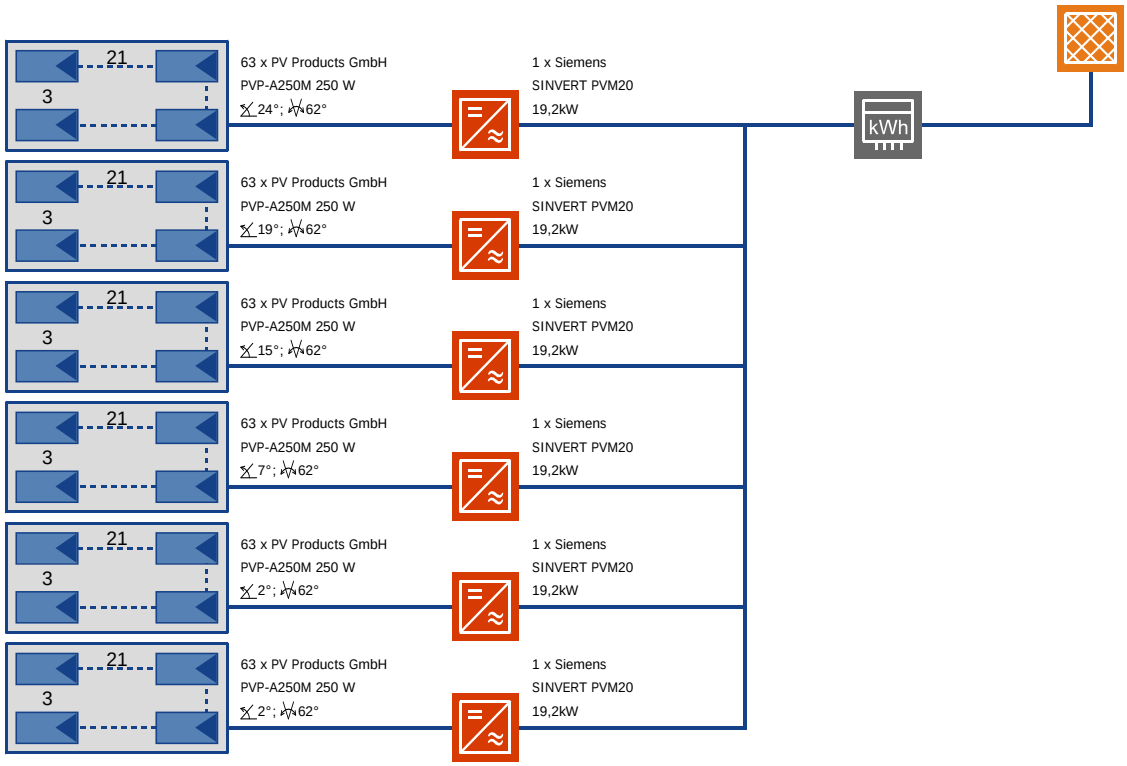
waterproof roof
Dachmanagement GmbH
Sandwirtgasse 16/1/15
A-1060 Wien
office@wpr-gmbh.at

Project Name:	Telese Indach	17.11.2011
Variant Reference:	Gebäude A 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:	937.337	kWh
Energy Produced by PV Array (AC):	121.899	kWh
Grid Feed-in:	121.899	kWh
Yield Reduction Due to Shading:	1	%

System Efficiency:	13,0	%
Performance Ratio:	83,9	%
Specific Annual Yield:	1.290	kWh/kWp
CO2 Emissions Avoided:	107.990	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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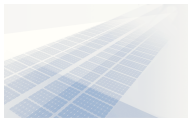

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System in Grid Connected Operation

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: System

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: System

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: System

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: System

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

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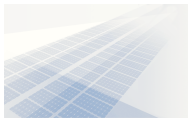

Project Name:	Telese Indach		17.11.2011
Variant Reference:	Gebäude A West		
Designer:	Hannes Pecaver		

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: System

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: System

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:	937.337 kWh	Own Use:	14,1 kWh
Irradiation minus Reflection:	900.346 kWh	Energy Produced by PV Array:	125.361 kWh
Irradiation without Shade:	960.759 kWh	System Efficiency:	13,0 %
Energy from Inverter (AC):	121.899 kWh	Performance Ratio:	83,9 %
Consumption Requirement:	0 kWh	Final Yield:	3,5 h/d
Specific Annual Yield:	1.290 kWh/kWp		

Results for Array 1: System

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	21.150 kWh
Array Irradiation:	157.477 kWh	System Efficiency:	13,1 %

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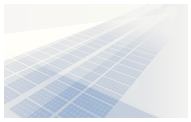

Irradiation without Shade:	161.251 kWh	Performance Ratio:	84,2 %
Energy Produced (AC):	20.556 kWh	Specific Annual Yield:	1.305 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,4 %
Inverter Efficiency:	97,2 %		

Results for Array 2: System

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	21.170 kWh
Array Irradiation:	157.853 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	161.639 kWh	Performance Ratio:	84,1 %
Energy Produced (AC):	20.582 kWh	Specific Annual Yield:	1.307 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,4 %
Inverter Efficiency:	97,2 %		

Results for Array 3: System

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	21.120 kWh
Array Irradiation:	157.716 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	161.515 kWh	Performance Ratio:	84,0 %
Energy Produced (AC):	20.537 kWh	Specific Annual Yield:	1.304 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,4 %
Inverter Efficiency:	97,2 %		

Results for Array 4: System

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	20.838 kWh
Array Irradiation:	155.984 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	159.903 kWh	Performance Ratio:	83,9 %
Energy Produced (AC):	20.269 kWh	Specific Annual Yield:	1.287 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,4 %
Inverter Efficiency:	97,3 %		

Results for Array 5: System

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	20.544 kWh
Array Irradiation:	154.185 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	158.252 kWh	Performance Ratio:	83,6 %
Energy Produced (AC):	19.981 kWh	Specific Annual Yield:	1.268 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,3 %
Inverter Efficiency:	97,2 %		

Results for Array 6: System

Irradiation onto Horizontal:	157.007 kWh	Energy Produced (DC):	20.538 kWh
Array Irradiation:	154.122 kWh	System Efficiency:	13,0 %
Irradiation without Shade:	158.200 kWh	Performance Ratio:	83,6 %
Energy Produced (AC):	19.975 kWh	Specific Annual Yield:	1.268 kWh/kWp
Own Use:	2 kWh	Array Efficiency:	13,3 %
Inverter Efficiency:	97,2 %		

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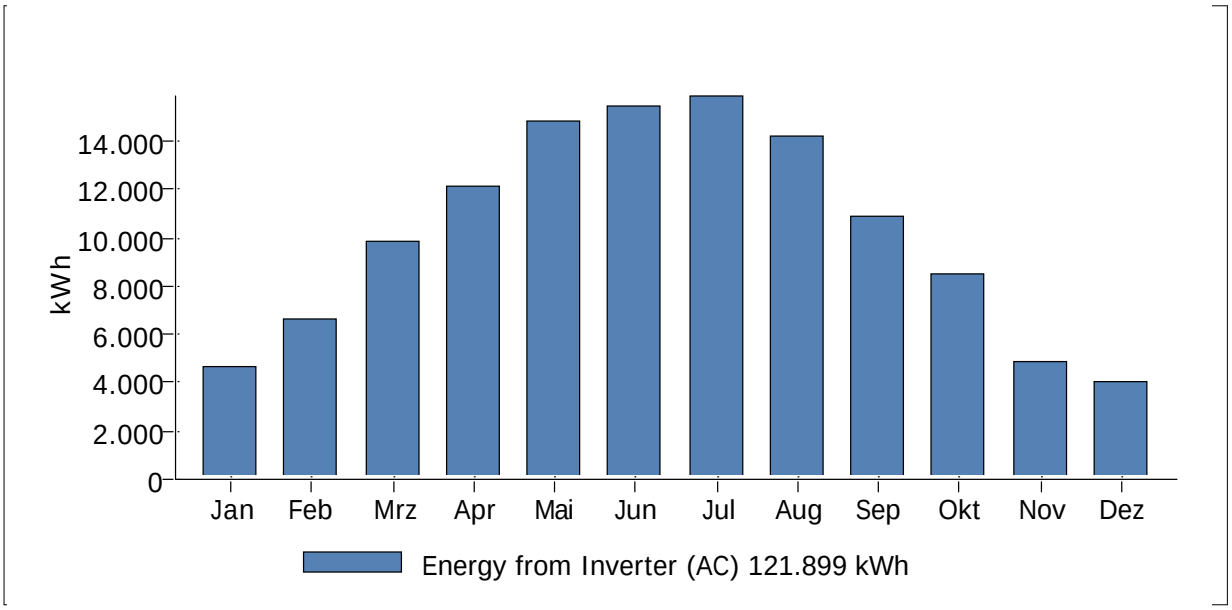

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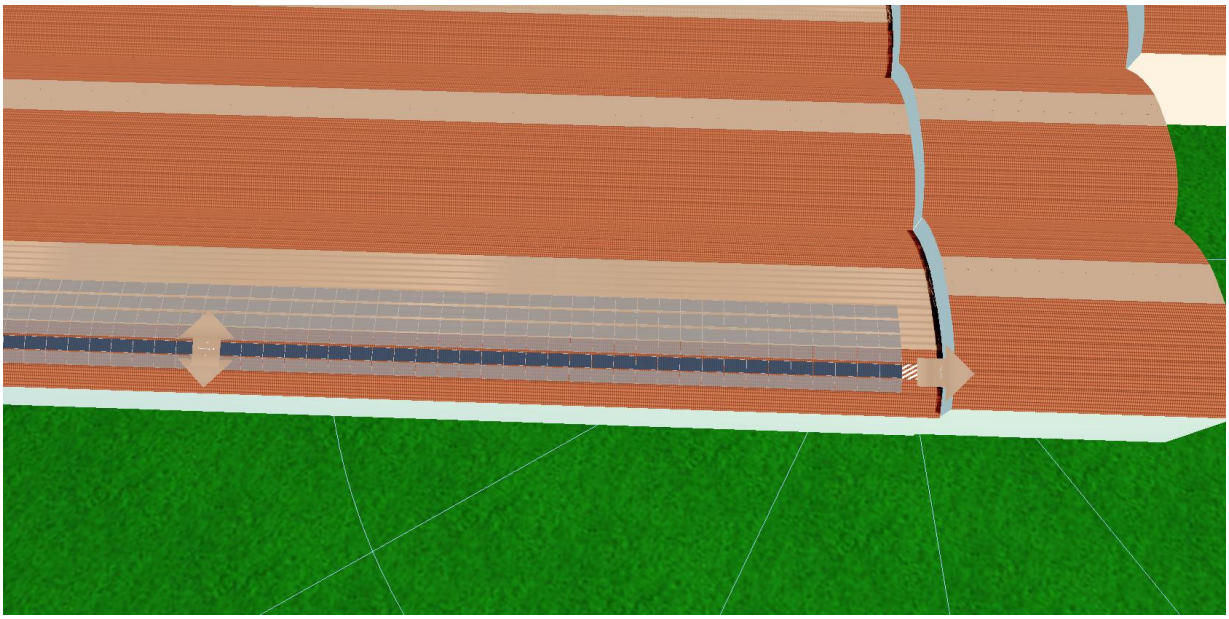
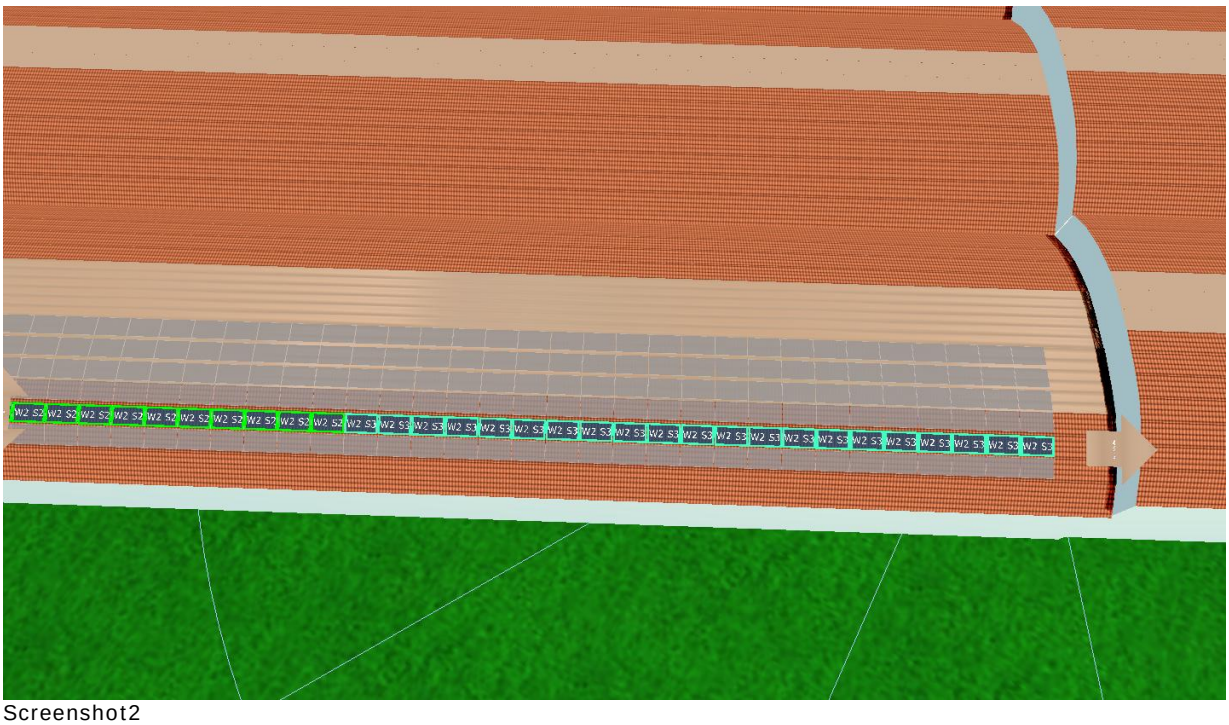
System Visualisation Screenshots

Module Coverage



Screenshot3

Module Configuration



Screenshot2

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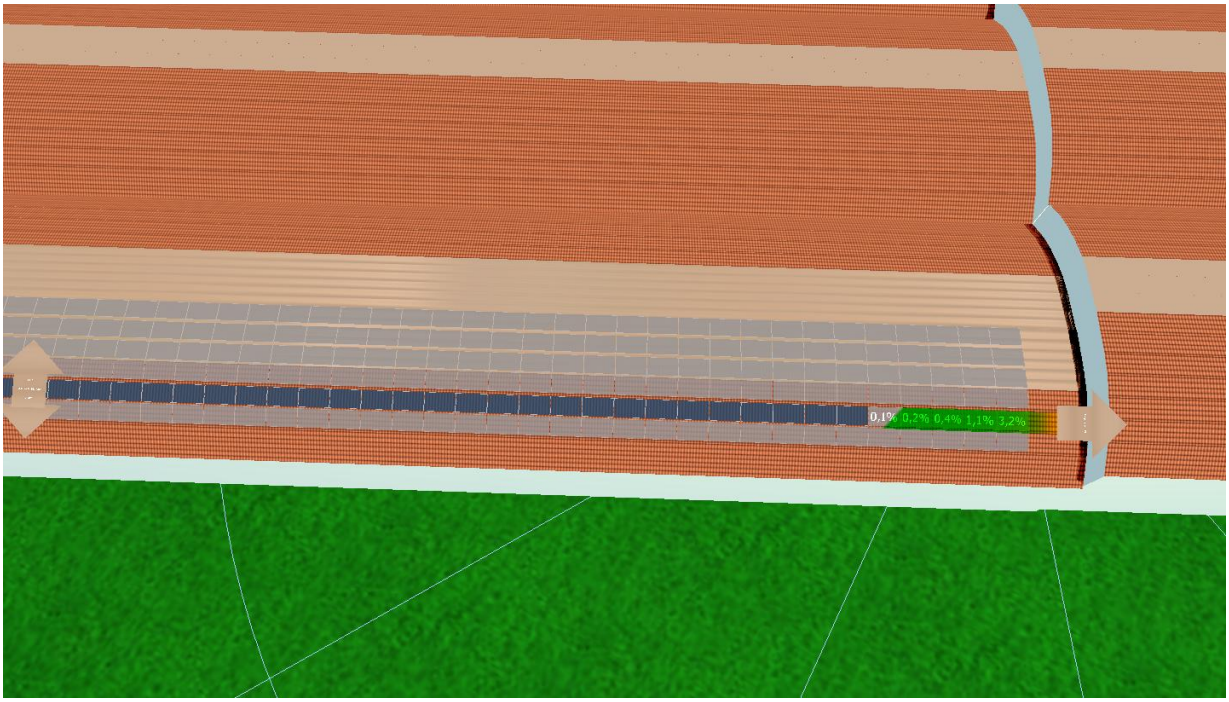
Frequency Distribution



Screenshot1