

## Abschätzung des Energieverbrauchs der Dreifachturnhalle

### Nutzung einer Grundwasserwärmepumpe (WIH 120TU)

#### Energieverbrauch Heizung und Warmwasser

Energiebedarf (H+WW)/a	223.000 kWh
el. Energieverbrauch/a	53.095 kWh
COP	4,2

	Jan	Feb	Mrz	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
Standardverteilung	16,1%	13,0%	12,5%	8,1%	3,5%	2,2%	1,7%	1,6%	5,2%	8,4%	12,2%	15,5%
Energiebedarf/mon	35.903 kWh	28.990 kWh	27.875 kWh	18.063 kWh	7.805 kWh	4.906 kWh	3.791 kWh	3.568 kWh	11.596 kWh	18.732 kWh	27.206 kWh	34.565 kWh
Energiebedarf/d	1.158 kWh	1.035 kWh	899 kWh	602 kWh	252 kWh	164 kWh	122 kWh	115 kWh	387 kWh	604 kWh	907 kWh	1.115 kWh
el. Energieverbrauch/d	276 kWh	247 kWh	214 kWh	143 kWh	60 kWh	39 kWh	29 kWh	27 kWh	92 kWh	144 kWh	216 kWh	265 kWh
el. Energieverbrauch/mon	8.548 kWh	6.902 kWh	6.637 kWh	4.301 kWh	1.858 kWh	1.168 kWh	903 kWh	850 kWh	2.761 kWh	4.460 kWh	6.478 kWh	8.230 kWh

#### Energieertrag Photovoltaik

	Referenzanlagen Mittelfranken 2015	PV-Anlage Turnhalle	Jan	Feb	Mrz	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
Leistung	1 kWp	226 kWp												
Energieertrag	1.000 kWh	226.000 kWh												
el. Energieertrag/mon (1 kWp)	17 kWh	42 kWh	17 kWh	42 kWh	91 kWh	127 kWh	122 kWh	125 kWh	142 kWh	130 kWh	88 kWh	56 kWh	36 kWh	25 kWh
el. Energieertrag/mon (226 kWp)	3.842 kWh	9.492 kWh	3.842 kWh	9.492 kWh	20.566 kWh	28.702 kWh	27.572 kWh	28.250 kWh	32.092 kWh	29.380 kWh	19.888 kWh	12.656 kWh	8.136 kWh	5.650 kWh
el. Energieertrag/d	124 kWh	339 kWh	124 kWh	339 kWh	663 kWh	957 kWh	889 kWh	942 kWh	1.035 kWh	948 kWh	663 kWh	408 kWh	271 kWh	182 kWh

#### Energiebilanz

	Jan	Feb	Mrz	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
el. Energieertrag/d	124 kWh	339 kWh	663 kWh	957 kWh	889 kWh	942 kWh	1.035 kWh	948 kWh	663 kWh	408 kWh	271 kWh	182 kWh
el. Energieverbrauch/d	-276 kWh	-247 kWh	-214 kWh	-143 kWh	-60 kWh	-39 kWh	-29 kWh	-27 kWh	-92 kWh	-144 kWh	-216 kWh	-265 kWh
el. Bilanz/d	-152 kWh	92 kWh	449 kWh	813 kWh	829 kWh	903 kWh	1.006 kWh	920 kWh	571 kWh	264 kWh	55 kWh	-83 kWh
el. Bilanz/mon	-4.706 kWh	2.590 kWh	13.929 kWh	24.401 kWh	25.714 kWh	27.082 kWh	31.189 kWh	28.530 kWh	17.127 kWh	8.196 kWh	1.658 kWh	-2.580 kWh

#### PH-Netzeinspeisung

PH-Netzeinspeisung	180.417 kWh
WP-Jahresbedarf	53.095 kWh
el. Jahresbezug	-7.286 kWh
Deckungsgrad	86,28 %

## Abschätzung des Energieverbrauchs der Dreifachturnhalle

### Nutzung einer Luftwärmepumpe (2xLA 60TU-2)

#### Energieverbrauch

Energiebedarf (H+WW)/a 223.000 kWh  
 el. Energieverbrauch/a 70.168 kWh

	Jan	Feb	Mrz	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
Durchschnittstemperatur	0,0 °C	1,0 °C	4,5 °C	9,0 °C	14,0 °C	17,0 °C	18,5 °C	18,0 °C	14,0 °C	9,0 °C	4,0 °C	1,0 °C
COP	2,80	2,90	3,20	3,60	3,90	4,00	4,10	4,10	3,90	3,60	3,20	2,90
Standardverteilung	16,1%	13,0%	12,5%	8,1%	3,5%	2,2%	1,7%	1,6%	5,2%	8,4%	12,2%	15,5%
Energiebedarf/mon	35.903 kWh	28.990 kWh	27.875 kWh	18.063 kWh	7.805 kWh	4.906 kWh	3.791 kWh	3.568 kWh	11.596 kWh	18.732 kWh	27.206 kWh	34.565 kWh
Energiebedarf/d	1.158 kWh	1.035 kWh	899 kWh	602 kWh	252 kWh	164 kWh	122 kWh	115 kWh	387 kWh	604 kWh	907 kWh	1.115 kWh
el. Energieverbrauch/d	414 kWh	357 kWh	281 kWh	167 kWh	65 kWh	41 kWh	30 kWh	28 kWh	99 kWh	168 kWh	283 kWh	384 kWh
el. Energieverbrauch/mon	12.823 kWh	9.997 kWh	8.711 kWh	5.018 kWh	2.001 kWh	1.227 kWh	925 kWh	870 kWh	2.973 kWh	5.203 kWh	8.502 kWh	11.919 kWh

#### Energieertrag Photovoltaik

	Referenzanlagen Mittelfranken 2015	PV-Anlage Turnhalle
Leistung	1 kWp	226 kWp
Energieertrag	1.000 kWh	226.000 kWh

	Jan	Feb	Mrz	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
el. Energieertrag/mon (1 kWp)	17 kWh	42 kWh	91 kWh	127 kWh	122 kWh	125 kWh	142 kWh	130 kWh	88 kWh	56 kWh	36 kWh	25 kWh
el. Energieertrag/mon (226 kWp)	3.842 kWh	9.492 kWh	20.566 kWh	28.702 kWh	27.572 kWh	28.250 kWh	32.092 kWh	29.380 kWh	19.888 kWh	12.656 kWh	8.136 kWh	5.650 kWh
el. Energieertrag/d	124 kWh	306 kWh	663 kWh	926 kWh	889 kWh	911 kWh	1.035 kWh	948 kWh	642 kWh	408 kWh	262 kWh	182 kWh

#### Energiebilanz

	Jan	Feb	Mrz	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
el. Energieertrag/d	124 kWh	306 kWh	663 kWh	926 kWh	889 kWh	911 kWh	1.035 kWh	948 kWh	642 kWh	408 kWh	262 kWh	182 kWh
el. Energieverbrauch/d	-414 kWh	-357 kWh	-281 kWh	-167 kWh	-65 kWh	-41 kWh	-30 kWh	-28 kWh	-99 kWh	-168 kWh	-283 kWh	-384 kWh
el. Bilanz/d	-290 kWh	-51 kWh	382 kWh	759 kWh	825 kWh	870 kWh	1.005 kWh	920 kWh	542 kWh	240 kWh	-21 kWh	-202 kWh
el. Bilanz/mon	-8.981 kWh	-1.423 kWh	11.855 kWh	22.759 kWh	25.571 kWh	26.112 kWh	31.167 kWh	28.510 kWh	16.273 kWh	7.453 kWh	-628 kWh	-6.269 kWh

#### PH-Netzeinspeisung

169.700 kWh  
**WP-Jahresbedarf**  
 70.168 kWh  
**el. Jahresbezug**  
 -17.301 kWh  
**Deckungsgrad**  
 75,34 %

### Diagramm Energieertrag, -verbrauch pro Tag

	Jan	Feb	Mrz	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez
el. PV_Energieertrag/d	124 kWh	339 kWh	663 kWh	957 kWh	889 kWh	942 kWh	1.035 kWh	948 kWh	663 kWh	408 kWh	271 kWh	182 kWh
el WP-GW_Energieverbrauch/d	276 kWh	247 kWh	214 kWh	143 kWh	60 kWh	39 kWh	29 kWh	27 kWh	92 kWh	144 kWh	216 kWh	265 kWh
el WP-Luft_Energieverbrauch/d	414 kWh	357 kWh	281 kWh	167 kWh	65 kWh	41 kWh	30 kWh	28 kWh	99 kWh	168 kWh	283 kWh	384 kWh

