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Prof. Dr. Borislav Stojkov

# **RENEWABLE ENERGY IN SERBIA**

**(The case of AP Vojvodina)**

Kecskemet, October 2012



# **THE FUTURE OF ENERGY AND SPATIAL DEVELOPMENT OF SERBIA:**

- **SPATIAL DEVELOPMENT OF SERBIA AND MUTUAL INFLUENCES WITH ENERGY:**
  - IN THE FUTURE-MORE INTENSIVE DEVELOPMENT AND INCREASED COMPETITIVENESS OF HER REGIONS (AGRICULTURE, INDUSTRY, TOURISM, ENERGY....)
  - SUSTAINABLE USE OF ENERGY RESOURCES
  - MORE EFFICIENT AND RATIONAL USE OF ENERGY (CONSTRUCTION INDUSTRY, INDUSTRY, TRANSPORT)
  - SHIFT TO RENEWABLES
  - PRUDENT INVESTMENT AND PRICE POLICIES
- **ENERGY AND REGIONAL DEVELOPMENT:**
  - INTER-DEPENDENCES OF ENERGY SYSTEM WITH OTHER DEVELOPMENT SYSTEMS (ECONOMY, ECOLOGY, SOCIAL)
  - HORIZONTAL COORDINATION BETWEEN STATE OFFICES AND MINISTRIES
  - VERTICAL COORDINATION (SPRS AS AN INSTRUMENT)
  - OBJECTIVE ANALYSES OF ECO-ECO RELATIONS AND SOCIAL IMPACTS



# **THE FUTURE OF ENERGY AND SPATIAL DEVELOPMENT OF SERBIA:**

- **OWNERSHIP IN ENERGY:**
  - PRIVATIZATION: TO BE OR NOT TO BE
  - TENDENCIES IN SERBIA (ORIENTATION TO RUSSIA)
  - RESOURCES, TECHNICAL SYSTEM, OPERATION AND DISTRIBUTION - WHAT TO PRIVATIZE?
  - RENEWABLES AS FOREIGN CONCERN
- **ENERGY PRICING-A KEY QUERY**
  - ENERGY PRICES AS SOCIAL ISSUE WITH NO ECONOMY
  - LONG TERM CONSEQUENCES
  - FOREIGN INVESTORS TAKING THE SYSTEM OVER (THE END OF SOCIAL PRICING AND OF STATE ENERGY DISPOSAL)
  - RENEWABLES WITH NO CLEAR AND DEFINITE POLICIES AND LEGISLATIVE
  - NEGATIVE EXTERNALITIES (COSTS) NOT INCLUDED IN RENEWABLE ENERGY PRODUCTION PRICE





# BASIC POLICIES:

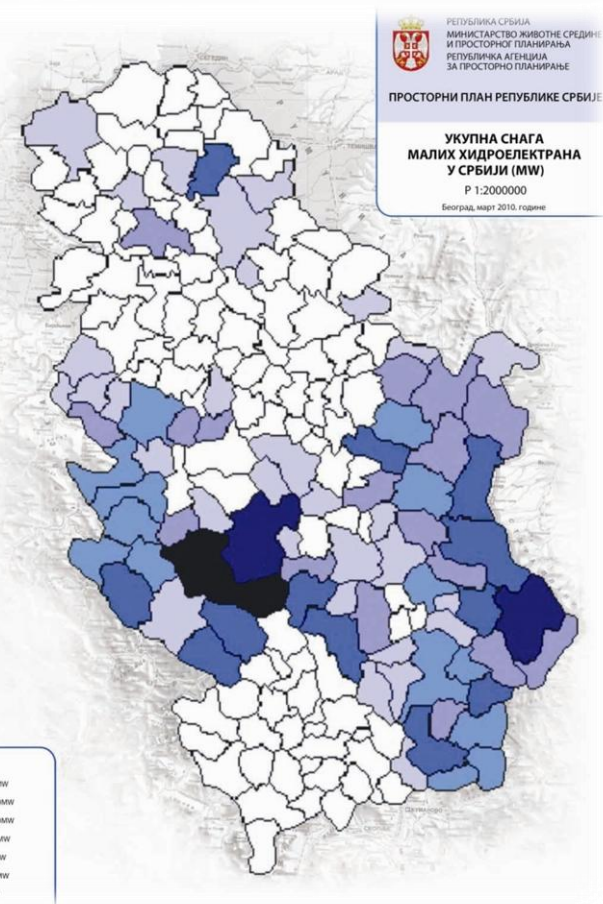
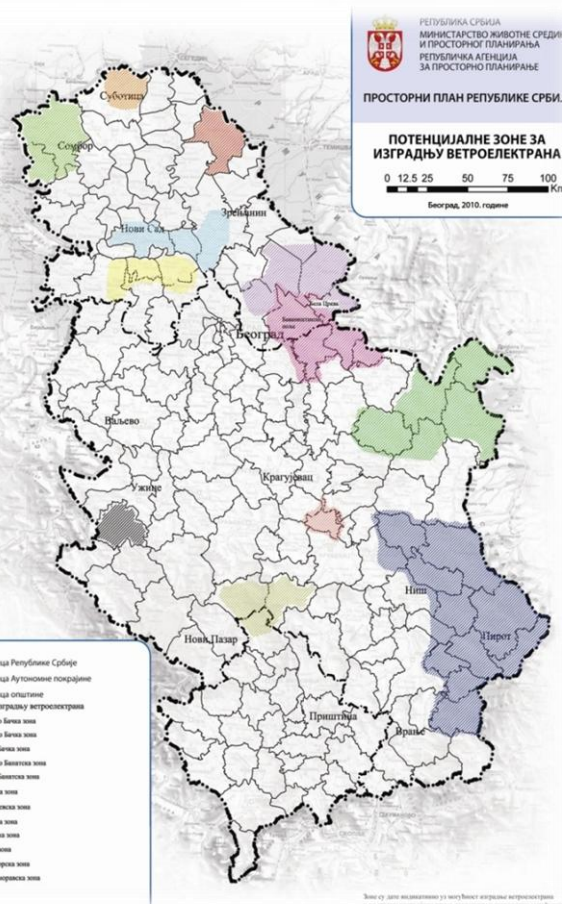
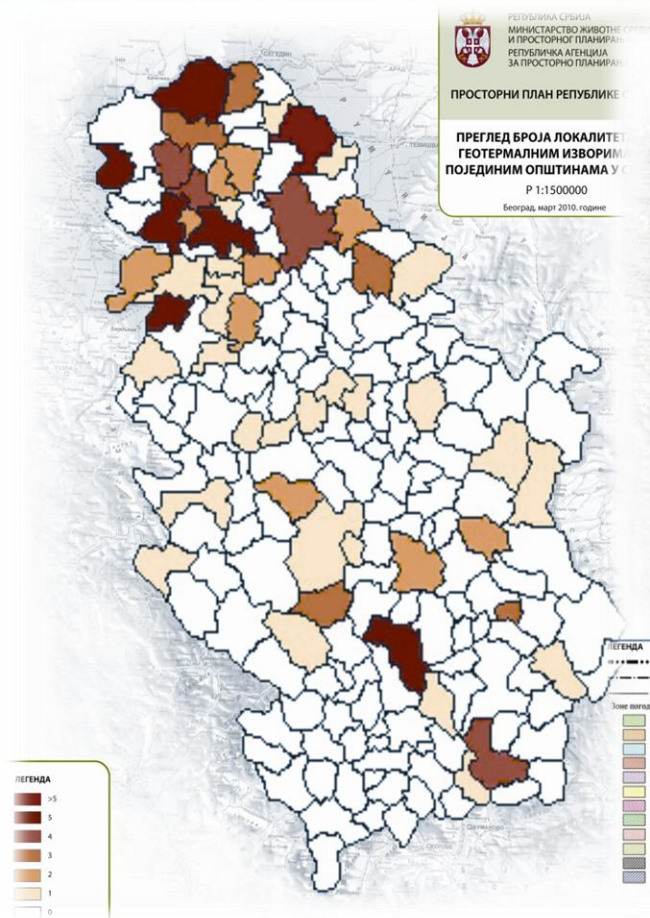
- SPRS, ENERGY DVPT STRATEGY, PROGRAMS OF IMPLEM., NEW LAWS.
- ENERGY ASKS FOR LONG-TERM PLANNING AND PRUDENT ANALYSES OF MUTUAL IMPACTS WITH THE NATURE, BIODIVERSITY, ENVIRONMENT, ECONOMY, SOCIAL DVPT, ETC.
- **BALANCED ROLE OF NON-RENEWABLE (NR) AND RENEWABLE (R) RESOURCES AND THEIR ENERGY CAPACITIES/CONTRIBUTIONS TO DEVELOPMENT?**
- **THE ROLE AND RIGHTS OF REGIONS AND LOCAL COMMUNITIES IN ENERGY POLICIES?**



# KEY DILEMMAS (1):

- FOSSIL ENERGY, CLIMATE CHANGES, THREATENED BIODIVERSITY // RENEWABLES AND THEIR AFFORDABILITY, LIMITS (FOOD PRODUCTION, ECOSYSTEMS- BIRDS, SOIL) AND PRIORITIES
- LIMITED CAPACITIES OF R-ENERGY RESOURCES, UNEVEN DISTRIBUTION OVER THE STATE TERRITORY
- THE ROLE OF DIFFERENT LOBBIES (NUCLEAR, COAL, HYDRO) WITH STRONG IMPACT TO SAVING THEIR POSITIONS- CONNECTIONS WITH GVMT BODIES
- THE PRICE OF ENERGY AS STRATEGIC INSTRUMENT FOR THE FUTURE (SOCIAL SUBVENTIONS OR ECONOMIC PAY-OFFS)
- R-ENERGY VS. NR-ENERGY: DIRECT AND INDIRECT COSTS AND EFFECTS (EU POLICIES?)







# KEY DILEMMAS (2):

- THE RELATION BETWEEN ENERGY AND POLITICAL SYSTEM
- CENTRALIZED STATE AND MONOPOLY OF ENERGY SYSTEM VS. DECENTRALIZED STATE WITH NEW ROLE OF REGIONS AND LOCAL COMMUNITIES
- LOCAL AND REGIONAL LAND PROPERTIES AND TERRITORIAL CAPITAL FOR NETWORKING TO MORE EFFICIENTLY USE OF THEIR ENERGY RESOURCES (POSITIVE/NEGATIVE EXTERNALITIES TO LOCAL COMMUNITIES)
- THE NEW ROLE OF FOREIGN MONOPOLIES





# THE CASE OF AP VOJVODINA

- THE REGIONAL DEVELOPMENT STRATEGIES OF APV
- ENERGY AS CRUCIAL HANDICAP FOR THE FUTURE
- OBJECTIVES:
  - DECREASING THE FINAL CONSUMPTION OF ENERGY
  - ENHANCING ENERGY EFFICIENCY
  - FUNCTIONAL USE OF R-RESOURCES
  - PROMOTION AND INCENTIVES TO R-RESOURCES (REGIONAL, LOCAL)
  - PARTICIPATION OF STAKEHOLDERS OF R-RESOURCES USE AND PROGRAMMING





АУТОНОМНА ПОКРАЈИНА ВОЈВОДИНА

Носилац израде:  
ПОКРАЈИНСКИ СЕКРЕТАРИЈАТ ЗА АРХИТЕКТУРУ, УРБАНИЗАМ И ГРАДИТЕЉСТВО

Координатор:  
РЕПУБЛИЧКА АГЕНЦИЈА ЗА ПРОСТОРНО ПЛАНИРАЊЕ  
ОРГАНИЗАЦИОНА ЈЕДИНИЦА ЗА ТЕРИТОРИЈУ АП ВОЈВОДИНЕ



РЕГИОНАЛНИ ПРОСТОРНИ ПЛАН

АП ВОЈВОДИНЕ

- КОНЦЕПТ ПЛАНА -

ЕНЕРГЕТСКА

ИНФРАСТРУКТУРА

-ТЕРМОЕНЕРГЕТСКА ИНФРАСТРУКТУРА-

Р 1:850 000

ЛЕГЕНДА

- |                                     |                            |
|-------------------------------------|----------------------------|
| <b>Постојеће</b>                    | <b>Планирано</b>           |
| Гасовод магистрални                 | Гасовод магистрални        |
| Гасовод разводни                    | Гасовод разводни           |
| Нафтовод магистрални                | Нафтовод                   |
| Нафтовод разводни                   | Нафтовод                   |
| Производња CO <sub>2</sub>          | Производња CO <sub>2</sub> |
| ГНС                                 | ГНС                        |
| Главни разводни чворови             | Подземно складиште гаса    |
| Сабина станица нафте и гаса         | Терминални производњски    |
| Рафинерија гаса                     | Термоелектране             |
| Подземно складиште гаса             | Термоелектрана-топлана     |
| Нафтни терминал                     | Термоелектрана-топлана     |
| Рафинерија                          | Термоелектрана-топлана     |
| Складиште нафте и нафтиних деривата | Термоелектрана-топлана     |
| Топлана                             | Термоелектрана-топлана     |
| Фабрика за производњу биодизела     | Термоелектрана-топлана     |

- |                  |                   |                    |
|------------------|-------------------|--------------------|
| Општински центар | Регионални центар | Покрајински центар |
| Државна граница  | Граница АПВ       | Граница општина    |

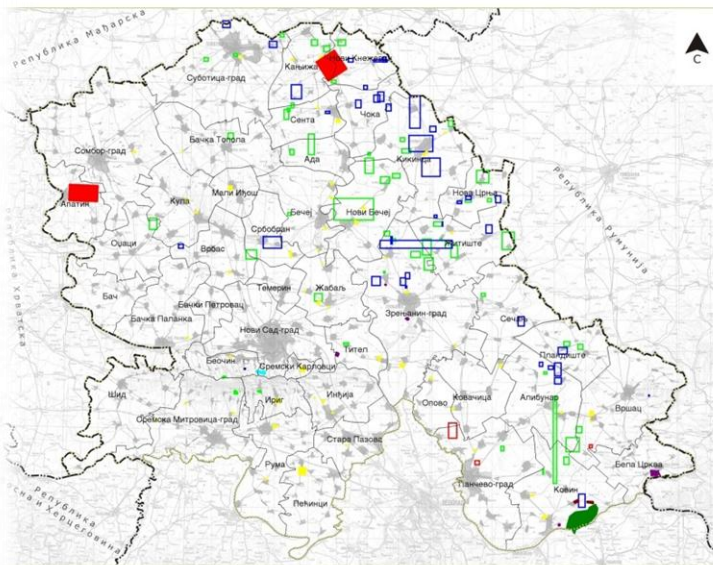
АУТОНОМНА ПОКРАЈИНА ВОЈВОДИНА

Тематска карта 8



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Тематска карта 2

Прегледна хидрографска карта Војводине  
са планираним хидроелектранама

0 10 20 30 40 50  
КМ

ЛЕГЕНДА

- |                          |
|--------------------------|
| планирана хидроелектрана |
| устава                   |
| устава са преводницом    |
| преводница               |
| сигурносна устава        |
| црпна станица            |



РЕГИОНАЛНИ ПРОСТОРНИ ПЛАН

АП ВОЈВОДИНЕ

- КОНЦЕПТ ПЛАНА -

ПРИРОДНИ РЕСУРСИ

- МИНЕРАЛНЕ СИРОВИНЕ -

Р 1:850 000

ЛЕГЕНДА

Експлоатациона поља минералних сировина

- |                                    |
|------------------------------------|
| Геотермална вода                   |
| Кречњак за цементну индустрију     |
| Кварчно-фелдспатски песак и шљунак |
| Латорији                           |
| Опекарске и керамичке глине        |
| Трехити                            |
| Тресет                             |
| Угаљ и шљунак                      |
| Зеолитисани тув и тув са зеолитом  |
| Шљунак и песак                     |
| Со поља                            |
| Гасна поља                         |
| Нафтна поља                        |

- |                 |             |                 |
|-----------------|-------------|-----------------|
| Државна граница | Граница АПВ | Граница општина |
|-----------------|-------------|-----------------|

Објекти из области заштите животне средине

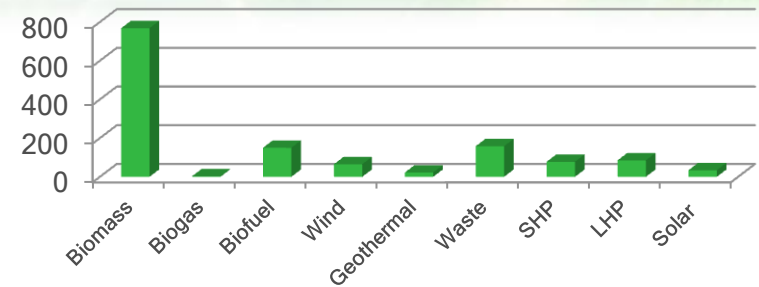


# APV R-ENERGY POLICIES

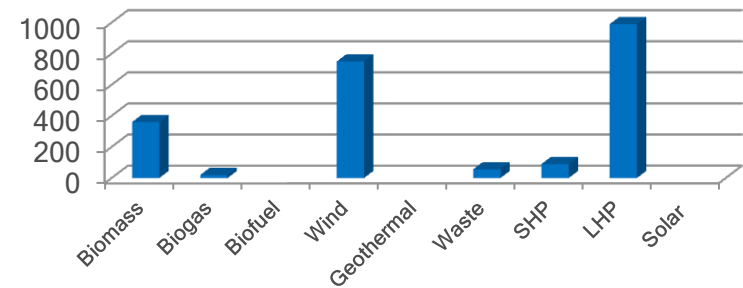
- R-ENERGY UP TO 20% IN 2021
- BIOMASS AS THE MOST IMPORTANT (20.500 TJ/A)
- PRODUCTION OF BIO-DIESEL AND ETHANOL (HIGH PRODUCTION COSTS?)
- SOLID WASTE (HEATING)
- GEOTHERMAL ENERGY FOR BALNEOLOGY (LAND OWNERSHIP PROBLEMS, QUANTITY- 54 MW TOTAL)
- WIND ENERGY CLASS 3, WITH 5.7% OF PRESENT ELECTRO-ENERGY IF REALIZED (COMPLICATED PROCEDURES, BIRDS AND SOIL PROTECTION)
- SOLAR ENERGY (267 SUNNY DAYS- 565 GW/H/A, SOIL PROBLEM)
- HYDRO POTENTIAL (POSSIBLY 13 PLANTS- 20.2 MW TOTAL, TECHNO-ECOLOGICAL PROBLEM)

## Total potential RES in AP Vojvodina

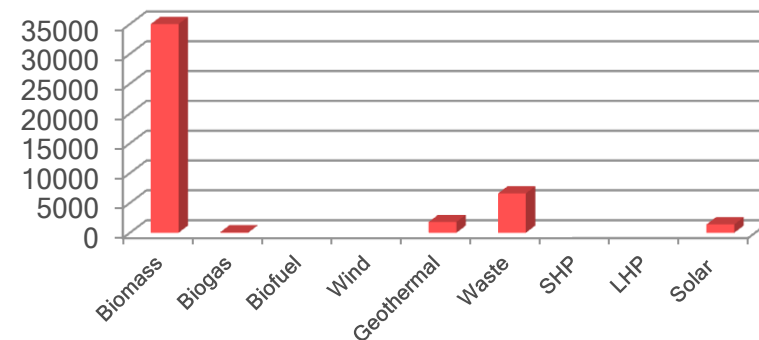
RES	Total Potential (k ten/year)	Thermal Energy (TJ/year)	Electric Energy (GWh/year)
Solid biomass(1/3 total amount)	768	35000	360
Biogas	3	90	20
Biofuel	150		
Wind (300 MW)	65		750
Geothermal	22	1800	
Waste	158	6600	56
Small Hydro Potential	77.7		90
Large Hydro Potential	85		990
Solar Energy	34	1400	
<b>Total</b>	<b>1293</b>	<b>44890</b>	<b>2266</b>



Possible Electric Energy production (TJ/year)



Possible Thermal Energy Production (TJ/year)







# PROBLEMS:

- WHO PRODUCES R-ENERGY (FOREIGN PARTNERS + STATE SYSTEM RELATIONS)?
- WHERE R-ENERGY GOES (ABROAD WITH HIGHER PRICE OR STATE SYSTEM)?
- WHAT WOULD BE INCENTIVES AND REGULATION FOR R-ENERGY?
- THE RELATION BETWEEN R-ENERGY AND REGIONAL (LOCAL) DEVELOPMENT (VOJVODINA'S AUTONOMY IN ENERGY)?
- ECONOMIC AND SOCIAL COSTS AND BENEFITS OF R-ENERGY (REGIONAL, LOCAL)?
- INSTRUMENTS FOR IMPLEMENTING R-ENERGY POLICIES (LEGAL, ADMINISTRATIVE, FINANCIAL, PPP, EDUCATIVE)?

The background is a vibrant green with a complex, abstract design. It features a central globe showing the continents of Europe and Africa. Overlaid on the globe are several concentric, swirling lines that create a sense of motion and depth. The overall aesthetic is modern and technological.

**THANK YOU FOR  
ATTENTION**