

**APPENDIX I
TO
POWER PURCHASE AND INTERCONNECTION AGREEMENT
FOR
SNAP GENERATION**

**INTERCONNECTION REQUIREMENTS
FOR
SUSTAINABLE NATURAL ALTERNATIVE POWER PRODUCERS
IN
GVEA'S SNAP PROGRAM**

This document states the minimum requirements for the safe and reliable operation of Member-owned Sustainable Natural Alternative Power (SNAP) generating facilities (25 kW or smaller in size) that will be eligible to be connected and operated in parallel with the Golden Valley Electric Association, Inc., (GVEA) utility system under GVEA's SNAP Program. Member-owned generating facilities that are fueled by: (a) Wind; (b) solar energy; (c) geothermal energy; (d) landfill gas; (e) wave or tidal action; (f) gas produced during the treatment of wastewater; (g) qualified hydropower; or (h) biomass energy based on solid organic fuels from wood or field residues, or dedicated energy crops that do not include wood pieces that have been treated with chemical preservatives, are eligible to become SNAP Projects.

SNAP Projects shall not be fueled or connected to any non-qualified alternative energy sources.

1. Compliance with Laws. Construction and installation of a SNAP Project shall be in compliance with all applicable national, state, and local construction and safety codes. Once operating, GVEA reserves the right to require the Member, at the Member's expense, to provide corrections or additions to their existing protective devices in the event of future modification of government or industry regulations and standards.

2. Placement of Member-owned SNAP Project. To maintain the existing GVEA distribution system's power quality and reliability, only one SNAP Project per distribution transformer will be authorized. This requirement may be waived by GVEA when GVEA, in its sole discretion, deems it appropriate under the circumstances.

3. Power Quality and Reliability. The interconnection of the SNAP Project with the GVEA utility system shall not cause any reduction in the quality and reliability of service provided to other Members. There shall be no objectionable generation of abnormal voltages or voltage fluctuations, and the harmonic content of the SNAP Project output must be below that level which

would cause undue interference with other Member loads, other utilities, or GVEA facilities and equipment.

To minimize all interference, GVEA requires the SNAP Project to meet the power quality standards presented in Section 10 Recommended Practices for Individual Consumers of the latest IEEE Std. 519, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems. In addition, to meeting all requirements identified in this document, the SNAP Project shall comply with GVEA's Operating Tariff, IEEE 1547, and the Technical Guidelines for Operating, Metering and Protective Relaying for Non-Utility Power Producers and Cogenerators which is the standard adopted by the Alaska Intertie Operating Committee dated March 15, 1990. Both of the aforementioned documents are available from GVEA's Engineering Department.

4. Testing. Prior to initial energization of the SNAP Project, inspection and/or tests will be jointly performed by both the Member and designated GVEA personnel. Purpose of the testing is to determine if the generator and related equipment of the SNAP Project meets the minimum safety requirements described by IEEE 929 and UL 1741 and IEEE1547. Member is solely responsible for ensuring proper operation of its SNAP Project. Further tests may be required on individual systems. The Member is responsible for the costs associated with testing and/or retesting inverters and power generating units that do not meet UL 1741 and IEEE 1547.

5. Association Inspection and Member Maintenance Records. The Member shall maintain the SNAP Project in good working order. The SNAP Project (*i.e.*, generator and associated equipment) may be subject to inspection by GVEA upon reasonable notice, but GVEA assumes no duty to inspect said facility. The Member will assume full responsibility for the routine maintenance of the SNAP Project, associated protective devices, and the keeping of records for such maintenance. These records shall be available to GVEA for inspection at all times upon reasonable notice to the Member, but GVEA assumes no duty to inspect said records.

6. Visible, Lockable Disconnect Switch. An accessible, visible, lockable disconnect switch is to be provided by the Member in an appropriate circuit which is lockable in the open position only. This switch, when locked in the open position for any of the following conditions, may be unlocked only by GVEA operating personnel. GVEA will unlock the switch under the following circumstances:

- (a) If it is necessary for the protection of line crew personnel when working on de-energized circuits during a system emergency.
- (b) If inspection of the SNAP Project reveals a hazardous condition or a lack of proper maintenance.
- (c) If the SNAP Project interferes with other Members, other utilities, or with the operation of GVEA's distribution system.

(d) If the GVEA determines that the SNAP Project has generated power from a non-qualified alternative energy resource.

(e) For general maintenance of GVEA's distribution system.

The installed switch will be locked open by GVEA the above conditions (a), (b), (c) and (d). GVEA will provide reasonable notice before locking the switch open for general maintenance as provided in condition (e) above.

7. Metering. GVEA shall install and maintain a kilowatt-hour meter, or meters at the SNAP Project capable of registering the bi-directional flow of electricity at the Point of Interconnection at a level of accuracy that meets all applicable standards, regulations and statutes. The meter(s) may measure such parameters as time of delivery, power factor, voltage and such other parameters as GVEA shall specify in its sole discretion. The Member shall provide space for metering equipment as specified by GVEA with the location of the meter(s) to be approved by GVEA. It will be the Member's responsibility to provide the current transformer enclosure (if required), meter socket(s) and junction box after the Member has submitted drawings and equipment specifications for approval by GVEA.

8. Nominal Voltages and Phasing. The generator nameplate voltage should be the same as one of the nominal voltages supplied by GVEA. The nominal voltages are 120/240 V single-phase, 120/208 V three-phase, and 277/480 V three-phase. If the generator nameplate voltage is different from GVEA's nominal voltages, the Member must supply a dedicated generator transformer. The preferred transformer connection, unless otherwise specified, is grounded wye-grounded wye.

9. Fault Current Increase and Upgrading Equipment. In general, installation of a new generator will increase the fault current level at the Member's electrical facility. This may require upgrading some of the Member's equipment. The Member will assume full responsibility of upgrading Member's own equipment.

10. Starting as Induction Motor. In general, induction generators start as motors and also synchronous generators may be designed to start as motors. The Member-owned generator starting as a motor shall meet the motor starting requirements prescribed by GVEA. GVEA may require the Member to provide, at Member's own expense, special or additional starting equipment.

11. Generating Facility Grounding. There are additional safety concerns that should be addressed when considering circuit grounding of the SNAP Project interconnected to GVEA's utility system. To ensure proper grounding of the generating facility, the Member should follow all applicable national, state, and local codes regarding grounding.

12. Synchronization. The SNAP Project must be synchronized with GVEA's utility system at all times and the Member shall be responsible for the cost and maintenance of synchronization.

13. Automatic Disconnection and Time-Delayed Automatic Reconnection. The SNAP Project shall be designed to automatically disconnect and lockout when GVEA's service is interrupted for any reason. Automatic reconnection of the SNAP Project to GVEA's utility system shall be done only on Hot-Bus/Hot-Line/Sync-Check at least five minutes after the automatic disconnection.

14. Single Phasing Protection. The Member is advised that a phase-unbalance disturbance on GVEA's utility system can result in overheating of the SNAP Project. A negative-sequence-type relay (current or voltage) could be necessary to initiate tripping under phase-unbalance conditions and may also be used to block closing of the automatic disconnecting device if GVEA's utility system is single-phased.

15. Generating Facility Protection. The Member is fully responsible for the protection of the generator and all of its associated equipment. Protection should be provided for the Member's own equipment failures, faults and other disturbances on GVEA's utility system. The Member shall provide equipment specifications, protection arrangements and design drawings to GVEA for review and written approval prior to installation.

16. Fault Detection and Automatic Isolation. To prevent a SNAP Project from supplying current to a fault on GVEA's utility system, the SNAP Project shall be equipped to provide isolation from GVEA's utility system for any fault on the GVEA's utility system. The automatic isolation shall be done prior to the Association breaker (or recloser) reclosing and within a reasonable period of time, typically less than two seconds (120 cycles).

17. Under/Over Voltage Relay. To prevent any hazardous operating conditions, the SNAP Project shall be isolated from GVEA's utility system for any under-voltage (lower than 80 percent of nominal voltage) and over-voltage conditions (higher than 110 percent of nominal voltage) within two seconds (120 cycles).

18. Under/Over Frequency Relay. To prevent any hazardous operating conditions, the SNAP Project shall be isolated from GVEA's utility system for any over-frequency and under-frequency conditions within a reasonable period of time. The Member's frequency relay settings will be reviewed and approved by GVEA prior to start-up of the SNAP Project.

19. No Automatic Reclosing. The GVEA feeder circuit breaker control scheme is normally designed to have at least one automatic reclosing in order to minimize unnecessarily prolonged outages. To minimize potentially hazardous conditions or equipment damage due to non-synchronized operation caused by automatic reclosing, no automatic reclosing of the SNAP Project breaker (or interrupting device) shall be allowed.

20. Dedicated Distribution Transformer. To ensure reliable service to other GVEA Members and to minimize all possible problems for other GVEA Members, the SNAP Project shall be interconnected to the GVEA utility system through a dedicated-to-single-Member distribution transformer. Any cost of new GVEA facilities to achieve dedicated-to-single-Member service shall be the Member's sole expense. This requirement may be waived by GVEA on a case-by-case basis, when it deems appropriate, in its sole discretion.

21. Single-phase Generating Facility on Three-phase Distribution Transformer. In general, a Member-owned single-phase generating facility greater than 10kW shall not be allowed to be connected to a GVEA three-phase distribution transformer. This requirement may be waived by GVEA on a case-by-case basis, when it deems appropriate, in its sole discretion.

22. Surge Protection. The Member is responsible for the protection of Member's SNAP Project from transient surges initiated by lighting, switching, or other system disturbances.

23. Future Modification or Expansion. Any future modification or expansion of the SNAP Project will require a separate engineering review and approval by GVEA.

24. Reservation of Rights. GVEA reserves the right to require, in its sole discretion, additional interconnection requirements for SNAP generating facilities in order to preserve the safety and integrity of GVEA's utility system.

ATTESTATION:

I, _____, am an authorized representative of _____ (SNAP Producer) have read the above Interconnection Requirements for Sustainable Natural Alternative Power Producers, understand the importance of adhering to the requirements, and agree to abide by the requirements set forth herein.

Signature: _____

Date: _____

SNAP Account No. _____