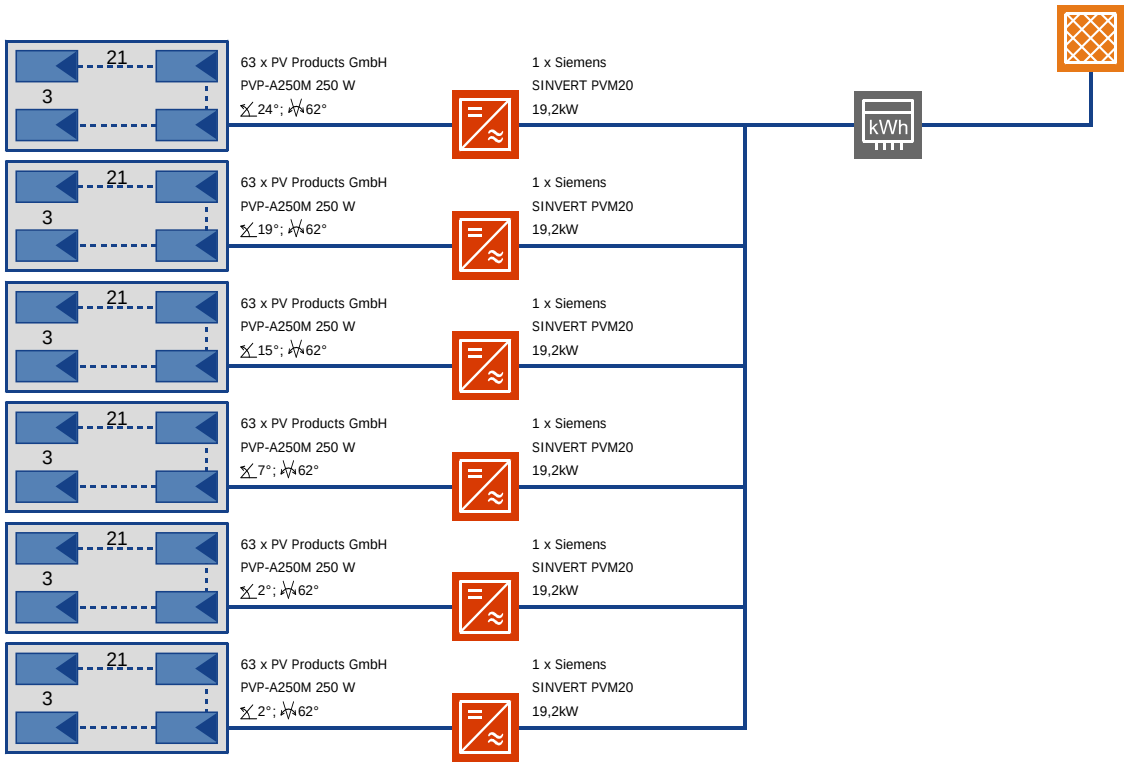
waterproof roof
Dachmanagement GmbH
Sandwirtgasse 16/1/15
A-1060 Wien
office@wpr-gmbh.at

Project Name:	Telese Indach	17.11.2011
Variant Reference:	Gebäude B West	
Designer:	Hannes Pecaver	



Location:	Telese Terme	
Climate Data Record:	Telese Terme (1981-2000)	
PV Output:	94,50	kWp
Gross/Active PV Surface Area:	608,99 / 609,92	m²

PV Array Irradiation:	936.194	kWh
Energy Produced by PV Array (AC):	121.424	kWh
Grid Feed-in:	121.424	kWh
Yield Reduction Due to Shading:	2	%

System Efficiency:	13,0	%
Performance Ratio:	83,7	%
Specific Annual Yield:	1.285	kWh/kWp
CO2 Emissions Avoided:	107.569	kg/a

The results are determined by a mathematical model calculation. The actual yields of the photovoltaic system can deviate from these values due to fluctuations in the weather, the efficiency of modules and inverters, and other factors. The System Diagram above does not represent and cannot replace a full technical drawing of the solar system.

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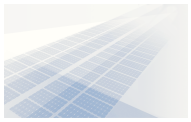

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System in Grid Connected Operation

Location:	Telese Terme	PV Output:	94,50 kWp
Climate Data Record:	Telese Terme	Gross/Active PV Surface Area:	609,0 m² / 609,9 m²
Number of Arrays:	6		

Array 1: Anlage 6

Output:	15,75 kW	Ground Reflection:	20,0 %
Gross/Active Solar Surface Area:	101,5 m² / 101,7 m²	Output Losses due to...	
PV Module	63 x	deviation from AM 1.5:	1,0 %
Manufacturer:	PV Products GmbH	deviation from Manufacturer's Specification:	2,0 %
Model:	PVP-A250M	in Diodes:	0,5 %
Nominal Output:	250 W	due to Pollution:	0,0 %
Power Rating Deviation:	0 %	Inverter	1 x
Efficiency (STC):	15,5 %	Manufacturer:	Siemens
No. of Modules in Series:	21	Model:	SINVERT PVM20
MPP Voltage (STC):	641 V	Output:	19,20 kW
Orientation:	62,0 °	European Efficiency:	97,8 %
Inclination:	24,1 °	No. of MPP Trackers:	1
Mount:	with Ventilation	MPP Tracking:	480 V To 850 V
Shade:	Yes		

Array 2: Anlage 5

Output:	15,75 kW	Ground Reflection:	20,0 %
Gross/Active Solar Surface Area:	101,5 m² / 101,7 m²	Output Losses due to...	
PV Module	63 x	deviation from AM 1.5:	1,0 %
Manufacturer:	PV Products GmbH	deviation from Manufacturer's Specification:	2,0 %
Model:	PVP-A250M	in Diodes:	0,5 %
Nominal Output:	250 W	due to Pollution:	0,0 %
Power Rating Deviation:	0 %	Inverter	1 x
Efficiency (STC):	15,5 %	Manufacturer:	Siemens
No. of Modules in Series:	21	Model:	SINVERT PVM20
MPP Voltage (STC):	641 V	Output:	19,20 kW
Orientation:	62,0 °	European Efficiency:	97,8 %
Inclination:	18,8 °	No. of MPP Trackers:	1
Mount:	with Ventilation	MPP Tracking:	480 V To 850 V
Shade:	Yes		

Array 3: Anlage 4

Output:	15,75 kW	Ground Reflection:	20,0 %
Gross/Active Solar Surface Area:	101,5 m² / 101,7 m²	Output Losses due to...	
PV Module	63 x	deviation from AM 1.5:	1,0 %
Manufacturer:	PV Products GmbH	deviation from Manufacturer's Specification:	2,0 %
Model:	PVP-A250M	in Diodes:	0,5 %
Nominal Output:	250 W	due to Pollution:	0,0 %
Power Rating Deviation:	0 %	Inverter	1 x
Efficiency (STC):	15,5 %	Manufacturer:	Siemens
No. of Modules in Series:	21	Model:	SINVERT PVM20
MPP Voltage (STC):	641 V	Output:	19,20 kW
Orientation:	62,0 °	European Efficiency:	97,8 %
Inclination:	14,8 °	No. of MPP Trackers:	1
Mount:	with Ventilation	MPP Tracking:	480 V To 850 V
Shade:	Yes		

Array 4: Anlage 3

Output:	15,75 kW	Ground Reflection:	20,0 %

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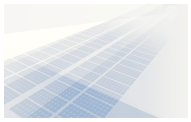

Project Name:	Telese Indach	17.11.2011
Variant Reference:	Gebäude B West	
Designer:	Hannes Pecaver	

Gross/Active Solar Surface Area:	101,5 m² / 101,7 m²	Output Losses due to...	
PV Module	63 x	deviation from AM 1.5:	1,0 %
Manufacturer:	PV Products GmbH	deviation from Manufacturer's Specification:	2,0 %
Model:	PVP-A250M	in Diodes:	0,5 %
Nominal Output:	250 W	due to Pollution:	0,0 %
Power Rating Deviation:	0 %	Inverter	1 x
Efficiency (STC):	15,5 %	Manufacturer:	Siemens
No. of Modules in Series:	21	Model:	SINVERT PVM20
MPP Voltage (STC):	641 V	Output:	19,20 kW
Orientation:	62,0 °	European Efficiency:	97,8 %
Inclination:	6,8 °	No. of MPP Trackers:	1
Mount:	with Ventilation	MPP Tracking:	480 V To 850 V
Shade:	Yes		

Array 5: Anlage 2

Output:	15,75 kW	Ground Reflection:	20,0 %
Gross/Active Solar Surface Area:	101,5 m² / 101,7 m²	Output Losses due to...	
PV Module	63 x	deviation from AM 1.5:	1,0 %
Manufacturer:	PV Products GmbH	deviation from Manufacturer's Specification:	2,0 %
Model:	PVP-A250M	in Diodes:	0,5 %
Nominal Output:	250 W	due to Pollution:	0,0 %
Power Rating Deviation:	0 %	Inverter	1 x
Efficiency (STC):	15,5 %	Manufacturer:	Siemens
No. of Modules in Series:	21	Model:	SINVERT PVM20
MPP Voltage (STC):	641 V	Output:	19,20 kW
Orientation:	62,0 °	European Efficiency:	97,8 %
Inclination:	2,5 °	No. of MPP Trackers:	1
Mount:	with Ventilation	MPP Tracking:	480 V To 850 V
Shade:	Yes		

Array 6: Anlage 1

Output:	15,75 kW	Ground Reflection:	20,0 %
Gross/Active Solar Surface Area:	101,5 m² / 101,7 m²	Output Losses due to...	
PV Module	63 x	deviation from AM 1.5:	1,0 %
Manufacturer:	PV Products GmbH	deviation from Manufacturer's Specification:	2,0 %
Model:	PVP-A250M	in Diodes:	0,5 %
Nominal Output:	250 W	due to Pollution:	0,0 %
Power Rating Deviation:	0 %	Inverter	1 x
Efficiency (STC):	15,5 %	Manufacturer:	Siemens
No. of Modules in Series:	21	Model:	SINVERT PVM20
MPP Voltage (STC):	641 V	Output:	19,20 kW
Orientation:	62,0 °	European Efficiency:	97,8 %
Inclination:	2,4 °	No. of MPP Trackers:	1
Mount:	with Ventilation	MPP Tracking:	480 V To 850 V
Shade:	Yes		

Simulation Results for Total System

Irradiation onto Horizontal:	942.076 kWh	Energy from Grid:	14 kWh
PV Array Irradiation:	936.194 kWh	Own Use:	14,1 kWh
Irradiation minus Reflection:	899.273 kWh	Energy Produced by PV Array:	124.876 kWh
Irradiation without Shade:	960.759 kWh	System Efficiency:	13,0 %
Energy from Inverter (AC):	121.424 kWh	Performance Ratio:	83,7 %
Consumption Requirement:	0 kWh	Final Yield:	3,5 h/d
Specific Annual Yield:	1.285 kWh/kWp		

Results for Array 1: Anlage 6

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	20.849 kWh
Array Irradiation:	156.827 kWh	System Efficiency:	12,9 %

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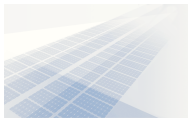

Irradiation without Shade:	161.251 kWh	Performance Ratio:	83,4 %
Energy Produced (AC):	20.257 kWh	Specific Annual Yield:	1.286 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,3 %
Inverter Efficiency:	97,1 %		

Results for Array 2: Anlage 5

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	21.091 kWh
Array Irradiation:	157.675 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	161.639 kWh	Performance Ratio:	83,9 %
Energy Produced (AC):	20.506 kWh	Specific Annual Yield:	1.302 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,4 %
Inverter Efficiency:	97,2 %		

Results for Array 3: Anlage 4

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	21.081 kWh
Array Irradiation:	157.615 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	161.515 kWh	Performance Ratio:	83,9 %
Energy Produced (AC):	20.500 kWh	Specific Annual Yield:	1.301 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,4 %
Inverter Efficiency:	97,2 %		

Results for Array 4: Anlage 3

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	20.813 kWh
Array Irradiation:	155.916 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	159.903 kWh	Performance Ratio:	83,8 %
Energy Produced (AC):	20.246 kWh	Specific Annual Yield:	1.285 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,4 %
Inverter Efficiency:	97,3 %		

Results for Array 5: Anlage 2

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	20.522 kWh
Array Irradiation:	154.100 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	158.252 kWh	Performance Ratio:	83,6 %
Energy Produced (AC):	19.959 kWh	Specific Annual Yield:	1.267 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,3 %
Inverter Efficiency:	97,2 %		

Results for Array 6: Anlage 1

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	20.521 kWh
Array Irradiation:	154.061 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	158.200 kWh	Performance Ratio:	83,6 %
Energy Produced (AC):	19.957 kWh	Specific Annual Yield:	1.267 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,3 %
Inverter Efficiency:	97,2 %		

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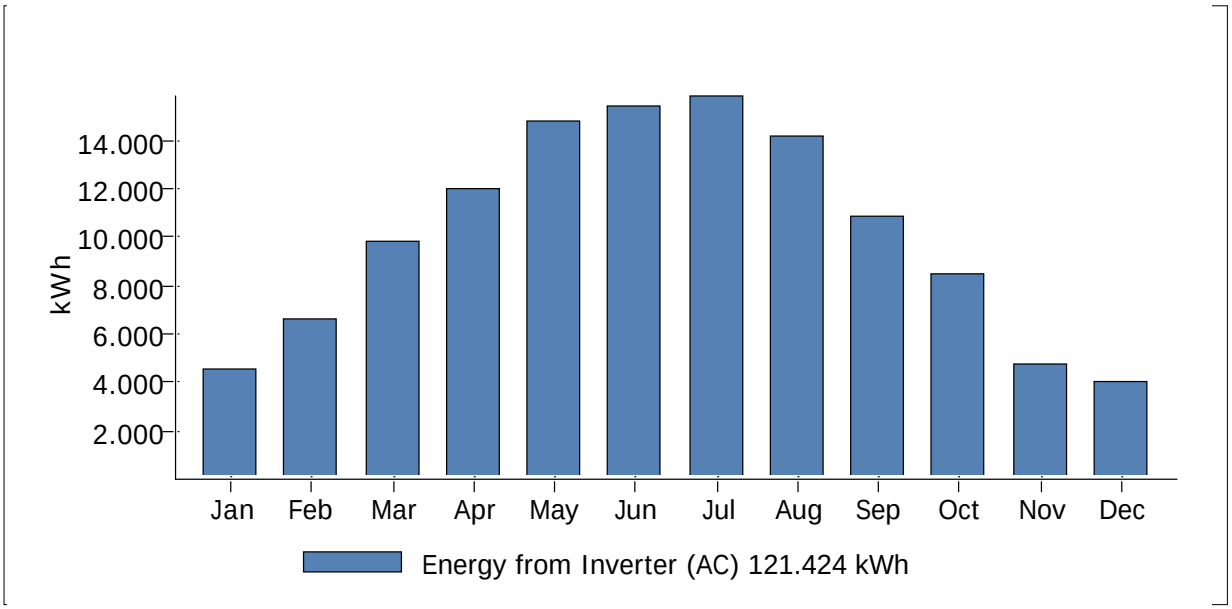

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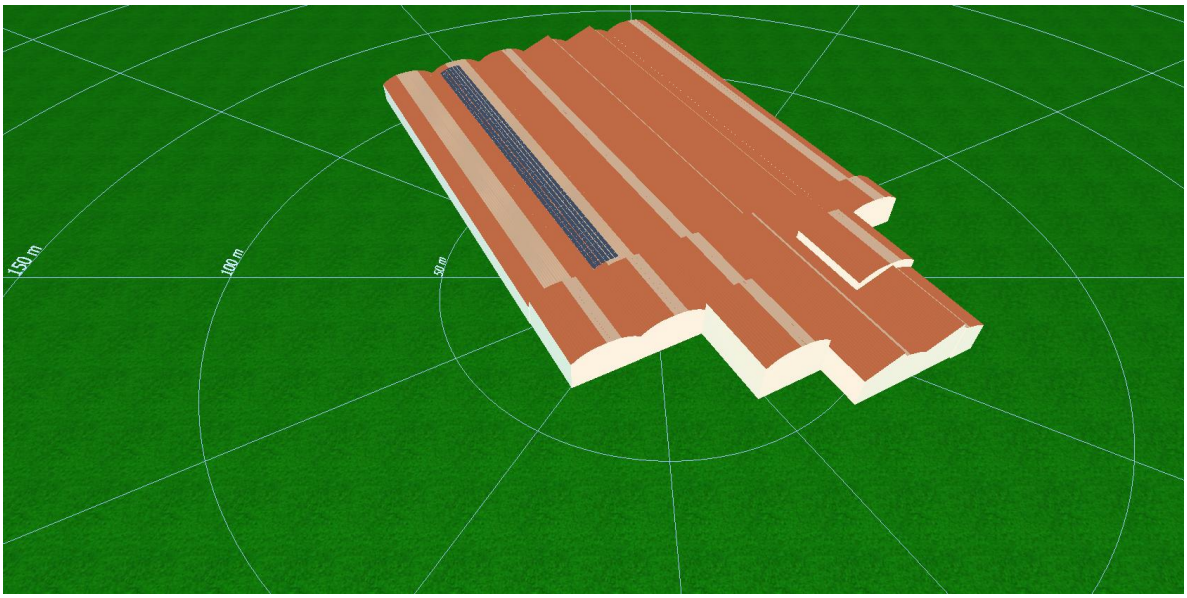
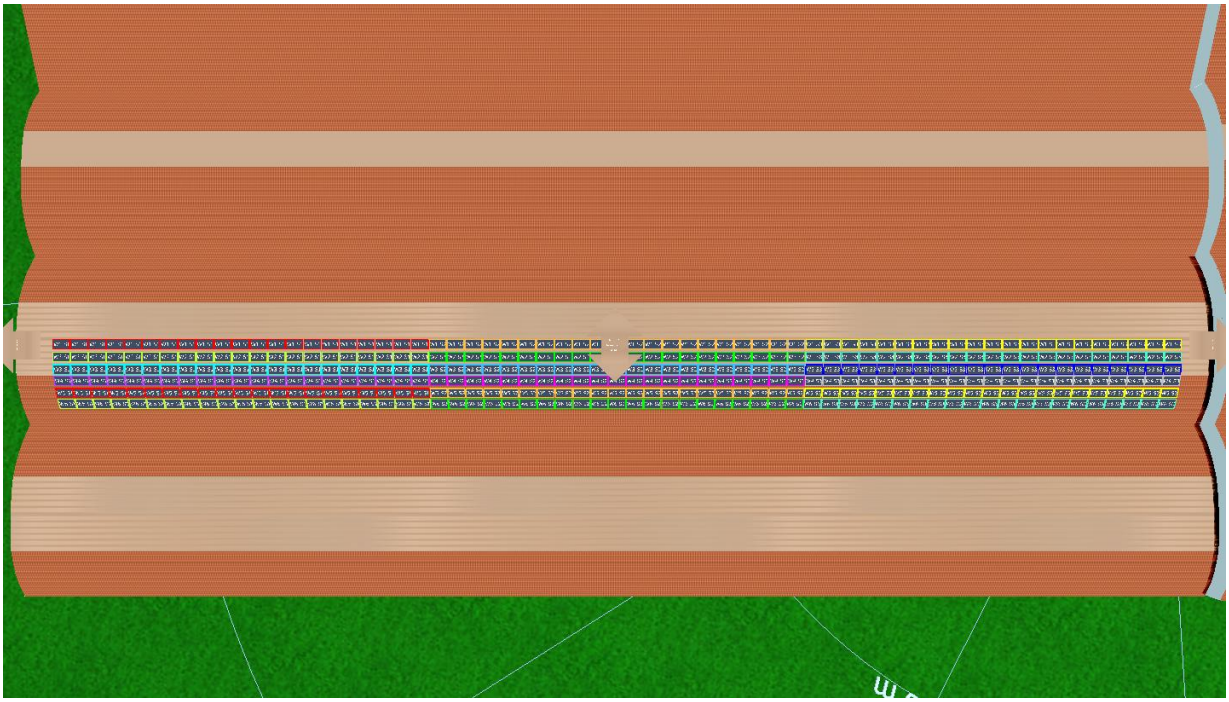
System Visualisation Screenshots

Environment



Screenshot3

Module Configuration



Screenshot2

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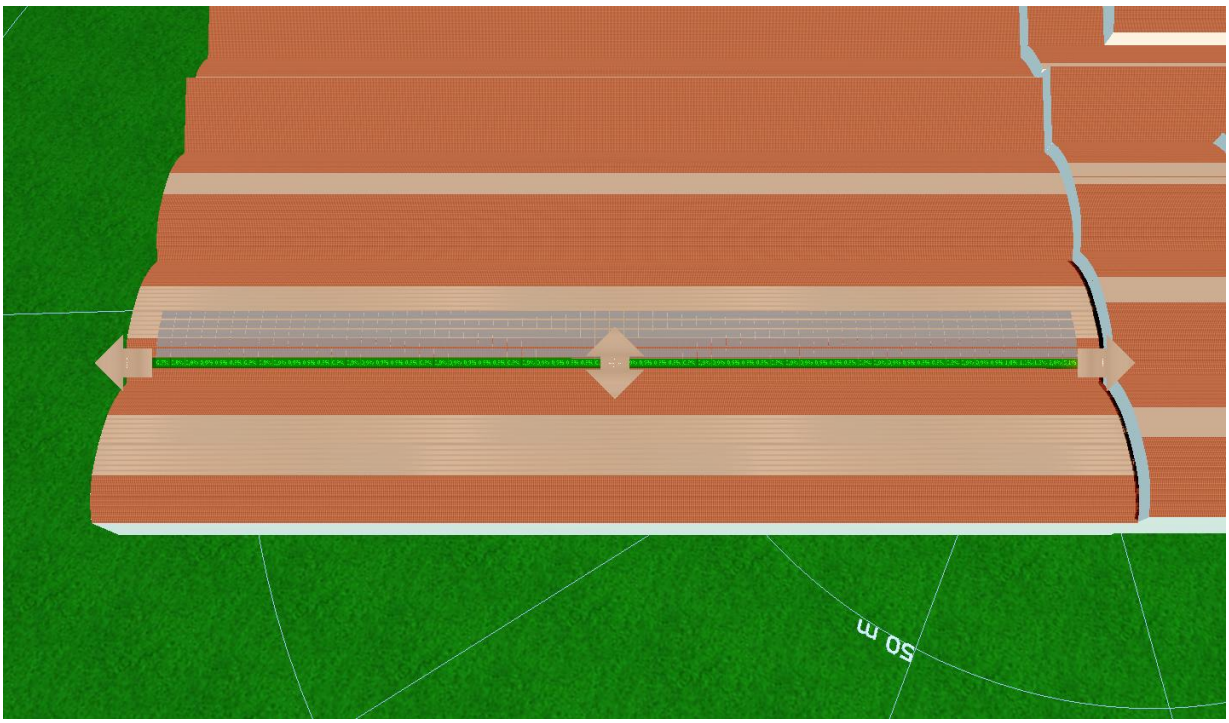
Frequency Distribution



Screenshot1