Estia

Our technical expertise makes your projects a sustainable reality



Profile / Areas of Activity





Estia is a spin-off company of the Laboratory of Solar Energy and Building Physics (LESO-PB/EPFL), founded in 1998 in the Innovation Park of the Swiss Federal Institute of Technology in Lausanne.

The team is composed of highly qualified engineers and architects with extensive experience.

The company has close links with EPFL and its vocation is to promote innovation and the implementation of sustainable development principles in the built environment.

Estia provides independent consultancy services, favouring a global approach to the issues addressed.









ACTIVITIES

Building physics expertise

- In situ measurements,
- Data analysis,
- Verification of conformity,
- Recommendations.

Support of construction projects

- Design assistance from the preliminary project (new or renovation),
- Optimization of comfort and energy aspects,
- Minergie/Minergie-P certifications, Certivéa, etc.
- Performance monitoring.

Building diagnostics / Property management

- Diagnosis of buildings,
- Intervention scenarios,
- Cost of works,
- Maintenance and investment planning.

Environmental analysis of transportation

- Mobility,
- Flow analysis,
- Environmental impacts, life cycle assessments.

Research & Development

- •Training,
- •Software development,
- Research projects.

Summer Comfort

Our approach combines an appropriate sizing of the openings, a good management of the solar gains, and the activation of the thermal inertia of the buildings. This approach is often complemented by the implementation of simple and robust automation systems to optimize the passive cooling potential of the building.



Estia's teams have developed in-house specific simulation tools allowing us to systematically propose detailed parametric studies. (Estia-g software "DIAL+Cooling", "DIAL+Ventilation").



DIAL+ Thermal simulation module.



FIPOI Building, Geneva, Arch. Group8



International School of Geneva, arch. CCHE



City Hall Nicosie, Irwin Kritioti arch.



UN-HCR, Geneva

Simulation and optimization of summer comfort with DIAL+

The numerical simulation work allows to bring detailed answers to the design teams on the choice of solar protections, the thermal inertia of the construction as well as the strategy and the dimensioning of the natural ventilation. The **DIAL+** simulation tool, developed and distributed by Estia, allows the thermal behavior of the building to be simulated in the early design phases and thus optimize the performance of the project.

Sizing of double-skin façades

This double-skin façade integrates glasses with various optical properties. To guarantee summer comfort in the offices, the thermal behavior of the façade was modeled taking into account the type of solar protection, the characteristics of the glasses and the materials of the interior façade.

The Estia-g tool, based on the work of LESO-EPFL, was used to model and dimension this façade.

Summer comfort in school buildings

For the construction of this new school, the ventilation openings, the thermal inertia of the interior materials and the choice of solar protection were carefully studied.

One opening per classroom is automated for passive cooling and the blinds are equipped with a robust and non-intrusive algorithm for the user. This automation concept was defined and commissioned by Estia.

Almost Zero-energy buildings for southern climates

In hot climates, ensuring summer comfort without air conditioning is a real challenge. This challenge was met for the new Nicosia City Hall inaugurated in 2013. The design of the envelope and the technical installations were studied by Estia.

This building is one of the first labelled exemplary energy building of Cyprus.

Optimization of summer comfort in atrium spaces

This building, which houses one of Geneva's international organizations, has a large atrium and the top floors were subject to recurring problems of overheating. Our contribution consisted in optimizing the natural ventilation controls according to the season and advising the client on envelope modifications (windows, solar protections).



Natural Ventilation

As an extension of the research work done at EPFL, Estia has continued to develop specific expertise in the field of natural ventilation. In each project, the potential for passive cooling through openings is explored in detail (sizing, design and positioning of openings, automation, etc.). The experience accumulated by the team is used to guarantee the summer comfort of occupants, including in Mediterranean climates, and is reflected in the development and maintenance of dedicated simulation tools.

Design of a specialized tool

Estia has taken up and extended the developments undertaken at LESO-PB in the 90's (Leso-COOL project) in order to complete the DIAL+ software suite. The result is a new module dedicated to natural ventilation which allows to calculate the position of the neutral level as well as the airflow rates through the openings, according to the temperature difference between the inside and the outside.

Natural ventilation of large volumes

In this project, the natural ventilation system is perfectly integrated into the facade, which leaves a great deal of freedom for architectural expression. It allows, depending on the circumstances, to evacuate the solar gains directly or to ensure the cooling thanks to the night ventilation. The chosen solution, which does not include any specific duct or ventilation grid, respects the delicacy and elegance of the building.

Valuation of the chimney effect

This project valorizes the circulations as a large air extraction volume. Automated openings guarantee the entry of air into the consultation rooms, the transfer to the atrium in the rear part, and then the extraction in the upper part. The thermal mass of the slabs allows to store the coolness during the night. Thanks to this design, the interior temperature remains limited to between 25 and 27°C, even in hot weather.

Passive cooling

The façade of this building, which houses industrial and administrative premises, was designed to integrate specific openings dedicated to night-time ventilation. Perfectly sheltered from the weather and offering effective protection against break-ins, they activate the thermal mass of the slabs and guarantee the summer comfort of the occupants.

Hybrid Ventilation of a conference room

In this project the air can take two distinct paths, through the ventilation ducts, or by passing under the massive structure of the building, before being diffused under the bleachers of the boardroom. The mechanical ventilation and heating/cooling system operates only during adverse weather conditions. The system favors natural air movement, drastically reducing energy requirements for ventilation and air conditioning.



DIAL+ software : « Ventilation" module



Sport Hall of Borex-Crassier, Arch. Graeme Mann, Patricia Capua Mann



Grangettes medical center, Arch. Dunant



Watchmacking Agenhor, Arch. BCR architectes



City Hall Nicosie (Chypre), Arch. Irwin Kritioti

Thermal performance

We strive to reduce the energy demand of buildings while respecting the architectural design of the project. Our approach is based on the search for a balance between the form factor, the composition of the envelope, the glazed surfaces, the insulated surfaces and the technical details allowing the elimination of thermal bridges. Each of our decisions is supported by simulations or calculations allowing us to objectively compare the potential of the different variants considered.





Foyer Sècheron, Geneva, Arch. BFIK



Gymnase d'Yverdon, Arch. CCHE



Nespresso, Lausanne, Arch. CCHE



Swisspor, Châtel St Denis, Arch. Cadosh



Ecole de Florimont, City of Lausanne

Minergie-P label

For this first Minergie-P building in the city of Geneva, the thermal envelope has been taken care of in the smallest details: ventilated facade with sub-construction equipped with thermal consoles, glazed fraction adapted according to the orientation, efficient insulating materials, systematic optimization of thermal bridges. At each stage of the construction, the constructive modifications were validated. The air tightness test (Blowerdoor) was carried out on the entire volume.

Technical / envelope adequacy

The renovation of the envelope has allowed to simultaneously improve the winter comfort, the summer comfort and the energy performance of the building. Thanks, in particular, to the automation of the blinds and the control of the ventilation openings, the actual consumption of the building, which is naturally ventilated and cooled, corresponds to the requirements of Minergie-P.

Optimization of smooth facades

The facade developed for the "Grand Rive parc" project in the Vidy district of Lausanne makes it possible to achieve a high thermal quality in winter while integrating an efficient solar protection and offering a large coverage in natural light. The desired architectural aspect, i.e., a smooth, non-opening façade, has been respected. The lake water is used for heating and cooling the building.

Synergy building / use

The production area as well as the administrative part are heated by the heat rejection of the manufacturing processes. Due to the size of the building and the effect of the terrain, it was possible to not insulate the floor against the ground in the industrial area. The ventilated facade is insulated with the products of the factory and the cooling of the hall is realized by natural ventilation openings.

Thermal improvement of historical buildings

This building, classified in note 3 in the inventory of the Heritage of the Canton of Vaud, was the subject of an energy efficient renovation respecting its architectural character. The detailed energy diagnosis allowed to establish an objective basis for discussion with the services of monuments and site. Roof, floors, windows and facades were insulated and a hybrid ventilation concept was implemented.



Building Physics Expertises

When faced with a problem or a physical disorder, Estia's approach consists of making an extensive diagnosis using a range of sometimes sophisticated instruments (thermographic camera, temperature and humidity probes, CO2 detectors, Blower-Door, fish-eye lenses, luminance meter, reflectometer, light meter, etc.). The collected information is completed by the analysis of construction details and is also validated by numerical simulation. Our proximity with the LESO-PB allows us to use the EPFL equipment when necessary (artificial sky, heliodon).

Thermal, hygrothermal, moisture damage

- Calculation of thermal bridges,
- Evaluation of the risks of condensation / mold,
- Thermographies,
- Temperature and humidity monitoring.

Thermal balances, energy renovation

- Thermal balance SIA 380/1
- Energy diagnosis of buildings,
- Diagnosis of technical installations (EPIQR+).

Summer comfort, overheating, indoor climate

- Temperature measurements,
- Dynamic simulations,
- Optimization of ventilation and solar protection,
- Shading studies (fish-eye).

Lighting

- In-situ measurements,
- Visual comfort diagnosis
- Studies on models / artificial sky,
- Daylight Factor and Daylight Autonomy calculations.

Natural ventilation, indoor environment quality

- Blower-door tests: air permeability of the construction,
- Air quality measurements (CO₂),
- Sizing of openings,
- Strategies for opening windows.









Diagnosis /Real-Estate management

Resulting from a research project financed by the Swiss Technology and Innovation Commission (CTI), the EPIQR+ diagnostic method allows a systematic approach to the state of deterioration of buildings (housing, administrative buildings, hospitals, schools, shopping centers, etc.). Estia, which is one of the key players in this project, has been able to diagnose several hundred buildings since the launch of EPIQR+ in 2003. When the assessments are performed on a group of buildings, this allows the building manager to have an overall view and facilitates the planning of renovation works.















CPK - Swatch Group Pension Fund

Multi-year investment plan for the real estate portfolio (180 buildings).

Banque Cantonale Vaudoise

Diagnosis of the real estate, establishment of the value, planning of investments and maintenance (27 buildings).

Geneva Airport

Evaluation of the value of the real estate assets. Establishment of a multi-year investment plan.

City of Lausanne

EPIQR and INVESTIMMO analyses for the Department of Culture, Housing and Heritage (77 buildings).

Migros Vaud

Energy analysis of buildings and optimization of the operation of technical installations. Establishment of costs and prioritization of works (121'000 m²).

Manor

Diagnosis of buildings and technical installations. Costs and prioritization of works.

City of Vevey

Evaluation of development scenarios for the Place du Marché.

Geneva University Hospitals

Evaluation of the value of the real estate assets. Investment planning (asset value: 1 billion CHF, planned investment: 255 million CHF).

Pension Fund for Hospital Personnel (CEH)

Elaboration of an energy strategy within the framework of a multi-year renovation investment plan (84 buildings, planned investment: 3 million CHF/year).

GEP

Accompaniment of the company in the elaboration of a multiannual plan of investment in renovation with the Investimmo method. (120 buildings).

State of Vaud

Elaboration of a guideline to put the canton's real estate on the path to a 2000 Watt society in 2050 (700,000 m²).

Popular pensions

Multi-year investment plan to finance renovation work through the Swiss tax on CO2 emissions (450 residential buildings, annual investment amount: 10 MCHF).

Transport Environnemental Analysis

Estia is a pioneer in transportation environmental analysis. The Estia-VIA method allows for the analysis of climate change impacts, effects on human health and ecosystems, resource consumption and noise emissions in a single run. Based partly on Ecoinvent[®] data, this original method has enabled Estia to play a leading role in Europe in the assessment of all environmental impacts associated with travel.

Nestlé-Waters: Environmental assessment of transport flows in the France-Belgium area.

UN International Agency: Study and monitoring of staff mobility.

Leshop.ch: Creation and management of an ecological account for the site's customers.

FEVAD: Environmental assessment of Internet purchases compared to physical purchases.

Sita-Suez : Environmental study of transport by barge.

Houra: Creation of an ecological account for the site's customers.

Semapa Paris Rive gauche : Environmental study of transport by barge.

Ports of Lille: Calculation of environmental benefits related to the barge transport activity.

Schneider Electric: Environmental assessment of railway scales in the European zone

Telemarket: Calculation of the "environmental benefits" linked to the home delivery logistics model.

Auchandirect: Calculation of the "environmental benefits" of the home delivery logistics model.

Nestlé Waters: Marco Polo project: transfer to rail of the transport flows of Vittel and Contrex waters to Germany.

Danone Eaux : Marco Polo project to transfer flows from road to rail between France and Germany.

Nestlé Europe : Estia-VIA analysis, environmental assessment of "cross border Europe" flows.

Holcim France : Environmental analysis of the French logistics schemes (supplies / deliveries).

Michelin : Environmental assessment of the implementation of a storage infrastructure in the Europe zone.

Arc International: Environmental assessment of the supply of the site by river.

Delta3: Calculation of the environmental benefits linked to the multimodal transport activity.















Research & Development

The founding members of Estia have all completed their PhD doctoral theses at the Laboratory of Solar Energy and Building Physics (LESO-PB / EPFL). In a literal sense, research is the key element of their meeting. Since its creation, the company has positioned itself as a link between laboratories and practice. This vocation, which is still very much alive, is in a way the trademark of Estia. This particularity is concretized in the development of methods and software tools commercialized, maintained and diffused by the company.





InvestImmo













SOFTWARE

DIAL+: Optimization of the energy performance of premises •Dayligthing,

- •Heat needs / Summer overheating / Natural ventilation.
- **EPIQR+:** Diagnosis of the physical and energetic condition of existing buildings. Elaboration of renovation scenarios
 - •List of works,
 - Costs of refurbishment,
 - Energy saving potential.
- **INVESTIMMO :** Strategic analysis of real estate assets
- •Determination of value,
- Investment needs,
- Priorities for intervention.

TRAINING

- Swiss Federal Institute of Technology Lausanne Teaching unit Space & Light
- fe3 course
- Training course for professionals in French-speaking Switzerland (thermal, ventilation and lighting).
- INVESTIMMO course: Real estate management.
- EPIQR+ course: Training of more than 500 engineers and architects on the method.
- Environmental Quality of Buildings training (France)

RESEARCH PROLECTS IN PROGRESS

- **RECO2ST: Re**sidential **Re**trofit assessment platform and demonstrations for near zero energy and **CO2** emissions with optimum co**ST**, health, comfort and environmental quality. <u>https://reco2st.eu/</u>
- E-DYCE: Energy flexible DYnamic building CErtification) <u>https://edyce.eu/</u>
- **PRELUDE:** Prescient building Operation utilizing Real Time data for Energy Dynamic Optimization <u>https://prelude-project.eu/</u>



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the Swiss way towards sustainable buildings

