

- [11] European Committee for Standardization (CEN) EN ISO 13790 (2008). Energy performance of buildings. Calculation of energy use for space heating and cooling.
- [12] Commission Recommendation (EU) 2016/1318 of 29 July 2016 on guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings, Official Journal of the European Union, 2.8.2016
- [13] www.CTI2000.it
- [14] Magrini A, Lazzari S, Marengo L. (2017). Energy retrofitting of buildings and hygrothermal performance of building components: Application of the assessment methodology to a case study of social housing. International Journal of Heat and Technology 35(1): S205-S213.
- [15] Decree of the Ministry of Economic Development (2015). Applicazione delle metodologie di calcolo delle prestazioni energetiche e definizione delle prescrizioni e dei requisiti minimi degli edifici (Application of the energy performance calculation methodologies and definition of dispositions and minimum requirements for buildings). OJ of the Italian Republic; 15 July 2015 (in Italian).
- [16] Italian Organisation for Standardisation (UNI). UNI/TS 11300 (series). Energy performance of buildings; 2010-2016 (in Italian).
- [17] Magrini A, Lazzari S, Marengo L, Guazzi G. (2017). A procedure to evaluate the most suitable integrated solutions for increasing energy performance of the building's envelope, avoiding moisture problems. International Journal of Heat and Technology 35(4): 689-699.
- [18] Italian National Decree D.P.R. 412/1993, Regolamento recante norme per la progettazione, l'installazione, l'esercizio e la manutenzione degli impianti termici degli edifici ai fini del contenimento dei consumi di energia, in attuazione dell'art.4, comma 4, della legge 09.01.1991, n.10 (Regulations for the design, installation, operation and maintenance of heating systems in buildings in order to limit energy consumption, implementing article 4, paragraph 4, of Law 09.01.1991, n. 10).
- [19] European Committee for Standardization (CEN). EN-15459 (2017). Energy performance of buildings - Economic evaluation procedure for energy systems in buildings.
- [20] Listino prezzi per l'esecuzione di opera pubbliche e manutenzioni del Comune di Milano, edizione 2017, volume 1.1 Opere compiute civili ed urbanizzazioni e 1.2 Opere compiute impianti elettrici e meccanici (Price list for the execution of public works and maintenances of the City of Milan).
- [21] <https://data.worldbank.org/indicator/>, 2016 update for Italy data
- [22] <http://it.inflation.eu/tassi-di-inflazione/italia/inflazione-storica/cpi-inflazione-italia-2018.aspx>

NOMENCLATURE

$CO_{a(i)}(j)$	annual cost for component or service j for year i.
$CO_{fin(t_{LS})}(j)$	disposal cost for decommissioning, deconstruction and disposal in last year of lifecycle of component j
CO_{INIT}	initial investment costs
$D_f(i)$	discount factor for year i
R	irradiation, MJ.m ⁻² .day ⁻¹
$RAT_{xx(i)}(j)$	price development for year i for component or service j
T	Temperature, °C
U	thermal transmittance, W m ⁻² K ⁻¹
$VAL_{fin(t_{rc})}$	residual value for component j at the end of the calculation period

Greek symbols

ΔR	irradiation difference, MJ.m ⁻² .day ⁻¹
ΔT	temperature difference, °C
δ	vapour permeability, kg.m ⁻¹ .s ⁻¹ .Pa ⁻¹
λ	thermal conductivity, W.m ⁻¹ .K ⁻¹
ρ	density, kg.m ⁻³

Subscripts

w	window
---	--------