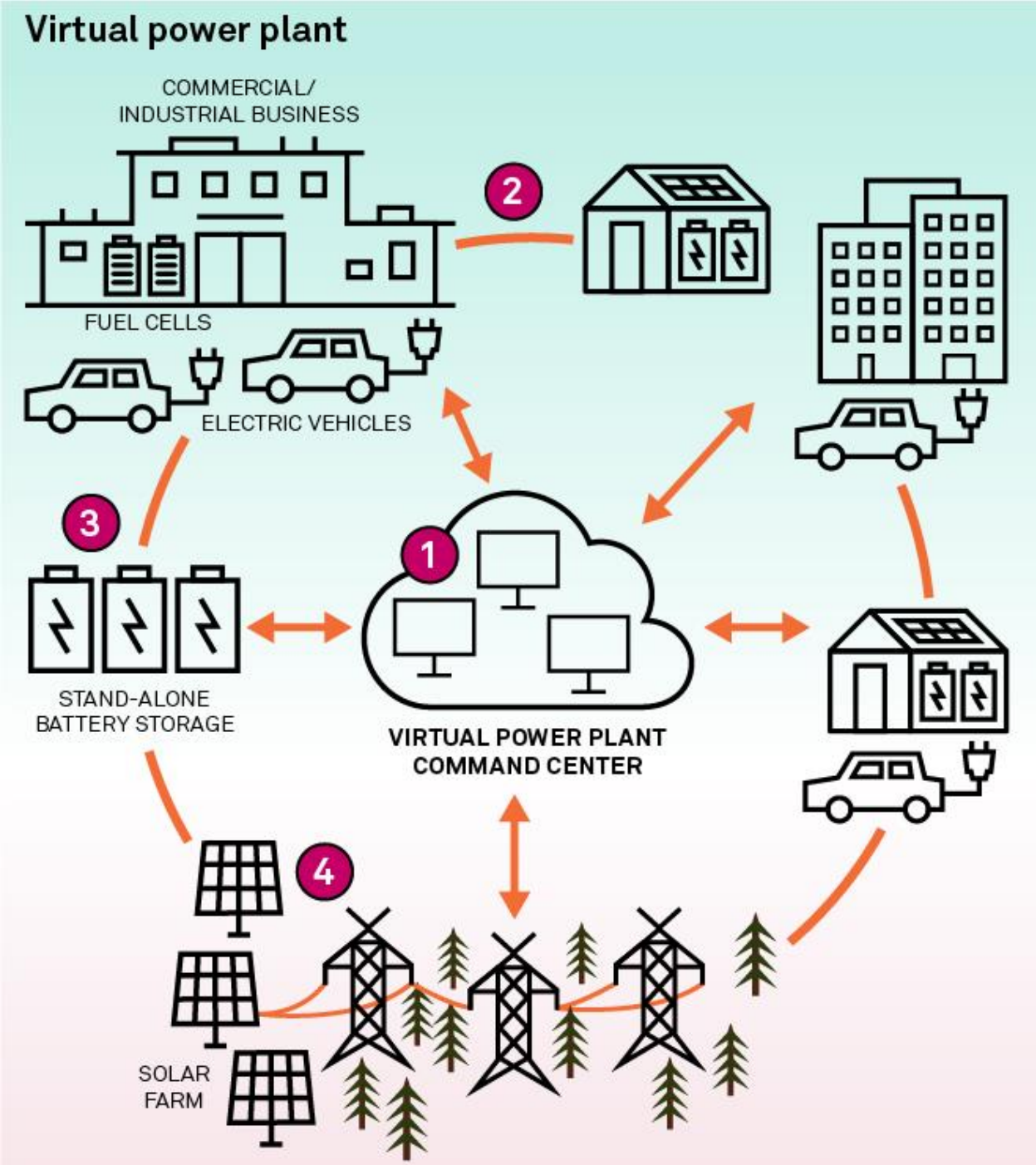
- Large solar contractors
- Electrical/solar supply houses
- Utility companies
- Deregulated utility resellers
- Municipalities
- Community groups (such as HOAs and associations formed for micro-utility purposes)
- Utility contractors
- LSV and EV manufacturers
- EV Charger Companies

**U.S. Government Aid**

In 2022 the U.S. signed into law the *Inflation Reduction Act of 2022*. There are provisions in that act that provide for considerable tax credits and grants for both residential installation of our technology as well as commercial buyers. Also, in 2021 the *Infrastructure Investment and Jobs Act* was signed, which provides for $7.5 billion in grant money for developing the EV charger station network. These incentives will greatly fuel the U.S. market demand for what Qpacity has to offer.

**Production Capability**

Currently, our manufacturing backbone consists of three strategically placed plants around the world. In 2023, there will be multiple assembly plants put into operation throughout the U.S. We anticipate our ability to keep up with all demands. Nevertheless, if demand becomes overwhelming for a particular product we can react swiftly and adjust production accordingly.




1. Virtual power plant software remotely aggregates distributed energy resources into a single controllable asset for wholesale market participation.
2. Distributed energy owners/hosts benefit from demand charge reduction, backup power, grid services revenues, resource optimization.
3. Large-scale stand-alone battery storage is combined with behind-the-meter resources for added flexibility.
4. Wholesale energy markets open to aggregated distributed energy for voltage support, peak reduction, renewables integration, reserve capacity, frequency regulation, etc.

## Dealer or Joint Venture Opportunity

The VPP **market size was $3.7 billion in 2022** and expected to increase at a compounded annual growth rate (CAGR) of about 17%, meaning 2023 is expected to hit close to $4 billion and reach over **$12 billion by 2030**, with North America dominating the market.[4]

For those needing more information and understanding of the VPP and DER marketplace, there is plenty of information and articles on the internet. For a good primer, read the article at vitual-peaker.com. See the article information in the footnote.[5]

Qpacity is looking for those already involved in this market or perhaps a 'sister' market, such as solar energy, or those with access to capital interested in taking advantage of this exciting new marketplace that is going nowhere but up. What portion of the multi-billion-dollar market do you wish to capture. Qpacity is in a position to work with you to enter that market quicker than any new startup in the industry.

Through our unique business model, you will be able to provide your customers with your own brand of VPP systems with our revolutionary all-graphene energy storage solutions.

If you already have a business in the VPP space and merely wish to add our product line to your business, we can discuss the **dealership model** we offer. On the other hand, whether new to this business or seasoned, we offer a **joint venture opportunity** that can offer either or both product and territory exclusivity.

We do not offer franchises and therefore we do not charge fees to participate with Qpacity. Your qualifications will be based on matters such as past business experience, enough capital to engage in this business at a serious level (or access to capital), be of good character, willingness to be an industry disrupter, and passion to better the world of renewable energy. SO, LET'S DO THIS!

***If you have further interest in our technology and wish to discuss your market or industry, whether as a large user, or interest in dealership and joint venture opportunities, please contact Qpacity or the person who provided this information.***

***THIS IS NOT A SECURTIES OR FRANCHISE OFFERING AND NO SOLICIATION IS MADE FOR ANY INVESTMENT. ANY INVESTMENT OR PURCHASES MADE BY PARTIES ENTERING THE VPP, DER, OR ANY OTHER MARKET OFFERED BY QPACITY, WHETHER THROUGH A DEALERSHIP ARRANGEMENT, JOINT VENTURE OR OTHERWISE WILL OCCUR ONLY THROUGH FUTURE NEGOTIATIONS AND AGREEMENTS.***

[4] Research And Market. March 22, 2023. Report: *Global Virtual Power Plant Market to Reach $12.2 Billion by 2030: Demand Response Category Generates More than Half the Revenue.*

[5] *Virtual Power Plants: Myth or Reality?* December 14, 2022. Virtual-Peaker.com. https://virtual-peaker.com/blog/virtual-power-plants-myth-or-reality/