SE3T·NET
thinking future energy systems

Agora Energiewende

Влада на Република Северна Македонија

Achieving carbon neutrality in Southeast Europe: Obstacles, opportunities and ways forward

From planning to reality

Deputy minister
Jani Makraduli, MSc.

- **Obstacles**
  - Current energy sector
  - Public concerns
- **Opportunities**
  - Energy law
  - Energy efficiency
  - National Energy and climate strategy
    - National energy and climate plan
  - Grid infrastructure
- **Way forward**
  - Oslomej solar power complex

Energy Community

12 November 2019

On 11 November 2019, North Macedonia presented to the Secretariat the final draft of its Energy Strategy 2040, including with the perspective till 2030, which is the first to follow the overall structure of national energy and climate plans (NECPs) in the Energy Community and the timeframe indicated by the related Ministerial Council Recommendation. It covers the five dimensions of the Energy Union, although merging integration and security of energy markets and including an additional dimension on legal and regulatory aspects. The strategy sets out three scenarios, of which the intensive renewables one (green scenario) proved to be the most cost-effective. It incorporates also results from the study on 2030 targets, which the Secretariat launched in 2018 and was finalised earlier this year.

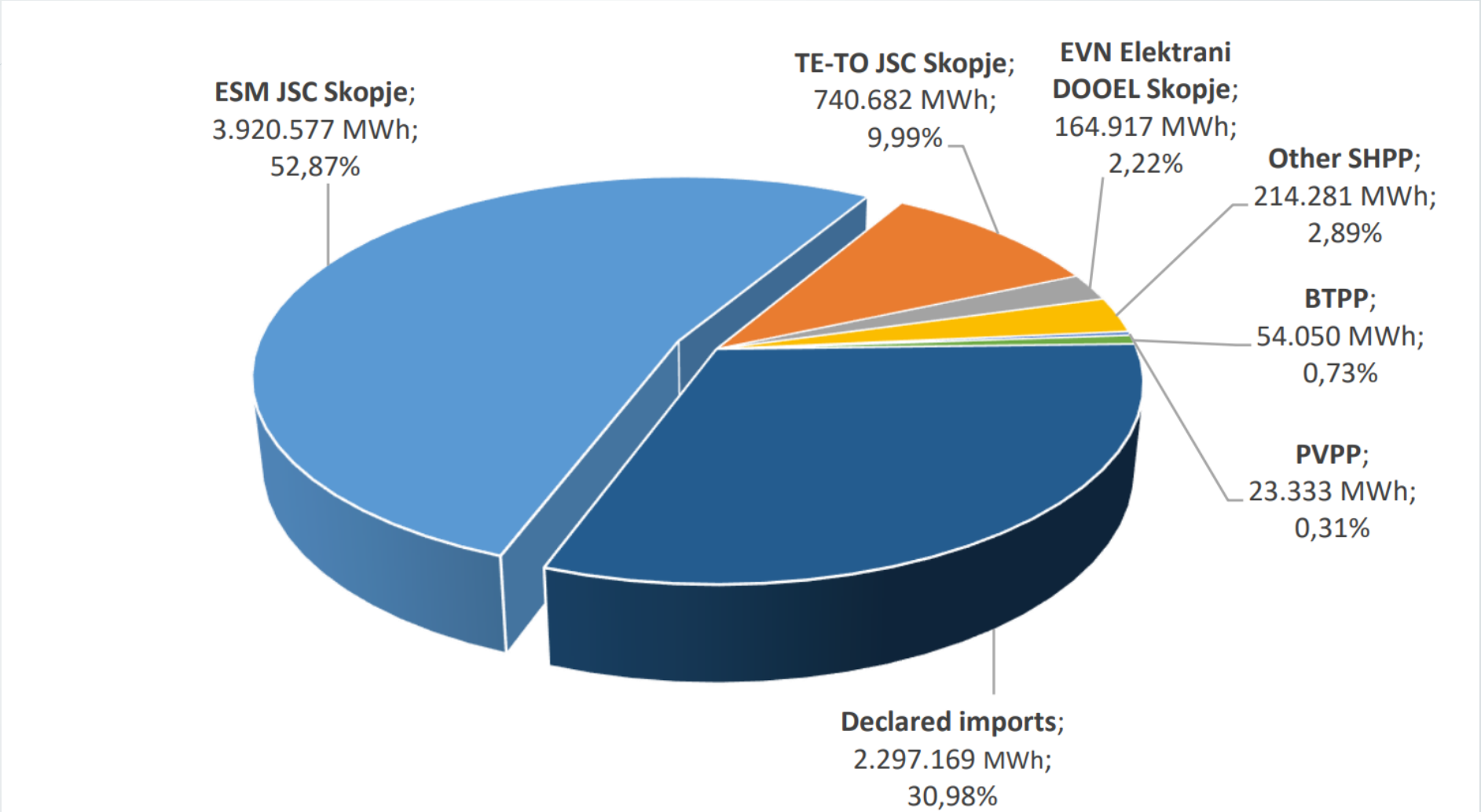
Following the first consultation round in July 2019, the Secretariat provided a new set of recommendations to fine-tune the strategy and to ensure due consideration and compliance with the development of energy and climate policies and targets at the Energy Community and EU level.

Obstacles

- Scale and nature of coal sector in the country
  - Existing 2 coal fired TPP (ESM owned)
    - TPP Bitola 3 units x 233MW
    - TPP Oslomej one unit 125MW.
  - Total share of energy production in the country in recent years from these capacities is approximately 60%, and decreasing during the years.
  - Total quantities of coal for nominal energy production is:
    - around 6.000.000t for TPP Bitola and
    - 1.000.000t for TPP Oslomej
  - In the recent years the annual quantities of coal is ranging from 5 to 6.000.000 t/y , especially for the TPP Oslomej where the coal production is nearing its depletion.
  - Main energy production company JSC ESM - 100% state owned company.

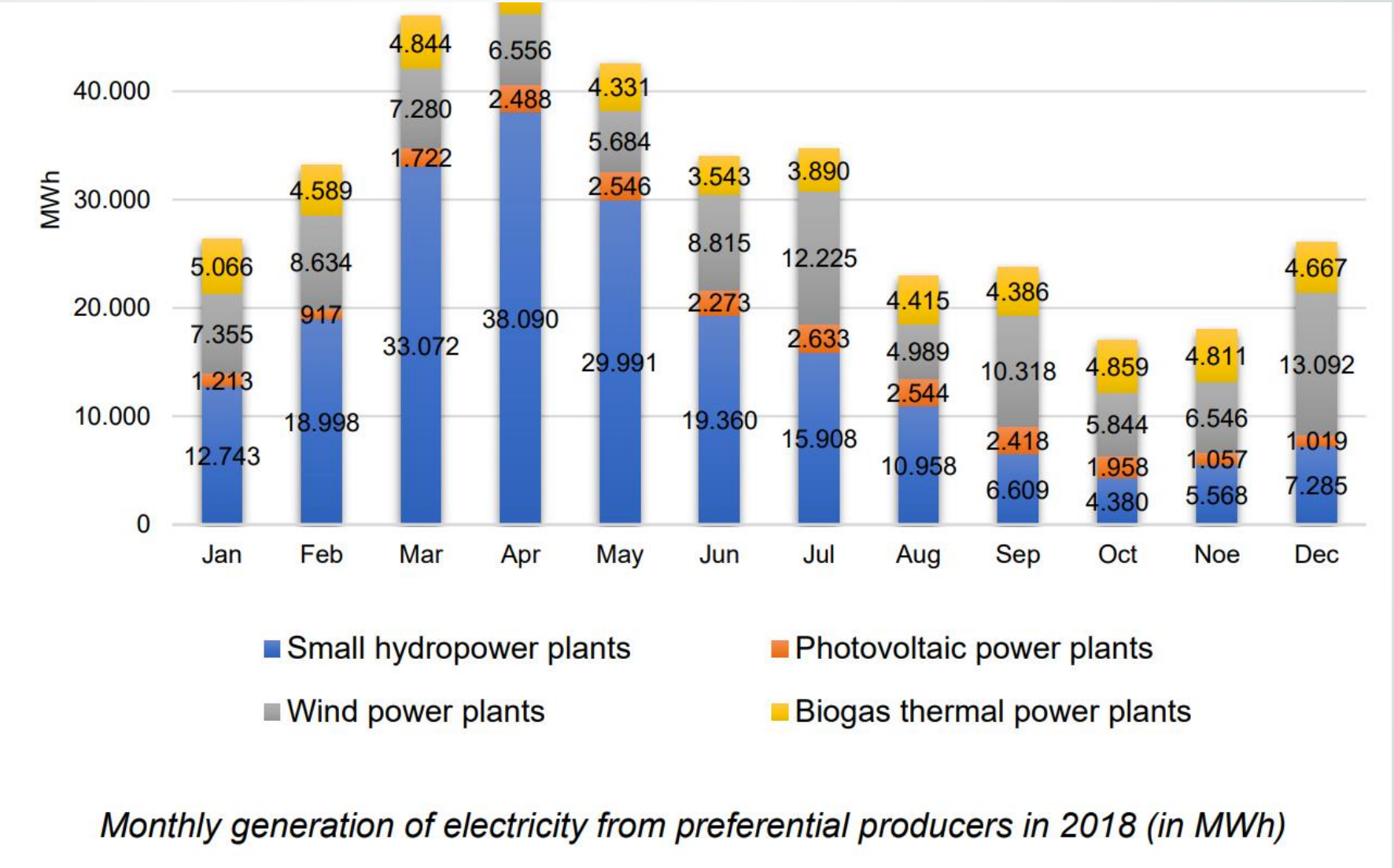
- Employment statistics for the sector
  - 4000 (out of 5000 from total ESM employees) in the sector for TPP;

Obstacles



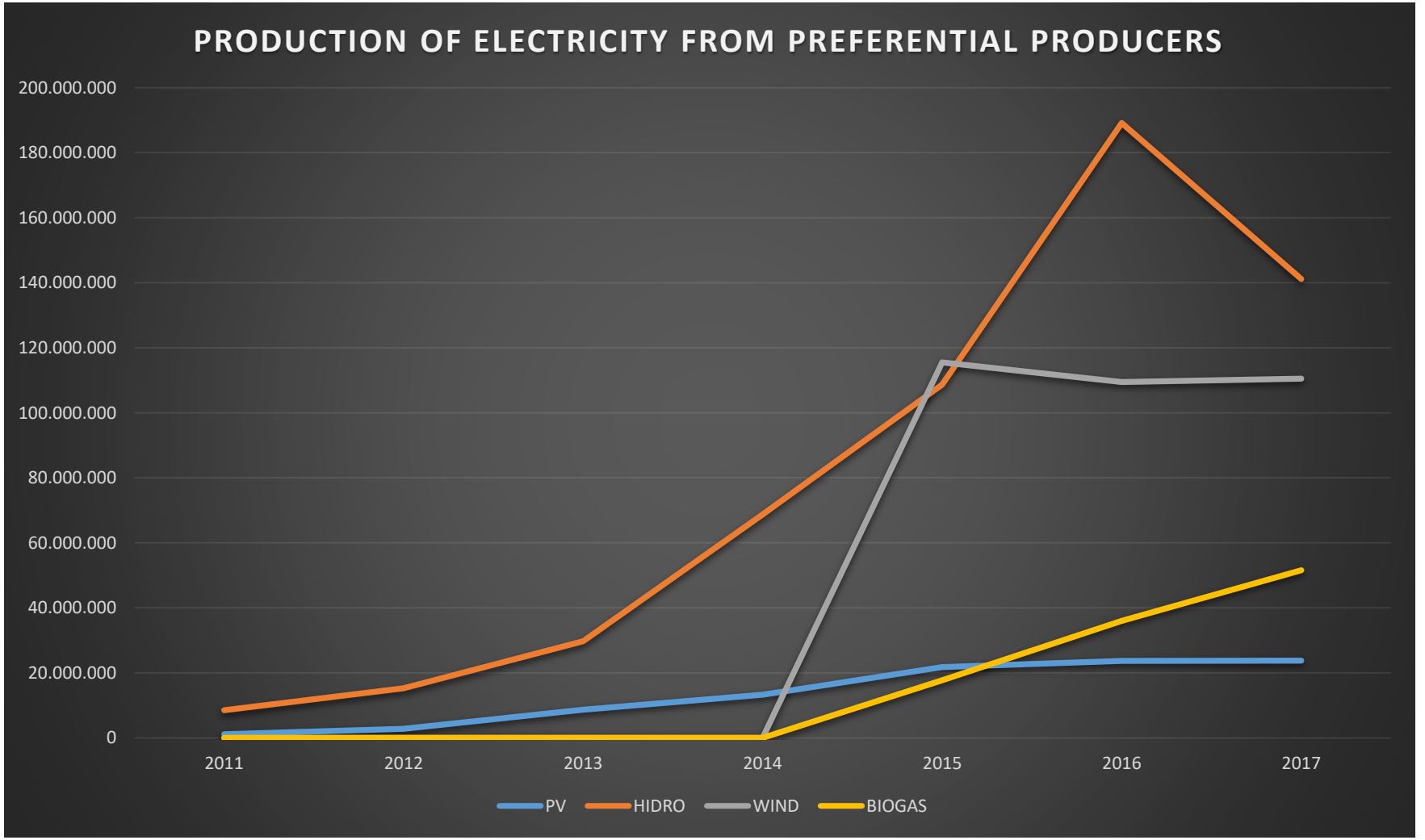
Structure of available electricity for covering needs of the consumers in the Republic of Macedonia in 2018 (in MWh and % share)

Obstacles

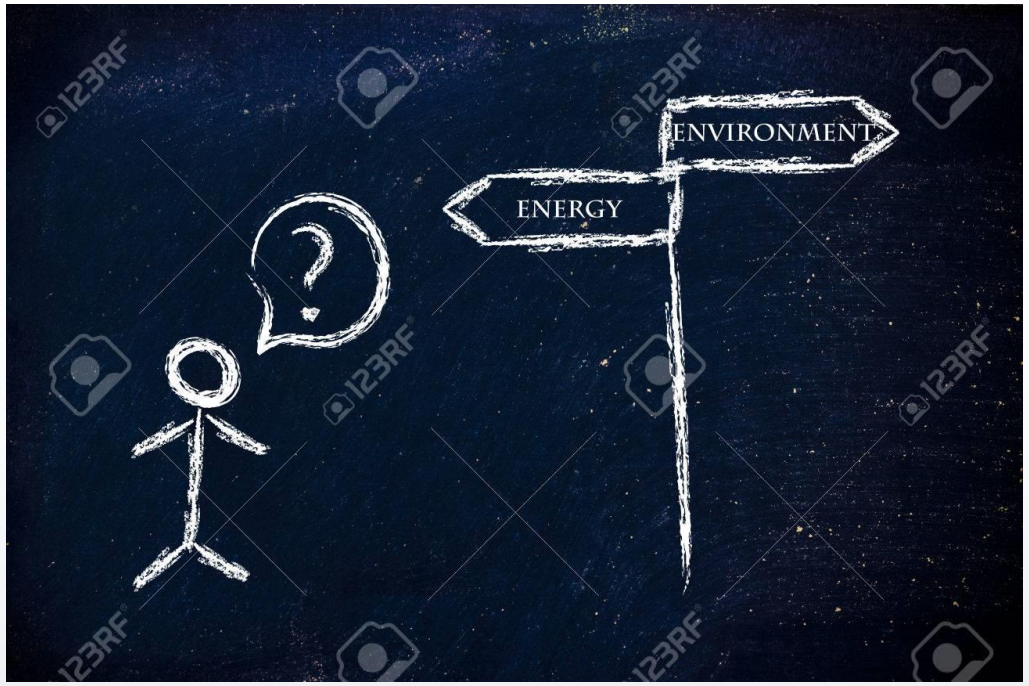


Monthly generation of electricity from preferential producers in 2018 (in MWh)

Obstacles

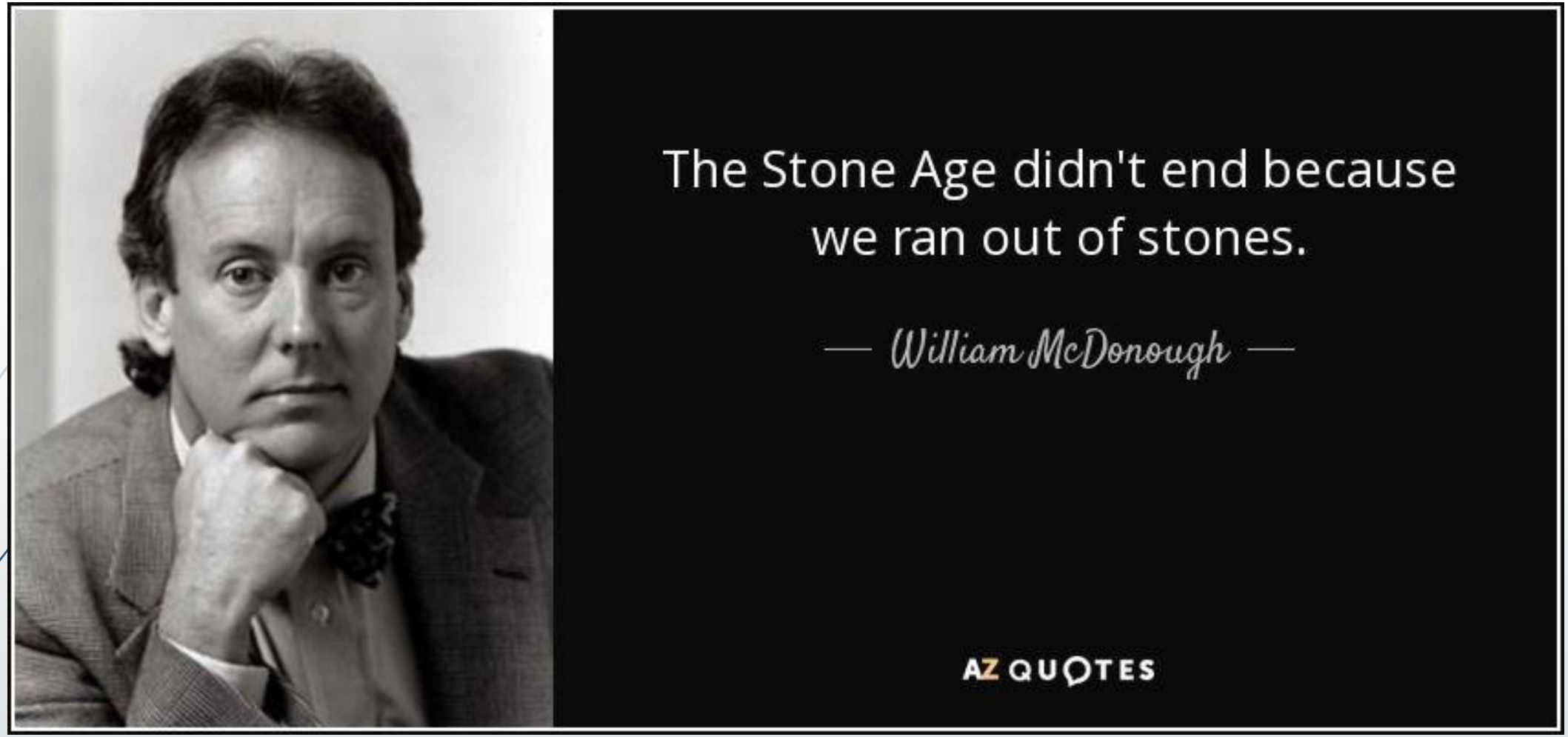

PRODUCTION OF ELECTRICITY FROM PREFERENTIAL PRODUCERS
200.000.000
180.000.000
160.000.000
140.000.000
120.000.000
100.000.000
80.000.000
60.000.000
40.000.000
20.000.000
0
2011
2012
2013
2014
2015
2016
2017
PV
HIDRO
WIND
BIOGAS

Public concerns



Energy needs Vs. Protect Environment

New Green Deal for Europe



Clean energy transition
economic opportunity & environmental imperative

Opportunity

The adoption of a Third Energy Package compliant Law in former Yugoslav Republic of Macedonia was a major step forward, providing the legal ground for the establishment of the day-ahead market and its coupling. A project to couple the markets of former Yugoslav Republic of Macedonia and Bulgaria was initiated. The first important milestone was a Memorandum of Understanding on Electricity Day-ahead Market Coupling between the two countries signed by the Ministers on the margin

New Energy Law a turning point for Macedonia, says Energy Community

Adoption of the Energy Law marks a turning point in the transposition of the Third Energy Package that provides the legal framework for establishment of "the day-ahead market" and merger of energy markets. In addition, Macedonia and Bulgaria have initiated the process of market coupling, says the Energy Community in its 2018 Annual Implementation Report.

Opportunity

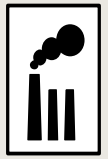
The Energy Law stipulates that the Strategy should ensure:

- Secure, safe and quality supply of all types of energy to the consumers;
- Stability, competitiveness and economic functionality of the energy sector;
- Efficient provision of services and protection and promotion of consumers rights;
- Reduction of energy poverty and protection of vulnerable consumers;
- Inclusion of the energy markets of the Republic of North Macedonia in the regional and international energy markets;
- Use of energy sources in a manner that provides sustainable energy development;
- Promotion of energy efficiency;
- Reduction of the use of fossil fuels for energy generation;
- Promotion of the use of renewable energy sources;
- Protection of public health, the environment and mitigation of climate change from the harmful effects arising from the performance of energy activities and
- Fulfilment of commitments assumed by the Republic of North Macedonia under ratified international agreements

2040 vision of the Strategy

Secure, efficient, environmentally friendly and competitive energy system that is capable to support the sustainable economic growth of the country.

		Reference scenario	Moderate Transition scenario	Green scenario
Vision		**Transition from conventional energy based on current policy and least cost principles**	**Progressive transition from conventional energy based on new policy and least cost principle**	**Radical transition from conventional energy based on new policy and lignite phase out**
Assumption highlights	**Demand drivers**	• Macedonian GDP growth to reach neighboring EU countries' GDP per capita levels of today by 2040 • Current energy efficiency policies • Penetration of EVs	• Same GDP growth as for reference • Energy efficiency based on enhanced policy (in line with EU Directives / EnC guidelines) • Higher penetration of EVs	• Same GDP growth as for reference • Same as moderate transition but more incentives and advanced technologies • Highest penetration of EVs
	Generation investments focus	• Lignite PP revitalization choice based on least cost principles • High focus on RES	• Lignite PP revitalization choice based on least cost principles • Further focus on RES technology investments	• Lignite PP revitalization choice based on least cost principles • Extreme focus on RES investments
	ETS entrance	2027	2025	2023
	Commodity prices (WEO 2017)[1]	Based on current policies scenario	Based on new policy scenario	Based on the sustainable development scenario
	Fuel Supply / Availability	• Lignite production capped at a maximum level of annual supply expected (~ 5 M tons 2018-2035, ~ 3 M tons 2035-2040) • Hydro production and wind/solar in line with historical trends and adjusted for new entering power plants • Cross Border Capacities (electricity and gas) evolution in line with the ENTSO-E, ENTSO-G and EnC • Sustainable consumption of biomass[2] • Battery storage (EVs and pump storage)		

Energy pillar	Indicator	STRATEGIC GOALS	Metric
1 Energy efficiency	Energy efficiency 	Maximize energy savings	• Reduction of primary and final energy consumption vs. BAU scenario
2 Integration and security of energy markets	Energy dependence 	Maintain current energy dependence around today's level (54% net import), while improving overall integration in European markets	• Net import share in primary energy consumption
3 Decarbonisation	GHG emissions 	Limit the increase of GHG emissions	• Absolute amount of GHG emissions (CO_2, CH_4 and NO_2) vs. BAU scenario and vs. 2005
	RES share 	Strongly increase RES share in gross final consumption from today's level (19% of RES) in a sustainable manner	• RES share (heating & cooling, electricity, transport) in gross final energy consumption
4 R&I and competitiveness	Total system costs 	Minimize system costs based on least cost optimization	• System costs per annum & cumulative in euros incl. overall annualized investments, O&M costs, delivery costs & fuel supply costs
5 Legal & regulatory aspects	Legal & regulatory compliance 	Ensure continuous harmonisation EnC acquis and its implementation	• Harmonisation of national legislation with EnC acquis and its implementation in practice

Energy pillar	Indicator	Metric	Year 2030			Year 2040		
			Reference	Moderate Transition	Green	Reference	Moderate Transition	Green
1 Energy efficiency	Energy efficiency	% reduction of primary & final energy consumption vs. BAU	-15.3% primary -10.3% final	-31.2% primary -16.6% final	-34.5% primary -20.8% final	-34.9% primary -14.2% final	-47.9% primary -21.7% final	-51.8% primary -27.5% final
2 Integration and security of energy markets	Energy dependence	% of net import in primary energy consumption	48.7%	61.9%	59.1%	51.0%	61.9%	55.3%
3 Decarbonisation	GHG emissions	% reduction vs. 2005 and vs. BAU	-20.9% -22.9% vs. BAU	-57.2% -58.3% vs. BAU	-64.7% -65.3% vs. BAU	-8.1% -35.6% vs. BAU	-43.3% -60.2% vs. BAU	-61.5% -72.8% vs. BAU
	RES share	% of RES in gross final energy consumption	33%	38%	40%	35%	39%	45%
4 R&I and competitiveness	Total system costs	Bn. EUR in 2030 and 2040 with cumulative	3.8 41.0	3.3 38.3	3.2 37.3	5.1 86.5	4.8 81.2	4.5 78.1
5 Legal & regulatory aspects	Legal & regulatory compliance	EnC acquis harmonisation & implementation	Full compliance			Full compliance		

The energy transformation will create a win-win situation - stronger economy, secure energy supply and cleaner environment at lower energy system costs. The Green scenario has the **lowest total system cost in 2030 and 2040**, which means that with this scenario the vision of the Strategy is achieved in a **cheapest way…**

Integration and security of energy markets

The Strategy is aiming to ensure that North Macedonia is:

- **even stronger integrated into European markets,**
- **protect today's levels of energy dependence and**
- **provide necessary flexibility for higher RES integration.**

Depending on the expected development of natural gas and CO_2 prices, the Reference scenario selects the option:

- To revitalize TPP Bitola in 2025, with required precondition to open new Zivojno mines and securing continuous coal supply at competitive price.

- On the contrary, higher CO_2 prices and lower natural gas prices in Moderate transition and Green scenarios result in decommissioning of TPP Bitola, which is being supplemented with a combination of new RES, gas fired capacities, as well as import.

TPP Oslomej is decommissioned in all three scenarios;

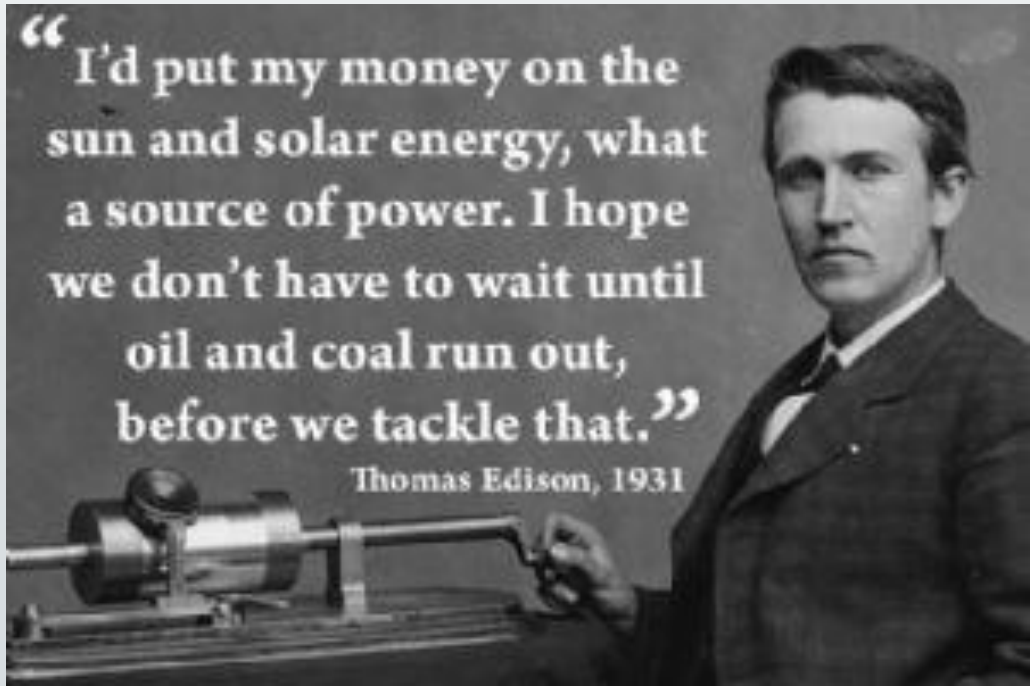
Decarbonisation:

- In the **Green scenario** in 2040 the Strategy decreases GHG emissions up to 61.5% vs. 2005 or 72.8% vs. BAU, while strongly increasing the usage of RES in a sustainable manner up to 45% in gross final energy consumption.
- In line with EU decarbonisation policies, all scenarios assume that the country will enter in the Emission Trading System (ETS), but with different year of entrance and using different WEO 2017 scenarios of CO_2 price, with most progressive in the Green scenario.
  - Aspiration to enter in the ETS should be seen as a key strategic measure to tackle CO_2 reduction in the electricity and heat production, where Moderate transition and Green scenario show coal phase out after 2025.
- The revitalization decision of TPP Bitola in Reference scenario includes also the prerequisite to install local pollutants control equipment to meet the requirements from Large Combustion Plants Directive and Industrial Emissions Directive.
- The Strategy also emphasises the need to promote the use of RES in a manner that provides sustainable energy development.
  - Specifically, for electricity generation, PV and wind will be the fastest growing technologies in all scenarios (up to 1,400 MW PV and 750 MW wind), while construction of new small hydropower plants should be carefully assessed to avoid the impact on environment compared to benefits of generated electricity.
- The Strategy envisages financial support mechanisms via feed-in tariffs and feed-in premiums with auctions (granted in a tendering procedure) to stimulate new RES production in all three scenarios, particularly for period 2020 – 2025.

The way forward

OSLOMEJ SOLAR POWER COMPLEX

- Context
  - Old system
  - Around 100m for revitalization
  - State land
  - Functional grid infrastructure
    - 110 kV substation
    - Switchgear
    - High voltage cabling
- Proposal
  - 100 MW solar photovoltaic plan
- Implementation
  - PPP
- Project outcomes
- Just transition



OSLOMEJ SOLAR POWER COMPLEX – CONCEPT NOTE

- Project outcomes
  - Clean, competitive and stable power;
  - Reuse of the existing facilities and land (no value)
  - Job opportunity for former workers
  - Economic investments in the community
  - State partner
    - ownership of solar assets
    - Dividend stream
- Just transition
  - transition from conventional energy, it is important to develop socially responsible transition programs to mitigate negative effects of associated job losses
  - Typical just energy transition project
  - Bid
    - Fund for new skills development, retrain
    - Fund for …

The way forward

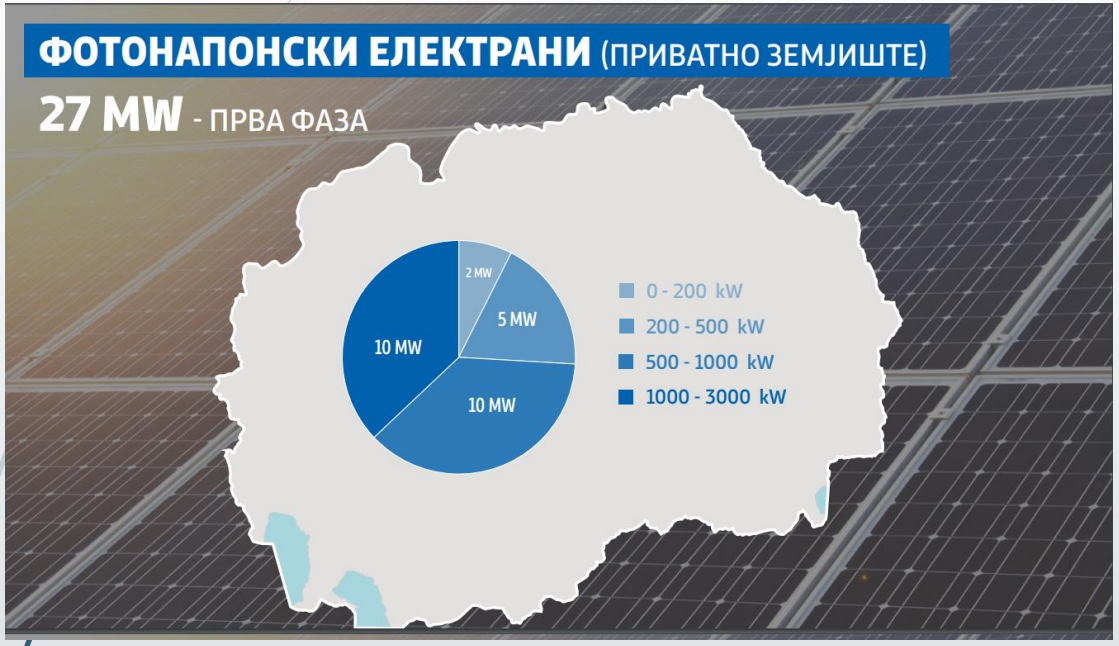
2x50=100 MW

OSLOMEJ SOLAR POWER COMPLEX – CONCEPT NOTE

- **Next steps**
  - Technical feasibility
  - Land condition and remediation costs
  - Environmental and social impact assessment of the project
  - Legislation revision

Additional RES activities

Private land



41 offers

State land

11 locations
80 companies
114 offers

The way forward

NEW SUPPORT MEASURE

FEED-IN TARIFF (FIT)

WIND
SHPP
BIOGAS
BIOMASS

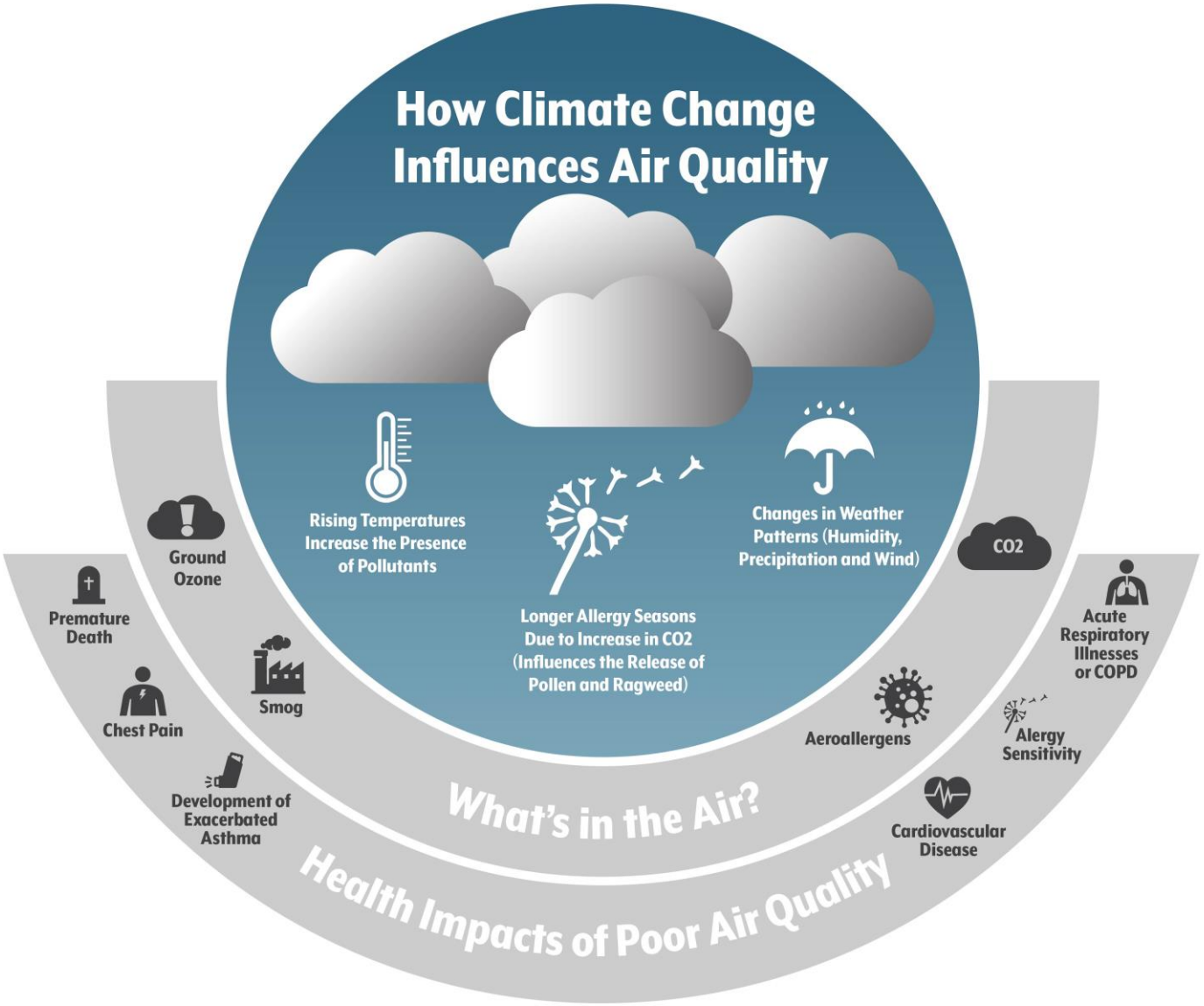
FEED IN PREMIUMS (FIPs)

WIND
PV

Renewable Support Schemes - FIPs

- will be granted based on a tender procedure **involving auctions**. The manner of conducting the tender procedure and auction for awarding premiums, specified by the Decree of the Government, the Ministry will only implement the procedure.
- the funds for the premiums: from the state budget
- the preferential producer who has acquired the right to use the premium can not use a feed-in tariff and is not guaranteed by the guaranteed purchase of the produced energy from the electricity market operator
- concluding contracts and payment of premiums specified by the Decree of the Government,
- FIPs are **set in ¢ per kWh of electricity** delivered into the electricity system and shall not include the VAT.
- own balance responsibility
- **FIXED FIP** – incentive to react to market signals, government spendings are predictable
- **PERIOD OF USE: WIND - 20 years**
  PV - 15 years
- **THE TOTAL INSTALLED CAPACITY** (new decision): **WIND - 50 MW**
  PV - 200 MW

The way forward



Air Pollution = Climate Change

- Increase Energy efficiency
- Increase Renewables
- Decrease GHG

PARIS AGREEMENT

SUSTAINABLE DEVELOPMENT GOALS

It’s up to us

Thank you