



Interconnection Policy Workshop

Amy Jo Miller, Simon Sandler and Souvik Ghosh | PJM | November 2nd, 2021



STRONG BACKING FROM HANWHA GROUP

Q CELLS is one of the core affiliates of Hanwha Group, a Fortune Global 500 Company (ranked 261) and the 7th largest conglomerate in South Korea.

Q CELLS

2020

\$301 million net sales
\$343 assets
(audited)

2021

\$193 million net sales
\$316 million assets
(as of 9/21)

- Develops, invests, and delivers
 - Photovoltaic (PV) and energy storage system (ESS)
- Develops through COD
 - Development team
 - EPC team
- Own & Operate
 - IPP Team

Q CELLS develops, invests, and provides EPC for photovoltaic (PV) and battery energy storage systems (BESS) throughout North America.



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1. Where does your company agree with PJM ANOPR response?

- A. HQC supports PJM's position that if the Commission requires transmission planners to build transmission for estimated future generation, the construction of such transmission should be informed by: (i) customer input based on surveys as described above, (ii) articulated state and federal clean energy goals, (iii) planned generation retirements; and (iv) to the extent possible, generation within the interconnection queue.
- B. HQC supports the option where to build transmission for new interconnection projects in the existing queue based on observed large concentrations of generators in some subzones visualized with heat maps. Transmission enhancements could be developed for those facilities impacted by the injection of generators located in these generation-centric areas and further advance renewable energy projects to more efficiently meet state or federal policy goals.
- C. While HQC recognizes that only 16% of generation capacity has achieved commercial operation, it is worth pursuing coordination between the regional planning process and generator interconnection process in order to meet various Clean Energy Standards/RPS based upon increasing public demand for cleaner resources. The load ultimately benefits from access to renewable cost efficient generation and it is worth exploring appropriate Policies that could lead to load benefiting from transmission/generation coordination.
 - i. HQC requests further clarity on when PJM is to deliver ICOSA. Also, HQC supports PJM providing as most accurate cost estimates as possible for ICOSA. Improvement in these areas would likely result increased projects going to COD.

2. Are there areas where your company felt PJM's response fell short?

- A. If there would be a Commission policy that encourages the adoption of an Electric Load Carrying Capability-based methodology for variable and limited duration resources, what does that look like? PJM to further expand upon this idea.

1. Where does your company agree with PJM ANOPR response?

- A. HQC supports PJM's proposal to work with stakeholders to develop an interregional transfer capability metric that can ensure that there is adequate transfer capability between regions so as to enhance both reliability and resilience as the nation faces more extreme weather and other related challenges. PJM believes that a common metric (and planning driver to support transmission expansions to meet that metric) would, in addition to enhancing reliability, have the ancillary benefit of allowing for increased import and export of renewable generation across the regions in other hours of the year without the Commission facing legal challenges that it is forcing development of new transmission to accommodate one particular type of generation.
- B. HQC also supports the Commission to work with the industry and stakeholders to explore the development of transfer metrics in an effort to evaluate an appropriate level of import/export capability by Balancing Authority (i.e., X% of load). Such study(ies) may result in a national standard or recommended planning driver for bi-directional transfer capability to enable delivery of power driven by multiple drivers (reliability, market efficiency, public policy and resilience) yielding criteria for which interregional coordination, with input from states on matters such as renewables penetration and siting, can be pursued.

2. Are there areas where your company felt PJM's response fell short?

- A. HQC would like to see coordination with affected systems. For example, HQC would like PJM to mediate with affected parties to find proactive solutions when affected system issues arise. PJM should not await a policy from the Commission.

1. Where does your company agree with PJM ANOPR response?

- A. HQC supports PJM's proposal to restructure its cost allocation process such that all projects in a particular cycle will share the costs of network upgrades. This is in contrast to PJM's current cost allocation process, pursuant to which the first project to cause the need for the network upgrades pays 100 percent of the cost with subsequent reimbursement.
- B. HQC supports Option 4-Baseline Upgrades for DOE-Identified Transmission Corridors per the Energy Policy Act of 2005 (EPAAct 2005") so that corridor-designation could be expanded to include reduction in congestion to promote power flows in renewable-rich areas to meet Clean Energy Standards and costs must be allocated on "roughly commensurate with" benefits.

2. Are there areas where your company felt PJM's response fell short?

- A. To avoid such large IC cost overruns, PJM and utility should consider developing a quarterly financial expenditure forecast (including all taxes) and include it in the ISA so that IC has a clear understanding of all financial obligations (construction quality job estimates with 10- 15% contingency) prior to contract execution.
- B. PJM should consider making network upgrades fully refundable for ICs over a period of time (say five year) and seek necessary FERC approval for a Tariff amendment for reclassification of NU costs.
- C. PJM should consider having a cost cap on all assigned network upgrades upon completion of the System Impact Study (or Cluster Phase I Study) so that IC has a definitive idea for maximum cost responsibility and project cost exposures before ISA execution.

1. Where does your company agree with PJM ANOPR response?

- A. HQC supports PJM's proposal to develop a working definition and common understanding of grid resilience as this is a bedrock necessity to be able to build legislation or rulings on for funding and supporting resilience drivers. The definition details are complex and HQC welcomes further discussion around PJM's comments on the definition modifications presented.
- B. HQC supports PJM's proposal to propose a framework by which regions can develop resilience-based industry planning drivers to advance resilience planning. Drivers are key to determining how resilience plans can be effectively implemented.

2. Where does your company disagree with PJM ANOPR response?

- A. HQC urges PJM and FERC to broaden the ways that a transmission planning driver can ensure planning for system restoration. Specifically, PJM mentions fuel security for black start resources. As PJM references earlier in its comments to FERC on grid reliability with higher penetration of renewables (page 24), grid forming inverters should be deployed to enable a 100% renewable grid. This statement should be extended to the topic of resilience with black start and grid forming capable inverters being a tool for renewable energy resources and storage already being installed today.
- B. Would PJM consider procure grid forming inverters similar to ERCOT & CA utilities for grid reliability and resilience?

3. Are there areas where your company felt PJM's response fell short?

- A. HQC supported PJM in its comments about developing Resilience-Based Industry Planning Drivers, however PJM calls for Grid Expansion as a tool to solve this, and HQC believes that "expansion" is not always necessary if other tools are used, including utilizing the new inverter based generation and resources such as batteries and grid forming inverters.
 - i. PJM or FERC could mandate larger BESS system to add resiliency for an extended period instead of imposing network upgrades for future interconnection.
- B. HQC supports the statement that resilience criteria would apply to both regional and local facilities. It is important to recognize the need for local resilience planning, however calling out "storm hardening to protect substations against flooding" without mentioning other methods for achieving resilience that is not just grid based expansion is important as mentioned in 2-A and 3-A on this slide.

5. OTHER

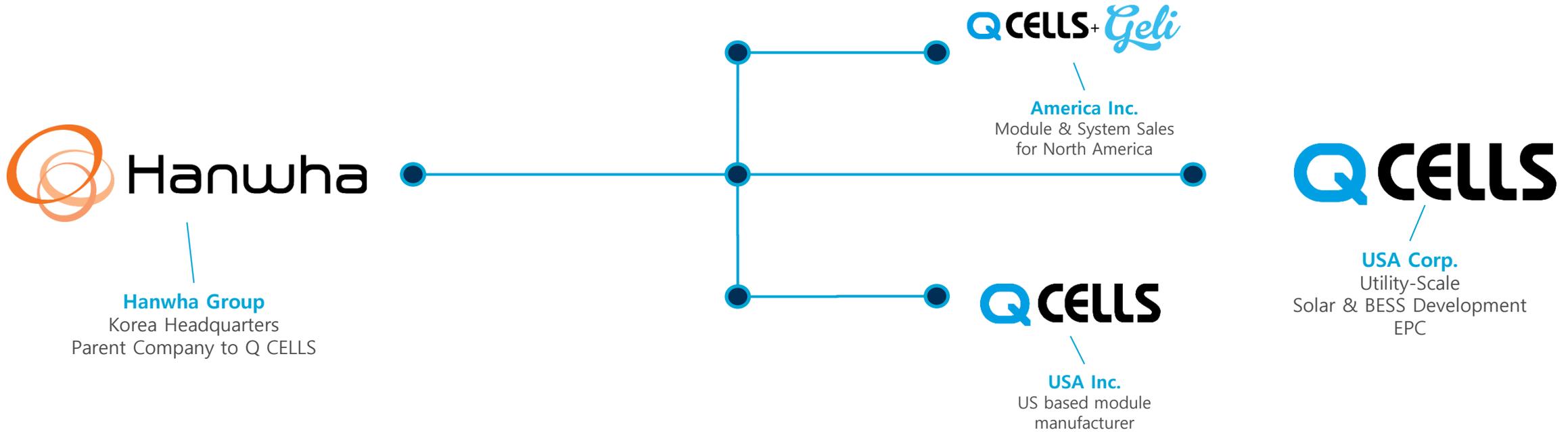
1. Q CELLS respectfully requests PJM to engage external consulting resources to manage the interconnection workload resulting from the large influx of renewable projects in the queue clusters to complete interconnection studies in alignment with the timeline outlined in the Tariff.
2. Create a project specific searchable timeline for projects considering GIR request as the new process is rolled out for interconnection queue reform (To compliment fee deposit calculator).
3. Q CELLS respectfully requests further dialogue for site control requirements, including acceptable alternative documentation such as MOU until at least the System Impact Study, to streamline negotiations with land owners and underwriters.

THANK YOU

Appendix

Q CELLS BUSINESS UNITS

Q CELLS USA Corp. is a part of a global network of entities all headed by Hanwha Group, which has its headquarters in Korea.



Q CELLS USA DEVELOPMENT PLATFORM

Q CELLS USA Corp. is a part of a global network of entities all headed by Hanwha Group, which has its headquarters in Korea.

Kellam

- **Capacity:** 82MWdc
- **COD:** 2020
- **Dev Contributions:** Project Development
- **Financing:** Raised Tax equity, Financed on Balance Sheet
- **Strategy:** Long term owner



Riphey

- **Capacity:** 82MWdc
- **COD:** 2020
- **Dev Contributions:** Project Development
- **Financing:** Raised Tax equity, Financed on Balance Sheet
- **Strategy:** 100% Divestiture



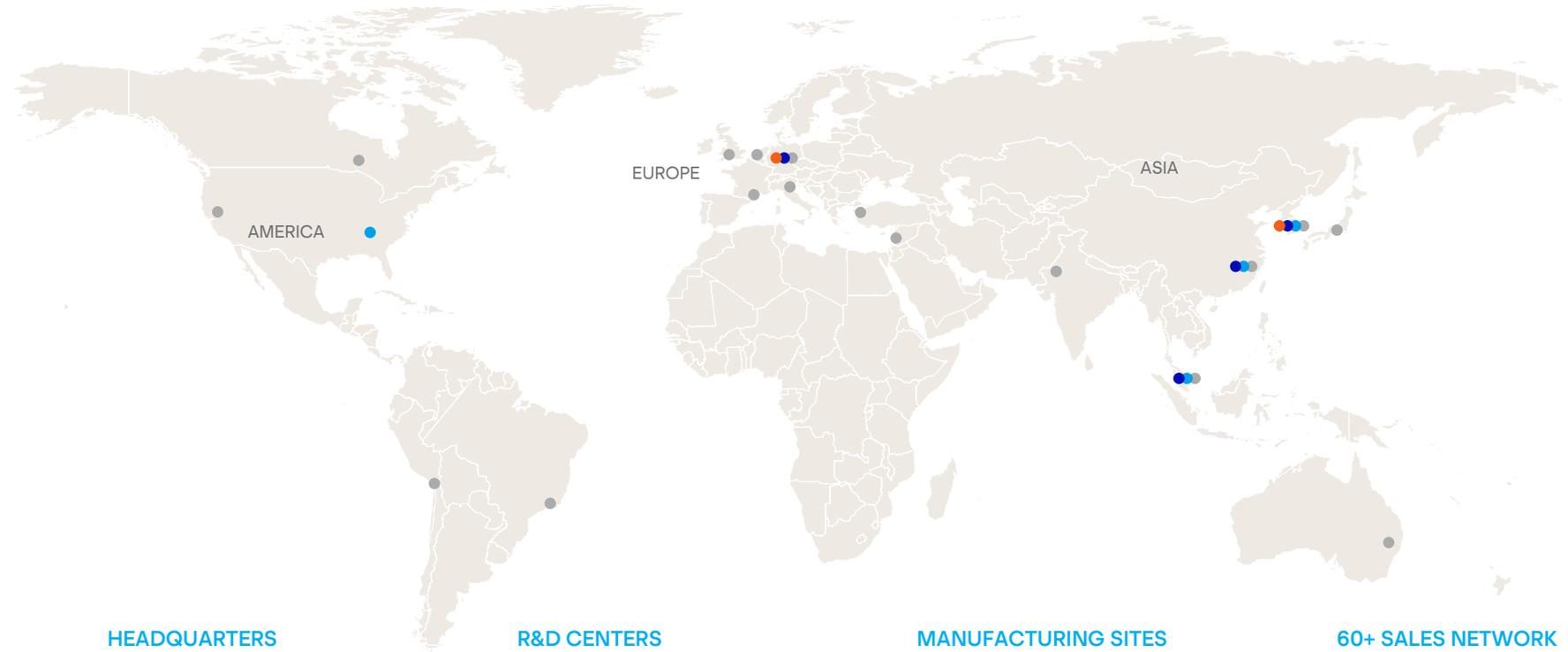
Coniglio

- **Capacity:** 168MWdc
- **COD:** 2021
- **Dev Contributions:** Project Development
- **Financing:** Raised Tax equity, Financed on Balance Sheet
- **Strategy:** Long term owner



Q CELLS GLOBAL NETWORK

Q CELLS works closely with global R&D and manufacturing sites to deliver the highest level of quality in manufacturing, sales and support.



2 Countries
● HEADQUARTERS

4 Countries
● R&D CENTERS

4 Countries
● MANUFACTURING SITES

60+ Countries
● SALES NETWORK

HEADQUARTERS

In Seoul, South Korea (Global Executive HQ) and Thalheim, Germany (Technology & Innovation HQ)

R&D CENTERS

R&D Centers in 4 countries (Germany, South Korea, Malaysia, and China)

MANUFACTURING SITES

Manufacturing Facilities in 4 countries (USA, South Korea, Malaysia, and China)

60+ SALES NETWORK

Spanning Europe, North America, Asia, South America, Africa and the Middle East