

Analysis of lost energy, looking for efficient buildings

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1. Introduction – Spain can fail to accomplish with European directives [1] [2] that state that every new building must be nearly zero energy emission. These legal requirements will be extended to all new buildings from 2020 on in an attempt to reduce their energy consumption when studying losses linked to energy transportation.

2. Results and Discussion – As stated in application “Mi Luz”, the mean energy prize for a 2 A invoice was 0.183 €/kWh. In this work a single-phase individual line, embedded under tube and included in a 9.2 kW mean power electric installation is analyzed. The technical section of this installation (6 mm²) should have a load factor of 69.44%. Savings related to overall costs throughout the line’s entire lifetime and energy savings are shown in Table I, where other higher technical sections have been analyzed, including the economic one (69.31 mm², as stated in UNE 21144, which could approximate to normalized 70 to 95 mm²).

Section (mm ²)	CI (€/m)	CJ (€/year·m)	CJ useful life (€/m)	CT useful life (€/m)	Savings useful life (%)	Lost energy (kWh/m)	Energy savings (%)	Losses (%/m)	Load factor (%)
6	3.62	14.27	310.72	314.34	0.00	94.82	0.00	0.118	69.444
10	5.12	8.16	177.64	182.76	41.86	54.21	42.83	0.067	52.083
16	7.52	4.96	108.13	115.65	63.21	33.00	65.20	0.041	40.000
25	11.50	3.13	68.16	79.66	74.66	20.80	78.06	0.026	31.250
35	15.27	2.22	48.35	63.62	79.76	14.75	84.44	0.018	26.316
50	21.38	1.55	33.66	55.04	82.49	10.27	89.17	0.013	21.739
70	30.15	1.10	23.95	54.10	82.79	7.31	92.29	0.009	17.857
95	39.17	0.81	17.61	56.78	81.94	5.37	94.33	0.007	14.925
120	49.76	0.64	13.92	63.68	79.74	4.25	95.52	0.005	13.158

3. Conclusions – Only by using a 16 mm² section line, two normalized section over the technical one for this case, economical savings throughout the useful life are higher than 63%, with energy saving of 65% and a loss that will change from 0.12 % to around 0.04 % per meter of line because of a reduction of almost 30 points in the load factor. This improvement has been achieved without using the “most” economical section stated in UNE 21144, which could generate unexpected problems during the project implementation caused by its value.

4. References

[1] Directive (UE) 2018/844 of the European Parliament and Council of May 30 2018 which modifies Directive 2010/31/UE regarding energy efficiency of buildings and Directive 2012/27/UE related to energy efficiency. DOUE L 156/75 OF 19.06.2018.

[2] Recommendation (UE) 2016/1318 of the Council of July 29 2016 regarding directives to promote nearly zero energy buildings and improvements to ensure that by the end of 2020 every new building must be nearly zero energy. DOUE L 208/46 of 02.08.2016.