PVsyst - Simulation report

Grid-Connected System

Project: Schoenfelder

Variant: 20252901_Schoenfelder_2P_Tracker_Bi_GCR53_320kW_615W_7563

Tracking system with backtracking

System power: 895 kWp

Scheideldorf - Austria

Author

Nexun AT GmbH (Austria)

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20252901_Schoenfelder_2P_Tracker_Bi_GCR53_320kW_615W_7563

PVsyst V7.4.5

VC0, Simulation date:
31/01/25 09:43
with v7.4.5

Nexun AT GmbH (Austria)

Project summary

Geographical Site	Situation		Project settings	
Scheideldorf	Latitude	48.74 °N	Albedo	0.20
Austria	Longitude	15.35 °E		
	Altitude	535 m		
	Time zone	UTC+1		

Meteo data

Scheideldorf

Meteonorm 8.1 (1996-2015), Sat=100% - Synthetic

System summary

Grid-Connected System   **Tracking system with backtracking**

PV Field Orientation
Orientation

Tracking plane, horizontal N-S axis

		Near Shadings	
Tracking algorithm		According to strings : Fast (table)	
Astronomic calculation		Electrical effect	100 %
Axis azimuth 0 °	Backtracking activated	Diffuse shading	Automatic

System information
PV Array

		Inverters	
Nb. of modules	1456 units	Nb. of units	2 units
Pnom total	895 kWp	Pnom total	700 kWac
		Pnom ratio	1.279

User's needs
Unlimited load (grid)

Results summary

Produced Energy	1143978 kWh/year	Specific production	1278 kWh/kWp/year	Perf. Ratio PR	92.37 %

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General parameters

Grid-Connected System   **Tracking system with backtracking**

PV Field Orientation

Orientation		Tracking algorithm	Backtracking array	
Tracking plane, horizontal N-S axis		Astronomic calculation	Nb. of trackers	28 units
Axis azimuth	0 °	Backtracking activated	**Sizes**	
			Tracker Spacing	9.00 m
			Collector width	4.79 m
			Ground Cov. Ratio (GCR)	53.2 %
			Phi min / max.	-/+ 55.0 °
			Backtracking strategy	
			Phi limits for BT	-/+ 57.7 °
			Backtracking pitch	9.00 m
			Backtracking width	4.79 m
			Mode	Automatic

Models used

Transposition	Perez
Diffuse	Perez, Meteonorm
Circumsolar	separate

Horizon

Free Horizon

Near Shadings

According to strings : Fast (table)	
Electrical effect	100 %
Diffuse shading	Automatic

User's needs

Unlimited load (grid)

Bifacial system

Model	2D Calculation
	unlimited trackers

Bifacial model geometry		**Bifacial model definitions**	
Tracker Spacing	9.00 m	Ground albedo	0.25
Tracker width	4.79 m	Bifaciality factor	85 %
GCR	53.2 %	Rear shading factor	5.0 %
Axis height above ground	1.53 m	Rear mismatch loss	5.0 %
		Shed transparent fraction	0.0 %

PV Array Characteristics

PV module		**Inverter**	
Manufacturer	Sunova Solar	Manufacturer	Sungrow
Model	SS-BG615-66MDH-G11(T)	Model	SG350HX-16MPPT
(Custom parameters definition)		(Custom parameters definition)	
Unit Nom. Power	615 Wp	Unit Nom. Power	350 kWac
Number of PV modules	1456 units	Number of inverters	2 units
Nominal (STC)	895 kWp	Total power	700 kWac
Modules	56 string x 26 In series	Operating voltage	500-1500 V
At operating cond. (50°C)		Max. power (=>30°C)	352 kWac
Pmpp	830 kWp	Pnom ratio (DC:AC)	1.28
U mpp	981 V	Power sharing within this inverter	
I mpp	846 A		

Total PV power		**Total inverter power**	
Nominal (STC)	895 kWp	Total power	700 kWac
Total	1456 modules	Max. power	704 kWac
Module area	3936 m²	Number of inverters	2 units
		Pnom ratio	1.28

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Array losses

Array Soiling Losses
Loss Fraction   1.0 %

Thermal Loss factor
Module temperature according to irradiance
Uc (const)   29.0 W/m²K
Uv (wind)   0.0 W/m²K/m/s

DC wiring losses
Global array res.   7.5 mΩ
Loss Fraction   0.6 % at STC

LID - Light Induced Degradation
Loss Fraction   1.5 %

Module Quality Loss
Loss Fraction   -0.5 %

Module mismatch losses
Loss Fraction   0.5 % at MPP

Strings Mismatch loss
Loss Fraction   0.1 %

IAM loss factor
Incidence effect (IAM): User defined profile

0°	20°	40°	60°	70°	75°	80°	85°	90°
1.000	1.000	1.000	1.000	0.998	0.980	0.940	0.750	0.000

System losses

Auxiliaries loss
Proportionnal to Power   2.0 W/kW
0.0 kW from Power thresh.

AC wiring losses

Inv. output line up to MV transfo
Inverter voltage   800 Vac tri
Loss Fraction   1.34 % at STC
Inverter: SG350HX-16MPPT
Wire section (2 Inv.)   Alu 2 x 3 x 185 mm²
Average wires length   114 m

AC losses in transformers

MV transfo
Medium voltage   20 kV
Transformer parameters
Nominal power at STC   880 kVA
Iron Loss (24/24 Connexion)   0.78 kVA
Iron loss fraction   0.09 % at STC
Copper loss   5.85 kVA
Copper loss fraction   0.66 % at STC
Coils equivalent resistance   3 x 4.83 mΩ

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Near shadings parameter

Perspective of the PV-field and surrounding shading scene
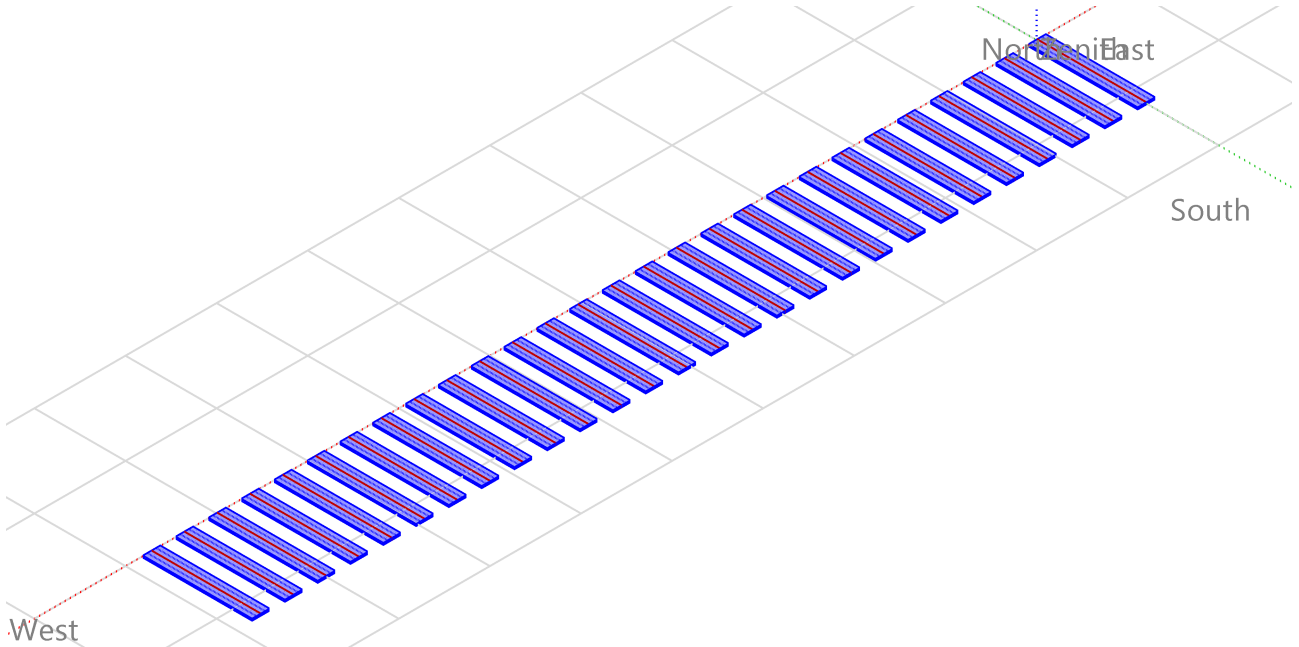
Iso-shadings diagram

Orientation #1

Shading loss: 1%	1: 22 June
Shading loss: 5%	2: 22 May and 23 July
Shading loss: 10%	3: 20 Apr and 23 Aug
Shading loss: 20%	4: 20 Mar and 23 Sep
Shading loss: 40%	5: 21 Feb and 23 Oct.
	6: 19 Jan and 22 Nov
	7: 22 December

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Main results

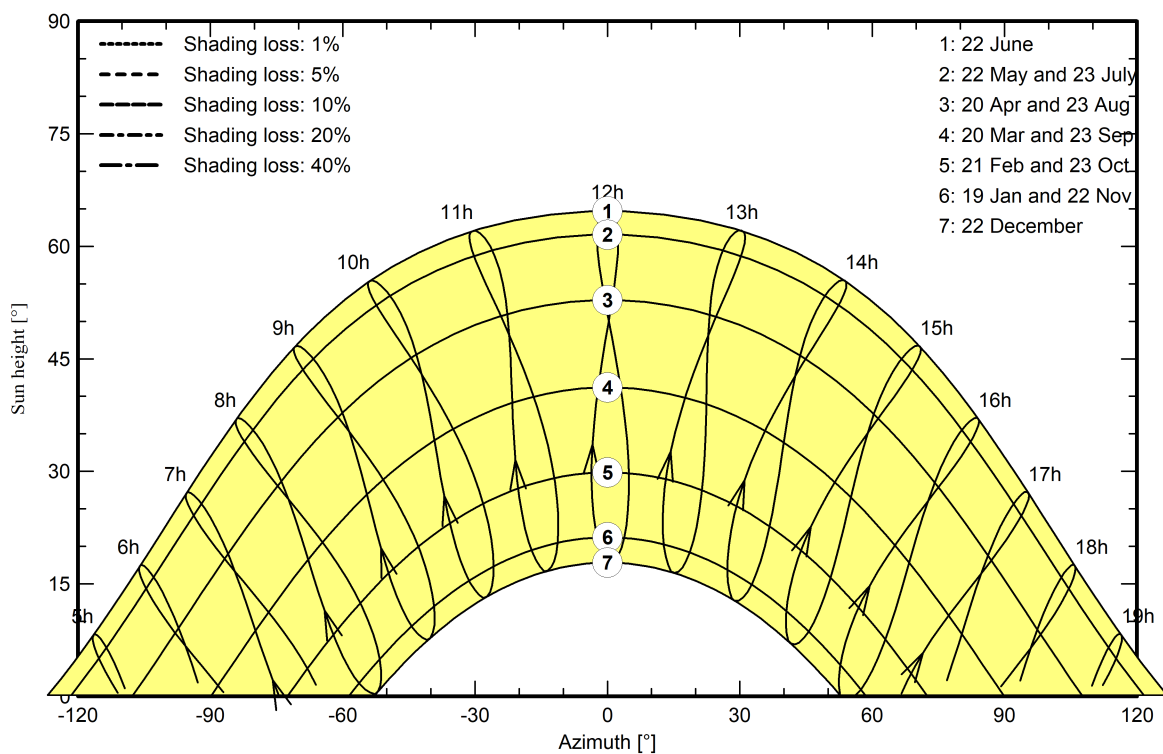### System Production

Produced Energy	1143978 kWh/year	Specific production	1278 kWh/kWp/year
		Perf. Ratio PR	92.37 %

Normalized productions (per installed kWp)

Lc: Collection Loss (PV-array losses)   0.17 kWh/kWp/day
Ls: System Loss (inverter, ...)   0.12 kWh/kWp/day
Yf: Produced useful energy (inverter output)   3.5 kWh/kWp/day

Performance Ratio PR

PR: Performance Ratio (Yf / Yr) : 0.924
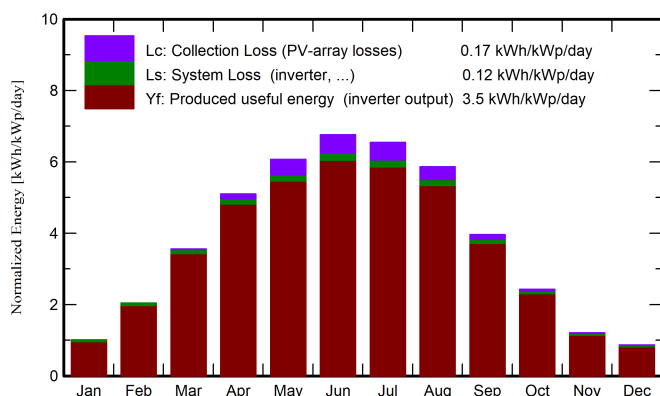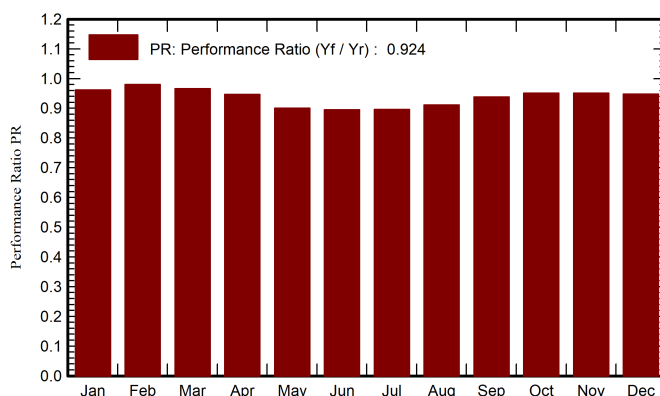
Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m²	kWh/m²	°C	kWh/m²	kWh/m²	kWh	kWh	ratio
January	26.0	16.32	-2.72	31.0	29.8	28000	26737	0.962
February	46.8	28.47	-1.29	56.5	54.5	51253	49567	0.980
March	89.3	43.21	2.86	110.1	106.8	98387	95261	0.966
April	126.7	69.26	8.11	152.9	148.0	133726	129565	0.947
May	153.2	76.25	12.81	188.1	182.6	156708	151753	0.901
June	165.6	81.11	16.45	202.8	196.9	168010	162557	0.895
July	166.6	81.84	18.29	202.8	196.9	168227	162822	0.897
August	145.8	68.89	17.66	181.7	176.5	153112	148201	0.911
September	97.8	52.85	12.53	118.8	115.0	103006	99773	0.938
October	61.7	34.98	7.97	75.3	72.7	66267	64082	0.951
November	30.2	19.35	3.30	36.2	34.8	32175	30844	0.951
December	22.2	13.74	-0.96	26.9	25.8	24011	22816	0.948
Year	1131.9	586.26	7.97	1383.0	1340.2	1182884	1143978	0.924

Legends

GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_Grid	Energy injected into grid
T_Amb	Ambient Temperature	PR	Performance Ratio
GlobInc	Global incident in coll. plane		
GlobEff	Effective Global, corr. for IAM and shadings		

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Loss diagram

1132 kWh/m²	**Global horizontal irradiation**
+22.2%	**Global incident in coll. plane**
-2.26%	Near Shadings: irradiance loss
-0.19%	IAM factor on global
-1.00%	Soiling loss factor
+0.34%	Ground reflection on front side
	Bifacial
	Global incident on ground
412 kWh/m² on 7399 m²	
-75.00% (0.25 Gnd. albedo)	Ground reflection loss
-75.07%	View Factor for rear side
+41.74%	Sky diffuse on the rear side
+0.00%	Beam effective on the rear side
-5.00%	Shadings loss on rear side
4.85%	**Global Irradiance on rear side (65 kWh/m²)**
1340 kWh/m² * 3936 m² coll.	**Effective irradiation on collectors**
efficiency at STC = 22.73%	PV conversion, Bifaciality factor = 0.85
1248668 kWh	**Array nominal energy (at STC effic.)**
-1.03%	PV loss due to irradiance level
-0.83%	PV loss due to temperature
0.00%	Shadings: Electrical Loss acc. to strings
+0.50%	Module quality loss
-1.50%	LID - Light induced degradation
-0.60%	Mismatch loss, modules and strings
-0.23%	Mismatch for back irradiance
-0.35%	Ohmic wiring loss
1198990 kWh	**Array virtual energy at MPP**
-1.45%	Inverter Loss during operation (efficiency)
-1.36%	Inverter Loss over nominal inv. power
0.00%	Inverter Loss due to max. input current
0.00%	Inverter Loss over nominal inv. voltage
0.00%	Inverter Loss due to power threshold
0.00%	Inverter Loss due to voltage threshold
0.00%	Night consumption
1165407 kWh	**Available Energy at Inverter Output**
-0.20%	Auxiliaries (fans, other)
-0.70%	AC ohmic loss
-0.95%	Medium voltage transfo loss
0.00%	MV line ohmic loss
1143978 kWh	**Energy injected into grid**

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Predef. graphs

Daily Input/Output diagram

○ Values from 01/01 to 31/12

X-axis: Global incident in coll. plane [kWh/m²/day]
Y-axis: Useful out system energy [MWh/day]
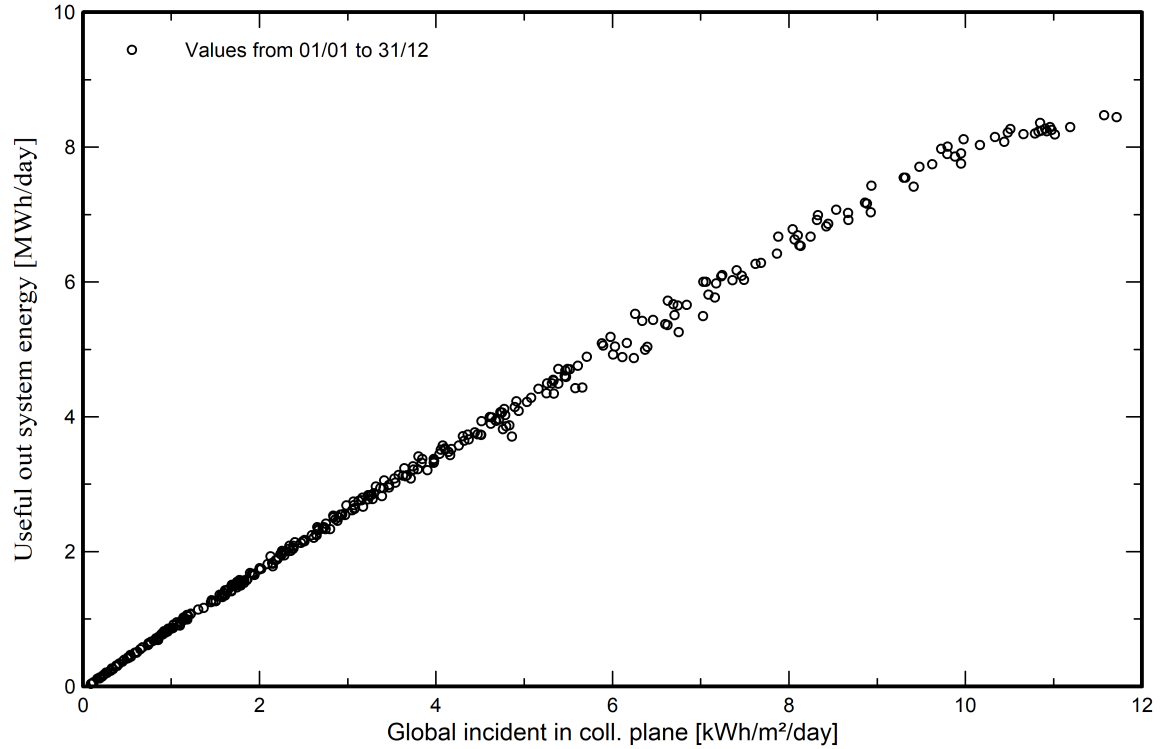
System Output Power Distribution
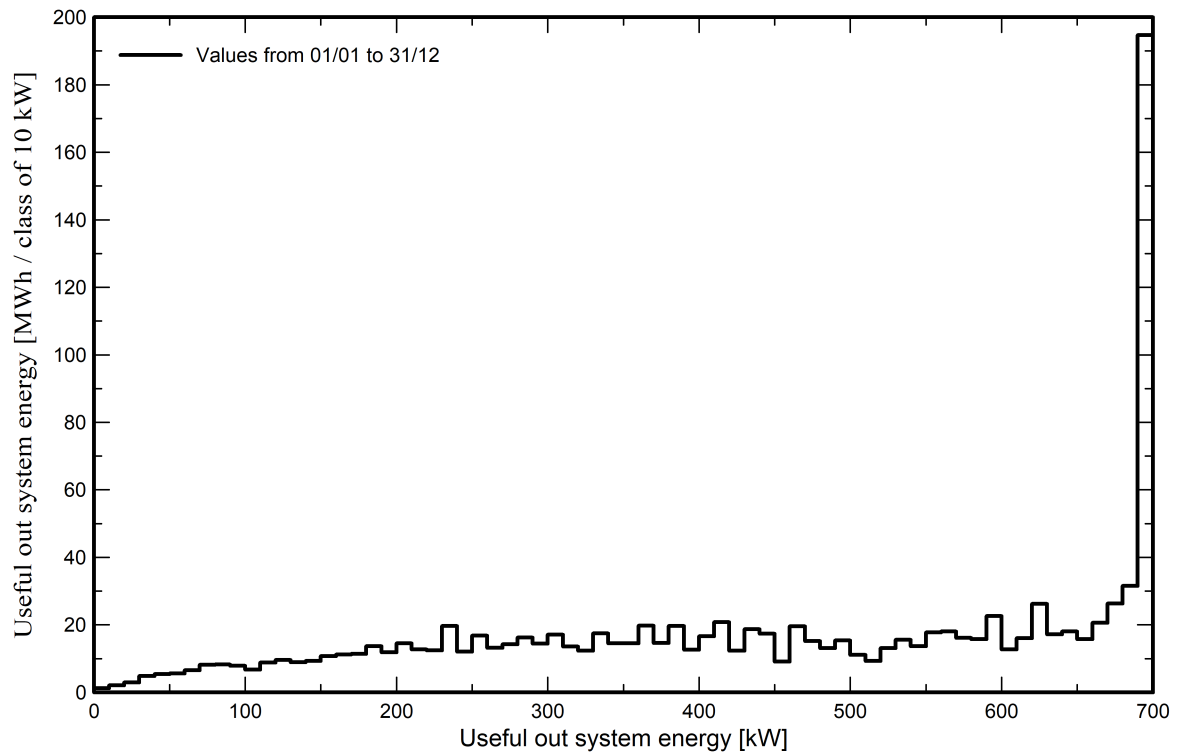
Values from 01/01 to 31/12

X-axis: Useful out system energy [kW]
Y-axis: Useful out system energy [MWh / class of 10 kW]

Single-line diagram

26 x SS-BG615-66MDH-G11(T)
28 Strings

DC/AC — 114.1 m
2 Inverter (700 kVA)

20 kV
MV transformer

kWh
Injection point
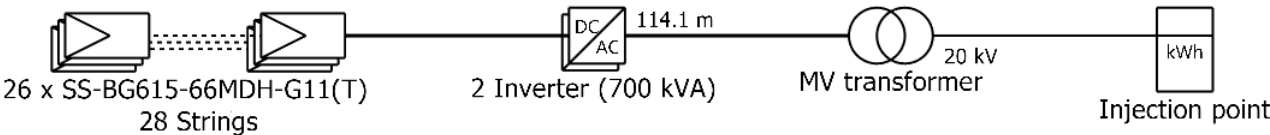
PV module	SS-BG615-66MDH-G11(T)
Inverter	SG350HX-16MPPT
String	26 x SS-BG615-66MDH-G11(T)

Schoenfelder	Nexun AT GmbH (Austria)
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