Utility Scale PV projects: Grid Service Solutions and Self-Consumption

Calgary, November 3rd

David A. Pichard, MSc., MBA
CDO, COO & Vice President, GP JOULE Americas
www.gp-joule.com
Company.
Unique All Around.

GP JOULE is the most innovative, authentic, and successful partner in the renewable energy sector.

GP JOULE has inherited and nurtured a down-to-earth culture, characterized by relentless respect and sense of responsibility for the environment. This crystallizes both the foundation and driving force of our company: enhance the connection between man and nature, safely and profitably for both parties. In GP JOULE, you will find a long-term partner with foresight and vision. GP JOULE’s goal is to ensure that 100% of the energy consumed around our planet in the future is produced from renewable sources.
To the point.

Key Figures.

- Founded in 2009
- Employees: 145
- Divisions: Projects, Products & Services, Think, Connect
- Installed generation capacity since 2009: 500 MW+
- German addresses: Reussenkoegge (headquarters), Buttenwiesen, Geislingen an der Steige
- North American addresses: Toronto (ON, CAN/ headquarters), San Mateo (CA, USA)
Leading the way.

Our strengths.

- Integrated corporate model
- In-house expertise for all phases of the project
- Highly qualified and experienced team
- Total customer focus thanks to strong motivation and dynamics
- Solid capital basis and first-class relations with investors and financial institutions
- In-house research and development
- Future-oriented corporate investments
Utility Scale PV
Projects PV.

Bright Outlook.

- MW-class greenfield projects
- Services along the entire value chain – from planning and installation to monitoring and maintenance
- International projects in the US, Canada, France, Germany, UK and Italy
- 447 MW of PV built to date
- Additional 250 MW in the international project pipeline
Products & Services.

Our services.

Development & planning
Whether by order or on our own initiative – our planning and development is detailed and trustworthy for every single project.

EPC
The turnkey package! From concept to commissioning – we manage the complete process.

O&M
We take care of the commercial and technical management of your project to secure your profits.
Products & Services.

Our products.

CULTIVECO
The Greenhouse innovation for biogas operators and more!

Solar Carport
The future of parking! Save energy costs by producing your own electricity or achieve attractive profits by feeding electricity to the grid.

Single Axis Tracker
Up to 25% more profit with the GP JOULE Phlegon© Single Axis Tracker!
An intelligent and robust tracking system for PV-plants
References PV.

As far as the eye can see.

MEURO, GERMANY
Output MWp: 70
Commissioned: July 2011

SAINT GOR – LAS CANES DOU RENARD, FRANCE
Output MWp: 12
Commissioned: July 2014

BALSAM LAKE, CANADA
Output MWp: 6
Commissioned: December 2014

PARAISO, USA
Output kWp: 434
Commissioned: May 2014
Grid Service Solutions
Reactive Power Compensation
Case Study: PV plant „Pompogne“ (France) 40 MWp.

- Good: Reactive power **necessary to transmit and distribute** active power.
- Bad: if reactive power is too high, increased heat loss in transmission lines and loads as current flow is much higher, creating potential hazardous breakdown situation.
- Power factor of a load tells us what fraction of the apparent power is true power vs. reactive power
- A high power factor is desirable since it minimizes the amount of reactive power needed by the load, reducing heat losses and maximizing efficiency
Reactive Power Compensation

Case Study: PV plant „Pompogne“ (France) 40 MWp.

- South Western France, 100 km South of Bordeaux
- 4 PV plants (40 MW in total), 181 acres,
- 173,052 PV modules (REC Solar), 57 central inverters (Refusol)
- 57 km routing between PV plant and substation
- Substation transforms from 30kV into transmission grid @ 63kV

Goal: Compensation within <1 sec reactive power varying ±10 Mvar within 10 sec
Reactive Power Compensation

Case Study: PV plant „Pompogne“ (France) 40 MWp.

- Full dynamic reactive power control on 63 kV
- Fully automatic grid support/reactive power compensation (feed-in or remove) aka Power Factor Control
- Controller measures at the high-voltage converters and controls the inverters through the STATCOM (Static Synchronous Compensator) automatically by Q(V)-curve
Reactive Power Compensation
Case Study: PV plant „Pompogne“ (France) 40 MWp.

- Reduces grid load and therefore grid upgrade costs.
- Stabilizes the grid through provision and compensation of reactive power loads.
- Improves stability of a weak grid hence increases region’s infrastructure.
Self-Consumption
PV Powered Winery in California.
500 kWp net metering system at Paraiso Vineyards.

- Covers main energy consumption: water pumps.
- Example of a decentral use: production at point of consumption.
- High energy cost savings and marketing value-added.
- Ecological and economical benefits.
Off-Grid Applications

Mining, Exploration, Communities

- Significant savings by reducing energy/fuel costs (incl. transportation)
- Off-grid hybrid system with Gensets, combined also with wind
- Reduces carbon footprint of these operations

- Exploration in NW Territories: 350 kW PV + 30 kW Diesel Generator – 2M$ savings over 3 years by reducing 20% fuel consumption
- Mining in NW Territories: 13.8 kV Micro grid, 9.4 MW Wind + 48 MW Diesel Genset (2012): 17.6M$ over 3 years (workforce: 1,071)
- Community Power in Australia: Shifted from 100% Diesel to 52% with a 300 kW PV system and 500 kW flywheel, no storage
What We Are Looking For
GP JOULE’s Objectives in Canada

Let’s do it

- Find local developers committed to utility scale renewable projects in search of planning, financing and/or technical expertise
- Support a reliable and profitable deployment of PV and Wind farms as a cost competitive alternative to fossil fuels
- Find and develop niche applications for our Products: PV greenhouse, Single Axis Tracker (self-consumption ‘kicker’) and our Hydrogen Electrolyzer Technology H-tech
- Leverage lessons learned from construction in Ontario severe environmental and geotechnical conditions
Are you interested in working with us?

GP JOULE Canada Corp.
219 Dufferin Street, 101A
Toronto, ON
M6K 3J1, Canada
www.gp-joule.ca

David A. Pichard, MSc., MBA
CDO, COO & Vice President
T +1 (416) 9070 408
d.pichard@gp-joule.ca