**POWER GAS PRODUCTS**

**& STORAGE NEEDS ASSESSMENT**

### Spinning Reserve % along Peak and trough PPA’s could be costing you a lot money.

### A project and plant assessment will guide your plant’s current and future power & gas strategy for improvement through:

### Optimizing current or planned production capacity for a single plant or multiple plants.

### Reducing spinning reserve and power buffer losses lower operating costs.

### We focus on sellable yield including maximum production and minimum turndown operating efficiencies

### Minimizing downtime and increasing reliability Enhancing efficiency and productivity

### Increasing safety performance Reviewing inventory and sparing program

### Extending component life, including Pressure Swing Adsorption (PSA)

### Secure Supplies is a market leader for Power to Gas and Gas to Power energy storage systems.

### Our focus is on safety, power to gas / gas to power technologies, distribution innovation and business operational excellence.

### Founded more than 15 years ago, Secure Supplies is a company with operations in several countries.

### Secure Supplies is the world’s leading provider of Power Gas Storage Systems using distributed hydrogen

### and combustion engines.

### We are proud to have proprietary designs and top tier manufacturing partners which not only have many years of hydrogen production plant assembly experience using power to gas production systems in several categories, But also have suitable expertise to implement our custom gas designs & gas control configurations. When it comes to distributed hydrogen, no other design company has our teams level of operational experience and expertise with blended and non blended energized gas applications. Put our Energy Storage design expertise to work for your site.

### Needs assessment • Engineering studies of your individual project site requirements can be conducted to review the current process and performance to investigate advancing the energy storage system needs and ability to utilize Secure Supplies Power to Gas Product Solutions. The assessment will help determine your plant’s size budget & any design limitations.

### The focus is on areas providing secure backup for your systems, particularly important for renewables as we go over 30% grid provision from renewables. This Needs Assessment further aids in planning for maximum development of power and heat assets and or distribution of power gas products in your projects region.

### Detailed assessment • Engineering design to determine and operational limitations and focus areas for further investigation. • Review the potential integration between multiple hydrogen plants S2 S3 , off-gas streams, and steam systems to increase efficiencies, and/or optimize overall production. • Evaluate major Power to Gas plant process units: – Compressors and fans – Feed purification systems – CHP/Reformer & Convection Section –Bypass Process Gas ,Boiler/High Temperature Shift/PSA – Gas cooling exchanger train – Instrumentation and controls – Feed Water & Steam system.

### Safety & Reliability assessment • Inspection and evaluation of process conditions and operating procedures to address safe and reliable plant performance. • Review current plant layout for safety improvements (ladders, platforms, concrete, etc.). • Identify safety hazards. • Review maintenance activities and programs. • Review equipment protection systems. • Inspect material conditions of the plant and equipment

### ​

The assessment is e.g. based on the amount of gas available, Energy Storage requirements, power needs,

gas quality of the operational pressure requirements of gas, and/or a need for emergency back up power operations.

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**Site Location and size & safety buffer measurement** plays a important role in this process and  uncovers the specific needs, for example, what specific engine or boiler will be suitable and what daily gas production and Roi is achievable for your specific site. It also maps out the amount of space required, and the ventilation needs.

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**ATEX conditions** / describing what equipment and work environment is allowed in an environment with an [explosive](https://en.wikipedia.org/wiki/Explosive) [atmosphere](https://en.wikipedia.org/wiki/Atmosphere). and the necessary equipment for gas cleansing, gas fans, torches, emergency cooling etc.

Very standard in refinery fuel gas production and use areas.

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The goal of this process is to help the customer achieve the most profitable operation.

​**Completing the needs assessment;**

makes it possible for Secure Supplies Design Teams

to provide the most suitable design and components to value add your project site.

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***Component choice examples:***

* Heat to Power units , ORC Turbines Useful for Bypass Heat Sources and Closed Loop Geothermal from 80’c
* Electrolyzer Power to Gas Modules 20 and 40 foot Solutions Mini Refinery or Factory Scale Full Refinery.
* Gas handling equipment ATEX Rated
* Transformer and Sub Station Selection
* Compressor Selection
* Gas packaging and storage equipment
* Soundproofing
* Burner type and size
* Hydrogen Dispensers and Fillers.
* Hydrogen Metering and Billing Systems
* Secondary Gas product Planning Oxygen and Nitrogen.
* Thermal Control Unit
* Water Production and Supply to the RO/DI Water System
* High purity H2 dryer
* Gas fans
* Emergency cooling type and method e.g. air or water based
* Gas container
* Valves
* Gas to Power System Selection, Hydrogen Power Plant (mechanical, Fuel Cell and Solid State Gas Harvester Options)
* Alternator Specifications
* Load Balancing Systems etc.

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**The basic steps involved;**

in conducting a needs assessment are as follows:

* Determine the Pilot /Project Site Size in MW, and Land Area at location selected for your project,
* Sites Inspection, soils samples, power water resource evaluation, buffer zone access roads.
* Develop a plan for assessing the needs and desired outcomes and Roi performance of the project.
* Conduct the assessment in conjunction with the renewable power and gas teams.
* Analyze the results and proposal of solutions, design and equipment install costs Submitted.

It is important to include key contacts in the needs assessment project.

These key individuals will vary from project to project and from community to community, but some examples include:

Community leaders

Staff that work at the site.

People whose jobs or lives could be affected by the project,

businesses involved in the project,

service providers who may be knowledgeable about the community.

**Please Attached any Annex or supporting doc maps or team or project data when returning Need Form to us.**

**Your Contact is :**

**PLEASE ANSWER QUESTION YOU CAN AND LEAVE ONES YOU NOT SURE OF.**

**AS IT WILL AID DISCUSSION AND DESIGN PROCESS with SECURE SUPPLIES TEAM.**

|  |  |
| --- | --- |
| *PROJECT START DATE* |  |
| *PROJECT TITLE* |  |
| *PROJECT LOCATION ADDRESS* |  |
| *POTENTIAL PROJECT PARTNERS, IF APPLICABLE* |  |

**Key Point Indicators** Date Document Provided / / 2017

**Site Operational Needs Assessment**

* Is there water on site ? **YES/NO**  **Grid Water**  **Lake**  **SEA WATER**  **REFUSE WATER**
* Do you require a RO/DI water System **YES /NO**
* Is there gas on site ? ** Bio Gas Bypass Gas  Frack Gas  Gas Type**\_\_\_\_\_\_\_\_\_\_\_
* Inlet pressure of Gas Purity of Gas\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ % **Attach** Gas Analysis.
* Does the Site Require Heat to Power? if so which type **Geothermal Exhaust heat CHP Type**\_\_\_\_\_\_\_\_\_
* What is the Available heat in **BTU or Temp \_\_\_\_\_\_\_\_\_\_\_\_C”/F**
* Are there any Sound Restrictions at site in **Db** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Is there Road Access to Project Address? **Dirt Road Paved ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Is the Land Buffer space any close building or structures ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Please provide land map google data aerial view of site.**
* Is The a Concrete Pad at site, **bitumen cement Earth Pad ? Earthed ?** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Is There Local Power or Main Line Power ? **What Voltages ? What Phases ?**
* Is there a Substation on site ?
* Are there Transformer resources on site ?
* Do you have a Safety Officer? YES/NO Contact \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do you have a Carbon Credit or Sustainability Officer? YES/NO Contact \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Will you need us to provide safety and monitoring systems? YES/NO
* Will you need us to provide safety signage? YES/NO

**Is There Power at Project Site select which types?**

|  |  |  |
| --- | --- | --- |
|  Grid power Connection |  Hydro Power Site | Wind Farm Site |
|  Geothermal Power Site |  Solar Power Farm Site |  Other (Specify below) |

*NOTES:*

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| * **Describe the physical location of the community – What are the climate and topography like?** * **Elevation Drainage. Flood Zone?** * **Average Day night Temperatures?** * **What project site is this** * **Is there a Dam or Lake** * **Is there Water Storage on site?** |

**POWER STORAGE NEEDS**

* Do you have any Energy Storage Now **YES/NO** Details \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Target Stored Power Volume per hour for your Site?  1 MW  2 MW  5 MW  10 MW  20 MW other \_\_\_\_\_\_
* What Voltages \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do you have Low/med voltage transformer on site ? YES/NO
* Do you have Battery Storage System on Site now? Details \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do you plan an Battery storage or capacitor systems on site ? YES / NO
* Do you run Ac Connection between arrays or production or DC point to point AC DC
* What size Dc invertors do you have and how many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**POWER BACK UP Security NEEDS**

* Do you have any Back up power systems now **YES/ NO** Details\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What is the Run time you need for Back up Power Hrs ? \_\_\_\_\_\_\_\_\_\_\_\_
* How many KW / MW per hr back do you need to Have in Power outage ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What Power Load do you have ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What % Load do you need in Outage?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Gas Production Needs**

* What is the Target Gas Volume per hour for your S1? 20 kg 40 Kg 80 Kg 100 kg
* What Stored Gas Volume do you need \_\_\_\_\_\_\_\_KG
* Do you want Gaseous or liquid Storage/ Delivery ? Gaseous Liquid Pipeline
* How Many tank Trailer Pods \_\_\_\_ 500 kg ­­­­\_\_\_\_ 1000 Kg \_\_\_\_1500 kg \_\_\_\_\_ 2500 kg
* *Inlet pressure provided \_\_\_\_\_\_\_\_\_\_\_\_\_\_* Bar /Mpa GAS Purity \_\_\_\_\_\_\_\_\_\_\_ Gas Type\_\_\_\_\_\_\_\_
* Outlet pressure desired  30 Bar /Mpa 250 Bar /Mpa  500 Bar /Mpa 900 Bar /Mpa
* Purity Desired  99.9 % 99.99%  99.999% 99.9999%
* Humidity Required \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do you have adequate airflow ? Onsite or Planned \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Would you like Gas Monitoring System ? YES / NO
* Would you like Gas Cooling system YES/ NO
* Do you require steam reforming ? YES/ NO
* Would you like high purity H2 Dryer system YES/ NO
* Do you have a Gas Flare on Site ? YES/ NO
* Do you Need Gas Flare on Site ? YES/ NO
* Do you need gas metering on Gas rail ? YES/ NO
* Do you need Fork lift Dispenser YES/ NO
* Do you need Bulk gas Dispenser Towers YES/ NO

**Which points Concern you?**

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| --- | --- | --- |
|  Purity of Gas |  Humidity of Gas |  Production volume |
|  Metering of gas made   Nitrogen   Other (Specify below   Propane |  Education   Oxygen   Safety   Ethane |  Hydrogen   Methane   Syngas   Other (Specify below) |

*NOTES:*

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**Gas Distribution Needs**

* Do you require Forklift Filling? **YES/NO** If so How many per hr \_\_\_\_\_\_What Pressure \_\_\_\_\_ Bar/PSI/Mpa
* Do you require Vehicle Filling? **YES/ NO** If so How many per hr \_\_\_\_\_\_What Pressure \_\_\_\_\_ Bar/PSI/Mpa
* Do you require airside ground vehicle filling **YES /NO** If so How many per hr \_\_\_\_\_\_ What Pressure \_\_\_\_\_ Bar/PSI/Mpa
* Do you require Fuel Cell filling **YES /NO** If so How many per hr \_\_\_\_\_\_ What Pressure \_\_\_\_\_ Bar/PSI/Mpa
* Do you require boiler kiln fueling **YES /NO** If so How many per hr \_\_\_\_\_\_ What Pressure \_\_\_\_\_ Bar/PSI/Mpa
* Do you need multi pressure filling?  35 Bar/Mpa  75 Bar/Mpa  other \_\_\_\_\_\_\_\_\_\_
* Do you require cascade Gas Delivery Filling around Project site? **YES / NO Liquid or Gaseous**
* Do you have a Planned Distribution Radius by Road ? **YES/ NO** How Many **Km /Miles** \_\_\_\_\_\_\_\_\_
* Do you need Pipe Line or mobile Pipe line gas Delivery ?  **Pipe line**  **Mobile**
* Do you have High voltage hazards on site. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do you have Flame Hazzard on or near site. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What sort of industrial facilities and commercial areas are present?

 Factory  Bottling  Airport  Port  Rail  Boiler  Furnace  Kiln  Dryer  Cement Plant

 Green House  Smelter  Plastic Factory  Poly Styrene Water Station Peaker Plants Fish Farms

 Farms

* What other gas environmental factors are applicable to your beneficiary community?

|  |  |  |
| --- | --- | --- |
|  Climate change |  Pollution |  Waste Management |
|  Other (Specify below)   Heat   Ground Heat |  Noise   Oxygen Delivery   TCU Thermal Control UNIT |  Sustainability  Air Quality  Controlled environment. |

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**Engineering Needs**

* Do you have Engineers on site full time **YES/NO** Which Type **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Do you have Engineers in company **YES/NO** Which Type **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Do you have Engineers for O&M **YES/NO** Which Type **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Do you have Gas Engineers **YES/NO**
* Do you have Civil Engineers **YES/NO**
* Do you have any Local Fire Rescue or EMS representative or relationships **YES/ NO**
* Do you have Mechanical Engineers on site full time **YES/NO**
* Do you have Electrical Engineers on site full time **YES/NO**
* Do you have Boiler Makers on site full time **YES/NO**
* Do you have Diesel Mechanics on site full time **YES/NO**
* Do you want recommended spares kit ? **YES/NO**
* Do you want recommended annual maintenance kit ? **YES/NO**
* Do you want recommended Installation supervision ? **YES/NO**
* Do you want recommended Commissioning and Training ? **YES/NO**
* Do you want 2 Year Operations and Maintenance JV ? **YES/NO**
* Do you Need Multi Gas Production  O2  N2  Liquid Gaseous
* Please Detail and introduce teams which require training during Operations and Maintenance term.

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* What sort of engineer facilities / areas are present at site ?

 Welding  Electrical  Gas  Road works  Construction  Boiler making  Farms  other

*NOTES: Detail any Specific Engineering teams or support teams which want to be involved or Trained*

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