

CHECKLIST FOR ENERGY SAVING MEASURES IN NEW BUILDINGS (AND BUILDINGS BEING RENOVATED)

A good building design helps save both construction costs and operating costs.

Total building costs are made up of three roughly equal costs

- Frame and enclosure
- Technical equipment (heating and ventilation, water, electrical services)
- Finishes, furniture and equipment.

1. Spending around 10% more on the total costs of a building by considering lists 1 and 2 below, can save significant costs on the items in list 3 simply because equipment can be smaller and less powerful. Altogether a proper design can also save 30-50% on annual operating costs.

2.

None of the measures mentioned below are new and have been in general use in buildings in Europe for decades. So costs are not high and technology is not risky.

Nearly all technical equipment is imported to Georgia so it is not more expensive to import something different.

3. BEFORE YOU START

Get the architect to position the building on the site and design its space so that it needs less energy. You can see from the suggestions below that this may not cost anything.

- Ensure (if possible) that the orientation faces east/ west rather than north/south
- Design the shape of the building in such a way that most internal spaces are lit and ventilated naturally and don't need permanent ventilation/cooling
- Plan for external shading, shutters or blinds for south facing windows to reduce air conditioning in summer
- Make sure winter sun reaches the internal spaces to save heating, but does not cause overheating in spring (passive solar heating)
- Where is the air conditioning going to be? (On the face of the building or hidden on the roof?) Central systems are more energy efficient.

Now is also the time to think about using renewable energy, to incorporate any special requirements before building designs become final and are hard to change. Options that might be relevant include:

- Solar panels for hot water
- Small scale wind generator

- Ground source heat pumps
- Small scale cogeneration
- Biomass for heating

4. FRAME AND ENCLOSURE

Improved Building Insulation

Although there are no current Georgian standards to apply like in EU countries, building with good insulation will save money straight away, because you can save money on the technical equipment which will be smaller.

Check that the architect/builder has planned for:

Insulation:

- Thick layers of mineral wool or polystyrene applied to the walls and roof.

Windows

- Double (or even treble glazing in mountainous areas)
- Reflective coatings on the glass to keep heat in and solar radiation out
- Built -in external shutters/blinds

5. TECHNICAL EQUIPMENT

Heating/Cooling/Ventilation systems

This list covers standard equipment available everywhere in Western Europe which is not new technology and carries no risks. Make sure your designers are not using cheaper old-fashioned equipment just because they do not know much else. You can read more about it on our website.

Nearly all equipment in Georgia has to be imported anyway, so there is nothing special about going for the types of equipment recommended here.

The main difference is the computerised control. This means that when equipment doesn't need to be switched on full, its output can be varied or switched off automatically. This simple control is what saves the energy. Older equipment is just on or off, and so frequently runs all the time, wasting energy.

- Use condensing boilers which are more efficient
- Install weather and time controls for the heating system - not needed if there is a Building Management System (BMS see later)
- Provide each room with temperature controls on radiators, or on air systems (not needed if there is a BMS)

- Design ventilation systems to operate with variable fresh air/ recirculation to use natural cooling except in high summer
- Design different zones (uses) of buildings with their own systems and controls, so that they can be managed separately
- Provide ventilation systems with heat recovery from exhaust air to fresh air in winter and vice versa in summer.
- Install fans and pumps which have variable speed drives
- Ensure that chillers are equipped with inverters.
- For bigger, more complex buildings install a Building Management System (BMS) to give centralised control of all the systems (including lights) and data recording to check on how much energy is being used.

Hot water systems

Here are some tips for saving energy and water by a more economic system design

- If there is only a small requirement for hot water, produce it locally without storage, for example with small instantaneous gas or electric heaters
- Install solar panels to cut operating costs with a gas boiler
- Save energy and water by designing with circulating loops to keep water hot, without draining off lots of cold water first. Saves waiting time too!
- Insulate all water storage and hot water pipes
- Install a separate boiler for large hot water demand, rather than operating the big heating boiler wastefully in summer

Lighting

Designing a modern lighting system makes your building look great and is an easy way to make significant electricity savings for very low investment.

- Use CFL or LEDs (production of inefficient conventional lamps is being phased out by the EU in stages from 2009). These new lamps also last about 10 times longer than conventional lamps, saving on maintenance costs)
- Use high efficiency electronic ballasts in fluorescent lights
- Introduce time and occupancy control for lighting
- Introduce photo-voltaic elements for the building perimeter lighting
- Use maximum natural lighting to delay use of artificial lighting (which increases the cooling load).