Feeder Voltage Rise from Distributed Generation

Approximate voltage rise at the point of connection of a generator exporting real and reactive power through a feeder of given resistance and reactance.

Method: Approximate voltage drop/rise on a feeder

Input parameters

Unit system: SI

Parameter	Value	Unit
Nominal line-to-line voltage	11.000	kV
Real power exported	3.0000	MW
Reactive power exported (negative = absorbed)	0	Mvar
Feeder resistance	2.0000	Ω
Feeder reactance	3.0000	Ω

Calculated results

Parameter	Value	Unit
Voltage rise	545.45	V
Voltage rise	4.9587	%
Reactive power to cancel the rise	-2.0000	Mvar
Power factor that gives no rise	0.83205	

Notes for this case

• ΔV ≈ (PR + QX)/V (three-phase quantities, line-to-line voltage). On rural feeders with high R/X, absorbing reactive power helps little and export may need curtailment or network reinforcement.

Formula and method

$$\Delta V \approx \frac{PR + QX}{V}, \quad Q_0 = -\frac{PR}{X}$$

Variables

V	Nominal line-to-line voltage	V
P	Real power exported	W
Q	Reactive power exported (negative = absorbed)	var
R	Feeder resistance	Ω
X	Feeder reactance	Ω
ΔV	Voltage rise	V
$\Delta V/V$	Voltage rise	-
Q_0	Reactive power to cancel the rise	var
pf_0	Power factor that gives no rise	-

Method and standards

Voltage rise.

Assumptions and limits

- Short line; small angle; constant source voltage.

References

Approximate voltage drop/rise on a feeder

Report details

Report reference	FCC-GFV5-61E3 (the same inputs always give the same reference)
Generated	23 November 2026, 17:50 UTC
Calculator	Feeder Voltage Rise from Distributed Generation
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
Release checks	4 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/power/voltage-rise-distributed-generation

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.