



Deborah Schor Elyasy

Green Architecture
Interior Design

Guide to an exclusive healthy, and energy efficient house

Intended for those about to undertake renovations
or build their dream home in Israel.



Guide to an exclusive healthy, and energy efficient house

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Guide to an exclusive healthy, and energy efficient house

Introduction

Greetings, and welcome!

In this guide, I'll teach you how to turn your apartment (or house) into a home that's healthier and more economical for you and the environment.

Whether you're about to renovate or build a new home, there are lots of things you can do to make it a better place to live, healthy, and even (why not?) conserve the earth's and our precious resources, like gas, diesel, electricity, and water.

Most people think that the principles of green building are better suited to building new homes. But actually, the opposite is true.

There are lots you can do even in an existing building. It's always possible to improve the situation you're given, and in the next sections, I'll show you how.

□ In this guide, we'll go over the principles at the heart of green building, we'll learn the principles of planning a new home, and we'll see how you can improve or upgrade an existing home.

Most of my clients have already downloaded this guide and designed their homes according to these principles, and today, they're enjoying a healthier home that's more friendly to the environment.

Here's what some of my readers have said:



"Thanks to you, I'm now aware of things I never thought about before, like, for instance, taking advantage of energy and weather conditions." (Tzippy)



"We're about to renovate our home, and we read all your tips with great interest. We just wanted to say thank you for helping enlighten us." (Nissim and Aviela)

Unfortunately, most people aren't aware of what I'm about to reveal to you, and only after they finish building their homes do they notice that the house is facing in the warmest direction, and they're forced to run the air conditioner most of the day.

Sometimes, they don't put enough effort into insulating the roof, so the rooms on the upper level are too cold in the winter and too hot in the summer. Or, for instance, they've chosen windows which feel cold and damp all winter long, while heating the inside of the house up to boiling in the summer.

There are so many other examples of common mistakes that make a home uncomfortable, add to the expense, and lower the overall quality of life.

Guide to an exclusive healthy, and energy efficient house

My Story

I was first exposed to the exciting concept of green architecture while I was still a student of architecture in Italy. I realized that if we want to pass on a better world to the coming generations, we must try to conserve it as well as possible. Building houses and apartments is one of the most destructive activities imaginable, and therefore, we must invest great thought to do it in the least harmful way.

At the same time, I always dreamed of living in Israel, with the common difficulties that come with life there (lack of space, challenging climate, more than half of the country being a desert).

But... it's always possible to turn difficulties into opportunities! And beginning with my thesis project, I decided to tackle it head-on by planning a green settlement in the Negev, a design which was awarded a prize in Milan.

When I moved to Israel, I saw that the field of green building was still more uncommon than it was abroad. Today, things have changed.

The subject is beginning to enter the nation's consciousness, both on the part of building professionals and on the part of the broader public. More and more architects are learning the subject, and even the more general public is showing interest.

I set the goal for myself of sharing my knowledge and making it accessible to everyone. And of course, I do all my work according to these principles.

That's the reason I decided to write a guide that would offer answers to anyone who wanted to learn, in a clear and simple way, how to create, for themselves and their families, a healthier, more pleasant living environment, while at the same time conserving the planet and saving on the expenses of operating a home.

So come on – let's dive into the guide!



Guide to an exclusive healthy, and energy efficient house

Chapter 1: What is green building, and why are green building and renovation necessary?

Green building is a building that's friendly to people and the environment.

Green building means making less use of sources of non-renewable energy (diesel, gas, electricity) while taking maximum advantage of clean, renewable energy (sun and wind) as well as of features of the local environment.

In contrast with a "regular" home, a green home will be healthier, more pleasant to live in, and the air inside will be cleaner. As well, the home will be more economical than a regular home, because expenses for heating and cooling will be lower.

Any building can be planned according to green architectural principles. The ideal situation is certainly a new building which is designed in the right way from the start, but it's always possible to improve any existing building.

People often ask me whether a green building looks different from a "regular" building. Will it look more natural and organic? The answer is no.

For the most part, only an experienced and professional eye will be able to pick out a green building from any other "non-green" building.

There's no need to build out of straw or packed earth to make sure the building will become more friendly to people and the environment.

Of course, there are green buildings which are made entirely out of natural materials, but since that's a highly specific niche which is less common within Israel, we won't focus on that for now.



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Chapter 2: Basic principles: Local climate, directions, and thermal insulation

In this chapter, we're going to move on to the features on which green building is based. As soon as these principles are understood and respected, half the work is already done!

Considering the local climate

To build green, we need to think about the features of the local climate. It's commonly known, for instance, that building in our hot country is different from the way it's done in northern Europe. Even in Israel itself, there are four different climatic regions which need to be considered during the planning stage.

Direction:

It's important to understand what the best directions are, and to try to build facing these directions. Within Israel, the best directions are north/south since this way the house will warm up naturally in the winter (taking advantage of the southern rays of the sun) and prevent excess warming during the summer and even cooling it down.

This table demonstrates solar radiation on various surfaces of a home:

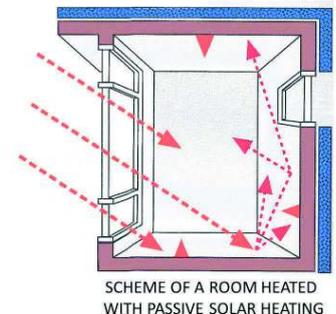
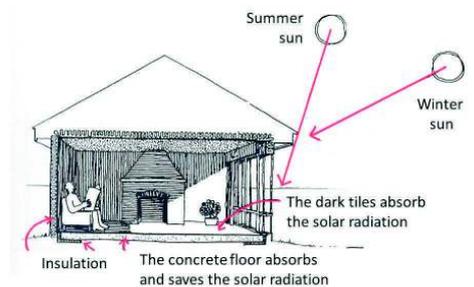
	NORTH	EAST	SOUTH	WEST	ROOF
JULY	2.48	6.07	2.62	6.07	7.67
JANUARY	1.08	2.54	4.83	2.54	3.33

Daily incidence of solar radiation on building surfaces by orientation

With an existing building, where it's not possible to align the property with the correct directions, it's important to understand the given situation to find the accurate and most efficient solutions.

This sketch shows us a well-insulated home, facing south, which takes advantage of the winter sun (warm and low) for natural, passive heating. In the summer, the house is protected, since the southern rays of the sun are weaker than in the winter, as seen in the table above. Additionally, the angle is very steep, keeping the sun out of the house. Thermal insulation: The role of insulation is to maintain pleasant conditions within the home. In the winter, the insulation keeps in the heat and doesn't let it escape outside, while in summer, it prevents the heat from entering.

These principles are the basis of green building; everything else is connected to these three principles.



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Chapter 3: Planning principles for a brand-new home

Principles which don't require financial investment

There are some principles whose application starts even from the planning stage. If we consider them from the very first steps, they won't affect the building cost and will lead to better results along with recognizable financial savings.

These planning principles mainly apply when we're talking about planning a brand-new home.

Like, for example:

Choosing the right property: It's extremely important to consult an architect who specializes in green architecture before purchasing a plot of land. The architect will be able to understand whether the location of the plot will enable you to take advantage of the directions of sun and air or whether the home will face in less-advantageous directions which will require a high investment to create pleasant living conditions inside the home.

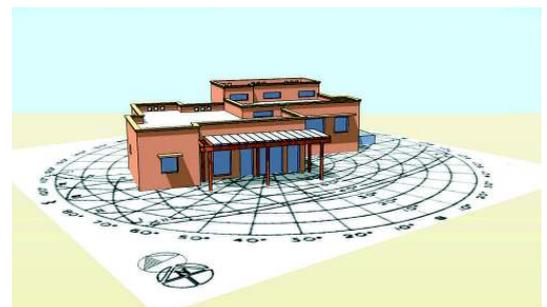
Placement of the house on the property: After the best property has been selected, it's important to situate the house in the correct position within the property itself.

Precision at this stage will determine whether the house will be suited to the climate and save money or the opposite, causing unnecessary expenses for cooling and heating.

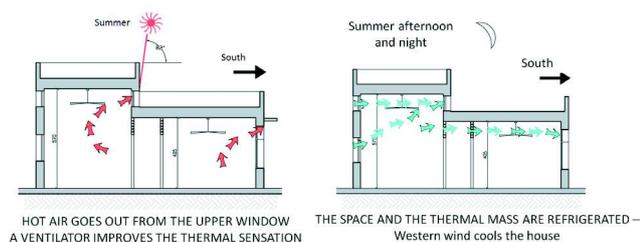
Planning the size and placement of windows:

This will influence both the natural air flow and the possibility of naturally heating the home in winter while preventing excess heating in summer.

Natural ventilation is facilitated when planning openings takes into account the prevailing local winds, topographical conditions, along with walls and partitions of the interior space.



Solar house in Merhav Am, Negev



HOT AIR GOES OUT FROM THE UPPER WINDOW
A VENTILATOR IMPROVES THE THERMAL SENSATION

THE SPACE AND THE THERMAL MASS ARE REFRIGERATED –
Western wind cools the house

Solutions which require initial investment but pay for themselves over time

These solutions are suitable either for a new building or for an existing building (green retrofitting).

Building external walls with improved thermal insulation:

Investing in improving the level of insulation in the walls is extremely worthwhile and much less expensive than what you might think. For instance, the cost of a layer of 5 cm. Styrofoam for a house, whose area is 170 sqm, is around ₪25,000, a negligible amount relative to the total building cost, and one which will pay back significant returns.

There are other possibilities for building an insulated wall (insulated concrete block, sandwich wall with insulation inside, concrete block wall with a layer of insulation on the external portion, and more).

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Chapter 3: Planning principles for a brand-new home

It's best to choose a wall material together with your architect taking into account the climatic region within Israel, the lifestyle of the occupants, the budget, and more.

Installing insulated windows: The window area and frame are sources of significant heat transfer. The most common material for window frames in Israel, aluminum, is not insulated at all. If you've ever noticed, it gets boiling in summer and freezing in the winter.

Today, there are window frames on the market made out of materials like PVC or wood combined with aluminum that offer an excellent level of insulation (ten times better than that of aluminum alone). The companies selling these windows are responsible for assembly and provide very long warranties. After changing the windows, savings on expenses of heating and cooling could be up to 40%! Additionally, it's good to know that there's a type of glass called "Low-E" which is capable of blocking heating rays.

It's worth investing in Low-E glass for windows which face east and west because, as we've seen, in those directions, the sun is very high in summer, while solar rays in winter aren't relevant for passive heating.

Ideally, the color of the blinds will be pale so that it won't absorb heat and release it into the house.



Luxury apartment, King David's Crown, Jerusalem
Wood/Aluminum integrated window

Reusing "gray water"

Sources of "gray water," also called drain water, include the bathtub, showers, sinks, and washing machine, and these constitute about sixty percent of the water requirements of the home.

Think about how significant it could be if we were able to reuse this water for flushing the toilet or watering plants.

Gray water is different from "black water" in its chemical and biological makeup. Black water is water that has been used for flushing the toilet. The materials found in gray water can be dangerous to health on the one hand, and on the other, pollute the environment. Therefore, treating this water is mandatory before it is reused.

The Ministry of Health has banned the reuse of gray water in private homes and community buildings and permitted it only in specific situations. This is because of the vulnerability that arises from using unpurified water.

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Chapter 3: Planning principles for a brand-new home

In private homes, many people install gray water purification systems, which don't require inspection here. For this reason, it's crucial that the broader community is aware of the dangers inherent in using uninspected systems since most people don't realize how dangerous it can be.

Since Israel has no standards yet for these systems, it's best for those who wish to install a home system (despite the ban by the Ministry of Health) to select systems that uphold stringent standards of other countries, such as, for instance, the Australian standard.

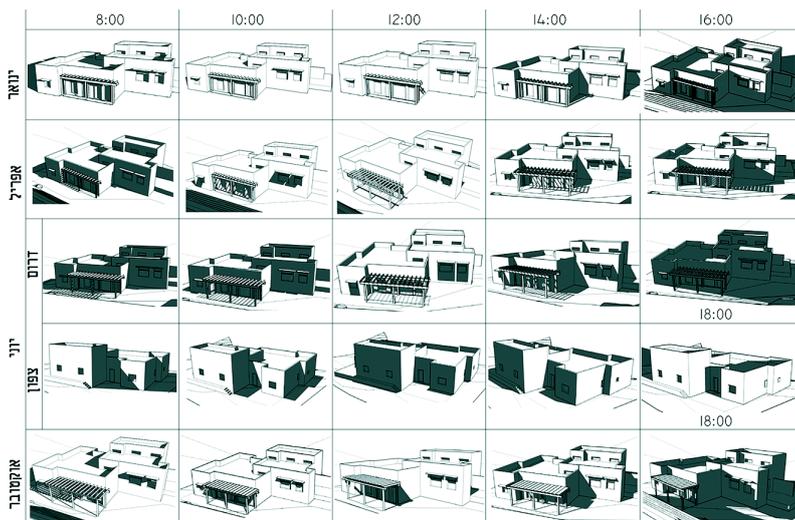
In any event, during the building stage, I recommend separating the gray water pipe from the black water pipe so that in the future, when Israel does create a standard for reusing gray water, your home will already be ready.

For simple ways to save on water, please see Chapter 4.

Design of shading

To take maximum advantage of solar energy to warm and light the home during the winter, you need to place many openings on the southern face of the building. Thus, the low winter sun will be able to enter the home.

To prevent those same windows from letting in too much sun in the summer, use external shading like, for instance, an awning made of cloth, concrete, aluminum, etc.



A further niche in the wide world of green building is the use of healthy materials which are non-toxic to people and the environment.

These are materials which don't emit substances which damage the environment, harm workers coming in contact with them, and residents who live with them. Please see Chapter 4.

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Chapter 4: What is green renovation (retrofit)?

The goal of green renovation is reducing the home's need for resources while saving operating and maintenance costs for residents as well as making the home healthier and more pleasant. There are many different methods of renovating green today, and these should be evaluated individually for each apartment or house according to its unique conditions such as climate and the environment as well as the needs and desires of the home's owners. Therefore, it's important to call on the professional assistance of architects who specialize in green renovations, who can aid you in choosing the practical solutions that are right for you.

Broad-scale renovations on an older apartment or renovations at the time of purchase are an ideal opportunity for a total "green revolution" for the home.

At the same time, green renovations can be carried out gradually while taking advantage of possibilities such as replacing older windows, heating and cooling system or electrical appliances, plumbing, painting the home, and more.

Green retrofitting is characterized by:

Use of healthy materials

Dealing with moisture and prevention of mold

Maintaining pleasant conditions within the house (by improving thermal insulation of the exterior)

Choosing and installing cost-efficient electrical appliances

Saving water

Use of healthy materials

One of the ways to identify healthy materials is the Green Label.

The Green Label is awarded to products which are less damaging to the environment (improve energy efficiency, reduce the use of dangerous materials, are reusable, and so on). These products are defined as green products. The Green Label is awarded jointly by the Standards Institute and the Israeli Ministry of the Environment. You can find a list of the goods which carry the Green Label on the Standards Institute website.



An example of a product which bears the Green Label is wall paint.

You can find wall and furniture paint on the market today which is water-based, meaning it has a lower percentage of Volatile Organic Compounds (VOCs). They don't emit toxins or an accompanying smell, and they're particularly appropriate for children's rooms but great to use throughout the home.

Dealing with dampness and preventing mold

This is done mainly through proper ventilation of the space, insulating the walls and sealing them against the entrance of water.



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Chapter 4: What is green renovation (retrofit)?

Maintaining pleasant conditions inside the home (by improving thermal insulation of the exterior)

This is done through improving the walls' insulation, installing insulated windows, and adding exterior shading.

You can improve the insulation of existing walls for a meaningful improvement in conditions within the home.

Whether you live in an apartment building or in a single-family home, if the level of wall insulation is weak or non-existent, some possibilities will help you improve the situation with significant savings in the cost of heating and cooling.

Treatments from the exterior:

It's possible to add a layer of thermal plaster. It's best to consult a professional to determine the thickness of the layer and the type of plaster. Solutions will be different based on the type of existing wall and the home's location within Israel.

It's also possible to add Styrofoam to the existing wall and then cover it with mesh and plaster. This is the best option, but requires a financial investment which is a little higher than the previous choice.

Treatments from the interior:

If you can't treat the wall from outside, it's possible to add insulation from inside. However, take into account the fact that this option will decrease the room area. Therefore, it's not always the ideal solution.

There is thermal plaster which is intended for interiors, and it's possible to coat the interior side of exterior walls of the apartment

It's also possible to add a layer of thermal insulation over an iron profile and to seal it with plasterboard and paint.

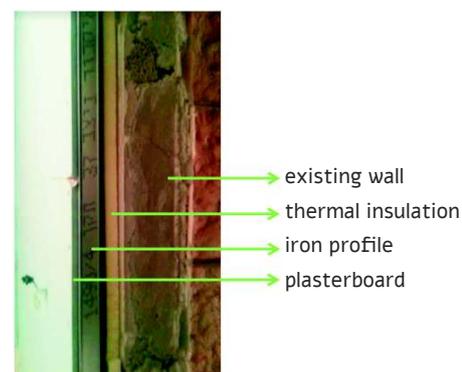
Installing insulated windows:

Everything listed in the previous chapter applies here as well to the situation where you are renovating an existing apartment or home.

Shading

If your home or apartment has some windows which are unshaded and without blinds, I recommend that you install, if possible, shading on the exterior side. This is because we are trying to stop the sun before it gets into your home. An internal curtain is simply not effective at all because it allows the heat to enter, crossing through the window glass!

In the situation of a western-facing window where it's not possible to situate shade over the window, it's worth considering installing a window with Low-E glass.



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Chapter 4: What is green renovation (retrofit)?

A great solution for shading – the green wall

If you have a home with an uninsulated wall, an interesting possibility to guard it against the sun's extremes is building a green wall.

A green wall is a “plant wall.” It consists of a wooden or aluminum screen 10 cm. from the wall (so the roots don't “eat” the plaster) and planting climbing plants. It's possible to use deciduous plants, which lose their leaves in the winter, so that the winter sun will pass through and warm up the wall.



Winery, Kfar Uriah – Green wall

Choosing energy-efficient electrical appliances

We recommend buying electrical appliances such as a dishwasher, washing machine, refrigerator, and more, which will offer high energy savings. As mentioned, all electrical appliances today in Israel are given an energy rate between A and G and therefore, it's easy to choose intelligently. Choosing highly energy-efficient electrical appliances, rated A or B, will contribute meaningfully to reducing household consumption of electricity.

Install a lighting system based on energy-efficient lighting. Compact fluorescent bulbs require about 1/4 of the power of regular incandescent bulbs for the same output of light, and their lifespan is far longer (up to eight times) than that of incandescent bulbs. LED lighting is even more efficient.

Install a lighting control system based on sensors which operate the light only when people are in the room. A system like this can make even exterior lighting more efficient and can also be used to turn off heating and cooling systems.

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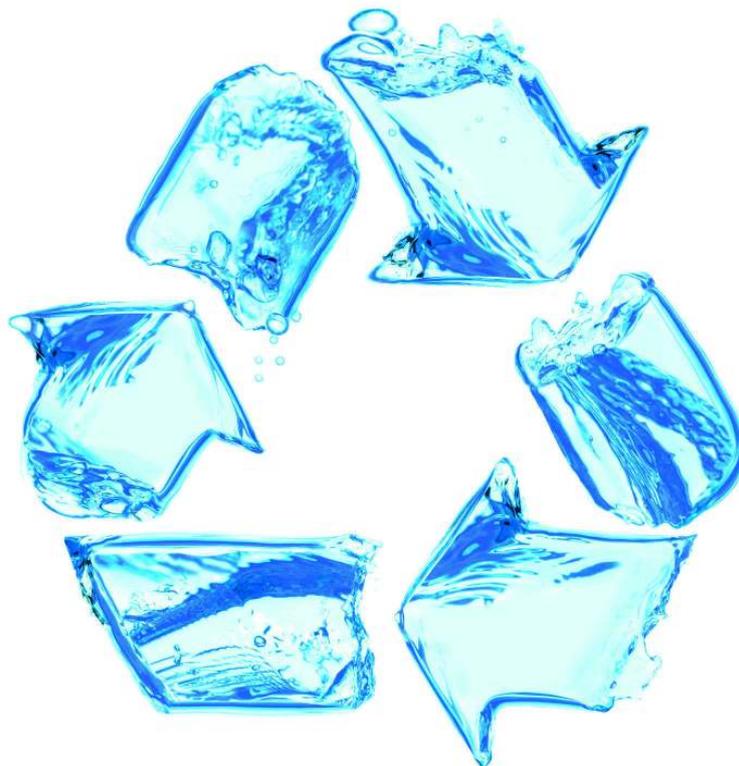
Chapter 4: What is green renovation (retrofit)?

Saving water

Drinking water in Israel is a limited resource, and therefore, saving water is of particular importance in caring for the environment. Additionally, the high cost of water in Israel makes any water savings for the private consumer worthwhile from a financial standpoint. Saving on water needs at home doesn't require complicated activities or installing expensive systems and can be attained through introducing some simple and relatively inexpensive means.

Install water-saving devices on all taps. This way, you'll save about 30% of your water requirements for your sinks! Flushing toilets use 40% of all water used in the home. Choose double-flush toilets only! If you have a garden, take advantage of water runoff from air conditioners to water plants. This water is completely clean! Install a central lime-scale filtering system for the main building pipe, which will improve the quality of water and save on electricity expenses for the water heater, hot water urns, washers, and dryers.

Install water-efficient shower heads and toilet tanks.



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Chapter 5: Tips for everyday situations which need attention (New building or retrofit)

1. The apartment is located beneath the roof and heats up too much in summer while getting too cold in the winter.

Indeed, the roof (referred to in professional terms as the fifth “facade” of the building) is the part of the home which absorbs the most sun in the summer. It heats up very much and distributes a lot of heat into the house. (See table on page 5)

There are two options for improving the situation:

A. For a flat roof, add a layer of thermal insulation on the outside (I recommend 8 or 10 mm of Styrofoam). Before installing insulation, it's critical to check that the roof is properly sealed. If the roof slopes, you can add insulation above the ceiling which separates the apartment from the roof space.

B. If there are water heaters on the roof or it's a multi-storey building (and the neighbors are not enthusiastic about the idea), you can add a layer of thermal plaster to the ceiling. It should be noted that this option reduces the height of the room at least 4 or 5 cm and therefore, it's suitable only for apartments with a high ceiling. Additionally, thermal plaster is relatively heavy. Therefore, you'll need to check whether the existing ceiling can withstand the new weight.

C. An additional solution for a shingled roof is to enable ventilation of the space beneath the roof and thus reduce the temperature in a natural way. There are some solutions on the market, for instance, installing ventilated shingles or installing a solar or electric fan which will vent hot air from the space.

Planning a new home:

It's imperative to insulate the roof well. Don't scrimp on the costs of insulation here. This is one area where the investment will repay you with generous savings in the costs of heating and air conditioning!

Bioclimatic house project, Ein Zurim



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Chapter 5: Tips for everyday situations which need attention (New building or retrofit)

2. There's a room in your apartment which faces west with a large window, and as a result, it's too hot in the summer.

As we've seen, the western sun is very intense in the summer months, since the sun angle is lower in the west and shines in particularly during the hot afternoon hours.

For existing houses:

If you have a balcony, I recommend that you add a shade over the window.

If you don't have a balcony, I recommend replacing the current window with a Low-E glass window. This is a double pane of glass with an outer layer which stops the sun's rays. Another good alternative (if you do not wish to replace all the window) is to cover the current glass with a coating sheet which will reduce the strength of the sun's rays entering the home.

For new homes:

If you're still in the planning stages, ask your architect to plan the face of the house such that there won't be large windows on the western side. If there's no choice (perhaps because the view is particularly nice on that side), I recommend that you incorporate a window with improved insulation and Low-E glass.

A few more recommendations to finish...

Installing a ceiling fan

The role of the ceiling fan is to increase air flow on the body and to dry it off. This causes us to feel as if the temperature is significantly lower – three or four degrees less than the surrounding temperature. Therefore, air conditioners are needed less for significant electricity savings.

Additionally, most fans have a seasonal switch. In the winter, we can reverse the direction of the fan's rotation so that the air will flow downwards. Since hot air is lighter than cold air, it rises upwards (the principle of thermal stratification). With a fan, we can direct the warm air downwards in the winter to warm up the living space.





Guide to an exclusive healthy, and energy efficient house

And now, a few words about myself



My name is Debby Schor Elyasy, and I'm an architect, a graduate of the Polytechnic University of Milan, with a Master's degree with high honors (summa cum laude). I have accumulated international experience in the field of green architecture from my work in design firms in Barcelona, Milan, and Jerusalem. I hold an Israeli architect's license, and my office deals with planning private homes, deluxe apartments, and offices, beginning with the initial planning stages down to the final details.

My planning concept is based on incorporating the client's needs along with ecological considerations of adapting the building to the environment from the perspective of climate, airflow directions, solar radiation, winds, and integration with the environment.

My clients are primarily non-Israelis (speaking Italian, English, and Spanish) who love a style and aesthetic that's European in general and Italian in specific, the precision in project completion, and the shared language.

I believe that the client needs to be an inseparable part of the building process. My role is to turn the customer's dream into reality in the field.

How can I help you?

If you have still not purchased a plot

This is the best possible situation! I'd be happy to advise you and help you to check:

Whether the plot is facing the right directions and enables you to build a green home

Whether the topography allows building the kind of house you're dreaming of and imagining

If there are any restrictions set by the urban development plan. What the maximum construction allowed is, how many floors can the house have What other limits does the urban development plan impose?

If you have already purchased a property and you're looking for an architect

I'd be happy to set up an initial conversation to see how we can proceed.

If you already started the planning process with another architect who doesn't specialize in green building

If it's important to you that your home is friendly to the environment, healthy, and economical – I'd be happy to help your architect to adapt the project to green building principles.

The goal of my advice is to verify that the project is going ahead according to green building principles and to see how the building can be adapted so that the home will be friendlier to the environment and even save money.

If you're about to renovate

I'd be happy to offer you a green consultation and to determine how to improve the conditions in the apartment or to counsel you throughout the entire design process.

To set up a conversation, just contact me at dse.arc@gmail.com

Or phone me at 052-645-2002

Good luck!