



the floor

## Doragno Castle - Rovio, Ticino, Switzerland

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Classical central ventilation with ducts integrated in

### HVAC

#### *What is the solution?*

A centralized system with heat recovery has been created, with a local distribution by local. All the parts are under the floor, taking advantage of the major works carried out and the execution of an internal insulation. An electric reversible air-water heat pump powered by the photovoltaic (PV) system on the roof is used for thermal and air conditioning. Distribution is made both from radiating floors and fans bellow a raised floor (Floortech patent, deltaZERO concept), dry laid and demountable giving flexibility. DHW thanks solar thermal becomes completely free and renewable.

#### *Why does the solution work?*

The building has undergone many interventions, for example to remove false and non-original parts that distorted the construction, for this reason the interventions have been carried out without particular difficulties if not the usual problems of breches and cores for the passage of the pipes. In particular, since there were no protection constraints, the interventions were aimed at enhancing the character of the building in its context. The air quality with these appliances is excellent despite reducing internal humidity. Energy efficiency for heat recovery reaches 92%. The solution is typical for refurbishment: the system starts from the basement, with horizontal ducts, the risers are inserted in the outside walls and then floor distribution boxes whit horizontal pipes.

#### *Description of the context:*

The project aims to restore the soul of the castle, by demolishing the works made in the 20th century and using new glazed surfaces with a completely new

concept for thermal and air conditioning achieving high standards for comfort and energy efficiency. An ancient medieval castle was converted into a private residence in 2014 where the existing building, which did not enhance the castle, has been subsequently restored in 2018. It was a part of a path bordered by fortified castles and watchtowers built at regular intervals on the way to the Alps. This private residence building, a historic not-listed building in Ticino, achieved a NZEB target using also solar renewables energy.

*Pros and cons of the solution:*

A work like this can be achieved at an existing building without particular difficulties or price supplements, only thanks to the fact that radical and costly interventions have been carried out.

*Type of data available (level of information, simulation):*

Several information is published regarding this project and is available in the in the architect's web page and projects documentation, DeltaZero SA:

<https://www.deltazero.net/en/what-2/6-icon-projects/doragno-castle/> Maria Mazza & Stefano De Angelis Effrem, deltaZERO Architettura, Il Castello di Doragno, Restauro e sostenibilità energetica, Archi magazine, Rivista svizzera di architettura, ingegneria e urbanistica. August 004, 2020. Pages: 26-29. Publisher: espazium. ISSN 1422-5417, [https://www.espazium.ch/it/archi4-20\\_castello](https://www.espazium.ch/it/archi4-20_castello) Solar web platform [www.solarchitecture.ch](http://www.solarchitecture.ch): <https://solarchitecture.ch/in-a-nutshell-doragno-castle/>

*Additional information about the solution:*

In the "related publication"; basement plan, ventilation appliance and pictures [https://www.hiberatlas.com/smarteredit/projects/28/Ventilazione - FR\\_HR-MURAL\\_800\\_1.pdf](https://www.hiberatlas.com/smarteredit/projects/28/Ventilazione-FR_HR-MURAL_800_1.pdf) Ventilation system [https://www.hiberatlas.com/smarteredit/projects/28/800.506a A3 ventilazione 1\\_100.pdf](https://www.hiberatlas.com/smarteredit/projects/28/800.506a_A3_ventilazione_1_100.pdf) Ventilation plans

*Are there any related publications or pictures of the solution?*



Ventilation system © L. Carugo



Ventilation pipes in the floor © L. Carugo



Distribution in the floor © L. Carugo

[https://www.hiberatlas.com/smartedit/projects/28/Ventilazione - FR\\_HR-MURAL 800\\_1.pdf](https://www.hiberatlas.com/smartedit/projects/28/Ventilazione - FR_HR-MURAL 800_1.pdf)  
Ventilation system

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Ventilation plans