

SOCIO-ECONOMIC EFFECTS OF COVID-19 IN A RESOURCE-BASED ECONOMY

An analysis using the macroeconomic model e3.dz for Algeria

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1. Introduction

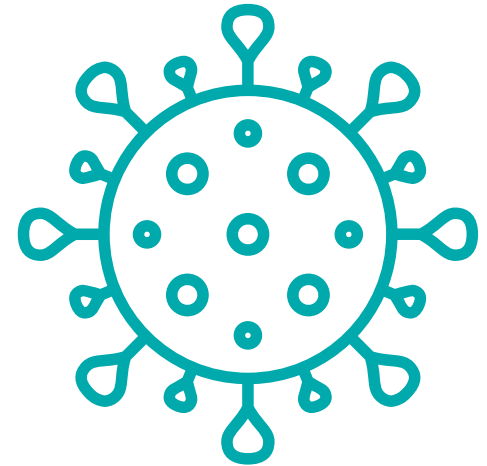
- a. **Model e3.dz**
- b. **Background information**
- c. **Scenarios**

1a | Model e3.dz

- ▶ National macro-econometric input-output model for Algeria, developed in 2019 (Lutz et al. 2019)
- ▶ e3 = economy, energy, environment
- ▶ Based on macroeconomic and sectoral data
- ▶ Parameters are econometrically estimated
- ▶ Projections are possible until 2050
- ▶ Translation of policies into changes of economic quantities and model variables
 - ⇒ deviations between two scenarios as the result of the respective policies

1b | Background information (I)

- ▶ For last year's conference, a different presentation on efficiency in the model was planned
- ▶ Due to the pandemic, we had the opportunity to continue using the model and thus to show more current results now



1b | Background information (II)

- ▶ Algeria was affected by lockdowns and severe trade and travel restrictions
- ▶ International energy markets were strongly influenced by the global recession in spring 2020
- ▶ In February 2020, the Algerian government had passed new targets for the expansion of renewable energy sources (RES)



The scenarios and underlying assumptions were prepared in the summer of 2020, so that only the developments up to then could be considered

1c | Scenarios

	Pre-COVID-19*	COVID-19	
		<i>Rapid Recovery</i>	<i>Slow Recovery</i>
New RES targets: <i>Stated Policy</i>	Scenario S3	Scenario S4.1	Scenario S4.2
Reduced RES targets: <i>Reduced Ambition</i>	-	Scenario S5.1	Scenario S5.2

* Pre-COVID-19 scenario S3 assumes economic development that would have been expected in a world without COVID-19 pandemic.

2. Assumptions

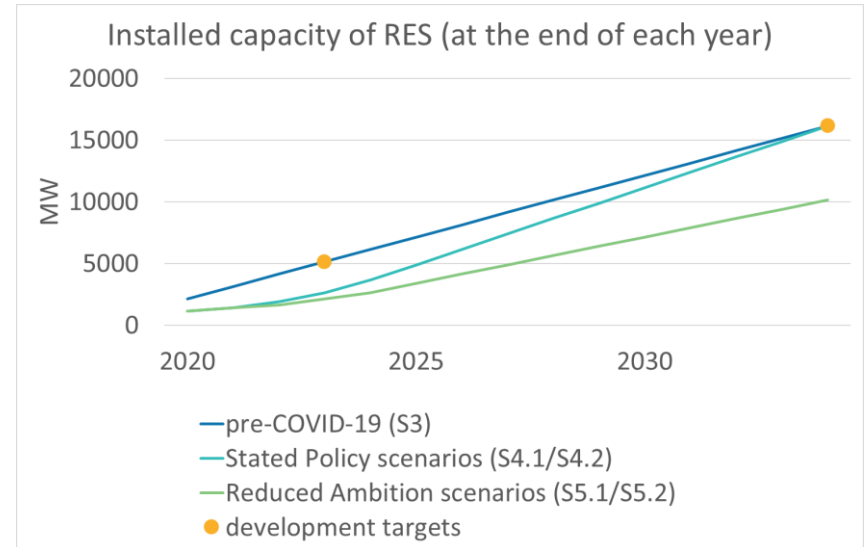


- a. RES development path
- b. Economic consequences of COVID-19

2a | RES development path

► Development targets for RES installed capacity*:

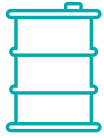
- ⇒ 4,000 MW by 2024
- ⇒ 15,000 MW by 2035



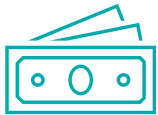
- ⇒ in the pre-COVID-19 *Stated Policy* scenario S3, both targets are achieved with a constant expansion of 1,000 MW per year
- ⇒ in the *Stated Policy* scenarios S4.1 / S4.2, expansion is slower at the beginning due to COVID-19, but then catches up so that the target by 2035 is achieved
- ⇒ in the *Reduced Ambition* scenarios S5.1 / S5.2, only 9,000 MW are installed until 2035

* Installed capacity until 2019 is set at 1,149 MW as modelled in the moderate scenario from the 2019 study.

2b | Economic consequences of COVID-19



- ▶ Oil and gas production reduced to expected level



- ▶ Oil and gas prices drop due to developments on international energy markets

⇒ in the scenarios with slow recovery, the negative effects last longer



- ▶ Macroeconomic variables were adjusted to observed developments due to COVID-19 and to changed consumption patterns

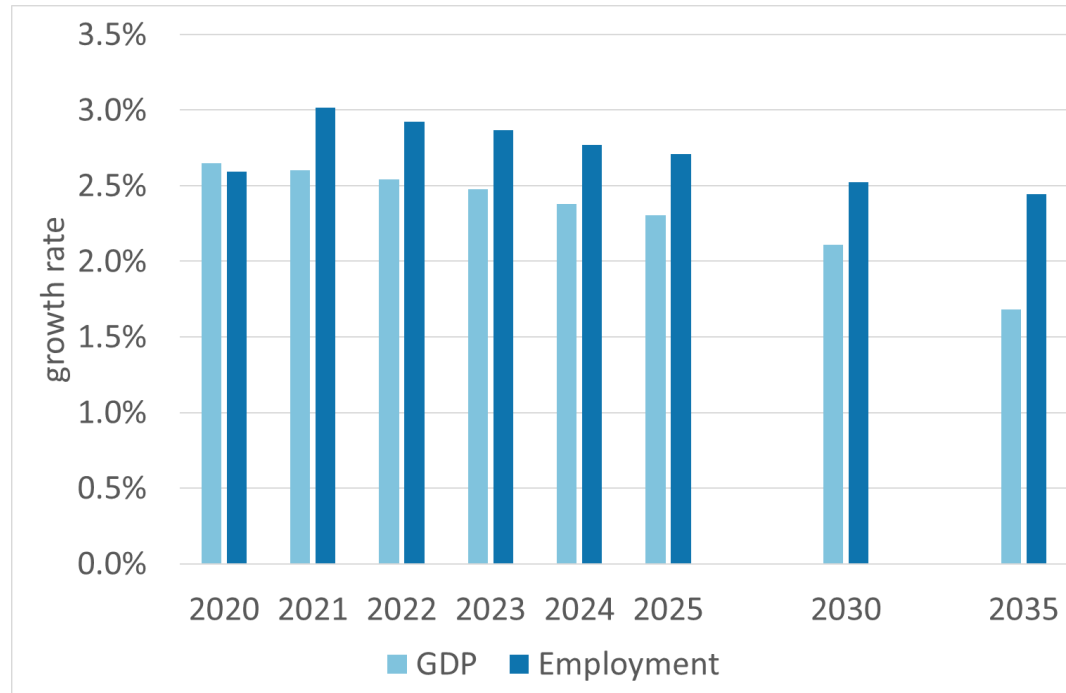
3. Results and conclusion



- a. Pre-COVID-19 Stated Policy Scenario S3**
- b. Stated Policy Scenarios S4.1 / S4.2**
- c. Reduced Ambition Scenarios S5.1 / S5.2**
- d. Conclusion**

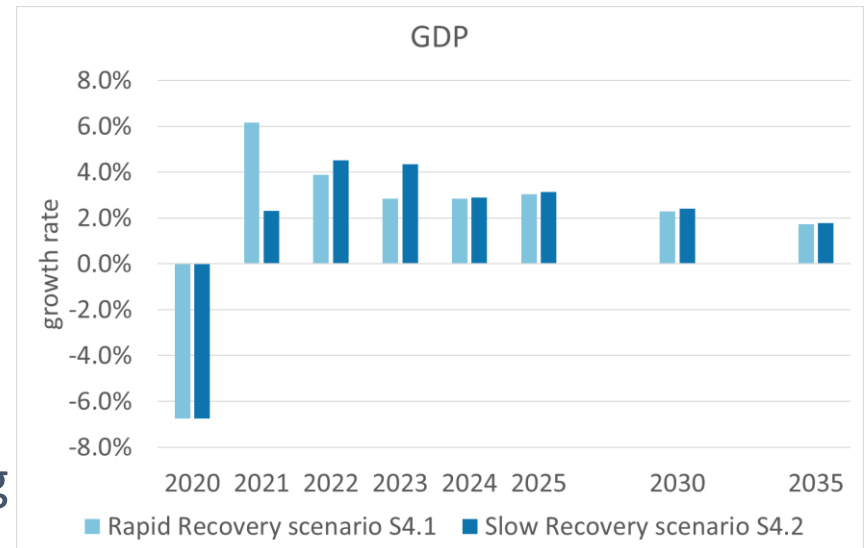
3a | Pre-COVID-19 *Stated Policy Scenario S3*

- Scenario S3 shows constant economic growth which would have been expected without COVID-19



3b | Stated Policy Scenarios S4.1 / S4.2

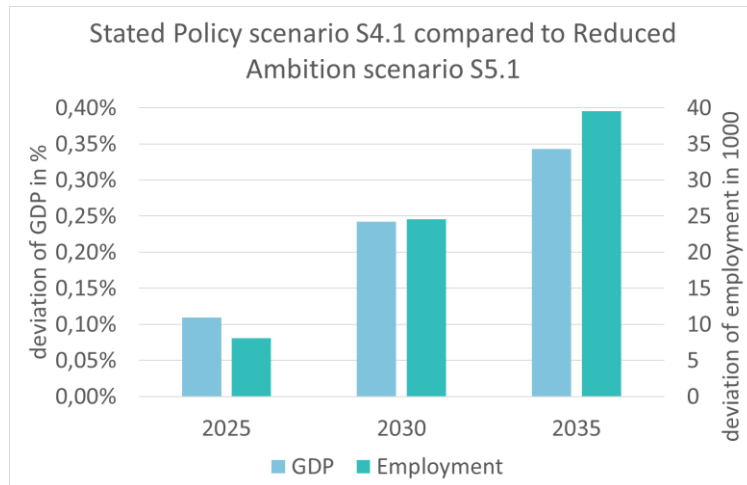
- ▶ COVID-19 has strong negative effects on economy and employment: decrease of the GDP by 6.7% in both scenarios
- ▶ With rapid economic recovery (S4.1), there is a strong upswing in 2021, leading to GDP growth of 6.2%
- ▶ With the slower recovery (S4.2), GDP will grow by only 2.3% in 2021



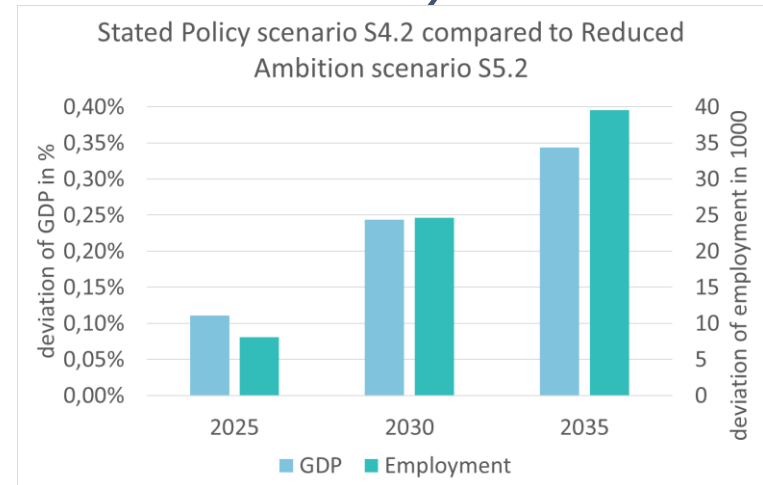
3c | Reduced Ambition Scenarios S5.1 / S5.2

- ▶ A comparison with S4 scenarios shows that even in the current situation with COVID-19, a more ambitious RES expansion as in S4.1 or S4.2 has a positive effect on GDP and employment

- ▶ *Rapid Recovery*

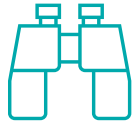


- ▶ *Slow Recovery*

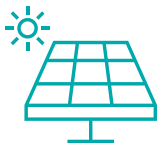


- ▶ The effects of RES expansion on the socio-economic variables are very similar regardless of the speed of economic recovery

3d | Conclusion



- ▶ Perspectives for the long-term socio-economic development based on oil and gas cloud over strongly



- ▶ RES expansion is an option to adjust the Algerian “business model”
 - ⇒ Maintaining the RES expansion targets has positive socio-economic effects

Thank you for your attention.



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Assumptions | Oil and gas production

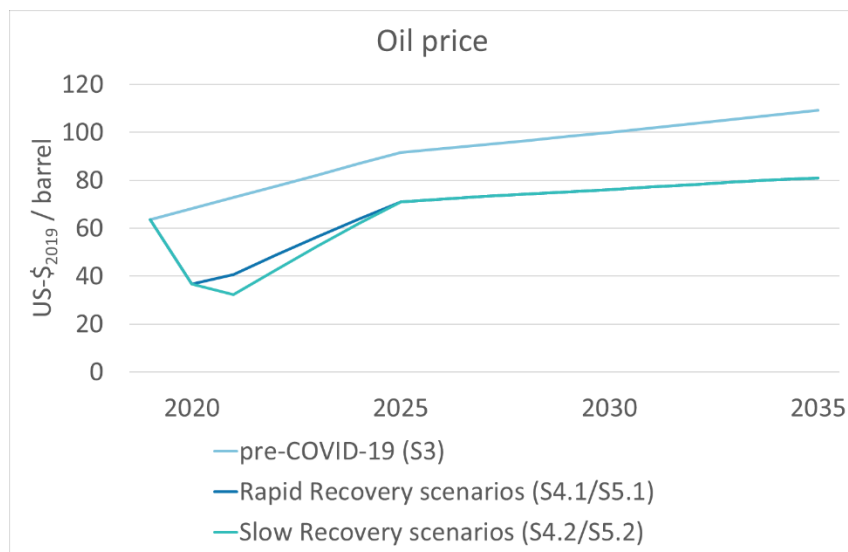
▶ Oil

- ⇒ *Slow recovery*: Oil production is reduced from May 2020 to April 2022 following OPEC's planned oil production cuts
- ⇒ *Rapid recovery*: Reduction is only assumed for 2020

▶ Gas

- ⇒ *Slow recovery*: For gas production, a reduction of 13% in 2020 compared to 2019 is assumed, returning to the initial production path in 2023
- ⇒ *Rapid recovery*: The initial path is reached in 2022

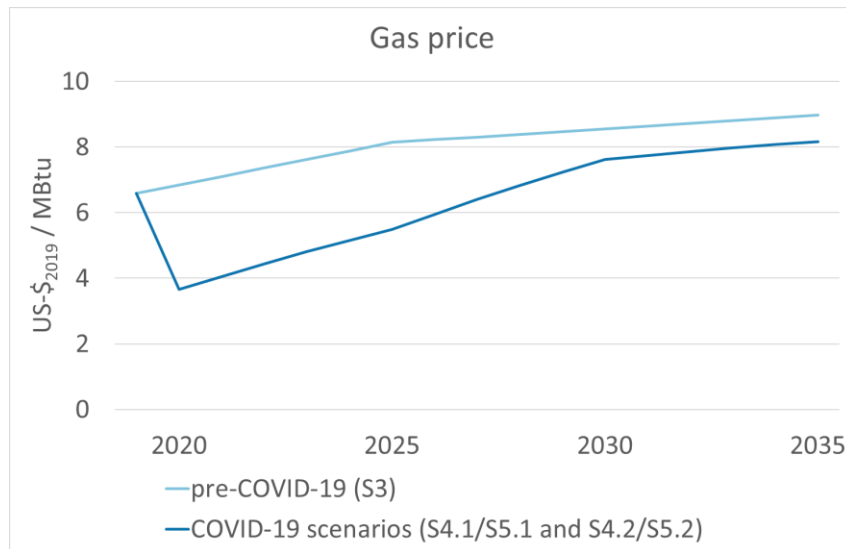
Assumptions | Oil price



- ▶ The oil price develops as in the IMF projection from June which assumes a reduction of 41% in 2020 compared to the previous year

- ▶ *Rapid recovery*: For 2021, the price development is based on IMF's scenario "Faster recovery starting in the second half of 2020"
- ▶ *Slow recovery*: IMF's scenario "Second outbreak in 2021" is assumed here for price development in 2021
- ▶ In the medium and long term from 2025, it follows the IEA's World Energy Outlook (WEO) 2020 which is significantly below the price path assumed in pre-COVID-19 scenario (S3)

Assumptions | Gas price



- ▶ For the gas price, there is no distinction between the *Rapid* and *Slow Recovery* scenarios

- ▶ In 2020, it drops by 43%; thereafter, the gas price rises again on the assumption that the COVID-19 measures are reduced, trade prospers again and the global economic situation recovers, resulting in an increase in energy demand
- ▶ In the medium and long term, the gas price is also assumed to develop below the expected pre-COVID-19 level; from 2030 on, this downward deviation becomes smaller

Assumptions | Macroeconomic parameters

- ▶ The macroeconomic variables of private consumption, government consumption and investment are adjusted to the COVID-19 situation via multiplicative factors on the values calculated by the model. The quantification for this is based on the observed developments, which could be estimated in summer 2020.
 - ⇒ Private consumption is set to be 5% and investment 15% below the (endogenous) model value for 2020. In addition, the structure of private consumption is adjusted to account for different patterns in the approximately three-month lockdown.
 - ⇒ Government consumption remains unchanged in 2020 to stabilize the economy. In 2021, a 5% reduction to calculated model value is assumed.

References

- ▶ International Energy Agency (IEA) (2020): World Energy Outlook 2020.
- ▶ International Monetary Fund (IMF) (2020): World Economic Outlook Update. June 2020.
- ▶ Lutz, C., Lehr, U., Banning, M., Becker, L. & Hohmann, F. (2019): An energy-economic model for Algeria. Renewable energy and energy efficiency scenario analysis with e3.dz. GWS Research Report 2019/01 (unpublished).
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