Forum Energii

Analizy i dialog

Cutting energy bills before winter

A smart guide for European households

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Forum Energii is a European, interdisciplinary think tank from Poland. Our team consists of experts in the field of energy, with experience in business, public administration, and science.

Our mission is to initiate dialogue, propose knowledge-based solutions, and inspire action for a just and effective energy transition leading to climate neutrality. We achieve this through analysis, opinions, and dialogue on the decarbonisation of key areas of the economy.

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AUTHORS
Sonia Buchholtz, PhD – Forum Energii
Piotr Kleinschmidt – Forum Energii

IN COOPERATION WITH
Aleksandra Stępniak, DSc
Konrad Witczak, DSc
Karolina Marszał – Reform Institute
Paweł Płonka – Reform Institute
Aleksander Śniegocki – Reform Institute

EDITOR
Brien Barnett

GRAPHIC DESIGN
Karol Koszniec

PHOTO
Evgen Prozhyrko, Istock

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Introduction

The upcoming winter will be a major challenge for many households across Europe. The rapidly rising costs of heat and electricity are driving record inflation. Cutting off the Russian supply of energy resources is right and important, as money from their sale is fuelling the Russian war in Ukraine. Enduring this difficult transition period is necessary, as is helping those who need it to achieve change. How long it will last depends on the decisions we make. The lowest-hanging fruit is energy conservation.

Moving faster away from fossil fuels will not only increase Europe's energy security but also counter the climate crisis. The future of heating is a radical improvement in energy efficiency and electrification based on renewables. This is a long and bumpy road, which must already be embarked on before the coming winter. This time, Forum Energii shares a guide to help households reduce their heating costs over the next few months. These are small and inexpensive measures that can nevertheless help us cut costs, increase energy security, and reduce CO_2 emissions. We encourage you to read and act.

Yours sincerely,
Joanna Maćkowiak-Pandera, PhD
President of Forum Energii

1. Summary

- On average, heating dwellings and water accounts for 78% of household energy consumption in the EU (Eurostat).
- Many households are already living modestly due to rising energy costs. Our guide is aimed at those who can and want to act.
- The burden from heating and electricity costs depends on income and energy consumption. Reducing the latter will improve household budgets and Europe's energy security.
- Many homes in the EU remain highly energy-intensive. This happens when ventilation systems are working inadequately, while walls, windows, roofs, and floors are poorly thermally insulated. In energy-intensive houses, it requires more fuel to maintain a given room temperature than in an energy-efficient home.
- Comprehensive and deep retrofitting (thermal modernisation) is an optimal solution, but it is costly and time-consuming. Therefore, it makes sense to start with easier and cheaper tasks that will relieve the burden on household budgets before the upcoming winter.
- In the report, we propose over 30 measures, divided into groups:
    1. Effective room temperature control.
    2. Improving the heating system.
    3. Hot water savings.
    4. Electricity savings.
    5. Effective low-budget thermal insulation of houses.
    6. Additional measures for multi-family houses.

2. Introduction

Energy bills are skyrocketing, putting serious strain on household budgets. It is unlikely that the situation will improve by next spring. We must prepare for the limited availability of fuels and high costs of heat and electricity.

Therefore, it is worth addressing those areas in which households have real impact. First and foremost, energy consumption. Methods of electricity saving is more widespread (not necessarily massively applied, though) than that of heating. At the same time, it is heating that accounts for the majority of our energy expenditure.

Rarely do we realise that an old building without proper insulation is a vampire, an energy and financial vampire. In practice, the greatest energy savings can be achieved through deep and comprehensive energy retrofitting and replacing household appliances with efficient ones. However, these are costly and often time-consuming investments, while we are looking for quick-to-implement measures to prepare for the upcoming winter. Additionally, keeping inflation in mind, these are measures intended to be low-cost or even costless.

In this guide, we answer the following questions:

- How to reduce heating and electricity bills with low-cost investments or by changing habits?
- What measures to recommend to administrators of multifamily buildings?
- What kind of support do people at risk of energy poverty receive in Europe?

The report's target audience is primarily inhabitants of flats and detached buildings. In it, they will find advice on reducing energy consumption and saving money. At the same time, these measures also will reduce the demand for fossil fuels and lower CO_2 emissions, as well as contribute to phasing out fuels from Russia. Implementing them on a mass scale should contribute to slowing down energy price rises, as lower demand means lower prices for hard-to-abate sectors.

3. Reducing energy bills

The most effective measure to permanently reduce a building's energy demand (thus, energy bills), is a deep and comprehensive energy retrofit. In this report, though, we focus on small steps only. We present a list of easy and low-cost or costless measures that will reduce energy consumption in homes before the upcoming winter. Estimated effort and costs for an average-sized home and the associated measures are shown as follows:

Effort		Cost of equipment and services	
Designation	**Explanation**	**Designation**	**Explanation**
	Complex task or only to be carried out by a professional		modest cost (up to 500 EUR*)
	Relatively easy to implement, although it may require the assistance of a professional		relatively cheap (up to 100 EUR)
	Very easy to do yourself		cheapest (up to 50 EUR)
			costless

* Cost estimates are based on Polish conditions. These will vary considerably, mainly due to the different labour costs in Western and Eastern Europe. Regardless of the actual price levels, the proposed measures are among the cheapest measures that can be taken in order to reduce energy consumption.

The impact of individual measures on energy consumption was based on scientific studies—the sources are available in the footnotes and bibliography—and sometimes estimated based on parameters indicated by producers of appliances. In practice, total savings will depend on the type of house, its previous energy efficiency and heating source. The more energy-efficient the building, the more difficult it is to make a meaningful improvement.

If we decide on a package of measures, the energy saved cannot be simply added up. For example, adjusting the boiler and replacing the windows yield a 20% reduction in energy demand each. Implementing them as a package means that after adjusting the boiler, we achieve a demand reduction of 20% (this leaves 80%), and after replacing the windows we are able to reduce the remaining demand by a further 20% (i.e., 20% of 80%). In this way, the total benefit is 36% rather than 40%. However, high bills are at stake, so every cent matters.

4. Proposals for residents of single- and multi-family homes

4.1. Room temperature control

Regulating the room temperature involves separating zones in the house that need to be heated more and less (or not at all). Instead, some of the heat can be obtained from natural sources. This way we intentionally use less energy.

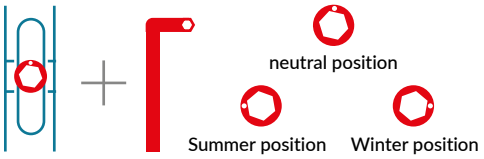
1. Optimisation of room temperature			
Solution	Installing automatic temperature control devices (e.g., valves and thermostatic heads) on the radiators in each room. There are regular and smart devices available. For the latter, the target temperature and changes can be programmed for different cycles.  thermostatic valve + head = radiator thermostat		
Ease of implementation	Plumber or fitter needed	**Cost**	Thermostatic valve + head + labour
Justification	• The optimal temperature varies between rooms: in the bathroom - up to 24-25°C, in the living room or children's room 21°C, in the bedroom – should not exceed 17-19°C. • In the kitchen we can make use of heat from cooking, baking or washing dishes etc. As a result, temperature should not exceed 20°C.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		
Additional benefits	• Optimal temperature control – too low temperatures are associated with excessive dampness or frost on walls and result in fungal growth. • Better health and well-being – too low temperature cause the body to get cold. Too high temperatures (above 21°C), makes mucous membranes of the respiratory tract dry out - the immune system is weakened, and leads to getting ill more often. In addition, at higher temperatures the quality of sleep is worse and it is more difficult to concentrate.		

2. Slight reduction in temperature in certain rooms or periods			
Solution	Installing automatic temperature control devices (e.g., valves and thermostatic heads) on the radiators in each room. There are regular and smart devices available. For the latter, the target temperature and changes can be programmed for different cycles.		
Ease of implementation	Plumber or fitter needed	**Cost**	Thermostatic valve + head + labour
Justification	• When leaving the flat or the house for a longer period of time, lowering the room temperature by a few degrees will not affect thermal comfort, but will reduce energy consumption (the temperature in unoccupied parts of the building can be decreased accordingly). • With smart appliances, the temperature can be adjusted very precisely, e.g., by raising the temperature two hours before waking up to optimise consumption.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		

3. Adequate ventilation of rooms in winter			
Solution	Ventilate the premises according to an appropriate scheme: 1. Turn down the radiator thermostats a few minutes before opening the window. 2. Ventilate in a rapid and intensive fashion. 3. Re-do the thermostats once windows have been closed.		
Ease of implementation		**Cost**	
Justification	• Fast, intensive ventilation results in lower heat loss than opening the window for a longer period. • By turning down the thermostat in advance, thermostat does not automatically intensify heating to prevent the room from getting colder due to the drop in temperature caused by the open window.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		

4. Making use of natural heat gains and avoiding heat loss			
Solution	During the heating season, excessive heat loss is avoided by: • uncovering windows on sunny days, • covering windows on cloudy days and at night.		
Ease of implementation		**Cost**	
Justification	Sunrays provide an additional, free source of heat when used skilfully.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		

5. Ensuring adequate air circulation in the room			
Solution	Exposure of radiators and thermostats during the heating season—the required distance between them and interior fittings should be a min. of 10-20 cm.		
Ease of implementation		**Cost**	
Justification	• Objects next to the radiator block adequate air circulation, resulting in an underheated room. This incentivises the thermostat to automatically increase heating. • When consumption meters on the radiators are installed, the disturbed air circulation leads to higher measurements.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		

6. Use of summer and winter window closing positions			
Solution	 Changing the window ventilation setting to winter position during the heating season and to summer position in warmer months (function available in newer window types).		
Ease of implementation	A spanner (e.g., hex key) may be needed.	**Cost**	
Justification	The winter and summer positions alter the pressure of the window against the frame, which is sufficient to change the intensity of the air exchange.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		

4.2. Improving the heating system

Improperly functioning heating equipment is one reason for higher energy use. Even a minor repair or change of the settings can improve the heating process significantly. This will result in the same thermal comfort at reduced costs.

1. Pre-season inspection of the heating system			
Solution	**Annual inspection of the efficiency of the heating system by a professional. The inspection typically includes:** • checking the technical condition of equipment, • cleaning the boiler, • cleaning the chimney or flue pipe, • professional boiler inspection.		
	Possible repairs: • cleaning the heat exchanger, filters and other components of dirt and deposits from operation, • venting the installation, • repairing leaking connections.		
Ease of implementation	 A professional needed	**Cost**	 Service
Justification	A faulty heating system uses more energy.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		
Additional benefits	Elimination of safety risks (e.g., fire if soot in the flue ignites).		

2. Use of thermostatic valves and heads			
Solution	• Installing thermostatic valves and heads to automatically regulate the room temperature (systems with radiators) or similar solutions for underfloor or supply heating. • There are simple and cheaper kits on the market, as well as more expensive smart devices, but even the simplest solutions can bring great benefits if none has been used before.		
Ease of implementation	 Installation by a plumber or fitter	**Cost**	 Thermostatic valve + head + labour
Justification	Automatic room temperature control taking into account thermal comfort, room functions, and use of heat gains (natural solar heat or heat resulting from activities such as cooking, baking, laundry, etc.).		
Energy savings	Up to 30%.*		
Attention	In some countries (e.g., Poland), "+16" thermostatic heads are mandatory in multi-family buildings. They are aimed to prevent the room temperature from falling below 16°C. This serves to prevent excessive temperature differences between individual flats (i.e., heating at the neighbours' expense).		

*R. Hirschberg, *Energy efficiency related to the change of thermostatic radiator valves. Research Report*, 2016.

3. Maintaining thermostatic valves in working order			
Solution	• Unscrewing and turning off thermostatic valves once a month. • When the heating season is over, valves should be open to the maximum and left that way until the next heating season.		
Ease of implementation		**Cost**	
Justification	Regular unscrewing and turning of the valves prolongs their efficiency. Opening the thermostats after the heating season prevents the radiators from becoming air-locked when the system is restarted in the Autumn.		
Energy savings	*difficult to estimate.*		

4. Installation of automatic vent valves			
Solution	Installing a vent valve on the ends of the riser pipes.		
Ease of implementation	 Professional needed	**Cost**	 Device + labour
Justification	Radiators with the air blocked inside do not work efficiently, hampering achieving a comfortable temperature. If the efficiency of the thermostatic valves is maintained (see point 3), such vent valves only need to be fitted at the ends of the risers (not necessarily on each radiator).		
Energy savings	Depends on the degree of aeration of the radiators—if the system is working inefficiently, more energy is needed to reach the desired temperature.		

5. Installation of radiator screens			
Solution	Radiator screens glued to the wall behind the radiator to reflect heat away from the walls.		
Ease of implementation		**Cost**	 Screen
Justification	A radiator screen is made of foam and covered with aluminium foil. It reflects the heat away from the wall, so less energy is used to heat the room.		
Energy savings	Approximately 2-7% depending on screen quality.*		

*N. König, *Der Einfluss von warmereflektierenden Folien in Heizkorpernischen auf den Heizenergieverbrauch eines Hauses*, Fraunhofer – Institut fur Bauphysik, 1980.

4.3. Hot water savings

In an average EU household, about 24% of the heating costs are consumed by water heating. Reducing its consumption saves money on both water itself and on heating, often without altering the comfort of living.

1. Quick shower instead of a bath			
Solution	Replacing a bath with a quick shower.		
Ease of implementation		**Cost**	
Justification	An average-sized bathtub has a capacity of around 150-200 litres, while a shower uses around 10-15 litres of water per minute. A ten-minute shower therefore saves approx. 50 litres of water each time and the energy required to heat it up.		
Energy savings	Approximately 25% of the energy required to heat the water stream and savings on the water itself.		

2. Fitting an aerator in the tap			
Solution	Installation of a faucet aerator, i.e., a special nozzle made up of a small mesh sieve.		
Ease of implementation	 For most taps - DIY	**Cost**	 Device
Justification	The aerator aerates the water flow from the tap, so that the impression of high water pressure is maintained with significantly lower water consumption.		
Energy savings	10-50% of the energy required to heat the water stream and savings on the water itself (up to 90%).		

3. Reducing tap water pressure			
Solution	• No-cost option: reducing the water flow at the valve located at the water meter. • Cost option: fitting a pressure regulator.		
Ease of implementation	 Installation of pressure reducer: Plumber needed	**Cost**	 or  Flow reduction: costless Installation of pressure reducer: device + labour
Justification	A reduction in tap pressure is particularly appropriate when users experience difficulties adapting the water flow to their needs (e.g., children, older people).		
Energy savings	10-50% of the energy required to heat the water stream and savings on the water itself.		

4. Optimal use of the washing machine			
Solution	• Washing only with a full drum. • Washing at the lowest possible temperature reasonable for a given type of material and soiling.		
Ease of implementation		**Cost**	
Justification	• Much of the energy consumed per wash cycle is used to heat the water - two wash cycles with an incomplete load will use more energy than a full one. • Washing at lower temperatures uses less energy.		
Energy savings	A single cycle of one fully-loaded wash can save up to 35% of the energy required to heat the water compared to two wash cycles with an incomplete insert. Additional water savings.*		

* *Let's make a good climate. A guide to saving energy at home*, WWF, www.wwf.pl.

4.4. Proper home insulation

Adequate insulation of the house is an important part of comprehensive thermal modernisation. Securing the areas particularly vulnerable to heat loss involves slightly more money than the previously mentioned measures, but overall, it is very effective.

1. Sealing windows and external doors			
Solution	Uszczelnienie okien i drzwi przy pomocy uszczelek, pianek, taśm lub innych preparatów		
Ease of implementation	Usually DIY (Follow the manual carefully)	**Cost**	Insulation tapes are typically the cheapest solution. The total cost depends on the sealing method chosen and the size and number of windows and doors
Justification	Preventing cold air from entering the dwelling and stopping heat from escaping through inadequately protected areas leads to reduced heat losses.		
Energy savings	Approximately 15% for a building with poor external insulation standards.* Savings will depend on the total proportion of heat loss through the entire building envelope (external walls, windows, external doors, roof and soffit, basement ceiling, foundations, floor on the ground).		
Attention	When using this improvement, moderate sealing must be applied in order to avoid disrupting the proper ventilation of the rooms, which can result in damp and mouldy walls.		

*E. Cuce, *Role of airtightness in energy loss from windows: Experimental results from in-situ tests*, "Energy and Buildings" 139(2017), s. 449-455.

2. Sealing basement windows			
Solution	Sealing cellar windows with gaskets, foams, tapes etc.		
Ease of implementation	Usually DIY (Follow the manual carefully)	**Cost**	Insulation tapes are typically the cheapest solution. The total cost depends on the sealing method chosen and the size and number of windows and doors
Justification	The reduction in heat loss comes from preventing cold air from entering and blocking heat loss through leaky windows.		
Energy savings	Approximately 3% of the heating use for the entire building.*		
Attention	When using this improvement, moderate sealing must be applied in order to avoid disrupting the proper ventilation of the rooms, which can result in damp and mouldy walls.		

*Own estimation.

3. Insulation of hot water pipes			
Solution	Covering heating pipes with insulating material (e.g., lagging).		
Ease of implementation		**Cost**	Lagging. The total cost depends on length of pipe and insulation material
Justification	Pipe insulation prevents heat loss during water heating and transmission, saving the energy required to heat the water.		
Energy savings	Up to 5% (depending on the material used).*		

*Obliczenia własne.

4. Insulation of unused attic ceiling			
Solution	Laying insulation, i.e., mineral wool, in a building with an unused (uninsulated and unheated) attic.		
Ease of implementation		**Cost**	 20 cm thick insulation, typically sold in rolls. The total cost depends on the insulated area.
Justification	Preventing heat from escaping to areas that do not require heating.		
Energy savings	Up to 35%, although this figure depends on the type of building.*		
Attention	This is a recommendation for an unused space. In occupied attics, the thermal insulation layer is more complex and has to be carried out by a professional.		

* Own estimation.

4.5. Electricity savings

The structure of electricity consumption in European homes depends on, among other things, the climate, cultural factors and individual lifestyles. Typically, the most energy consuming items are: fridge (works 24/7), lighting and small appliances. This is followed by the kitchen, washing machine and TV.

1. Replacing an old fridge			
Solution	• Replacing the old appliance with one possessing a good energy rating. • When replacing, it is worth adjusting the size of the unit to the typical (rather than maximum) needs of the family.		
Ease of implementation		**Cost**	 Depending on the device
Justification	• The annual energy consumption of a refrigerator from the 1980s and 1990s can be as high as 600 kWh. By comparison, the cheapest appliances today (with an energy class of F) consume around 250 kWh, while appliances with an energy class of D only 180 kWh. • A comparison of one line of fridge-freezers shows that a difference of 20 litres of volume translates into approximately 20 kWh of energy consumed (in F class).		
Energy savings	Reducing from 600 to 250 kWh means a saving of almost 60% on this item of the energy bill		
Attention	There are two energy class scales in use: the old one (from A+++ to D) and the new one (from A to G). The further along in the alphabet, the more energy the appliance consumes. Buying a fridge with one of the highest energy ratings means a more expensive investment, but the overall energy savings should be worthwhile in the long run. It is also worth bearing in mind that smaller appliances are generally less energy-consuming. It is a good idea to review the market offer in advance, for example using an online price comparison site. In the purchase price, the shop is obliged to take back the old appliance.		

2. Appropriate use of the fridge			
Solution	• The fridge must not stand in warm rooms or near radiators. • The tightness of the door determines energy consumption - the seals should be kept clean and replaced if necessary (simple test: if a piece of paper slammed against the door moves freely along the seal, it should be replaced). • Warm dishes should not be placed in the fridge, while it is a good idea to defrost products from the freezer inside the fridge. • The fridge should be defrosted regularly.		
Ease of implementation		**Cost**	 or  Maintenance: costless Repair: sealing kit
Justification	The appliance cools internally but gives off the heat taken from the inside—the less it emits, the less energy it consumes.		
Energy savings	Difficult to estimate—depends on usage patterns.		
Other savings	Reduced equipment failure rate (avoiding rust, clogging of components, and smooth functioning of systems) extends the life of the equipment.		

3. Replacement of incandescent bulbs with LED lighting			
Solution	• Replacing traditional incandescent bulbs with LED lighting. • Replacing older-generation LED bulbs with newer ones.		
Ease of implementation		**Cost**	 LED bulbs
Justification	• Traditional incandescent bulbs emit heat, which is technically a waste of energy—LED bulbs are able to provide similar light with much smaller energy losses. • The heat from traditional light bulbs is not an alternative to heating because it is expensive. • Progress in LED technology has been very rapid, which means that with cheap bulbs you can save a relatively large amount of energy.		
Energy savings	The latest light sources, which are replacements for the old 60W incandescent bulb, use 4W while delivering 210 lm/W (light per unit of energy consumed). Older-generation LED bulbs consumed 11W. Typically, the household has approx. 20 light sources used on average 5 hours per day.		

4. Rational use of standby mode			
Solution	Switching devices off when not in use, rather than letting them fall into standby mode. This holds especially for older devices, where standby mode consumes a lot of energy.		
Ease of implementation		**Cost**	
Justification	In standby mode, the device continues working even though it is not needed.		
Energy savings	Up to 30 watts that can be saved with older appliances (260 kWh per year).		

5. Limited use of stand-by mode and optimisation of functions			
Solution	• Switching off laptops, computers or monitors if they are not needed for at least several minutes. • Adjusting the screen brightness.		
Ease of implementation		**Cost**	
Justification	• After a few minutes of not using, the appliance will save more energy by turning off and on again than in standby mode. • The brighter the screen, the more energy the device consumes.		
Energy savings	Difficult to estimate—depends on the device characteristics.		
Additional benefits	Eye protection—too bright a light is harmful to the eyes.		

5. Proposals for administrators of multi-family buildings

Typically, in multi-family buildings, energy consumption in common areas is billed to all residents and therefore has a real impact on each resident's energy costs. Thus, it is worth taking measures to reduce common energy consumption as well. The proposed changes must be carried out by a qualified professional.

Attention!

Irrespective of consumption, it is worth checking the contracted capacity with the heating company first, as it may affect fixed rates on the bill. Sometimes buildings have oversized capacities, which increases the bills. Fixing this creates room for cutting costs easily.

1. Reduce heating and control temperature in common areas			
Solution	• Fitting valves and thermostatic heads on radiators in common parts of multi-family buildings (in stairwells, corridors, basements). • Reducing the heating of common areas. • Air ventilation by opening a window conducted only when radiators are turned off.		
Ease of implementation	 Authorised professional needed	**Cost**	 Receiver + labour
Justification	The temperature in stairwells does not have to be as high as inside the flats.		
Energy savings	• Approximately 5-8% for every 1°C lower in the area. • An overnight reduction of 1°C between 11pm and 6am can save up to 10%.*		

**Optimising the energy use of technical building systems – unleashing the power of the EPBD's Article 8, Ecofys 2017.*

2. Refurbishment of bathroom candle risers			
Solution	Control of the hot water flow (heating medium) with return temperature control in the central heating system.		
Ease of implementation	 Authorised professional needed	**Cost**	 Riser + labour
Justification	• In some countries buildings of older types have central heating systems without the regulation of the room temperature (bathroom risers, so-called candle risers). • Closing the thermostatic valves outside the bathroom raises the temperature in the candle risers, resulting in overheating of the bathroom. • Flow control enables temperature optimisation and reduces energy losses.		
Energy savings	Up to 18%.		

3. Weather-compensated control at the boiler or thermal centre			
Solution	• Installation of a controller optimising the operation of the heating unit, taking into account the temperature outside. • Configuration of the controller depends on the facility and actual needs (annual cycle, daily cycle, etc.), providing minimum consumption while maintaining thermal comfort (the latest technological solutions include control by means of artificial intelligence).		
Ease of implementation	 Authorised professional needed	**Cost**	 New heat source with weather-compensated control or AI control as a subscription service
Justification	• The amount of heat supplied to the central heating system should be adapted to the current energy demand of the building, which depends on, among other things, the weather conditions. • On warm, sunny days, you can benefit from natural heat gains in the form of solar radiation coming through the windows. On such days, there is also much less energy lost through the building envelope.		
Energy savings	Up to 9%.*		

** Optimising the energy use of technical building systems..., op.cit.*

4. Optimisation of the settings of heating appliances			
Solution	Adjustment of the parameters of the heating equipment to optimally cover the building's heat demand (technically: control of the settings and hysteresis curve of the heating equipment).		
Ease of implementation	 Authorised professional needed	**Cost**	 Labour
Justification	Optimisation of thermal energy consumption relative to current conditions. This measure is particularly important if the building has been modernised, e.g., insulated. The building's heat demand should be recalculated, the initial settings on all thermostats in the building changed, and the contract with the energy supplier adjusted to take into account the lower heat demand.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		

5. Heating curve optimisation			
Solution	The heating curve relates to the temperature of the water in the system to external conditions. This measure can be used with modern heat sources.		
Ease of implementation	 Authorised professional needed	**Cost**	 Labour
Justification	The heating curve depends on many parameters, including temperature preferences, design, location of the building, power and efficiency of the heating source, heat source automation used, insulation of the building envelope, ventilation in the building, and consumers—one setting is used for the radiator system and another for underfloor heating.		
Energy savings	Approximately 5-8% for every 1°C lower in the room.		

6. Use of dynamic hydronic balancing in the central heating system			
Solution	Control of the flow of a heating medium, usually hot water, together with control of the return temperature in a central heating system.		
Ease of implementation	 Authorised professional needed	**Cost**	 Labour
Justification	The dynamic hydronic balancing prevents rooms located closer to the heat source from overheating and the more distant ones from underheating. This results in adequate thermal comfort and energy savings.		
Energy savings	A minimum of 10%, on average around 18% and in special cases up to 30%.*		

** Optimising the energy use of technical building systems..., op.cit.*

7. Use of dynamic thermal and hydronic balancing of the hot water system and restriction of the water flow on its circulation system			
Solution	Flow control with return temperature monitoring in a hot water system.		
Ease of implementation	 Authorised professional needed	**Cost**	 Circulation riser + labour
Justification	• The dynamic hydronic balancing ensures an optimum flow of drinking water in the system, so that every user receives water at the right parameters—regardless of the distance between the dwelling and the heat source. • A thermally balanced domestic water system provides hot water on demand, meaning that the user pays for hot water rather than cold water which only becomes hot after several seconds.		
Energy savings	Up to 40% of energy related to hot water consumption and savings on water itself.		
Additional benefits	Health and safety—a properly designed hot water system reduces the risk of bacterial outbreaks (e.g., Legionella).		

6. How else can we help those at risk of fuel poverty?

Europe has not defeated energy poverty yet. In practice, it is being tackled best by Scandinavian countries, which have prioritised energy efficiency for decades, and the high incomes of the population make such investments possible. The situation is worse in Central, Eastern, and Southern Europe, but energy poverty does not escape the British or Western Europeans either.

The problem of fuel poverty in Europe has not yet been solved completely, but there is a set of actions that have proven to be effective and have reduced its scale at national or local levels. A list of reliable sources with descriptions of good practices includes:

- *Tackling energy poverty through local actions—Inspiring cases from across Europe*, Energy Poverty Advisory Hub, 2021
- *How to engage energy poor and vulnerable consumers in the energy transition?*, Energy Cities, 2021
- *Review of public policies and interventions to reduce energy poverty*, WELLBASED, 2021
- *Best practices in STEP project countries.* STEP Report, 2019
- *Policy instruments and measures to alleviate energy poverty in Germany—learning from good practices in other European countries*, Oeko-Institut, 2018
- *Good practices aiming to end energy poverty*, A. Bajomi, Á Gosztonyi, European Parliament, 2017.

The upcoming winter will be very difficult for many households due to skyrocketing costs and likely fuel shortages. The most effective way to reduce heating costs is through thermal renovation (retrofit) of buildings and replacement of heat sources. The future is undoubtedly electrification of heating. These are complex, difficult changes that may require state support not only at the financial level but also at the technical (standards) and advisory levels. However, there are many measures that can be taken in a short time and at a relatively low cost, and it is these solutions that our short guide presents.

Cutting energy bills before winter
A smart guide for European households

FORUM ENERGII
ul. Wspólna 35/10, 00-519 Warszawa
NIP: 7010592388, KRS: 0000625996, REGON: 364867487

www.forum-energii.eu