UNECE

Development of Renewable Energy in Ukraine

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1. Renewable energy resources familiarization is requirement of the time.

- Energy consumption per unit of the GDP:
- Ukraine – 0.5 kg oil equivalent per 1 $ US.
- It is 2.6 time higher than other developed countries and 3 times higher than EU country
- (Denmark, Japan – 0,11; Great Britain – 0.14; Germany, France – 0.18; USA – 0.21; Russia – 0.47)

1.1. Renewable energy resources familiarization is requirement of the time.

- High energy intensity of the Ukrainian GDP has historical roots.
- This situation leads to:
- Increasing its dependence on foreign energy sources
- Decreasing energy security
- Increasing greenhouse gases (GHG) emissions

1.2. Renewable energy resources familiarization is requirement of the time.

- Countries with economy in transition belongs to biggest emitters of GHG after USA and China (13% total world GHG emissions)
- According to IEA estimates to 2025 these emissions can increase to 40%

1.3. Renewable energy resources familiarization is requirement of the time.

- Development of renewable energy can significantly improve the reliability of energy supply in Ukraine and become important step to sustainable development.
- In the Energy Strategy 2030 adopted by Ukrainian Government (decree 145-r of March 15, 2006) it is stated that

1.4. Renewable energy resources familiarization is requirement of the time.

- “Development of alternative and renewable energy sources (ARES) should be regarded as an important factor enhancing energy security and decreasing anthropogenic impact of the energy sector on the environment. Large-scale use of ARES potential in Ukraine has not only internal, but also international importance as an essential factor mitigation on climate system, improving general energy security state in Europe.”

2. Renewable energy resources potential in Ukraine

RES	Annual technical potential		Annual volumes of substituting for natural gas
	Bln. kW*hour	Mil. T.c.e.	Bln. m^3
Wind power energy	41.7	21.0	18.26
Solar energy	28.8	6.0	5.22
Geothermal energy	105.1	12.0	10.43
Hydropower energy	27.7	10.0	8.70
Bio energy	162.8	20.0	17.4
Energy of environment	154.7	18.0	15.65
Total RES	**520.8**	**87.0**	**75.66**

2.1. Wind energy

- Ukraine keeps 14th position in Europe in wind energy utilization
- Total capacity of installed wind power facilities: 94 MW (March 2009)
- Electricity production is 270 mil. kW*h/year from the beginning of wind power development

2.2 Solar energy

- Ukraine has wide opportunities for creation solar converters (scientific and production capacity).

Ukraine produces photo-electric elements 150 MW every year but installs only near 100 kW. Most of the production is for export.

45 000 m^2 solar collectors are installed.

2.3 Bio energy

Type of biomass/ bio fuel	Energy potential mil. Tce/year
Crops straw	4.6
Corn stalk, cobs for chipping	2.6
Sunflower stalk and peeling	2.6
Biogas from manure	1.6
Waste gas	0.2
Waste from organic waste	0,3
Wood waste	1.6
Fuel from municipal solid waste	1.9
Liquid bio fuels (biodiesel fuel, bioethanol)	2.2
Timber (cane, poplar, China reed)	5.1
Peat	0.6
Total	23.3 (16 mil. tons of oil equivalent)

2.3.1. Bioenergy

- The surplus of straw and stalks produced in agriculture is in 3.4 times more than the quantity of fuel which is utilized by boilers located in rural areas (2.9 mil. t.c.e./year).
- Rural areas can become reliable producer of energy resources.
- The production of liquid biofuel could be reached: spirit – 2 mil. t /year,
- Biodiesel - 7 2 mil. t /year

2.4. Small hydropower

- Small hydropower has potential 8.3 bln. kW*hour/ year. Utilization of these resources will permit to save 3 mil t.c.e. or 2.6 bln. m^3 natural gas.
- It is planned to increase the capacity of small hydropower to 2030 to 1250 MW with electricity production 3.75-4.2 bln. kW*hour/ year. It will save 1.5 mil t p.c.e/year.

2.5. Geothermal energy

- Geothermal energy sources have capacity 27.3 mil. m^3/24 hours geothermal water with heating potential - 84 mil. Gcal/year.
- Annual energy potential that can be technically achieved - equivalent of 12 mil. t.p.c.e.
- It will permit to save near 10 bln. m^3 natural gas.

2.6. Barriers

1. Imperfect system of energy supply
2. Imperfect account of energy resources and payments
3. Imperfect tariff policy
4. Absence of legislation which would stimulate development of renewable energy
5. Diminishing access to the credit resources in all branches of economy
6. Procedures of the permanent financing of projects of small hydropower and wind energy do not exist

2.6.1. Barriers

7. Absence of the legal base for the use of renewable energy sources
8. Technical capacity of the energy supply networks to accept the renewable energy needs to be investigated
9. Absence of the biomass market as energy sources
10. A financing mechanism of renewable energy projects on the basis of Kyoto Protocol is in initial stage of development
11. The share of RE of developed energy is near 3%, in electricity – near 6.5%

3. Conclusion

- Ukraine has extensive potential for electricity generated from renewable energy sources. Apart from large hydro facilities which are already well utilized, the main sources are bioenergy, wind energy and small scale hydro installations.
- However, the utilization of this potential is very slow, lagging behind progress in other countries in Eastern and Western Europe, and also behind the targets Ukraine set for itself. For example, the wind energy support program established as a priority in 1996 envisaged 190 MW of wind capacity by 2010 but by March 2009 only 94 MW was installed.

3.1. Conclusion

- Full-scale utilization of the renewable energy in Ukraine will permit to cover 43% total demand of energy and will save 76 bln. m^3 of natural gas .
- The improvement of the environment for renewable energy (RE) development requires enforcement :
- scientific and research base for development of RE projects
- legislative and procedural system for RE projects
- finance mechanisms for supporting of the RE projects and incentives for business to develop the RE projects
- international cooperation in the field of development, implementation and creation of finance pipeline for RE projects

- Thank you for attention

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