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## Data

Discount Rate	5,50%
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Inflation Rate	4,00%
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Investment Cost	Scenario 1	78.838,50 €
	Scenario 2	6.000,00 €
	Scenario 3	14.000,00 €
	Scenario 4	37.500,00 €
	Scenario 5	8.184,00 €
	Scenario 6	144.522,50 €

ESM Operational Cost	Scenario 1	0,00 €
	Scenario 2	0,00 €
	Scenario 3	250,00 €
	Scenario 4	250,00 €
	Scenario 5	
	Scenario 6	500,00 €

Lifetime of Project	Scenario 1	30
	Scenario 2	25
	Scenario 3	20
	Scenario 4	20
	Scenario 5	
	Scenario 6	

## Energy Efficiency

Primary energy consumption [kWh/m <sup>2</sup> ]	Reference building	Building
Heating	20,00	179,10
Cooling	11,10	24,10
Domestic Hot Water	0,00	0,00
Lighting	69,50	79,50
Renewable Energy Source	0,00	0,00
<b>Total</b>	<b>100,70</b>	<b>282,70</b>
<b>Ranking (Energy Class)</b>	<b>-</b>	<b>H</b>

Energy source	Fuel Consumption [kWh/m <sup>2</sup> ]	CO <sub>2</sub> Emissions [kg/m <sup>2</sup> ]
Electricity	49,30	48,80
Oil	139,60	36,90
Natural gas	0,00	0,00
Other fossil fuels	0,00	0,00
Solar	0,00	0,00
Biomass	0,00	0,00
Geothermal	0,00	0,00
Other RES	0,00	0,00
<b>Total</b>	<b>188,90</b>	<b>85,60</b>

Energy demand [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	18,4	12,6	7,7	2,4	0,0	0,0	0,0	0,0	0,0	0,7	7,1	15,4	64,3
Cooling	0,0	0,0	0,0	0,0	0,0	14,6	0,0	0,0	0,0	0,0	0,0	0,0	14,6
Domestic Hot Water	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Final energy consumption	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	43,6	29,9	18,2	6,2	0,0	0,0	0,0	0,0	0,0	1,7	16,8	36,8	153,2
Solar Energy for Heating	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Cooling	0,0	0,0	0,0	0,0	0,0	8,3	0,0	0,0	0,0	0,0	0,0	0,0	8,3
Domestic Hot Water	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Lighting	2,7	2,7	2,7	2,7	2,7	2,7	0,0	0,0	2,7	2,7	2,7	2,7	27,4
Energy from PVs	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
<b>Total</b>	<b>46,3</b>	<b>32,6</b>	<b>20,9</b>	<b>8,9</b>	<b>2,7</b>	<b>11,0</b>	<b>0,0</b>	<b>0,0</b>	<b>2,7</b>	<b>4,4</b>	<b>19,5</b>	<b>39,5</b>	<b>188,9</b>

<b>Operational cost [€]</b>	<b>40.838,30</b>
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### Energy Efficiency

Primary energy consumption [kWh/m <sup>2</sup> ]	Building under Study	ESM Building
Heating	179,10	72,80
Cooling	24,10	15,80
Domestic Hot Water	0,00	0,00
Lighting	79,50	79,50
Renewable Energy Sources	0,00	0,00
<b>Total</b>	<b>282,70</b>	<b>168,10</b>
Ranking (Energy Class)	H	A

Energy source	Fuel Consumption [kWh/m <sup>2</sup> ]	CO <sub>2</sub> Emissions [kg/m <sup>2</sup> ]
Electricity	41,00	40,50
Oil	42,90	13,00
Natural gas	0,00	0,00
Other fossil fuels	0,00	0,00
Solar	0,00	0,00
Biomass	0,00	0,00
Geothermal	0,00	0,00
Other RES	0,00	0,00
<b>Total</b>	<b>83,90</b>	<b>51,90</b>

Energy demand [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	6,6	4,1	2,4	0,4	0,0	0,0	0,0	0,0	0,0	0,1	1,9	4,9	20,4
Cooling	0,0	0,0	0,0	0,0	0,0	0,0	9,8	0,0	0,0	0,0	0,0	0,0	9,8
Domestic Hot Water	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Final energy consumption [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	15,80	10,10	6,10	1,60	0,00	0,00	0,00	0,00	0,00	0,30	5,00	12,10	51,00
Solar Energy for Heating	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Cooling	0,00	0,00	0,00	0,00	0,00	5,50	0,00	0,00	0,00	0,00	0,00	0,00	5,50
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Lighting	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	32,40
Energy from PVs	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
<b>Total</b>	<b>18,50</b>	<b>12,80</b>	<b>8,80</b>	<b>4,30</b>	<b>2,70</b>	<b>8,20</b>	<b>2,70</b>	<b>2,70</b>	<b>2,70</b>	<b>3,00</b>	<b>7,70</b>	<b>14,80</b>	<b>88,90</b>

Operational cost [€]	19.992,60
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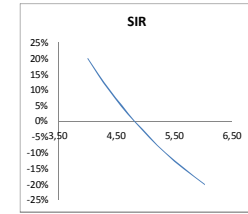
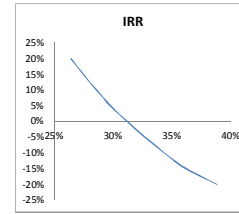
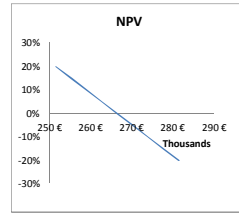
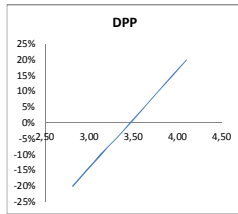
### Feasibility Study

Cash Flow	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Initial Investment	78838,5																					
Savings		21.679,53	22.546,71	23.448,58	24.386,52	25.361,98	26.376,46	27.431,52	28.528,78	29.669,93	30.856,73	32.091,00	33.374,64	34.709,62	36.098,01	37.541,93	39.043,61	40.605,35	42.229,56	43.918,75	45.675,50	
ESM Operating Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Operating Income</b>	<b>-78.838,50</b>	<b>21.679,53</b>	<b>22.546,71</b>	<b>23.448,58</b>	<b>24.386,52</b>	<b>25.361,98</b>	<b>26.376,46</b>	<b>27.431,52</b>	<b>28.528,78</b>	<b>29.669,93</b>	<b>30.856,73</b>	<b>32.091,00</b>	<b>33.374,64</b>	<b>34.709,62</b>	<b>36.098,01</b>	<b>37.541,93</b>	<b>39.043,61</b>	<b>40.605,35</b>	<b>42.229,56</b>	<b>43.918,75</b>	<b>45.675,50</b>	
<b>Cumulative Cash Flows</b>	<b>-78.838,50</b>	<b>-57.158,97</b>	<b>-34.612,26</b>	<b>-11.163,69</b>	<b>13.222,84</b>	<b>38.584,82</b>	<b>64.961,28</b>	<b>92.392,80</b>	<b>120.921,58</b>	<b>150.591,51</b>	<b>181.448,24</b>	<b>213.539,23</b>	<b>246.913,87</b>	<b>281.623,49</b>	<b>317.721,50</b>	<b>355.263,43</b>	<b>394.307,03</b>	<b>434.912,38</b>	<b>477.141,95</b>	<b>521.060,69</b>	<b>566.736,19</b>	

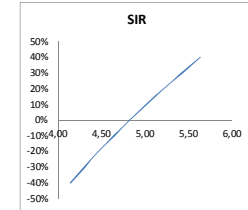
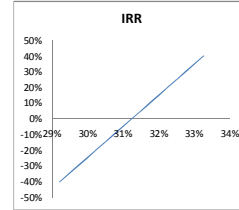
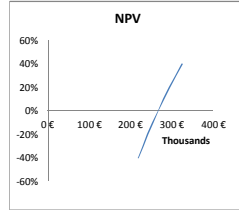
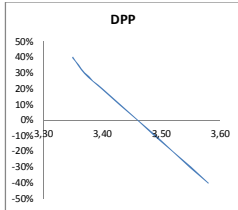
Depreciated Payback Period	3,46
NPV	266.443,13 €
IRR	31,24%
SIR	4,82

### Sensitivity Analysis

Initial Cost	DPP	NPV	IRR	SIR
-20%	63070,8	2,81	281.389 €	39%
-15%	67012,7	2,97	277.652 €	36%
-10%	70954,7	3,13	273.916 €	34%
-5%	74896,6	3,30	270.180 €	33%
0	78838,5	3,46	266.443 €	31%
5%	82780,4	3,62	262.707 €	30%
10%	86722,4	3,78	258.970 €	29%
15%	90664,3	3,94	255.233 €	28%
20%	94606,2	4,10	251.497 €	26%



Inflation Rate	DPP	NPV	IRR	SIR
-40%	2,40%	3,58	218.493 €	29%
-30%	2,80%	3,55	229.649 €	30%
-20%	3,20%	3,52	241.341 €	30%
-10%	3,60%	3,49	253.596 €	31%
0%	4,00%	3,46	266.443 €	31%
10%	4,40%	3,43	279.915 €	32%
20%	4,80%	3,40	294.042 €	32%
30%	5,20%	3,37	308.861 €	33%
40%	5,60%	3,35	324.407 €	33%



### Energy Efficiency

Primary energy consumption [kWh/m <sup>2</sup> ]	Reference building	Building under Study
Heating	179,10	115,70
Cooling	24,10	24,10
Domestic Hot Water	0,00	0,00
Lighting	79,50	79,50
Renewable Energy Sources	0,00	0,00
<b>Total</b>	<b>282,70</b>	<b>219,20</b>
Ranking (Energy Class)	H	E

Energy source	Fuel Consumption [kWh/m <sup>2</sup> ]	CO <sub>2</sub> Emissions [kg/m <sup>2</sup> ]
Electricity	48,10	47,60
Oil	0,00	0,00
Natural gas	89,40	17,50
Other fossil fuels	0,00	0,00
Solar	0,00	0,00
Biomass	0,00	0,00
Geothermal	0,00	0,00
Other RES	0,00	0,00
<b>Total</b>	<b>137,60</b>	<b>65,10</b>

Energy demand [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	18,80	12,80	7,90	2,50	0,00	0,00	0,00	0,00	0,00	0,70	7,20	15,70	65,60
Cooling	0,00	0,00	0,00	0,00	0,00	14,50	0,00	0,00	0,00	0,00	0,00	0,00	14,50
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Final energy consumption [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	28,80	19,80	12,20	4,30	0,00	0,00	0,00	0,00	0,00	1,20	11,30	24,30	101,90
Solar Energy for Heating	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Cooling	0,00	0,00	0,00	0,00	0,00	8,30	0,00	0,00	0,00	0,00	0,00	0,00	8,30
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Lighting	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	32,40
Energy from PVs	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
<b>Total</b>	<b>31,50</b>	<b>22,50</b>	<b>14,90</b>	<b>7,00</b>	<b>2,70</b>	<b>11,00</b>	<b>2,70</b>	<b>2,70</b>	<b>2,70</b>	<b>3,90</b>	<b>14,00</b>	<b>27,00</b>	<b>142,60</b>

Operational cost [€]
26.482,00

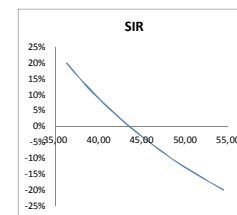
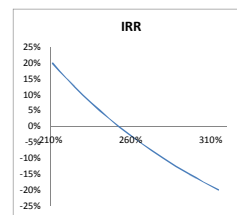
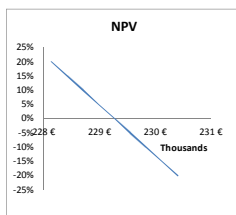
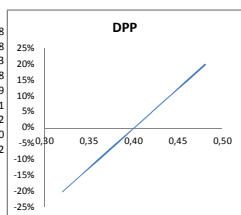
### Feasibility Study

Cash Flow	Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Initial Investment		6000																					
Savings			14.930,55	15.527,77	16.148,89	16.794,84	17.466,63	18.165,30	18.891,91	19.647,59	20.433,49	21.250,83	22.100,86	22.984,90	23.904,29	24.860,47	25.854,89	26.889,08	27.964,64	29.083,23	30.246,56	31.456,42	
ESM Operating Costs			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Operating Income</b>		<b>-6.000,00</b>	<b>14.930,55</b>	<b>15.527,77</b>	<b>16.148,89</b>	<b>16.794,84</b>	<b>17.466,63</b>	<b>18.165,30</b>	<b>18.891,91</b>	<b>19.647,59</b>	<b>20.433,49</b>	<b>21.250,83</b>	<b>22.100,86</b>	<b>22.984,90</b>	<b>23.904,29</b>	<b>24.860,47</b>	<b>25.854,89</b>	<b>26.889,08</b>	<b>27.964,64</b>	<b>29.083,23</b>	<b>30.246,56</b>	<b>31.456,42</b>	
<b>Cumulative Cash Flows</b>		<b>-6.000,00</b>	<b>8.930,55</b>	<b>24.458,33</b>	<b>40.607,21</b>	<b>57.402,05</b>	<b>74.868,69</b>	<b>93.033,99</b>	<b>111.925,90</b>	<b>131.573,48</b>	<b>152.006,98</b>	<b>173.257,81</b>	<b>195.358,67</b>	<b>218.343,57</b>	<b>242.247,86</b>	<b>267.108,33</b>	<b>292.963,22</b>	<b>319.852,30</b>	<b>347.816,94</b>	<b>376.900,17</b>	<b>407.146,73</b>	<b>438.603,15</b>	

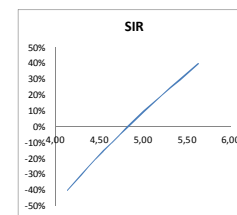
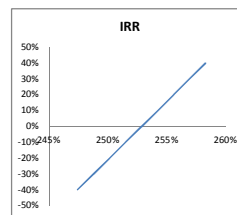
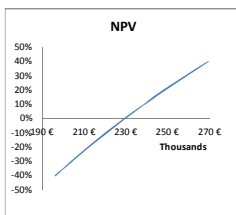
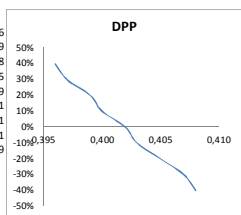
Depreciated Payback Period	0,40
NPV	229.275,47 €
IRR	252,84%
SIR	43,59

### Sensitivity Analysis

Initial Cost	DPP	NPV	IRR	SIR	
-20%	4800	0,32	230.413 €	315%	54,48
-15%	5100	0,34	230.129 €	297%	51,28
-10%	5400	0,36	229.844 €	280%	48,43
-5%	5700	0,38	229.560 €	266%	45,88
0	6000	0,40	229.275 €	253%	43,59
5%	6300	0,42	228.991 €	241%	41,51
10%	6600	0,44	228.707 €	230%	39,62
15%	6900	0,46	228.422 €	220%	37,90
20%	7200	0,48	228.138 €	211%	36,32



Inflation Rate	DPP	NPV	IRR	SIR	
-40%	2,40%	0,408	196.253 €	247%	37,46
-30%	2,80%	0,407	203.936 €	249%	38,89
-20%	3,20%	0,405	211.988 €	250%	40,38
-10%	3,60%	0,403	220.427 €	251%	41,95
0%	4,00%	0,402	229.275 €	253%	43,59
10%	4,40%	0,400	238.553 €	254%	45,31
20%	4,80%	0,399	248.283 €	256%	47,11
30%	5,20%	0,397	258.489 €	257%	49,01
40%	5,60%	0,396	269.195 €	258%	50,99



### Energy Efficiency

Primary energy consumption [kWh/m <sup>2</sup> ]	Building under Study	ESM Building
Heating	179,10	166,70
Cooling	24,10	24,10
Domestic Hot Water	0,00	0,00
Lighting	79,50	79,50
Renewable Energy Sources	0,00	0,00
<b>Total</b>	<b>282,70</b>	<b>270,30</b>
Ranking (Energy Class)	H	Z

Energy source	Fuel Consumption [kWh/m <sup>2</sup> ]	CO <sub>2</sub> Emissions [kg/m <sup>2</sup> ]
Electricity	49,20	48,70
Oil	129,10	34,10
Natural gas	0,00	0,00
Other fossil fuels	0,00	0,00
Solar	27,70	0,00
Biomass	0,00	0,00
Geothermal	0,00	0,00
Other RES	0,00	0,00
<b>Total</b>	<b>178,30</b>	<b>82,70</b>

Energy demand [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	18,40	12,60	7,70	2,40	0,00	0,00	0,00	0,00	0,00	0,70	7,10	15,40	64,30
Cooling	0,00	0,00	0,00	0,00	0,00	14,60	0,00	0,00	0,00	0,00	0,00	0,00	14,60
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Final energy consumption [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	41,80	28,30	16,60	4,40	0,00	0,00	0,00	0,00	0,00	0,90	15,50	35,10	142,60
Solar Energy for Heating	2,00	2,10	2,70	3,10	3,60	3,80	0,00	0,00	3,40	2,80	2,10	1,90	27,70
Cooling	0,00	0,00	0,00	0,00	0,00	8,30	0,00	0,00	0,00	0,00	0,00	0,00	8,30
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Lighting	2,70	2,70	2,70	2,70	2,70	2,70	0,00	2,70	2,70	2,70	2,70	2,70	27,40
Energy from Pvs	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
<b>Total</b>	<b>44,50</b>	<b>31,00</b>	<b>19,30</b>	<b>7,20</b>	<b>2,70</b>	<b>11,10</b>	<b>0,00</b>	<b>2,70</b>	<b>3,70</b>	<b>18,20</b>	<b>37,90</b>	<b>178,30</b>	

Operational cost [€]	38.605,00
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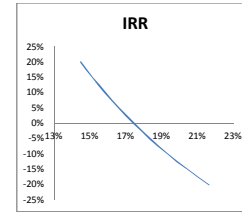
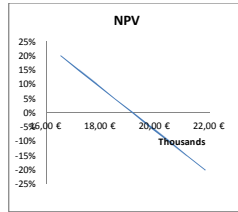
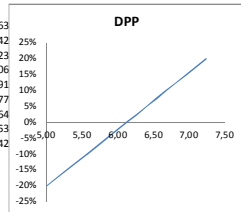
### Feasibility Study

Cash Flow	Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Initial Investment		14000																					
Savings			2.322,63	2.415,54	2.512,16	2.612,65	2.717,15	2.825,84	2.938,87	3.056,43	3.178,68	3.305,83	3.438,06	3.575,59	3.718,61	3.867,35	4.022,05	4.182,93	4.350,25	4.524,26	4.705,23	4.893,44	
ESM Operating Costs			260,00	270,40	281,22	292,46	304,16	316,33	328,98	342,14	355,83	370,06	384,86	400,26	416,27	432,92	450,24	468,25	486,98	506,45	526,71	547,78	
<b>Operating Income</b>		<b>-14.000,00</b>	<b>2.062,63</b>	<b>2.145,14</b>	<b>2.230,94</b>	<b>2.320,18</b>	<b>2.412,99</b>	<b>2.509,51</b>	<b>2.609,89</b>	<b>2.714,28</b>	<b>2.822,85</b>	<b>2.935,77</b>	<b>3.053,20</b>	<b>3.175,33</b>	<b>3.302,34</b>	<b>3.434,43</b>	<b>3.571,81</b>	<b>3.714,68</b>	<b>3.863,27</b>	<b>4.017,80</b>	<b>4.178,51</b>	<b>4.345,65</b>	
<b>Cumulative Cash Flows</b>		<b>-14.000,00</b>	<b>-11.937,37</b>	<b>-9.792,23</b>	<b>-7.561,29</b>	<b>-5.241,11</b>	<b>-2.828,12</b>	<b>-318,61</b>	<b>2.291,27</b>	<b>5.005,56</b>	<b>7.828,41</b>	<b>10.764,18</b>	<b>13.817,38</b>	<b>16.992,71</b>	<b>20.295,05</b>	<b>23.729,48</b>	<b>27.301,29</b>	<b>31.015,98</b>	<b>34.879,25</b>	<b>38.897,05</b>	<b>43.075,56</b>	<b>47.421,22</b>	

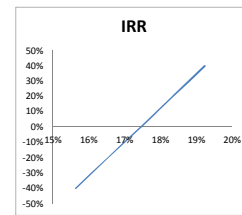
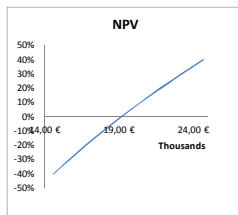
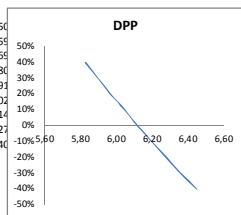
Depreciated Payback Period	6,13
NPV	19.189,58 €
IRR	17,44%
SIR	2,91

### Sensitivity Analysis

Initial Cost	DPP	NPV	IRR	SIR
-20%	11200	5,01	21.843,61 €	22%
-15%	11900	5,29	21.180,10 €	20%
-10%	12600	5,57	20.516,59 €	19%
-5%	13300	5,85	19.853,08 €	18%
0	14000	6,13	19.189,58 €	17%
5%	14700	6,41	18.526,07 €	17%
10%	15400	6,68	17.862,56 €	16%
15%	16100	6,96	17.199,06 €	15%
20%	16800	7,24	16.535,55 €	14%



Inflation Rate	DPP	NPV	IRR	SIR
-40%	2,40%	6,45	14.627,53 €	16%
-30%	2,80%	6,36	15.688,95 €	16%
-20%	3,20%	6,28	16.801,30 €	17%
-10%	3,60%	6,20	17.967,24 €	17%
0%	4,00%	6,12	19.189,58 €	17%
10%	4,40%	6,05	20.471,27 €	18%
20%	4,80%	5,97	21.815,43 €	18%
30%	5,20%	5,90	23.225,33 €	19%
40%	5,60%	5,83	24.704,42 €	19%



**Energy Efficiency**

Primary energy consumption [kWh/m <sup>2</sup> ]	Building under Study	ESM Building
Heating	179,10	179,10
Cooling	24,10	24,10
Domestic Hot Water	0,00	0,00
Lighting	79,50	79,50
Renewable Energy Sources	0,00	43,70
<b>Total</b>	<b>282,70</b>	<b>239,00</b>
<b>Ranking (Energy Class)</b>	<b>H</b>	<b>Z</b>

Energy source	Fuel Consumption [kWh/m <sup>2</sup> ]	CO <sub>2</sub> Emissions [kg/m <sup>2</sup> ]
Electricity	38,10	37,70
Oil	150,80	39,80
Natural gas	0,00	0,00
Other fossil fuels	0,00	0,00
Solar	0,00	0,00
Biomass	0,00	0,00
Geothermal	0,00	0,00
Other RES	0,00	0,00
<b>Total</b>	<b>188,90</b>	<b>77,50</b>

Energy demand [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	18,40	12,60	7,70	2,40	0,00	0,00	0,00	0,00	0,00	0,70	7,10	15,40	64,30
Cooling	0,00	0,00	0,00	0,00	0,00	14,60	0,00	0,00	0,00	0,00	0,00	0,00	14,60
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Final energy consumption [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	43,60	29,90	18,20	6,20	0,00	0,00	0,00	0,00	0,00	1,70	16,80	36,80	153,20
Solar Energy for Heating	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Cooling	0,00	0,00	0,00	0,00	0,00	8,30	0,00	0,00	0,00	0,00	0,00	0,00	8,30
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Lighting	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	27,00
Energy from Pvs	0,80	0,80	1,10	1,40	1,60	1,70	0,00	0,00	1,40	1,10	0,80	0,70	11,50
<b>Total</b>	<b>46,40</b>	<b>32,60</b>	<b>20,90</b>	<b>8,90</b>	<b>2,70</b>	<b>11,10</b>	<b>0,00</b>	<b>2,70</b>	<b>4,40</b>	<b>4,40</b>	<b>19,60</b>	<b>39,50</b>	<b>188,90</b>

Operational cost [€]	37.692,00
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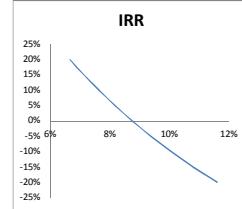
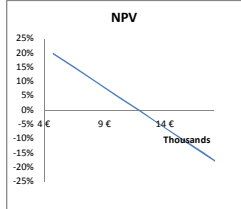
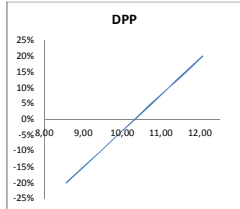
**Feasibility Study**

Cash Flow	Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Initial Investment		37500																					
Savings			3.272,15	3.403,04	3.539,16	3.680,73	3.827,96	3.981,07	4.140,32	4.305,93	4.478,17	4.657,29	4.843,58	5.037,33	5.238,82	5.448,37	5.666,31	5.892,96	6.128,68	6.373,83	6.628,78	6.893,93	
ESM Operating Costs			260,00	270,40	281,22	292,46	304,16	316,33	328,98	342,14	355,83	370,06	384,86	400,26	416,27	432,92	450,24	468,25	486,98	506,45	526,71	547,78	
<b>Operating Income</b>		<b>-37.500,00</b>	<b>3.012,15</b>	<b>3.132,64</b>	<b>3.257,94</b>	<b>3.388,26</b>	<b>3.523,79</b>	<b>3.664,74</b>	<b>3.811,33</b>	<b>3.963,79</b>	<b>4.122,34</b>	<b>4.287,23</b>	<b>4.458,72</b>	<b>4.637,07</b>	<b>4.822,55</b>	<b>5.015,45</b>	<b>5.216,07</b>	<b>5.424,72</b>	<b>5.641,70</b>	<b>5.867,37</b>	<b>6.102,07</b>	<b>6.346,15</b>	
<b>Cumulative Cash Flows</b>		<b>-37.500,00</b>	<b>-34.487,85</b>	<b>-31.355,21</b>	<b>-28.097,27</b>	<b>-24.709,00</b>	<b>-21.185,21</b>	<b>-17.520,47</b>	<b>-13.709,14</b>	<b>-9.745,35</b>	<b>-5.623,01</b>	<b>-1.335,78</b>	<b>3.122,94</b>	<b>7.760,01</b>	<b>12.582,56</b>	<b>17.598,02</b>	<b>22.814,09</b>	<b>28.238,81</b>	<b>33.880,51</b>	<b>39.747,88</b>	<b>45.849,95</b>	<b>52.196,10</b>	

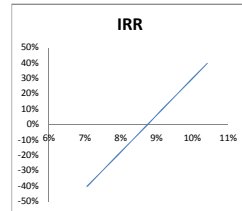
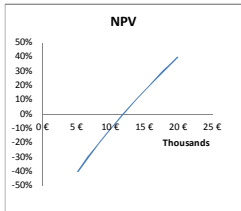
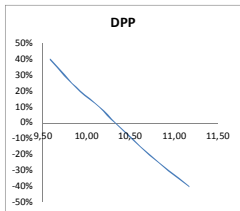
Depreciated Payback Period	10,31
NPV	11.857,33 €
IRR	8,74%
SIR	1,53

**Sensitivity Analysis**

Initial Cost	DPP	NPV	IRR	SIR	
-20%	30000	8,56	18.966 €	12%	1,91
-15%	31875	9,00	17.189 €	11%	1,80
-10%	33750	9,44	15.412 €	10%	1,70
-5%	35625	9,87	13.635 €	9%	1,61
0	37500	10,31	11.857 €	9%	1,53
5%	39375	10,75	10.080 €	8%	1,46
10%	41250	11,19	8.303 €	8%	1,39
0,15	43125	11,62	6.526 €	7%	1,33
20%	45000	12,06	4.748 €	7%	1,27



Inflation Rate	DPP	NPV	IRR	SIR	
-40%	2,40%	11,17	5.195 €	7%	1,31
-30%	2,80%	10,94	6.745 €	7%	1,36
-20%	3,20%	10,72	8.370 €	8%	1,42
-10%	3,60%	10,52	10.072 €	8%	1,47
0%	4,00%	10,33	11.857 €	9%	1,53
10%	4,40%	10,15	13.729 €	9%	1,59
20%	4,80%	9,93	15.692 €	10%	1,65
30%	5,20%	9,75	17.751 €	10%	1,72
40%	5,60%	9,59	19.911 €	10%	1,79



### Energy Efficiency

Primary energy consumption [kWh/m <sup>2</sup> ]	Building under Study	ESM Building
Heating	179,10	191,10
Cooling	24,10	23,00
Domestic Hot Water	0,00	49,00
Lighting	79,50	49,10
Renewable Energy Source	0,00	0,00
<b>Total</b>	<b>282,70</b>	<b>260,30</b>
Ranking (Energy Class)	H	Z

Energy source	Fuel Consumption [kWh/m <sup>2</sup> ]	CO <sub>2</sub> Emissions [kg/m <sup>2</sup> ]
Electricity	37,70	37,30
Oil	150,10	39,60
Natural gas	0,00	0,00
Other fossil fuels	0,00	0,00
Solar	0,00	0,00
Biomass	0,00	0,00
Geothermal	0,00	0,00
Other RES	0,00	0,00
<b>Total</b>	<b>187,80</b>	<b>76,90</b>

Energy demand [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	20,30	13,30	7,90	2,50	0,00	0,00	0,00	0,00	0,00	0,70	7,70	16,50	69,00
Cooling	0,00	0,00	0,00	0,00	0,00	13,90	0,00	0,00	0,00	0,00	0,00	0,00	13,90
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Final energy consumption	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	48,00	31,60	18,60	6,40	0,00	0,00	0,00	0,00	0,00	1,80	18,30	39,30	164,00
Solar Energy for Heat	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Cooling	0,00	0,00	0,00	0,00	0,00	7,90	0,00	0,00	0,00	0,00	0,00	0,00	7,90
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Lighting	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60	16,00
Energy from PVs	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
<b>Total</b>	<b>49,60</b>	<b>33,20</b>	<b>20,20</b>	<b>8,00</b>	<b>1,60</b>	<b>9,50</b>	<b>0,00</b>	<b>1,60</b>	<b>1,60</b>	<b>3,40</b>	<b>19,90</b>	<b>40,90</b>	<b>187,90</b>

Operational cost [€]
40.382,80

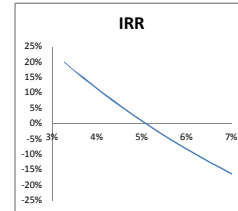
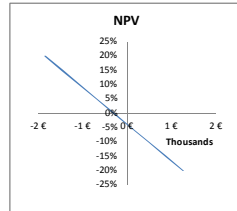
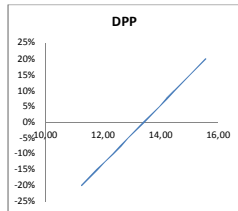
### Feasibility Study

Cash Flow	Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Initial Investment		8.184,00																					
Savings			473,72	492,67	512,38	532,87	554,19	576,35	599,41	623,38	648,32	674,25	701,22	729,27	758,44	788,78	820,33	853,14	887,27	922,76	959,67	998,06	
ESM Operating Costs			0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
<b>Operating Income</b>		<b>-8.184,00</b>	<b>473,72</b>	<b>492,67</b>	<b>512,38</b>	<b>532,87</b>	<b>554,19</b>	<b>576,35</b>	<b>599,41</b>	<b>623,38</b>	<b>648,32</b>	<b>674,25</b>	<b>701,22</b>	<b>729,27</b>	<b>758,44</b>	<b>788,78</b>	<b>820,33</b>	<b>853,14</b>	<b>887,27</b>	<b>922,76</b>	<b>959,67</b>	<b>998,06</b>	
<b>Cumulative Cash Flow</b>		<b>-8.184,00</b>	<b>-7.710,28</b>	<b>-7.217,61</b>	<b>-6.705,24</b>	<b>-6.172,37</b>	<b>-5.618,18</b>	<b>-5.041,83</b>	<b>-4.442,42</b>	<b>-3.819,04</b>	<b>-3.170,72</b>	<b>-2.496,47</b>	<b>-1.795,25</b>	<b>-1.065,98</b>	<b>-307,53</b>	<b>481,24</b>	<b>1.301,57</b>	<b>2.154,72</b>	<b>3.041,99</b>	<b>3.964,74</b>	<b>4.924,41</b>	<b>5.922,47</b>	

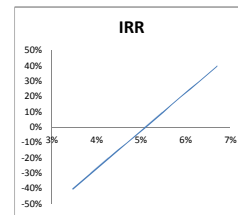
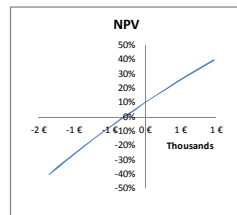
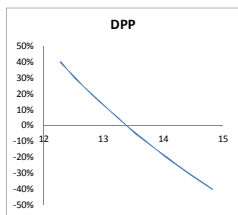
Depreciated Payback Period	13,41
NPV	-302,40 €
IRR	5,09%
SIR	1,01

### Sensitivity Analysis

Initial Cost	DPP	NPV	IRR	SIR
-20%	6547	11,25	1.249 €	8%
-15%	6956	11,79	861 €	7%
-10%	7366	12,34	473 €	6%
-5%	7775	12,87	85 €	6%
0	8184	13,41	-302 €	5%
5%	8593	13,95	-690 €	5%
10%	9002	14,48	-1.078 €	4%
15%	9412	15,02	-1.466 €	4%
20%	9821	15,56	-1.854 €	3%



Inflation R	DPP	NPV	IRR	SIR
-40%	2,40%	14,82	-1.350 €	3%
-30%	2,80%	14,43	-1.106 €	4%
-20%	3,20%	14,06	-851 €	4%
-10%	3,60%	13,71	-583 €	5%
0%	4,00%	13,39	-302 €	5%
10%	4,40%	13,09	-8 €	5%
20%	4,80%	12,80	301 €	6%
30%	5,20%	12,53	624 €	6%
40%	5,60%	12,28	964 €	7%





### Energy Efficiency

Primary energy consumption [kWh/m <sup>2</sup> ]	Building under Study	ESM Building
Heating	179,10	40,20
Cooling	24,10	15,60
Domestic Hot Water	0,00	0,00
Lighting	79,50	79,50
Renewable Energy Sources	0,00	43,70
<b>Total</b>	<b>282,70</b>	<b>91,60</b>
<b>Ranking (Energy Class)</b>	<b>H</b>	<b>B</b>

Energy source	Fuel Consumption [kWh/m <sup>2</sup> ]	CO <sub>2</sub> Emissions [kg/m <sup>2</sup> ]
Electricity	33,60	33,20
Oil	0,10	0,40
Natural gas	28,50	5,60
Other fossil fuels	0,00	0,00
Solar	27,70	0,00
Biomass	0,00	0,00
Geothermal	0,00	0,00
Other RES	0,00	0,00
<b>Total</b>	<b>62,30</b>	<b>38,80</b>

Energy demand [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	6,90	4,40	2,50	0,40	0,00	0,00	0,00	0,00	0,00	0,10	2,00	5,20	21,50
Cooling	0,00	0,00	0,00	0,00	0,00	9,50	0,00	0,00	0,00	0,00	0,00	0,00	9,50
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Final energy consumption [kWh/m <sup>2</sup> ]	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Heating	9,60	5,90	3,20	0,70	0,00	0,00	0,00	0,00	0,00	0,20	2,70	7,30	29,60
Solar Energy for Heating	2,00	2,10	2,70	3,10	3,60	3,80	3,40	3,40	2,80	2,10	1,90	2,70	27,50
Cooling	0,00	0,00	0,00	0,00	0,00	5,40	0,00	0,00	0,00	0,00	0,00	0,00	5,40
Domestic Hot Water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Lighting	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70	27,00
Energy from Pvs	0,80	0,80	1,10	1,40	1,60	1,70	0,00	0,00	1,40	1,10	0,80	0,70	11,40
<b>Total</b>	<b>12,30</b>	<b>8,70</b>	<b>5,90</b>	<b>3,40</b>	<b>2,70</b>	<b>8,10</b>	<b>0,00</b>	<b>2,70</b>	<b>2,90</b>	<b>5,40</b>	<b>10,10</b>	<b>10,10</b>	<b>62,30</b>

Operational cost [€]	10.183,20
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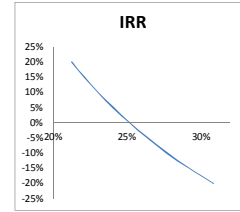
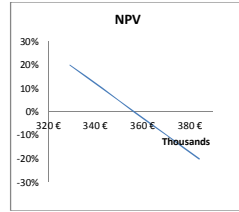
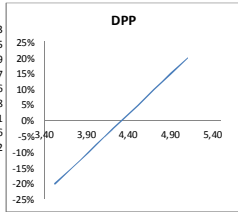
### Feasibility Study

Cash Flow	Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Initial Investment		144522,5																					
Savings			31.881,30	33.156,56	34.482,82	35.862,13	37.296,62	38.788,48	40.340,02	41.953,62	43.631,77	45.377,04	47.192,12	49.079,80	51.042,99	53.084,71	55.208,10	57.416,43	59.713,08	62.101,61	64.585,67	67.169,10	
ESM Operating Costs			520,00	540,80	562,43	584,93	608,33	632,66	657,97	684,28	711,66	740,12	769,73	800,52	832,54	865,84	900,47	936,49	973,95	1.012,91	1.053,42	1.095,56	
<b>Operating Income</b>		<b>-144.522,50</b>	<b>31.361,30</b>	<b>32.615,76</b>	<b>33.920,39</b>	<b>35.277,20</b>	<b>36.688,29</b>	<b>38.155,82</b>	<b>39.682,05</b>	<b>41.269,34</b>	<b>42.920,11</b>	<b>44.636,91</b>	<b>46.422,39</b>	<b>48.279,29</b>	<b>50.210,46</b>	<b>52.218,88</b>	<b>54.307,63</b>	<b>56.479,94</b>	<b>58.739,13</b>	<b>61.088,70</b>	<b>63.532,25</b>	<b>66.073,54</b>	
<b>Cumulative Cash Flows</b>		<b>-144.522,50</b>	<b>-113.161,20</b>	<b>-80.545,44</b>	<b>-46.625,05</b>	<b>-13.347,85</b>	<b>25.340,44</b>	<b>63.496,26</b>	<b>103.178,31</b>	<b>144.447,65</b>	<b>187.367,76</b>	<b>232.004,68</b>	<b>278.427,07</b>	<b>326.706,35</b>	<b>376.916,81</b>	<b>429.135,69</b>	<b>483.443,32</b>	<b>539.923,26</b>	<b>598.662,39</b>	<b>659.751,09</b>	<b>723.283,34</b>	<b>789.356,87</b>	

Depreciated Payback Period	4,31
NPV	356.545,90 €
IRR	25,17%
SIR	3,86

### Sensitivity Analysis

Initial Cost	DPP	NPV	IRR	SIR
-20%	115618	3,52	383.944 €	31%
-15%	122844	3,72	377.094 €	29%
-10%	130070	3,92	370.245 €	28%
-5%	137296	4,11	363.395 €	26%
0	144523	4,31	356.546 €	25%
5%	151749	4,51	349.697 €	24%
10%	158975	4,70	342.847 €	23%
15%	166201	4,90	335.998 €	22%
20%	173427	5,10	329.148 €	21%



Inflation Rate	DPP	NPV	IRR	SIR
-40%	2,40%	4,49	287.182 €	23%
-30%	2,80%	4,44	303.321 €	24%
-20%	3,20%	4,39	320.233 €	24%
-10%	3,60%	4,35	337.961 €	25%
0%	4,00%	4,31	356.546 €	25%
10%	4,40%	4,27	376.033 €	26%
20%	4,80%	4,23	396.471 €	26%
30%	5,20%	4,19	417.907 €	27%
40%	5,60%	4,15	440.396 €	27%

