

## Housing in several countries of Europe and in Ukraine:

Country	sq. m. per a person	Amount of apartments per 1000 inhabitants	Amount of inhabitants per one room
France	43	490	0,8
Sweden	44,4	482	...
Poland	22,2	300	1,0
Great Britain	44	417	0,5
Hungary	29	400	0,9
Portugal	28	482	0,9
Russia	20,8	360	0,9
Ukraine	22,5	411	1,0

*Note: Evaluation data for Ukraine is for 2007, including the persons who live in hostels and rent accommodation, for other countries the data is for 2001-2003*

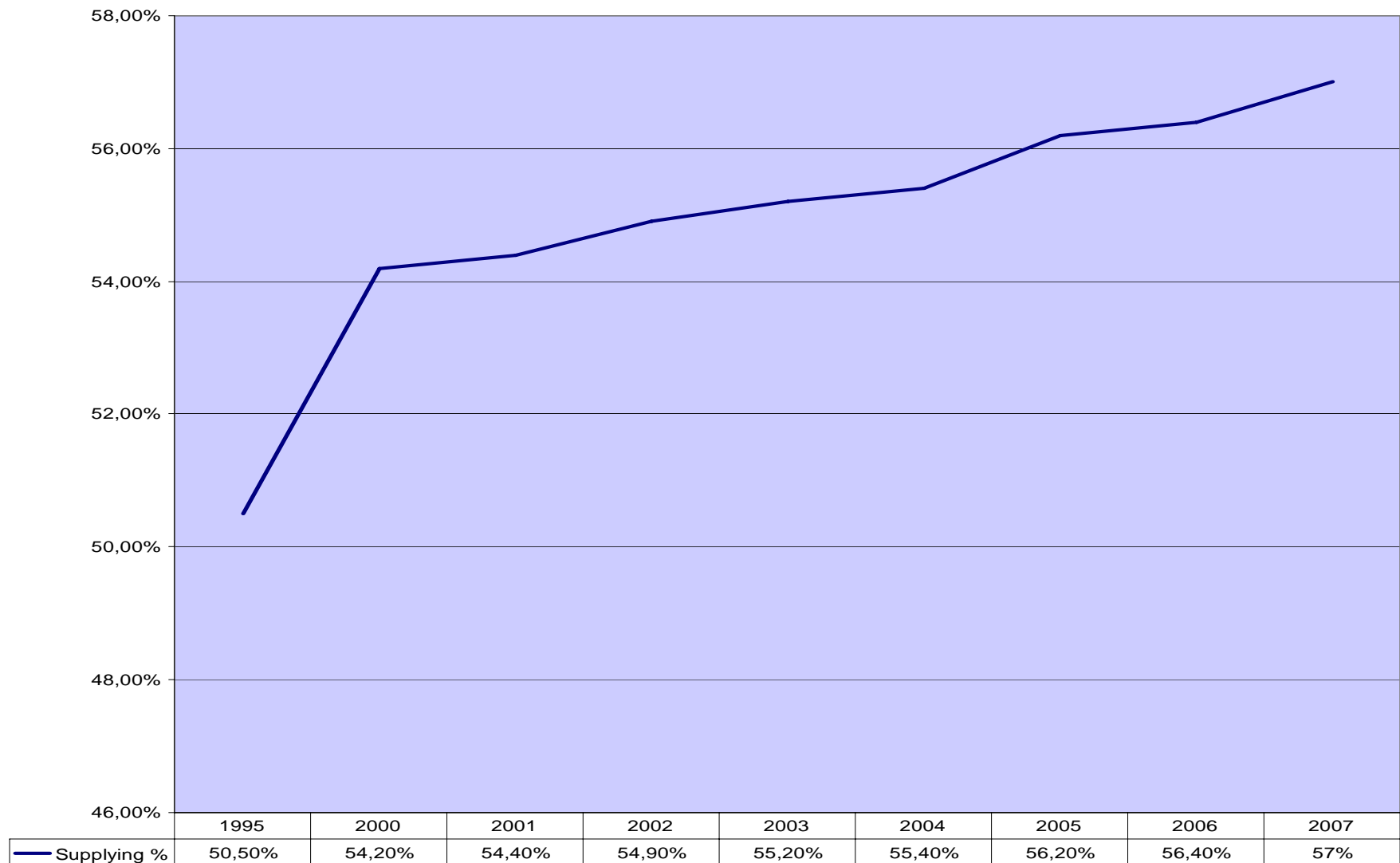
## Households' classification by the time of the last capital repair of the housing in 2000-2007

Indicators	2003	2004	2005	2006	2007
<b>Quantity of households (thousands)</b>	17680	17638	17613	17634	17539
<b>before 1970</b>	2,5	2,6	2,3	2,5	2,2
<b>1970-1980</b>	3,2	3,3	3,1	3,3	2,8
<b>1981-1990</b>	8,0	7,7	8,3	7,9	7,1
<b>in 1991-1995*</b>	4,9	4,8	5,9	13,3	13,3
<b>in 1996 and later*</b>	6,3	9,2	13,7	9,3	11,9
<b>The capital repair was not done</b>	75,1	72,4	66,7	63,7	62,7

*\*For 2006-2007 is given the information for the period of 1991-2000 and for 2001 and later.*

	1995	2000	2001	2002	2003	2004	2005	2006	2007
<b>Housing equipment, % to total residential space:</b>									
<b>Central heating</b>	47,9	52,8	53,7	54,2	54,7	55,1	56,2	56,8	57,5
<b>Water supply system</b>	50,5	54,2	54,4	54,9	55,2	55,4	56,2	56,4	57,0
<b>Canalization</b>	47,3	51,4	51,9	52,4	52,7	53,1	53,8	54	54,7
<b>Hot water supply system</b>	35,0	38,6	39,0	39,2	39,0	39,3	40,0	39,9	40,2

# Supplying of Housing with Water Supply System % to General Living Space



# Supplying of Housing with Central Heating

## % to General Living Area



1. Order of the Cabinet of Ministers of Ukraine from 16<sup>th</sup> of October 2008 #1334-p “About approval of priority activities in the field of energy efficiency and energy saving for 2008-2009”
2. Order of the Cabinet of Ministers of Ukraine from 16<sup>th</sup> of October 2008 #1337-p “About implementation of activities on decreasing of electrical energy consumption by state financed organizations”
3. Decree of NAER from 30<sup>th</sup> of March 2007 # 56 “About approval of the procedure of competitive selection of expert organizations and qualification of cogeneration plant”
4. Decree of NAER from 17<sup>th</sup> of April 2007 #59 “About approval of the procedure of approval by NAER the innovative and investment projects on implementation of energy saving technologies and technologies on production of alternative fuel recourses, that are realized by the economic agents in the frames of concessional lending”.

## **Technical State of Boiler and Machinery Equipment, that is Used in Housing and Public Utilities and Budget Spheres.**

- **On gas work 77,4%, on solid fuel – 21%, on oil fuel – 1%, electric boilers – 0,6 % of total quantity of working boilers.**
- **14,7 % of boilers work with efficiency till 70 %,**
- **28,6 % - with efficiency till 80 %,**
- **56,7% with efficiency till 90 % and higher.**
- **So almost 44% of boilers require high priority replacement.**

## LIST OF THE MAIN SYSTEMS OF HEAT SUPPLY USING ELECTROENERGY

	Name	Type	Efficiency of fuel's usage, %
1	Direct electric heat supply	individual	35
2	Electroheat-accumulating cabling system	individual	35
3	Electric space heating on the base of electroheat installation with water accumulator boxes	local	35
4	Electric space heating on the base of hydrodynamical installations	local	35
5	Electric space heating on the base of heat-retaining furnaces	individual	35
6	Electric space heating on the base of heat pump plants	local	110
7	Combined heat supply using privileged electric power and gas boilers of small power	local	58

## PROGRAM OF ELECTRO-HEATING IN DONETSK REGION

The program, that was developed in 2006 in Donetsk region, foresees reconstruction of coal boiler-houses in 20 towns of Donetsk region, heat supply of more then 170 objects of social sphere more then 44000 customers. The total area, that is heated, will be 2,50 millions sq.m. by:

- Implementation of electric-boilers in quantity of 10 units, that are built instead of existing ones using the existing heat supply system. At the bottom of system decisions – autonomous and group warmth points.
- Implementation of individual electric-boiler in quantity of 121 units, build on the level: house – entrance with the usage of existing inner heat supply system of a building. At the bottom of system decisions – inbuilt and modular automatical (domestic heating plant).
- Implementation of heat-accumulators on 63 points, electro-heating with the usage of solid warmth accumulators (in the quantity of more then 20000 units).

**In residential buildings of large scale building the heat losses are because of:**

**Plinths and the floor of a ground floor – 5-10%,**

**Walls – 30%,**

**Windows – 40%,**

**Others – the losses because of the losses through the roof, garret and other elements of the houses.**

## ADMINISTRATIVE-OFFICE BUILDING WITH IMPLEMENTATION OF ENERGY SAVING TECHNOLOGIES



## LIST

**of energy saving technologies and actions that will be implemented  
in administrative-office building with apartments,  
that is built at address: 2, Bulakhovskoro str., Kiev, Ukraine**

#	Name of technology or activity	Foreseen volumes of implementation	Expected result
1.	<b>Heat pump system for heating, hot water supply and air conditioning :</b>		
1.1	<b>Heat pump system on the base of helio-heaters, places on the roof of a building, reverse compressor units.</b>	Several floors	<b>Heat pump system has a modular type (модульный характер). Annual losses from the heating of an area of 200 sq.m. with heat pumps are in 2,8 times lower then from the central heating. Period of recoupment is 3-6 years.</b>
1.2	<b>Heat pump system “air-water” that is utilizing the warmth of the air of extraction ventilation of a building.</b>	Several floors	
1.3.	<b>Heat pump system “water-water” that is utilizing the warmth of the ground with the help of heat exchangers, that were built-up during the construction of the foundation of a car park building.</b>	Several floors	
2.	<b>Aerial waste heat exchangers of heat, that utilize the warmth of the air and are placed under the windows in the rooms.</b>	Floors or several rooms	<b>Utilize till 70% of the warmth of the air, that is off-taken from the room. Period of recoupment is 1-2 years.</b>

3.	<b>Electrical accumulators of a heat are using the phase change of working material for heating or hot water supply.</b>	<b>A floor or several rooms</b>	<b>Usage of three tariff meter of electric energy lets to reach the period of recoupment is 3-4 years.</b>
4.	<b>Electro-cable privileged heating is organized by electro-heating-accumulating technology with discontinuous energy consumption</b>	<b>Several floors</b>	<b>Enhanced comfort, ecological compatibility and (with rational choosing of operating conditions) economic efficiency. Period of recoupment is 3-4 years.</b>
5.	<b>Self-contained boiler house (Автономна котельня) for heating and hot water supply</b>	<b>Whole building</b>	<b>High efficiency = 92-94% is achieved using the modulation burners, unique heat-exchanging units and climatic automation. Period of recoupment is about 5 years.</b>

6.	<b>HP for accounting of heat-energy losses and automated control of energy consumption in a building and in systems of technical equipment</b>	<b>Whole building</b>	<b>Heating plant lets to consider individual features of every consumer, that gives an opportunity to lower the expenditures connected with pipage of heat carrier for 20-40% and to save up to 15% of warmth for heating and to make the most comfortable conditions of peoples' staying and living.</b>
7.	<b>System of monitoring of rooms' warmth losses.</b>	<b>Several rooms</b>	<b>Definition of warmth losses of the rooms in different periods of a year and annual exploitation conditions. Period of recoupment is about 1 year.</b>
8.	<b>Efficient thermal insulation materials, insulating glass units and special paints for building constructions of a house.</b>	<b>Whole building</b>	<b>Low coefficient of thermal conductivity, good gripping power and extensive effective life.</b>

**On execution of the Law of Ukraine from 16.03.07 # 760-V “About introduction of amendments to some legislative acts of Ukraine on stimulation of energy saving activity”:**

- **The order of inclusion of the enterprises, institutions and organizations that perform researches, implementation and usage of energy saving activities and energy efficient projects to the Government registration, was approved by Decree of NAER from 1<sup>st</sup> of April 2008 #49, registered in the Ministry of Justice of Ukraine on 16<sup>th</sup> of April 2008 #318/15009.**
- **The act of the Cabinet of Ministers of Ukraine from 26<sup>th</sup> of March 2008 #249 approved the order of the usage of the funds in 2008, which are foreseen in the Government budget for government support of energy saving activities.**