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EXPO  
2017  
ASTANA  
FUTURE ENERGY

**UKRAINE :**

**ENERGY EFFICIENCY AND RENEWABLE ENERGY**

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and Energy Saving of Ukraine

# NATIONAL TARGETS ON ENERGY EFFICIENCY AND RENEWABLES

## National Renewable Energy Action Plan-2020

as of Oct.1, 2014, № 902-p

**11%**

of Renewables in final  
energy consumption

## National Energy Efficiency Action Plan-2020

as of Nov. 25, 2015, № 1228-p

**-9 % (6,5 million t.o.e.)**

of energy saving comparing  
to the average final energy  
consumption in 2005-2009

Ukraine was the 20<sup>th</sup> country to ratify the Paris Agreement

New Energy Strategy – 2035 is being developed

# KEY PRIORITY: SUBSTITUTION OF NATURAL GAS

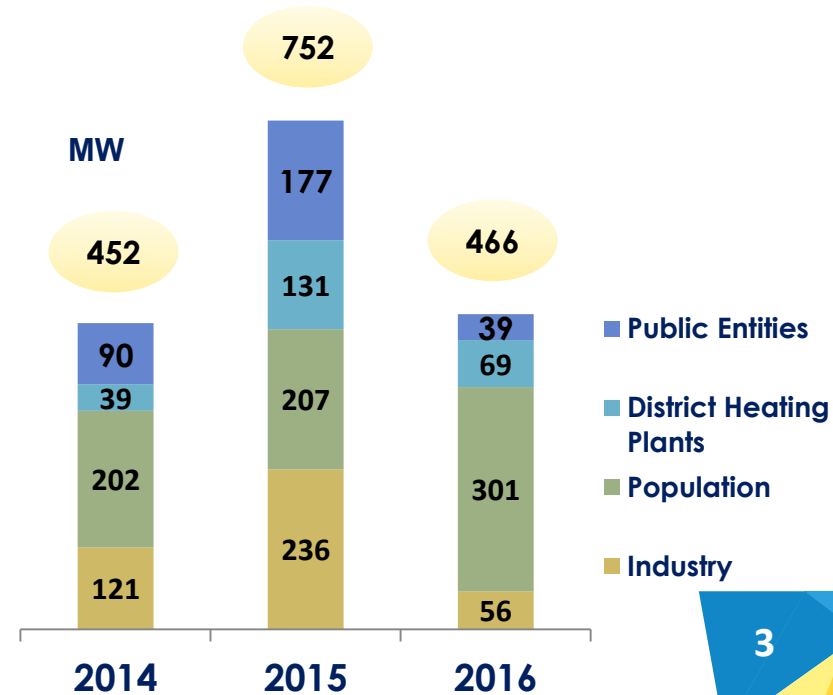
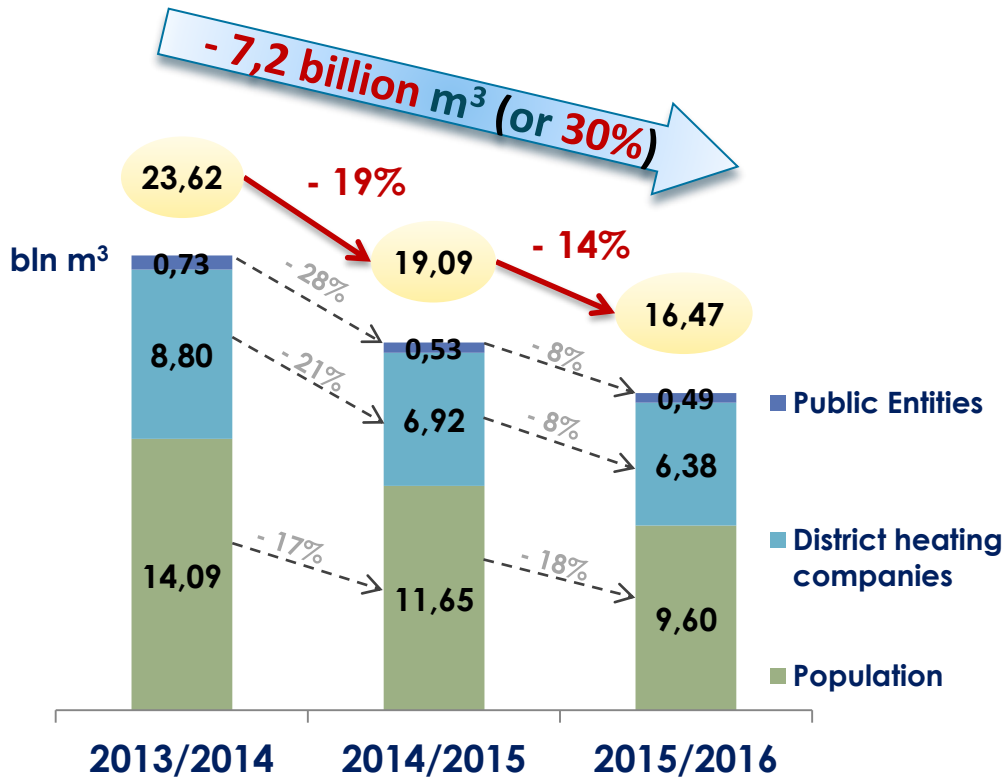
## Reduction of gas consumption

during heating periods 2013 / 2014, 2014 / 2015 and 2015 / 2016\*

## New biomass heat generation facilities

launched in 2014, 2015, 2016 \*\*

$\Sigma$  1 670 MW



\*According to "Naftogaz Ukraine" (Excluding Crimea, Luhansk and Donetsk regions).

\*\*According to regional state administrations.

# ENERGY EFFICIENCY IN BUILDINGS



Residential buildings		Public entities
Multi-Apartment	Private (Individual)	
<b>Number of Buildings</b>		
≈ 80 000	≈ 6,5 million	≈ 100 000
<b>Necessary Investment</b>		
≈ from 50 to 85 billion USD*		≈ from 4 to 8 billion USD*
<b>Annual Saving Potential (in gas equivalent)</b>		
8 billion cubic meters		800 million cubic meters

\*depending on the thermal modernization level

# STATE SUPPORT PROGRAM FOR HOUSEHOLDS (“WARM LOANS PROGRAM”)

## Duration:

Active since Oct'2014

## Mechanism:

Partial reimbursement of the loans obtained by participants (Individual Households & Home Owner Associations (multi-dwelling buildings))

## Financial partners:

Oschadbank, Privatbank, Ukreximbank, Ukrgasbank

## Support Share:

20% - for biomass boilers

35% - for energy efficiency measures for individual households

40% - for Home Owner Associations

## Funding:

**EUR 126 million** has been distributed to 300 000 households

**EUR 47,8 million - Government reimbursement**

## + 286 regional programs

(from local budgets due to fiscal decentralization) for extra reimbursement of «warm» loans

# ENERGY SAVING PERFORMANCE CONTRACTING FOR PUBLIC SECTOR

**2016: first 20 EPCs were concluded in 5 regions of Ukraine**

**2017: more than 100 EPCs are under initiation**

**The following laws and regulations, developed with EBRD assistance, have been adapted:**

- On public procurement and general issues
- On special ESCO's budgetary commitments (amendments to the Budget Code of Ukraine) – extra guaranty for return of investment during EPC (up to 15 years)
- Model of energy performance contract
- Methodology of calculation of basic consumption level
- Other sub-Laws of Ministry of Finance
- New public procurement of ESCO's service (e-procurement "PROZORRO")

# RENEWABLES IN UKRAINE

Installed Capacity of RES Power Plants, MW

Year	2013	2014	2015	2016
Solar PVs	748	819	839	938
Wind plants	371	497	514	525
Small hydropower	75	80	87	90
Biomass	17	35	35	39
Biogas	7	14	17	20
<b>Total</b>	<b>1218</b>	<b>1445</b>	<b>1492</b>	<b>1612</b>

Electricity Production by Types of RES, mln kWh

Year	2013	2014	2015	2016
Solar PVs	563	485	475	492
Wind plants	637	1124	1125	925
Small hydropower	286	251	172	189
Biomass	32	60	77	80
Biogas	5	40	64	89
<b>Total</b>	<b>1523</b>	<b>1960</b>	<b>1913</b>	<b>1775</b>

# TARGETS OF NATIONAL RENEWABLE ENERGY ACTION PLAN TILL 2020

	2009	2016	2020
<u>Power plants installed capacity</u>	4 625 MW	7 977 MW	10 900 MW
<u>Power generation</u>	11 471 GWh	18 726 GWh	26 000 GWh
<u>Heat and Cooling</u>	1 473 thou. t.o.e.	3 576 thou. t.o.e.	5 850 thou. t.o.e.
	14 730 thou. Gcal	35 760 thou. Gcal	58 500 thou. Gcal
<u>Transport</u>	52 thou. t.o.e.	298 thou. t.o.e.	505 thou. t.o.e.



# REQUIRED INVESTMENTS FOR NATIONAL RENEWABLE ENERGY ACTION PLAN IMPLEMENTATION

**Total amount of investments required – 12 billion EURO:**

**6,54 bln** – for electric power production;

**5,2 bln** – for heating and cooling;

**0.45 bln** – for transport.

**The Investment should be directed to the construction of:**

- Solar and wind power stations
- Cogeneration plants on biomass and biogas
- Waste recycling plants
- Geothermal power stations
- Small hydro power stations



# LAW OF UKRAINE

## «ON FOSTERING RENEWABLE ENERGY DEVELOPMENT»,

### 04.06.2015, NO. 514-VIII

#### Introduced feed-in tariff till 2030 for:

- on-ground solar power stations:

**15,03 €ct/kWh;**

- wind power turbines above 2 MW:

**10,18 €ct/kWh;**

- biomass power stations:

**12,39 €ct/kWh;**

- hydro-power stations up to 10 MW:

**10,45 €ct/kWh;**

- geothermal power installations:

**15,03 €ct/kWh;**

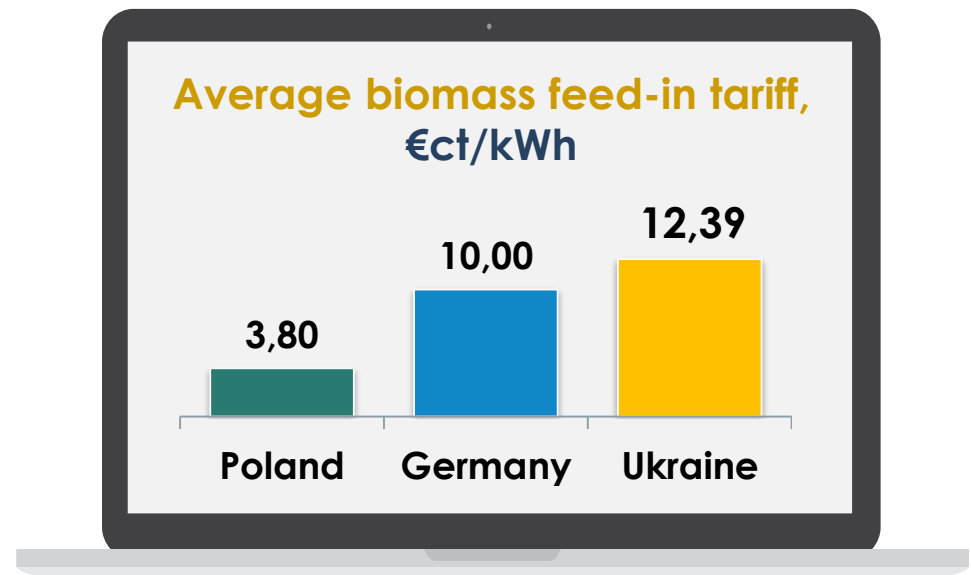
- private household PVs up to 30 kW:

**18,09 €ct/kWh;**

- private household wind turbines up to 30 kW:

**11,63 €ct/kWh.**

Premium for Ukrainian equipment usage is provided – 5-10% to existing tariff



\*approved by Order of the Cabinet of Ministers of Ukraine

№ 902-p dated October 1, 2014

# LAW "ON ELECTRICITY MARKET OF UKRAINE"

## 08.06.2017, No. 2019-VIII



### Targets of Law:

- creating a competitive electricity market
- providing reliable and uninterrupted power supply to customers

### Key Provisions of the Law regarding Renewable Energy:

1. **Signature of long-term Power Purchase Agreement (PPA)** with Guaranteed Buyer within feed-in tariff up to 2030.
2. **Step-by-step introduction of payment for unbalanced power supply:**
  - 10% in 2021
  - 100% - in 2030
3. **Establishment of a "corridor of irresponsibility"** for an error in forecasting the volumes of electricity production from RES.

#### Allowable variation of declared amounts of power production:

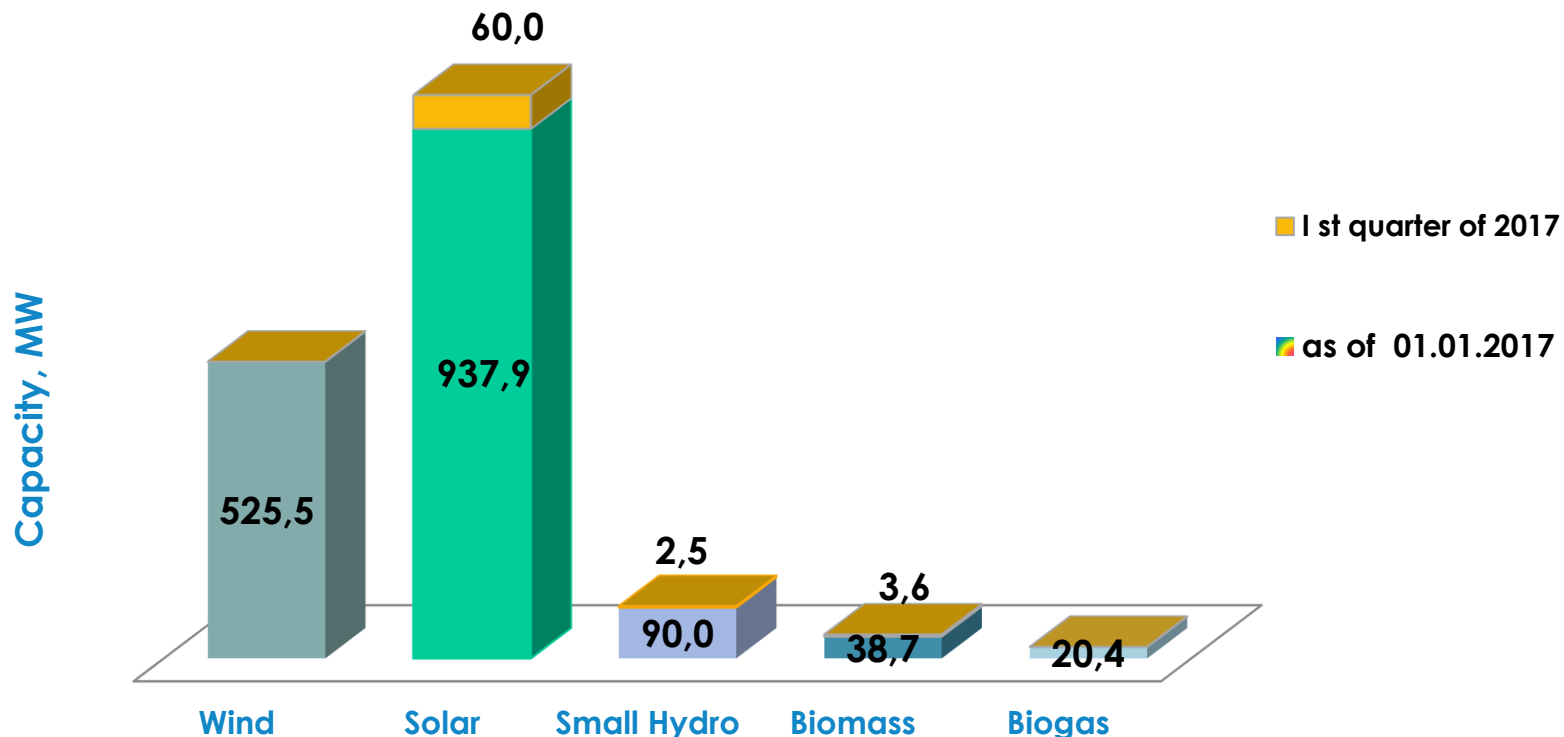
- for Wind Power Plants – 20%
- for Solar Power Plants – 10%
- for Small Hydro Power Plants – 5%

4. **Exemption from payment for unbalances** of RES facilities put into operation before the adoption of the Law.

### Law stimulates:

- Improvement of the system for forecasting electricity production
- Expansion of the market of power storage systems

# CAPACITY OF RENEWABLE ENERGY UNITS, OPERATING ACCORDING TO «GREEN» TARIFF



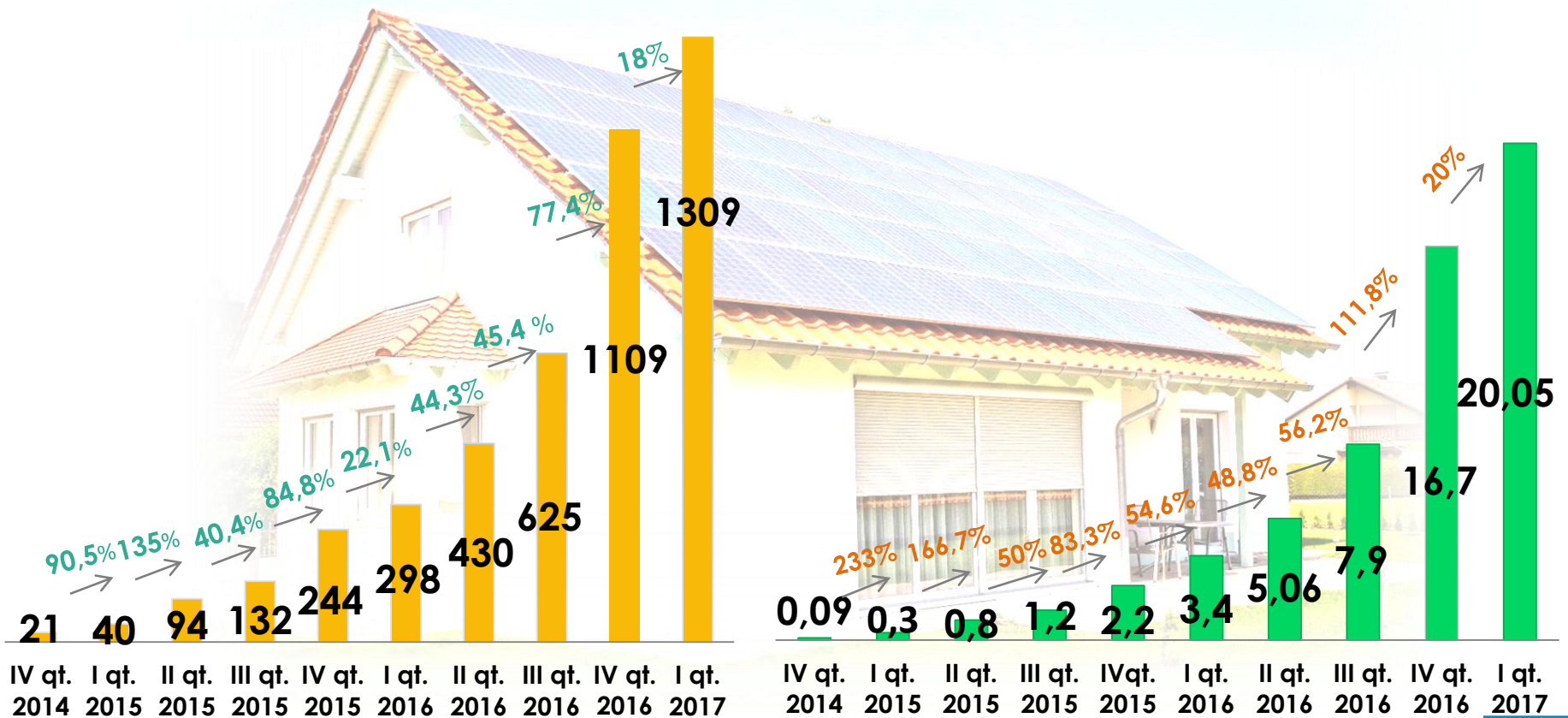
As of April 1, 2017 total capacity of renewable energy units which produce «green» energy is **1678,66 MW** (including 494,86 MW in the occupied Crimea).

Note: In 2016 there were introduced **120,6 MW** of new power facilities that generate «green» electricity and operate according to «green» tariff. **This is 4 times more than it was in 2015!**

# DYNAMICS OF SOLAR INSTALLATIONS IN PRIVATE HOUSEHOLDS

Number of private households

Installed capacity, MW



The number of private houses eligible for solar panels installation is 6.5 million

# EXAMPLES OF SUCCESSFUL RENEWABLE PROJECTS

## Boiler station on renewable fuels



The boiler station provides heat and hot water for 4 municipal medical institutions

Installed capacity: **10,5 MW**

Type of fuel: **pellets**

Investments: **47,3 mln UAH**

Put into operation: **2015 year**

Investor: **APS Power Technology**

## Botievska wind power station



Electricity output to the Integrated Power System of Ukraine – **634 mln. kWh**

Installed capacity: **200 MW**

Ratio of equipment availability: **98,9%**

Ratio of capacity usage: **36,2 %**

Total investment: **340 mln. €**

The level of "green" tariff:

**11,3 €ct/kWh**

## Wind power turbines production plant



Under license of German company Fuhrlaender AG

Installed capacity of turbines:

**2,5 MW, 3,2 MW**

Mass of unit: **285 tone**

Height: **100 m**

# EXAMPLES OF SUCCESSFUL RENEWABLE PROJECTS

## Biogas plant 5.5 MW (PJSC "Orel-Lieder")



Recycling 100% of chicken manure

Energy supply of poultry

Reduced CO2 emissions:

**270 000 tonnes**

Produced **Biogas - 35 million m<sup>3</sup>**

Produced "Green" electricity:

**70 million kWh**

Produced "Green" heat:

**10000 Gcal**

Replaced of natural gas:

**1.2 million m<sup>3</sup>**

## Energy willow (SALIX energy)



Company: «**SALIX energy**»

Plantations area: **1 700 ha**

Crop capacity: **20 t/ha**

Annual growth: **34 000 t/year**

Crop capacity cycle: **25 years**

Heat of combustion:

**17,3-18,0 MJ/kg**

Substitution of gas:

**10 mln m<sup>3</sup> gas/year**

## Boiler Plant on Alternative Fuel



Provides heat and hot water for **52 multistorey buildings, 2 kindergartens, 1 school**

City: **Vinnitsa**

Start of operation: **2016**

Capacity: **23.2 MW**

**(5.2 MW on wood chips, 18 MW on gas)**

Type of fuel: **wood chips**

Investments: **3,6 mln EUR**

Producer: **VISSMANN AG (Switzerland)**

# UAMAP – WEB PLATFORM OF INVESTMENT PROJECTS FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY IN UKRAINE



[www.uamap.org.ua](http://www.uamap.org.ua)



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**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH

On behalf of:



Federal Ministry  
for the Environment, Nature Conservation,  
Building and Nuclear Safety

of the Federal Republic of Germany



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**It's time to  
INVEST in UKRAINE!**