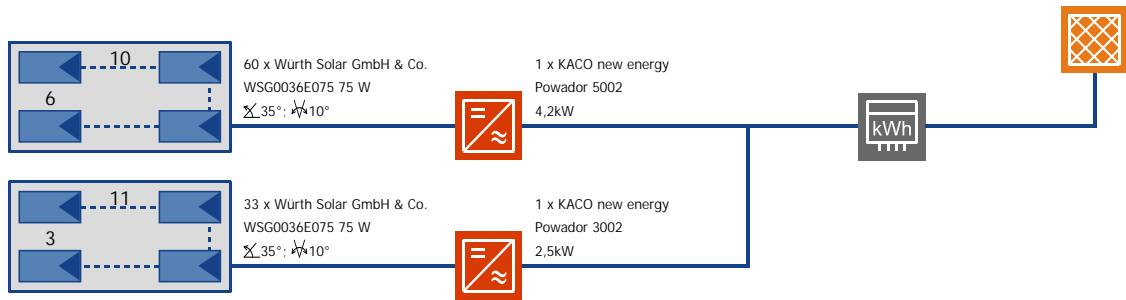


Project Name: Študija izvedljivosti 1  
 Variant Reference:  
 Designer: Marko Žibert

1.5.2010



Location:	Kranj
Climate Data Record:	Kranj
PV Output:	6,98 kWp
Gross/Active PV Surface Area:	67,80 / 59,46 m <sup>2</sup>

PV Array Irradiation:	73.639 kWh
Energy Produced by PV Array (AC):	7.148,3 kWh
Grid Feed-in:	7.148,3 kWh
Yield Reduction Due to Shading:	1 %

System Efficiency:	9,7 %
Performance Ratio:	82,6 %
Specific Annual Yield:	1.023 kWh/kWp
CO2 Emissions Avoided:	6.320 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..

Project Name:	Študija izvedljivosti 1	1.5.2010
Variant Reference:		
Designer:	Marko Žibert	

#### System in Grid Connected Operation

Location:	Kranj	PV Output:	6,98 kWp
Climate Data Record:	Kranj	Gross/Active PV Surface Area:	67,8 m <sup>2</sup> / 59,5 m <sup>2</sup>
Number of Arrays:	2		

#### Array Name

Output:	4,50 kW	Ground Reflection:	20,0 %
Gross/Active Solar Surface Area:	43,7 m <sup>2</sup> / 38,4 m <sup>2</sup>	Output Losses due to	
PV Module	60 x	Deviation from AM 1.5:	1,0 %
Manufacturer:	Würth Solar GmbH & Co.	Deviation from Manufacturer's Specification:	2,0 %
Type:	WSG0036E075	In Diodes:	0,5 %
Nominal Output:	75 W	Due to Pollution:	0,0 %
Power Rating Deviation:	0 %	Inverter	1 x
Efficiency (STC):	11,7 %	Manufacturer:	KACO new energy
No. of Modules in Series:	10	Type:	Powador 5002
MPP Voltage (STC):	340 V	Output:	4,20 kW
Orientation:	10,0 °	European Efficiency:	95,3 %
Inclination:	35,0 °	No. of MPP Trackers:	1
Mount:	With Ventilation	MPP Tracking:	200 V To 510 V
Shade	Yes		

#### Array 2 Name

Output:	2,48 kW	Ground Reflection:	20,0 %
Gross/Active Solar Surface Area:	24,1 m <sup>2</sup> / 21,1 m <sup>2</sup>	Output Losses due to	
PV Module	33 x	Deviation from AM 1.5:	1,0 %
Manufacturer:	Würth Solar GmbH & Co.	Deviation from Manufacturer's Specification:	2,0 %
Type:	WSG0036E075	In Diodes:	0,5 %
Nominal Output:	75 W	Due to Pollution:	0,0 %
Power Rating Deviation:	0 %	Inverter	1 x
Efficiency (STC):	11,7 %	Manufacturer:	KACO new energy
No. of Modules in Series:	11	Type:	Powador 3002
MPP Voltage (STC):	374 V	Output:	2,50 kW
Orientation:	10,0 °	European Efficiency:	95,1 %
Inclination:	35,0 °	No. of MPP Trackers:	1
Mount:	With Ventilation	MPP Tracking:	200 V To 510 V
Shade	Yes		

#### Simulation Results for Total System:

Irradiation onto Horizontal:	68.945 kWh	Energy from Grid:	15 kWh
PV Array Irradiation:	73.639 kWh	Own Use:	15,0 kWh
Irradiation minus Reflection:	71.952 kWh	Energy Produced by PV Array:	7.598 kWh
Irradiation without Shade:	75.968 kWh	System Efficiency:	9,7 %
Energy from Inverter (AC):	7.148 kWh	Performance Ratio:	82,6 %
Consumption Requirement:	0 kWh	Final Yield:	2,8 h/d
Specific Annual Yield:	1.023 kWh/kWp		

#### Array Results: Array Name

Irradiation onto Horizontal:	44.482 kWh	Energy Produced (DC):	4.902 kWh
Array Irradiation:	47.509 kWh	System Efficiency:	9,7 %
Irradiation without Shade:	49.012 kWh	Performance Ratio:	82,7 %
Energy Produced (AC):	4.615 kWh	Specific Annual Yield:	1.024 kWh/kWp
Own Use:	7 kWh	Array Efficiency:	10,3 %
Inverter Efficiency:	94,0 %		

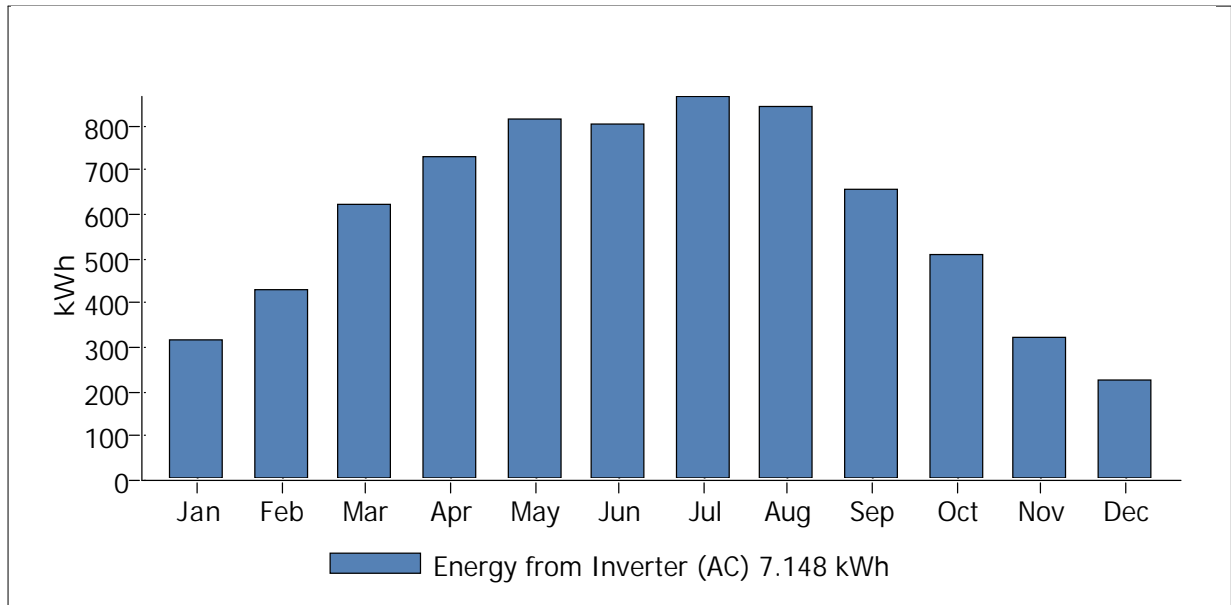
#### Array Results: Array 2 Name

Irradiation onto Horizontal:	24.467 kWh	Energy Produced (DC):	2.696 kWh
Array Irradiation:	26.130 kWh	System Efficiency:	9,7 %

Project Name: Študija izvedljivosti 1  
Variant Reference:  
Designer: Marko Žibert

1.5.2010

Irradiation without Shade:	26.957 kWh	Performance Ratio:	82,4 %
Energy Produced (AC):	2.534 kWh	Specific Annual Yield:	1.021 kWh/kWp
Own Use:	7 kWh	Array Efficiency:	10,3 %
Inverter Efficiency:	93,7 %		



Project Name: Študija izvedljivosti 1 1.5.2010  
 Variant Reference:  
 Designer: Marko Žibert

## Economic Efficiency Calculation

### System Data

PV Output: 6,98 kWp  
 System Operating Start: 1.1.2011 Total Degradation: 16,00 %

### Electricity Feed-in:

Grid Concept: Full Feed-in  
 For the First 15 Years: 0,3860 €/kWh  
 Thereafter: 0,3860 €/kWh

### Basic Economic Efficiency Parameters

Assessment Period: 15 Years  
 Interest on Capital: 3,00 %  
 All entries without sales tax

### Income and expenditure

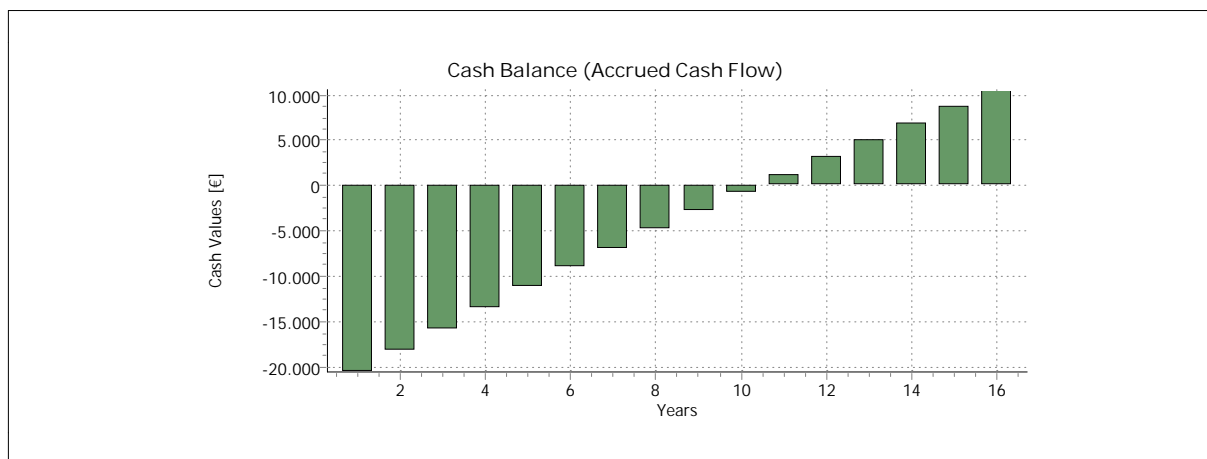
Investments: 23.017,50 €  
 Operating Costs: 161,12 €/a  
 Feed-in Payment Received in First Year: 2.759,25 €/a

### Tax

Tax Rate: / from Year 10: 20,0 % / 0,0 %  
 Depreciation Period: 10 Years  
 Depreciation Type: Linear Depreciation  
 Depreciation Rate: 10,00 %

### Results According to Net Present Value Method

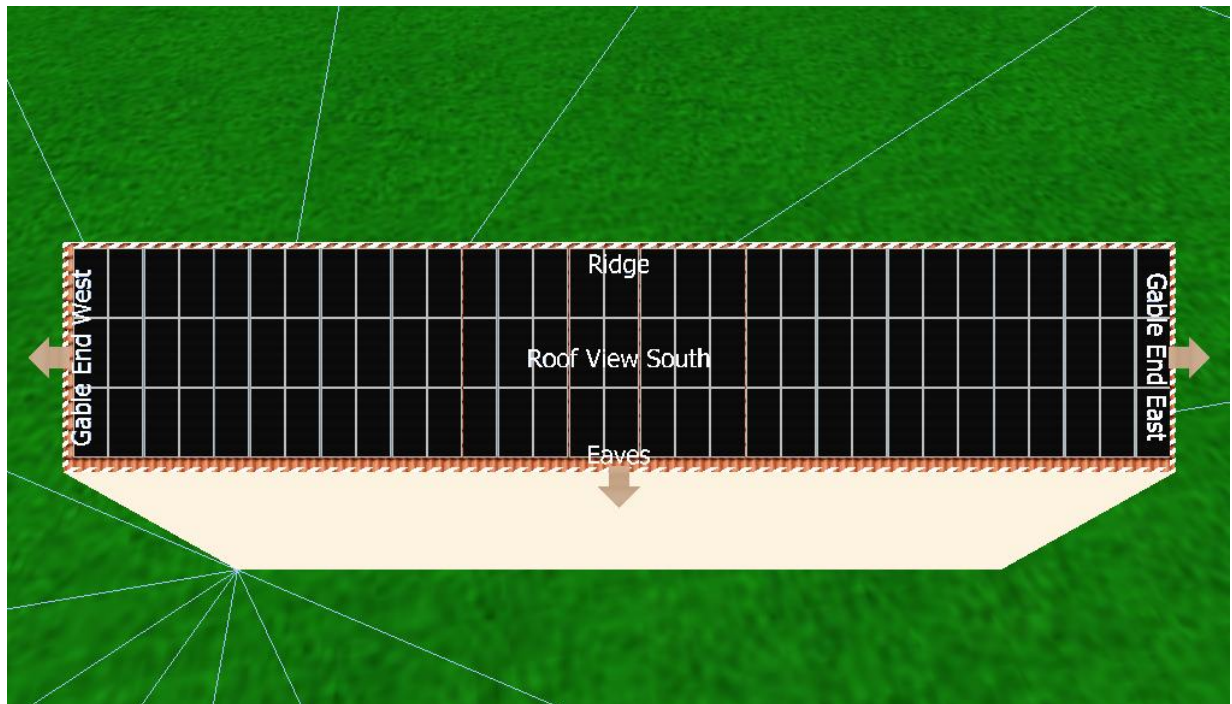
Net Present Value: 10.587,39 €  
 Payback Period: 10,4 Years  
 Yield: 8,2 %  
 Electricity Production Costs: 0,28 €/kWh



## System Visualisation Screenshots

### Module Coverage

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Screenshot1

### Module Configuration

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