# About Us



It is possible to produce buildings with less energy demand with the received service provided by Ekomim Ecological Architectural Services without extra initial investment cost.

## Company Profile

The academic company “Ekomim Ecological Architectural Services, Prof. Dr. Zerrin Yılmaz and Y. Mim Oğuz Bayazıt” that established by Prof. Dr. Zerrin Yılmaz and M.Sc. Architect Oğuz Bayazıt is in service in ITU Arı Teknokent. Within the scope of ecological building design and implementation, “Ekomim”;

- Ecological architecture pre and post design consultancy services,
- Energy and cost efficient building design consultancy,
- Development of optimization scenarios,
- Feasibility studies within the scope of green building certification,
- Development of carbon emission reduction strategies,
- Thermal, visual, acoustical comfort analysis,
- Building energy performance assessment,
- Integration of renewable energy sources,
- Whole building energy simulations within the scope of green building certification,
- Determination of the amount of primary energy consumption,
- Determination of the amount of $CO_2$ emissions,
- Determination of the amount of % improvement by using reference building that specified according to the EU, US or national standards:
    - Detailed energy modeling with a combination of passive systems and mechanical systems,
    - Acoustic architectural design and detailed acoustic modeling,
    - Measuring and simulations of room acoustic and noise control,
    - Daylight modeling,
    - Material selection, etc.

performs services about all building physics issues within the scope of energy-ecology with the most competent experts in Turkey.

## Our Mission

In the process of legal regulations and sanctions process of Turkey’s EU membership process, to serve to the related sector, to make research projects and to develope account models in case of need within the scope of energy efficient and comfortable building design, access of renewable

energy technologies in buildings, determination and optimization of energy performance of buildings by energy modeling.

In addition, to make R & D and application projects in the ecological architecture field to reach the solutions that have reduced $CO_2$ emissions and source usage for the construction and usage of buildings in Turkey as a country that has signed Kyoto Protocol.

In this way, it is to lower down our nationwide energy consumption to the minimum level without swerving from our life comfort by providing efficient use of energy in buildings.

### Our Vision

In accordance with its determined mission, within the first five years ahead, to be used in the relevant regulations it is to improve building energy performance national account model, to update the model continuously in case of need depending on the application problems and new standards, to improve national reference building models that will form the basis of the determination of building energy performance certificate, and to improve building prototypes in accordance with energy efficient design principles.

Both in the field of energy and comfort in order to increase the awareness in Turkey about Building Performance Modeling and Simulation as an integral part of building design, BinSimDer (Bina Performansı Modelleme ve Simulasyonları Derneği) as Turkish version of IBPSA (International Building Performance Simulation Association) has been established by Ekomim employees and BinSimDer association will serve education and information studies in this field.

http://www.binsimder.org.tr/

### Customer Groups

Groups to be served; architectural offices, engineering firms, contractor firms, building material manufacturers, and end-users.

## Fields of Activity

- Energy Efficiency in Buildings
- Building Integrated Renewable Energy Systems
- Energy Certification/Energy Performance Certificate
- Building Energy Modeling and Simulation
- Eco-Building
- R & D Projects
- Architectural Acoustic Design and Consultancy Services

## Energy Efficiency in Buildings

**Energy efficient building design and application:**

- Architectural and engineering services that are related to building design and application which provide thermal, visual, and acoustical comfort of users in maximum level by a natural way and allow minimum energy consumption.

**Consultancy about energy efficient building design:**

- Constant consultancy services from the first stage of design decisions until the end of construction in order to obtain energy efficient buildings.
- Consultancy service for the determination of the roadmap to achieve energy efficient design scenario.

**Consultancy about energy efficient building after the building design process:**

- In the buildings with completed preliminary design, service for determination of the post-design condition by detailed building performance simulation tools.
- Consulting services for improving the designated building energy performance level.

**Consultancy about energy efficient improvement for existing buildings:**

- Consulting services for the determination of energy performance level of existing buildings and development of design scenarios in order to improve these levels.
- Services for proposing solutions in order to achieve the most effective improving method by testing the scenarios with simulation tools.

## Building Integrated Renewable Energy Systems

**Consultancy in selecting the appropriate renewable energy systems (feasibility work):**

- Consulting service for the determination of the systems that can be integrated to the building in accordance with climate zone, function and requirements of the building.

**Performance evaluation with the building integrated renewable energy systems:**

- Consulting service for comparing building energy performance level in terms of energy and cost with renewable energy systems and conventional systems, and so for selection of appropriate systems.
- Services to determine the payback period.
- Services for life-cycle cost and its effects analysis.

## Energy Certification/Energy Performance Certificate

**Determination and/or improvement of the energy performance level that is documented by "Building Energy Performance Certificate":**

- Services for taking energy performance certificate and/or improving energy level of design phase buildings or existing buildings.

## Building Energy Modeling and Simulation

Building energy modeling provides to identify building's energy behavior during or prior to construction before the building is opened for use. In this way, the parts of the building that need increased efficiency in terms of energy can be easily detected.

It is possible to prevent energy waste that results from inefficient systems use, wrong material selection and wrong applications by validated detailed energy simulation tools.

Over the first situation observations, it is possible to display this time the amount of energy savings and also its monetary value through the simulation of improvements.

To represent the detailed information of the building in accordance with the original building in simulation tools will bring the results closer to reality. For this reason, Ekomim prefers to use computer tools that can picture in detail the complex geometry, function, user parameters, electrical and mechanical systems, material characteristics, climate conditions of the building.

In addition, the consultation given by Ekomim will guide to increase the score in LEED and BREEAM in the most important title energy, and also to get score for internal environmental quality/thermal comfort titles and sunlight credit.

According to all of these, Ekomim provides service to do and report necessary energy simulations;

- Determining the building energy class
- Improving building energy class
- Energy modeling appropriate to green building certificates, such as BREEAM, LEED

for design phase or existing buildings.

## Eco-Building

**Eco-building design and consultancy service:**

To design the most appropriate building and consultancy services, in terms of;

- Acoustic
- Lighting
- Energy
- Thermal, visual, auditory comfort

in accordance with the known ecological building certification systems.

These services covers;

- Analyzing comfort to ensure the optimal level for user comfort by using climate, audio, lighting data via simulation tools and certification systems and determining the appropriate comfort levels and designing buildings in accordance with these levels

- Designing ecological buildings that have maximum internal comfort level that can be provided after scoring the energy performance of buildings according to the criteria that is assessed in terms of user comfort
- Or consultancy service in these issues

services.

## R & D Projects

Executive service for R & D projects about energy and ecology fields in buildings.

## Architectural Acoustic Design and Consultancy Services

**Room acoustic studies:**

In general the purpose of acoustic design in hearing based halls is; providing the best hearing and perception for listeners, the best understanding of speech sounds (high percentage of intelligibility in all listener points), preserving the natural quality (clarity, volume, spectral features, …) of the music sounds depending on the intended use of the space. To this aim;

- The target is application of projects in terms of optimum form and material choice that provide the values which are determined by national and international standards and regulations at design stage both with the help of geometric analysis and computer-aided modeling techniques.
- For existing buildings, after existing conditions are determined by acoustic measurements, improvement recommendations are developed to provide benchmark values.

**Noise control studies:**

As it is known the first principle to provide auditory comfort is; to provide sufficient protection and prevention to all kinds of sounds that can enter from outside, other internal spaces, and inside of the space itself and will affect listening, perception and concentration of users. Today the increasing population of cities causes the expansion of industrial areas and leads to an increase in the noise level created by the means of transportation. Changing and developing construction techniques in buildings leads to widespread use of lightweight building components and this condition causes to solve noise problem during design stage as a priority issue. To this aim;

- Proposed solutions services provided to determine sound insulation level of facades and to improve it in case of need.
- Acoustic measurement and analysis services include making measurements in laboratory conditions for both determining existing noise levels affecting the building and product development.
- Air conditioning systems creates the mechanical system noise problems that affect the building and its environment. In various units located inside and outside of the building; to prevent the noise problem derived from very high level air based sounds, structure based sounds, and mechanical vibration based sounds; services are provided as wall insulation and vibration insulation of power stations, sound absorber plenum chambers and the other

structural preventions in mechanical center for improving methods to reduce the noise problem, implementation and application control of these systems.

- According to the Control and Evaluation of Environmental Noise Regulation, if necessary; noise mapping and barrier preparation, evaluation of barrier performances by accounts or measurements services are provided.

# References

- BEP-tr
- Citynet Project
- Balparmak Ula Beekeeping and Bee Products Education, Support, Research and Promotion Center
- VEFA Prefabricated Buildings “0” Carbon House Prototype Project
- Prefabricated Construction Inc. Eco Container Project Modeling
- Akşan Construction – 35. Street Housing Project
- Redevco Turkey – Magnesia Shopping Mall
- Divan Istanbul Hotel Project Acoustic Services
- Libya Al-Tahadi University Economy Building Acoustic Project
- Istanbul Technical University Foundation ECO-BUILDING Project
- Office Building in Ayvalık Historical Urban Pattern

**Citynet Project:**

In general, “Marie-Curie Research Network (RTN), Citynet” aims to produce tools for improving energy management of large-scale urban projects.

Joint scope of the communication network research activities is to develop web-based innovative tools for planning, management and operations with lower energy consumption and a high portion of renewable energy of urban areas in order to reduce $CO_2$ emissions by up to %30.

Citynet includes research groups of eight universities from six different EU countries. Turkey hosts the visits as an associate member country and in addition to this involving seven commercial company including public authorities.

This project will be carried out for architecture, building physics, social sciences, computer science, and economy fields as conducted for research, construction, mechanical and environmental engineering fields.

Please click here for the original location of the video in European Commission Website.

**Balparmak Ula Beekeeping and Bee Products Education, Support, Research and Promotion Center**

For “Balparmak Ula Beekeeping and Bee Products Education, Support, Research and Promotion Center” project energy modeling has been done with the principles of BREEAM – Green Building

Certificate. This energy modeling has been done with the EnergyPlus simulation tool that its validity and accuracy internationally recognized and it has fewer experts.

The data belonging to the building at the end of our study are listed below:

- Monthly/Annual heating energy demand and consumption
- Monthly/Annual cooling energy demand and consumption
- Monthly/Annual lighting energy demand and consumption
- Natural ventilation
- Internal air quality
- Thermal comfort
- Visual comfort
- Daylight calculation
- Glare control
- Emission calculation
- Energy costs calculation

**VEFA Prefabricated Buildings "0" Carbon House Prototype Project**

This project is an "Eco-house" project that is initiated and conducted by VEFA Prefabricated Buildings Industry and Trade Inc. and the company's project coordinator TechnoBee, Technology and Project Development, Management, Consulting, Training Industry Trade Ltd. Co. "Eco-house" is the development of residential type models by using lightweight steel technology that will be designed on the basis of "sustainability", "renewable energy", "ecology" concepts. Ekomim has made energy consultancy of the project.

Consultancy services are provided for the following topics by Ekomim to get closer the prototype building to its "0" energy –"0" emission target:

- During the design of prototype building in terms of orientation, form and spatial organization providing the necessary information flow to the company which is responsible for the design
- Reporting the ideas through architectural projects to be able to design an eco-building that provides maximum thermal, visual, and acoustical comfort for users and consumes minimum energy
- Co-operation with the system consultant to determine the heating, cooling, and lighting energy need of the proposed building in the application project by project group
- Co-operation with the system consultant when it is needed for renewable energy systems (PV, thermal solar collectors) that can be applied to the prototype
- Organization of information and documents for the promotion of type models

With respect to these goals studies have been done by Ekomim towards to be appropriate to "Eco-house" definition with evaluation of results through energy modeling of prototype building.

**Prefabricated Construction Inc. Eco Container Project Modeling**

Eco Container that is owned by Prefabricated Construction Inc. has been developed with recommendations by Ekomim that would increase energy efficiency of the building and has been planned to be exhibited in 2010 Buildist Building Fair. It has been targeted to actively use Eco

Container in the parking lot area next to the Prefabricated Construction Inc. Company Building and to put on market more Eco Containers for real users after the necessary energy efficiency improvement studies by testing for different climatic zones.

Building construction materials and details are proposed by Prefabricated Construction Inc. Ekomim has done energy analysis of this project by Energy Plus simulation tool and has compared the results with the results of reference building that is described in National Building Energy Performance Calculation Method and therefore energy level of Eco Container project has been determined. Analysis has been made with Energy Plus simulation tool by Ekomim are;

- The results of design phase decisions
- Analysis of the optimum insulation thickness
- Night insulation, solar control, and Low-e glass analysis for transparent components
- Tromb wall analysis
- Analysis for the existence of windshield in front of the entrance door
- Analysis for the existence of windshield/greenhouse in front of the entrance door
- Analysis for the existence of windshield/greenhouse in front of the entrance door and existence of solar control during summer
- In addition to the analysis for the existence of windshield/greenhouse in front of the entrance door and existence of solar control during summer, analysis for the existence of 100x20 cm ventilation outlet on North façade

According to these analysis through comparisons with the reference building in terms of annual heating and cooling energy demands per $m^2$, it is determined that the energy level of Eco Container Project is “A” both for heating and cooling energy. When all of these needs of the building are met with renewable energy technologies, greenhouse gas emissions of the building will be “0” and in this respect Container will be referred as “0” Carbon Container.

**AKŞAN CONSTRUCTION – 35. STREET HOUSING PROJECT**

35. Street Project is a housing project in Izmir, Turkey implemented by Akşan Surveying Consulting and Engineering Inc. Energy and daylight modeling, renewable energy feasibility studies, and acoustical sound insulation evaluations has been done by Ekomim based on the principles of BREEAM Green Building Certification. In this project;

- Monthly/Annual heating energy demand and consumption
- Monthly/Annual cooling energy demand and consumption
- Monthly/Annual lighting energy demand and consumption
- Daylight calculation
- Sound insulation performances of building components
- Renewable energy systems/Heat pump – Solar collector
- Zero/Low-carbon technologies feasibility report
- Emission calculation

evaluations have been done.

**REDEVCO TURKEY – MAGNESIA SHOPPING MALL**

Magnesia Shopping Mall Project has 17.000 $m^2$ rentable area and Ekomim has been worked for the evaluation of energy modeling credits in the BREEAM Green Building Certification process of this project. Simulations, analysis and evaluations regarding the flowing topics has been done with our expert team of employees;

- Monthly/Annual heating energy demand and consumption
- Monthly/Annual cooling energy demand and consumption
- Monthly/Annual lighting energy demand and consumption
- Daylight calculation
- Thermal comfort evaluation
- Sound insulation performances of building components
- Noise control inside and outside of the building
- Zero/Low-carbon technologies feasibility report
- Emission calculation

**DIVAN ISTANBUL HOTEL PROJECT ACOUSTIC SERVICES**

Divan Istanbul Hotel Project is the evaluation of architectural projects in terms of acoustic comfort and as a basis to architectural projects to prepare type and application details with necessary solutions.

Hotel buildings are facilities that provide accommodation which is due to the features such as technical hardware, comfort, and maintenance conditions and in accordance with their class in a certain defined level of comfort. Although there are different classes for hotel buildings, acoustic comfort conditions and requirements for the actions that take place inside of the building such as sleeping, resting are specified with standards and regulations and these do not consider any class distinction.

In this study, following a detailed examination of the project first of all, the determination of the criteria and limits have been studied in terms of sound insulation and room acoustics based on the approval of the architectural project team and the project management group. Acoustic services that carried out for proposing solution alternatives and detection of the necessary options based on these studies are divided into three groups:

- Estimation of environmental noise and control of façade sound insulation
- Insulation of vibration and noise spreading from mechanical centers
- Room acoustics studies

**LIBYA AL-TAHADI UNIVERSITY ECONOMY BUILDING ACOUSTIC PROJECT**

This project is a matter of evaluation of Libya Al-Tahadi University Economy Building architectural projects in terms of acoustics and preparation of type and application details that would be the base of the architectural projects.

In this study, following a detailed examination of the project first of all, the determination of the criteria and limits have been studied in terms of sound insulation and room acoustics based on the

approval of the architectural project team and the administration. Acoustic services that carried out for proposing solution alternatives and detection of the necessary options based on these studies are divided into two groups:

- Room acoustics examinations: Studies to ensure the best conditions for hearing for the congress and concert halls, and classrooms.
- Sound insulation studies: Studies for the control of undesired noises in the building

**ISTANBUL TECHNICAL UNIVERSITY FOUNDATION ECO-BUILDING PROJECT**

Architectural project is developed by Has Architecture and it locates in ITU Ayazaga Campus. Energy modeling sponsorship is undertaken by Ekomim.

**OFFICE BUILDING IN AYVALIK HISTORICAL URBAN PATTERN**

This is an office building project in the historical pattern which is designed on the basis of sustainability, renewable energy, and ecology concepts. Energy demand and consumption amounts for optimum heating, cooling, lighting, and ventilation are designated by blending the energy modeling results with building design principles.