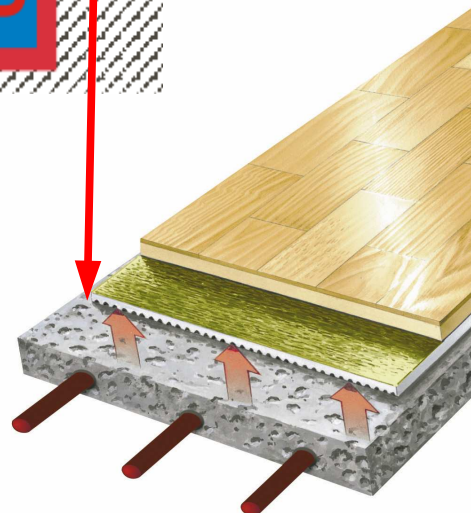
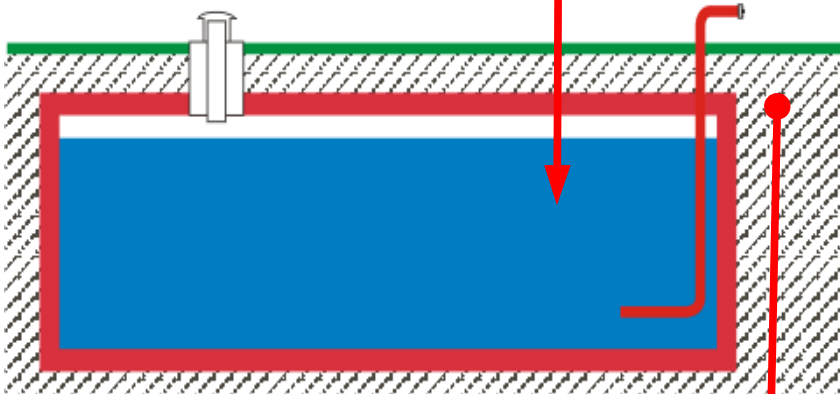


C

Community Fund for the Promotion of Basic Education and Community Infrastructure
Energy Efficiency and renewable Energies
Replacement of heating system - solarthermal system in combination floorheating





No.	Point	Declaration	Comment
1.1	Measure	Construction of solar-collectors, thermal storage system, more efficient heating	
1.2	Idea	<p>Large quantity of energy, available in summer, is to be saved for the relatively short period of low temperatures in winter.</p> <p>There are the 3 parts</p> <ul style="list-style-type: none">➤ Energy harvesting➤ Energy storage➤ Heating <p>merged to an effective heating system.</p> <p>In a collector farm, solar energy is to be fed to a large thermal storage system below the school. Either a big tank of water or, better, a latent thermal storage will save heat energy for the months of winter.</p> <p>Because thermal energy is limited, it is used so efficiently as possible, to heat the school. Heating via floorheatingssystem, running with low temperatures.</p> <p>Electrical energy required for running of pumps is generated by photovoltaic system.</p>	
1.3	Effect	<p>By the heated foundation slab (1st floor) or the tempered paving slab 2nd floor), there exist a basic warmness, which exists especially near feets.</p> <p>So there can be build a floor covering , which are easy to clean and robust, but discharge also the building regulations, to carry too much heat energy away.</p> <p>With the thermal storage system below the building, the transmission losses are reduced. Between tank and ground there is build a massive insulation.</p>	
1.4	Limits	<p>Storing thermal energy is the limiting element. The use of latent thermal storage is not easy to understand, development is in beginning , the chemical connections are complicated. For storage in clear water it needs large volumes.</p> <p>The stored heat-energy must be used moderate and forward-looking. Floor heating will not allow high room temperatures. The careful insulation and the Airtightness of the classrooms will have a significant part to the functioning of the concept.</p>	
1.5	Realization	Collectors can be purchased as finished products (e.g. vacuum collector), or they are manufactured by companies in departement (e.g. area collectors).	



The handicap of lower quality and efficiency of manufactured collectors is matched by the value added in the department. Moreover local craftsmen purchase an additional qualification. If collectors are built in the field and not on the roof, any damages (e.g. leaks), are less dangerous. Maintenance and cleaning are easier. Of course, the environmentally damaging effects of the coolant must be taken into account.

For the thermal storage system local existing steel tanks will be recycled and set at zero. The insulation is build by low-cost local materials (e.g. seaweed); if not available will be used conventional insulation (e.g. XPS).

The previous floor construction is modified for construction of floor heating: There is installed an on all sides insulated foundation slab. This slab contains the heating pipes, build according to the regulations of the manufacturers. So far examined pipes didn't accomplish requirements; so material is to import.

Control of the heating system will be manually.

In summer the floor-heating should running with cold water; so there can be reach:

- classrooms will be cooled
- regeneration of water tanks.

Because the appropriate control technology is expensive, so there is required good competence and high commitment of caretaker .

Electrical energy is generated on a PV-system. Regulators and PV elements are now relatively cheap.

- | | | |
|-----|--------|--|
| 1.6 | Impact | <ul style="list-style-type: none"> ➤ School can be operated independently. No other energy sources are necessary. ➤ Qualification of regional craftsmen; Competence support to build Solar thermal-elements. |
|-----|--------|--|

- | | | |
|-----|-----------|---|
| 1.7 | Operation | <ul style="list-style-type: none"> ➤ <p>Switch-on and switch-off of power, transposing of certain distributors, monitoring of storage etc. is not a quite simple task. The caretaker operating the system should know about basic knowledge of the system.</p> <p>From time to time a cleaning of collectors is required, as well as control of leakage.</p> |
|-----|-----------|---|

Circulating pumps must be maintained regularly. The storage is to



observe.

Users, here: Teachers and students, must be informed in the use of the building, to avoid unnecessary heat loss.
The use of heating shall be jointly and severally.

1.8	Time	Planning time:	60 days
		Building licence:	done
		Bidding:	30 days
		Realization:	60 days

1.9	Value	+++
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без похвалой

ESTIMATED COST

Measure C - Solarthermie and floorheating system

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND
COMM

client: NSIFT

planing: ba-K

supplier: _____

Total offer netto: _____

0%% charge: _____

brutto: _____

Total approved netto: _____

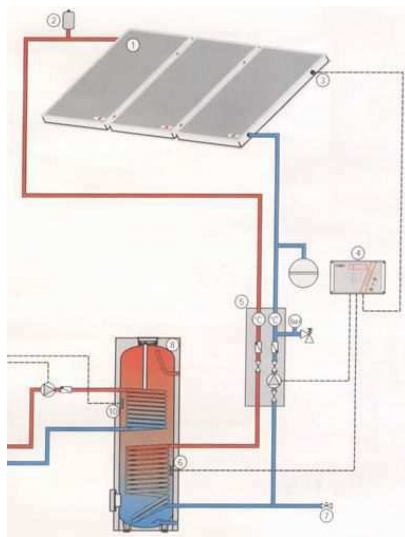
0%% charge: _____

brutto: _____

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing: ba-K
 LV: Measure C - Solarthermie and floorheating system

Pos.Nr. Einheitspr. Gesamtp.

Lv: Measure C - Solarthermie and floorheating system



1. Bereich: heat production

1.1. collector



100,00 St

1.2. installation
 tube, batteries etc.

1,00 piece

1.3. insulation

1,00 piece

1.4. pump

1,00 St

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing: ba-K
 LV: Measure C - Solarthermie and floorheating system

1. heat production

Pos.Nr.		Einheitspr.	Gesamtp.
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1.5. solarstation
 Solarstation TACOSOL FV70 1,5-6
 2-Strang Ausführung mit integrierter Entlüftereinheit in der
 Version 1,5-6 l/min



1,00 piece

1.6. control system



1,00 Psch

1.7. glykol

1,00 Psch

1.8. expansion tank, pressurized

1,00 St

Summe Bereich 1. heat production

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

2. heat accumulator

Pos.Nr.		Einheitspr.	Gesamtpr.
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2. Bereich: heat accumulator



2.1.	heat accumulator-10m ³ , Material	3,00 piece	
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2.2.	Groundwork, heat accumulator-3x10m ³ + insulation	40,00 m3	
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2.3.	insulation		
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		10,00 m3	
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2.4.	installation of tank, insulation	1,00 Psch	
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2.5.	control system	1,00 piece	
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Summe Bereich 2. heat accumulator _____


project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

3. heat distribution

Pos.Nr.		Einheitspr.	Gesamtpr.
3.	Bereich: heat distribution		
3.1.	pump heating	1,00 St	
3.2.	tubes distribution	140,00 m	
3.3.	parts, valve, turnout etc	1,00 Psch	
3.4.	floorheatingsystem 	420,00 m2	
3.4.a	tubes, material distance of tubes: 25cm; costs of 1m: 1,00 EUR; m tubes for 1m ² : 2,0m; costs of tubes 1m ² : 4 EUR 	420,00 m2	

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

3. heat distribution

Pos.Nr.		Einheitspr.	Gesamtpr.
3.4.b	additional material		
		420,00 m2	
3.5.	distribution block		
		2,00 piece	
3.6.	work		
		1,00 piece	
	Summe Bereich 3. heat distribution		

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

4. electricity

Pos.Nr.		Einheitspr.	Gesamtp.
4.	Bereich: electricity		
4.1.	control system	1,00 piece	_____
4.2.	control system, temperature	1,00 piece	_____
4.3.	pv-modul	1,00 piece	_____
4.4.	buffer batterie, accumulator	1,00 piece	_____
	Summe Bereich 4. electricity		=====
	Summe Lv Measure C - Solarthermie and floorheating system		=====

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
client: NSIFT
planning: ba-K
LV: Measure C - Solarthermie and floorheating system

Zusammenfassung

Bereich 1. heat production

Bereich 2. heat accumulator

Bereich 3. heat distribution

Bereich 4. electricity

Gesamt netto

zzgl. 0 % MwSt

Gesamt brutto

Lv Measure C - Solarthermie and floorheating system.....2

Bereich 1. heat production.....2

Bereich 2. heat accumulator.....4

Bereich 3. heat distribution.....5

Bereich 4. electricity.....7

с похвалой

ESTIMATED COST

Measure C - Solarthermie and floorheating system

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND
COMM

client: NSIFT

planing: ba-K

supplier: _____

Total offer netto: _____

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Total approved netto: _____

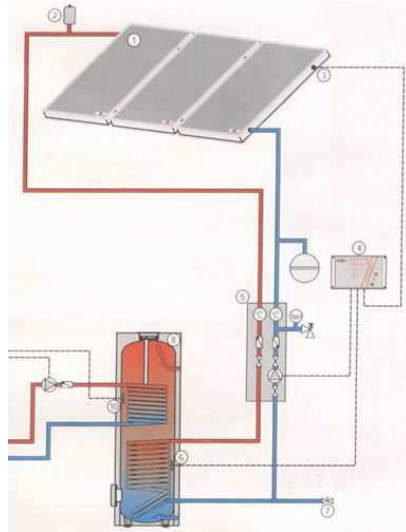
0%% charge: _____

brutto: _____

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

Pos.Nr. Einheitspr. Gesamtp.

Lv: Measure C - Solarthermie and floorheating system



1. Bereich: heat production

1.1. collector



100,00 St 350,00 35.000,00

1.2. installation
tube, batteries etc.

1,00 piece 700,00 700,00

1.3. insulation



1,00 piece 800,00 800,00

1.4. pump

1,00 St 350,00 350,00



project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing: ba-K
 LV: Measure C - Solarthermie and floorheating system

1. heat production

Pos.Nr.		Einheitspr.	Gesamtpr.
1.5.	solarstation Solarstation TACOSOL FV70 1,5-6 2-Strang Ausführung mit integrierter Entlüftereinheit in der Version 1,5-6 l/min		
			
		1,00 piece	700,00
			700,00
1.6.	control system		
			
		1,00 Psch	320,00
			320,00
1.7.	glykol		
		1,00 Psch	500,00
			500,00
1.8.	expansion tank, pressurized		
		1,00 St	350,00
			350,00
	Summe Bereich 1. heat production		<u>38.720,00</u>



project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

2. heat accumulator

Pos.Nr.		Einheitspr.	Gesamtpr.
2.	Bereich: heat accumulator		
			
2.1.	heat accumulator-10m³, Material		
	3,00 piece	4.000,00	12.000,00
2.2.	Groundwork, heat accumulator-3x10m³ + insulation		
	40,00 m3	35,00	1.400,00
2.3.	insulation		
			
	10,00 m3	1.200,00	12.000,00
2.4.	installation of tank, insulation		
	1,00 Psch	1.000,00	1.000,00
2.5.	control system		
	1,00 piece	350,00	350,00
	Summe Bereich 2. heat accumulator		<u>26.750,00</u>


project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

3. heat distribution

Pos.Nr.		Einheitspr.	Gesamtpr.
3.	Bereich: heat distribution		
3.1.	pump heating	1,00 St	350,00
			350,00
3.2.	tubes distribution	140,00 m	3,20
			448,00
3.3.	parts, valve, turnout etc	1,00 Psch	1.250,00
			1.250,00
3.4.	floorheatingsystem		
			
	420,00 m2		0,00
3.4.a	tubes, material distance of tubes: 25cm; costs of 1m: 1,00 EUR; m tubes for 1m ² : 2,0m; costs of tubes 1m ² : 4 EUR		
			
	420,00 m2	4,00	1.680,00

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

3. heat distribution

Pos.Nr.		Einheitspr.	Gesamtp.
3.4.b	additional material		
	420,00 m2	3,00	1.260,00
3.5.	distribution block		
			
	2,00 piece	245,00	490,00
3.6.	work		
	1,00 piece	2.500,00	2.500,00
	Summe Bereich 3. heat distribution		<u>7.978,00</u>

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
 client: NSIFT
 planing ba-K
 LV: Measure C - Solarthermie and floorheating system

4. electricity

Pos.Nr.		Einheitspr.	Gesamtp.
4.	Bereich: electricity		
4.1.	control system	1,00 piece	120,00
			120,00
4.2.	control system, temperature	1,00 piece	120,00
			120,00
4.3.	pv-modul	1,00 piece	1.400,00
			1.400,00
4.4.	buffer		
	batterie, accumulator	1,00 piece	800,00
			800,00
	Summe Bereich 4. electricity		<u>2.440,00</u>
	Summe Lv Measure C - Solarthermie and floorheating system		<u>75.888,00</u>

project: 110601-A COMMUNITY FUND FOR THE PROMOTION OF BASIC EDUCATION AND COMM
client: NSIFT
planing ba-K
LV: Measure C - Solarthermie and floorheating system

Zusammenfassung

Bereich 1. heat production	38.720,00
Bereich 2. heat accumulator	26.750,00
Bereich 3. heat distribution	7.978,00
Bereich 4. electricity	2.440,00

Gesamt netto 75.888,00

zzgl. 0 % MwSt 0,00

Gesamt brutto 75.888,00

Lv Measure C - Solarthermie and floorheating system.....	2
Bereich 1. heat production.....	2
Bereich 2. heat accumulator.....	4
Bereich 3. heat distribution.....	5
Bereich 4. electricity.....	7