Recovery of the power system
The potential of using local types of fuel

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Decarbonization of the economy

- development of renewable energy
- increasing energy efficiency
- development of circular economy
- synchronization with the REPpowerEU initiative and the "European Green Course"

OBLIGATIONS FOR RENEWABLE ENERGY UNTIL 2030

- share of renewable sources in total energy consumption 27%
  - the share of RES in electricity 25%
  - share of RES in heating 35%
  - share of RES on transport 14%
Decentralization of energy

Challenges
A waste of control/destruction
30% of power generation capacity:
- more than 10 GW of thermal generation
- about 6 GW of nuclear power plants
- 80% of Wind station
- 20% of Solar station
- Kakhovka hydroelectric power station

Advantages of distributed generation
- reducing the vulnerability of the power system during attacks
- reducing balancing needs
- reduction of losses in the network
- increasing maneuverability and flexibility
- increasing controllability
- increasing the use of local energy sources and types of fuel

The role of RES in distributed generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
<th>Capacity, MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1109</td>
<td>16.7</td>
</tr>
<tr>
<td>2017</td>
<td>3010</td>
<td>52</td>
</tr>
<tr>
<td>2018</td>
<td>7,450</td>
<td>157</td>
</tr>
<tr>
<td>2019</td>
<td>21,800</td>
<td>520 MW</td>
</tr>
<tr>
<td>2020</td>
<td>29,931</td>
<td>779 MW</td>
</tr>
<tr>
<td>2021</td>
<td>44,888</td>
<td>1205 MW</td>
</tr>
<tr>
<td>2022</td>
<td>52,205</td>
<td>1411 MW</td>
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</tbody>
</table>

DYNAMICS OF INCREASE
QUANTITIES AND POWERS OF EU HOUSEHOLDS
Directive 2012/27/EU "On energy efficiency"

Law No. 2955-IX dated February 24, 2023

- Qualification of high efficiency cogeneration;
- Methodology for determining the efficiency of the cogeneration process;
- Introduction of a guarantee of the origin of electricity produced by high efficiency cogeneration.

Signs of high efficiency cogeneration:
- Savings of primary energy over 10%* (CHP over 1 MW);
- Savings of primary energy more than 0% (for small and micro CGUs);
  
  * compared to reference values of separate production of electricity and heat.

Energy production by cogeneration plants (year 2020):

- 30% of the total thermal energy generation (40 GW thermal, 26 million Gcal)
- 30% of total electricity generation (28 GW electric, 49 billion kWh)
### The Structure and Volume of Agricultural Crop Waste

<table>
<thead>
<tr>
<th></th>
<th>The total amount of, million tons</th>
<th>The share is available to obtain energy, %</th>
<th>Economic potential, million tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereal straw</td>
<td>33.5</td>
<td>30%</td>
<td>10.05</td>
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<tr>
<td>Rapeseed straw</td>
<td>3.9</td>
<td>40%</td>
<td>1.56</td>
</tr>
<tr>
<td>Corn waste</td>
<td>37.0</td>
<td>40%</td>
<td>14.8</td>
</tr>
<tr>
<td>Sunflower waste, incl. husk</td>
<td>19.1</td>
<td>40%</td>
<td>7.64</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>93.5</strong></td>
<td><strong>37%</strong></td>
<td><strong>34.05</strong></td>
</tr>
</tbody>
</table>

**Substitution potential**: 9.3 billion $m^3$ gas

\[ \approx 30\% \text{ of the total annual gas needs of Ukraine} \]
INITIATIVES IN THE FIELD OF BIOENERGY DEVELOPMENT

DRAFT LAWS

DEVELOPMENT OF SOLID FUEL TRADE (№ 8052)

PROMOTION OF CULTIVATION OF ENERGY CROPS (№ 5227)

DEVELOPMENT OF THE MARKET OF LIQUID BIOFUELS IN TRANSPORT (№ 3356)

BIOFUEL TAX EXEMPTION (№ 9596)

BASIC PROVISIONS

• creation of a single e-commerce system
• introduction of requirements for the quality of biofuels

• improving the conditions for growing energy crops
• envisaging state support

• introduction of a mandatory share of biofuels
• introduction of sustainability criteria for biofuels

• reducing the tax burden for bioenergy
• improving the investment attractiveness of projects
THE CONCEPT OF IDENTIFYING REGIONS AT THE ACCOUNT OF ENERGY CLUSTER (example)

**Bioenergy cluster:**
2 OTG
≈40 thousand ha

Production of biomethane (25 million m³), bioethanol (4 thousand tons/year), solid biofuels

Cultivation of agricultural crops (24 thousand ha) and energy plants (6 thousand ha)

Waste processing production

Alternative energy (SPP, WPP, HPP, bio-CHP)

Production of energy-efficient building materials

Housing and infrastructure

Agricultural, farming and food production

Cultivation of agricultural crops (24 thousand ha) and energy plants (6 thousand ha)
Thank you for attention!