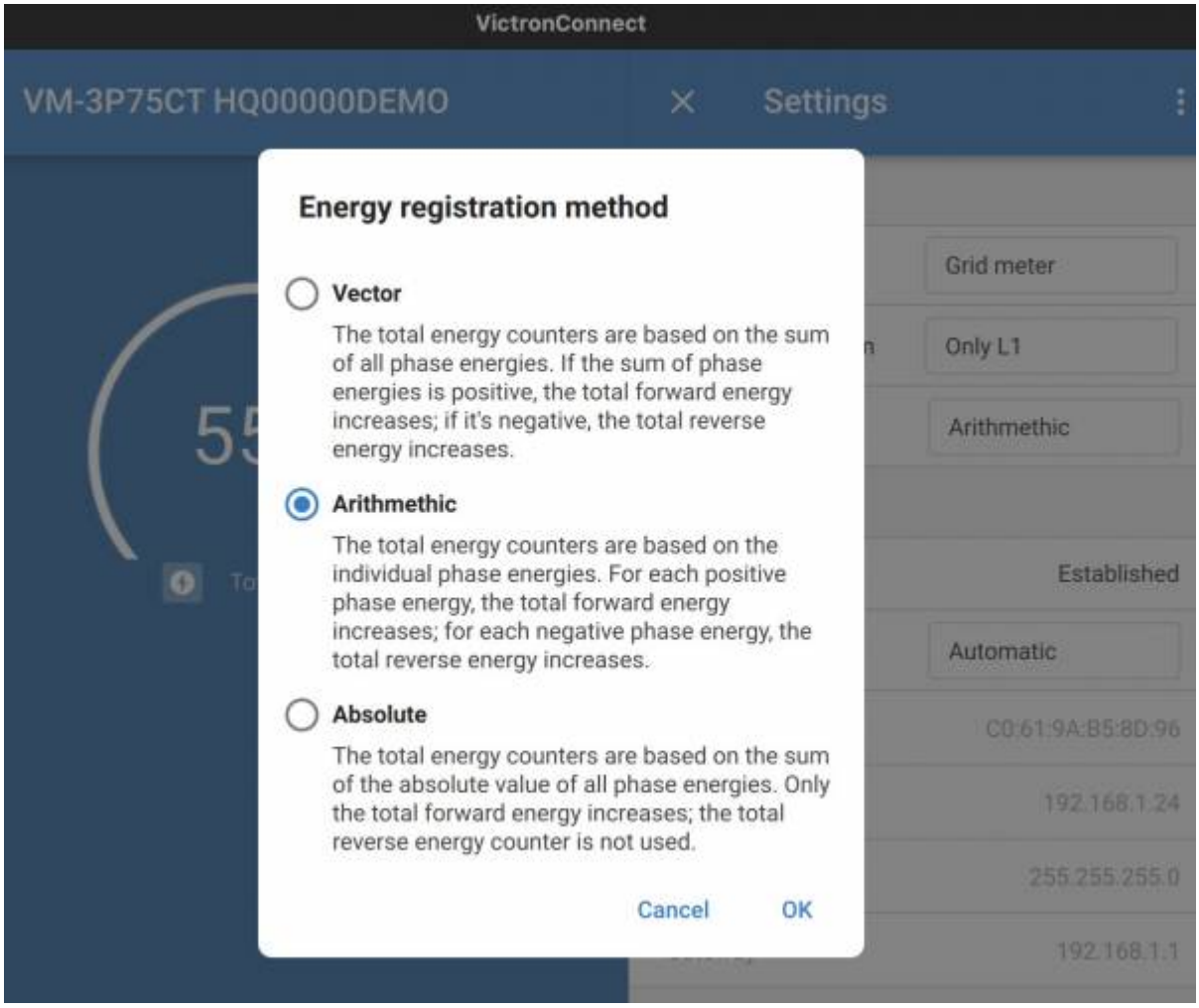
# Victron 3 phase compensation behaviour

## Simplified Explanation

The grid utility meter determines how energy usage is billed. The type of energy meter used in the Victron system determines how energy is calculated and reported (via VRM). The ESS Phase Compensation setting determines how the system behaves.

## Energy Counting Methods




**Phase Compensation (Sum/Vector Method):** It is common for 3 phase grid utility meters calculate energy by summing all phases. If your meter does this, VRM (Victron Remote Management) should also show this summed (compensated) energy, or else there will be a discrepancy.

To show compensated energy on VRM, you must use a grid energy meter designed for this, such as:

- EM24
- EM530/540
- Victron Energy Meter VM-3P75 (set to Vector mode)

**Individual Phase Counting:**

If your utility meter counts energy for each phase separately, VRM should show each phase individually (without compensation).

These meters count energy this way:

- The ET340 meter,
- Multis+GX devices (without a meter),
- Victron Energy Meter VM-3P75 (set to Arithmetic mode)

What VRM shows is determined by the type of meter used in the system, not by VRM or any other configurable setting on the GX device.

# Understanding Phase Compensation

- **Phase Compensation:** Energy billing is based on the total of all phases combined. If you import energy on one phase and simultaneously export energy on another, the net sum is billed.
- **Individual Phase:** Energy billing is based on each phase separately. You pay for imports and earn from exports independently, often at different rates.

For VRM and optimal pricing accuracy, the energy counting method must match your utility's billing method.

## Practical Example

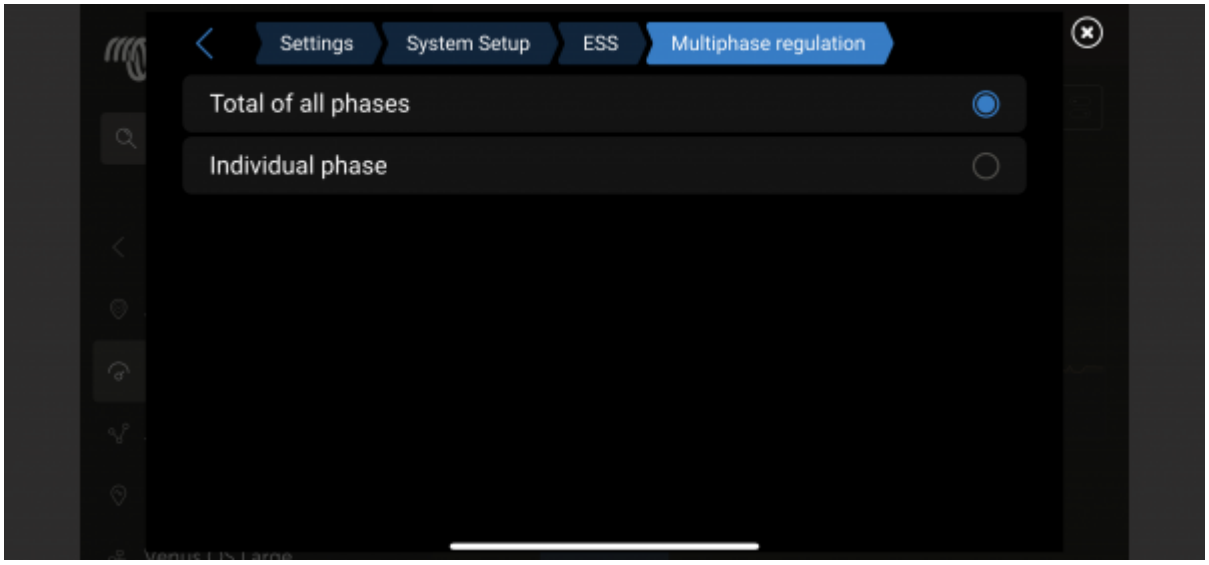
- Import tariff: €1/kWh
- Export tariff: €0.50/kWh
- Phase 1 imports 1000W; Phase 2 exports 1000W; Phase 3 is inactive.

| Counting Method | Displayed Power | After 1 Hour (kWh) | Cost |
|---|---|---|---|
| Phase Compensation | 0 W | 0 imported, 0 exported | €0 |
| Individual Phase | 0 W | 1 imported, 1 exported | €0.50 |

# Important Clarifications

The **Phase Compensation setting** in the ESS menu affects system behaviour, **not** the energy counting method. It:

- **Total of all phases:** Multis distribute load/supply compensation evenly across all phases.
- **Individual phase:** Multis manage loads separately per phase.




## Possible Improvement

Allow 3 Multis in a 3-phase setup to internally calculate phase-compensated energy. This would remove the need for an additional energy meter in many ESS installations, common in Austria/Germany.

## Technical Challenge

Calculating compensated kWh solely on VRM without additional changes to GX firmware / hardware is impractical due to real-time data needs. Without continuous internet connectivity, inaccuracies would occur.