# Project Sheet

Central Southern Italy

| | |
|---|---|
| Project type | transmission |
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# Key Information

## Internal Project
## AC transmission line
## New

## In Permitting

### Description

The project consists in the reinforcement of southern Italy 400 kV network through new 400 kV lines. The activities will involve the network portions between the substation of Villanova and Foggia, Deliceto and Bisaccia as well as Laino and Altomonte

### Project promoters

TERNA

### Countries

Italy

### National development plan(s)

Avanzamento Piani di Sviluppo precedenti 2015/Pag.280-336-345, Italy

### Additional information on the project

Link to the last release of the Italian National Development Plan

http://www.terna.it/en-gb/sistemaelettrico/pianodisviluppodellarete.aspx

## Project sheet backlog

6 Nov. 2020 - Publication as part of the draft TYNDP 2020 package for consultation

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# Project Description & Context

## Project Investments

### Main investment(s): New 178km double circuit 400kV OHL between existing Foggia and Villanova 400kV substations, also connected in and out to the Larino and Gissi substations.

| Type of element | Total route length (km) | From substation 1 | To substation 2 | Present status | Commissioning year | Progress of the investment | Explanation in case of delay or reclustering |
|---|---|---|---|---|---|---|---|
| AC transmission line | 178 | Foggia (IT) | Villanova (IT) | In Permitting | 2024 | Investment on time | |

### Other investments

| Description | Type of element | Total route length (km) | From substation 1 | To substation 2 | Present status | Commissioning year | Progress of the investment | Explanation in case of delay or reclustering |
|---|---|---|---|---|---|---|---|---|
| New 30km single circuit 400kV OHL between the future substations of Deliceto and Bisaccia, in the Candela area | AC transmission line | 30 | Deliceto (IT) | Bisaccia (IT) | Under Construction | 2021 | Investment on time | |

## Reason for investment clustering

The three investments will closely contribute to reduce congestions and guarantee a major market integration between Italy-center South and Italy South.

## Is the project in the reference grid?

Yes

## System Needs addressed by the project

Project promoter(s) selected up to 4 system needs that are addressed by their project in a

predefined list. Available needs ranged from reduction of price differentials between countries, improvement of system flexibility and stability, enabling cost-efficient connection of high volumes of RES, improvement of voltage stability...
As part of the TYNDP 2020, ENTSO-E released a study investigating cross-border system needs in the 2030 and 2040 horizons.

| Need | | How the project addresses each need (explanation provided by the project promoter(s)) |
|---|---|---|
| | Infrastructure to improve system flexibility and stability e.g. improve system or local ramp rate, improve transient stability or RoCoF to meet system Needs. | In case of failure of the first OHL Foggia-Villanova the new line will improve transient stability. |
| | Infrastructure to facilitate and accommodate future scenarios, cross-border flows or loop flows. | The new line will allow congestion reduction in the Southern-Northern border, and the integration of the local renewable production. |
| | Infrastructure designed to enable cost-efficient grid connection of high volumes of RES and/or reduce RES curtailment | Reduction of expected RES curtailment |

## Interconnection targets

In 2017, the Interconnection Target Expert Group proposed alternative indicators to the 15% interconnection criteria for every country and electrified island with a new methodology developed collaboratively between the European Commission, ENTSO-E, ENTSOG, industry, universities and other experts. The methodology is based on three indicators:
1. Price differential between EU countries, with an objective to reduce it below 2 EUR/MWh
2. Ratio between nominal transmission capacity and installed RES capacity, with a target of past 30%
3. Ratio between nominal transmission capacity and peak load, with a target of past 30%

The following maps show the ITEG methodology applied to the TYNDP 2030 scenarios, with the 2020 grid.

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# Project Assessment

## Transfer capacity increase (National Trends 2025)

| | Border | A B | B A |
|---|---|---|---|
| Transfer capacity increase (in MW) | Internal (Italy) | 1000 | 1000 |

## CBA results

ENTSO-E has assessed the benefits delivered by each project in 2025 (scenario National Trends 2025) and in 2030 (three scenarios: National Trends, Distributed Energy and Global Ambition). Indicators B1 to B6 were computed by ENTSO-E, while promoters had the possibility to compute and submit so-called project-level benefits (B7 to B10). The benefits must be understood as benefits for Europe as a whole, not for the promoters of the project.
Results are presented per scenario.

## Central scenario: National Trends

National Trends is the central policy scenario of the TYNDP2020, designed to reflect EU member state's National Energy and Climate Plans (NECP), in line with the requirement to meet current European 2030 energy strategy targets.

| | | | Comparison of the COP21 scenarios with NT2030 average result | | |
|---|---|---|---|---|---|
| | **NT2025** | **NT2030** | **DE2030 is < or > than NT2030** | **GA2030 is < or > than NT2030** | |

### Increase in socio-economic welfare

| | | | | | | |
|---|---|---|---|---|---|---|
| B1 Annual Socio-Economic Welfare (SEW) increase (M € / year) | max<br>average<br>min | 3<br>1<br>0 | 12<br>10<br>9 | > | > | ENTSO-E assessment |
| B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction | max<br>average<br>min | 1<br>0<br>-2 | 5<br>4<br>3 | > | > | ENTSO-E assessment |
| B1_RES Annual Socio-Economic | max<br>average | 1<br>0 | 9<br>6 | > | > | ENTSO-E assessment |

| | | | | | | |
|---|---|---|---|---|---|---|
| Welfare increase resulting from RES integration | min | 0 | 4 | | | |

## Reduction of CO2 and GHG emissions

B4 Non-CO2 emissions (kg/year)

| | | | | | | |
|---|---|---|---|---|---|---|
| B4a Nitrogen oxides | average | 59 | -90 | n/a | n/a | ENTSO-E assessment |
| B4b Ammonia | average | 0 | 0 | n/a | n/a | ENTSO-E assessment |
| B4c Sulfur dioxide | average | 106 | -56 | n/a | n/a | ENTSO-E assessment |
| B4d Particular matter 5 | average | 4 | -28 | n/a | n/a | ENTSO-E assessment |
| B4e Particulate matter 10 | average | 2 | -3 | n/a | n/a | ENTSO-E assessment |
| B4f Non-methane volatile organic compounds | average | 3 | -19 | n/a | n/a | ENTSO-E assessment |

| | | | | | | |
|---|---|---|---|---|---|---|
| B2a Annual CO2 variation from market simulation (ktonnes / year) | max<br>average<br>min | 71<br>9<br>-43 | -102<br>-128<br>-178 | <<br><br> | <<br><br> | ENTSO-E assessment |
| B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M € / year) | CO2 price 60€/ ton<br>100€/ ton<br>189€/ ton | 0<br>-1<br>-1 | 4<br>9<br>21 | <<br>><br>> | <<br>><br>> | ENTSO-E assessment |
| B2b Annual CO2 variation due to network losses (ktonnes / year) | average | -76 | -176 | n/a | n/a | ENTSO-E assessment |
| B2b_€ Annual Societal cost variation resulting from | CO2 price 60€/ ton<br>100€/ | 3<br>6<br>13 | 6<br>13<br>28 | n/a | n/a | ENTSO-E assessment |

| | | | | | | |
|---|---|---|---|---|---|---|
| CO2 variation from network simulation monetised (M € / year) | ton<br>189€/ ton | | | | | |

## Integration of renewable energy sources

| | | | | | | |
|---|---|---|---|---|---|---|
| B3 Annual avoided curtailment (RES integration) (GWh / year) | max<br>average<br>min | 25<br>10<br>3 | 207<br>141<br>86 | > | > | ENTSO-E assessment |
| B3a Connected RES (MW) | - | | | n/a | n/a | ENTSO-E assessment |

## Impact on grid losses

| | | | | | | |
|---|---|---|---|---|---|---|
| B5 Variation of network losses (GWh / year) | average | -125 | -373 | n/a | n/a | ENTSO-E assessment |
| B5_€ Variation of network losses monetised (M€ / year) | average | -7 | -18 | n/a | n/a | ENTSO-E assessment |

## Security of supply

| | | | | | | |
|---|---|---|---|---|---|---|
| B6 Annual reduction in Energy Not Served (MWh / year) | max<br>average<br>min | | 0 | n/a | n/a | ENTSO-E assessment |
| B6_€ Annual Socio-Economic Welfare increase resulting from reduction in Energy Not Served monetised (M€ / year) | average | n/a | 0 | > | n/a | ENTSO-E assessment |

# Scenarios: Distributed Energy & Global Ambition

DE and GA are two scenarios created in line with the COP21 targets to understand the impact on infrastructure needs agains different pathways reducing EU-28 emissions to net-zero by 2050. For these two scenarios, projects were assessed with a subset of CBA parameters.

| | | DE2030 | GA2030 | |
|---|---|---|---|---|

### Increase in socio-economic welfare

| | | | | |
|---|---|---|---|---|
| B1 Annual Socio-Economic Welfare (SEW) increase (M€ / year) | average | 24 | 22 | ENTSO-E assessment |
| B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction | average | 17 | 6 | ENTSO-E assessment |
| B1_RES Annual Socio-Economic Welfare increase resulting from RES integration | average | 19 | 17 | ENTSO-E assessment |

### Reduction of CO2 and GHG emissions

| | | | | |
|---|---|---|---|---|
| B2a Annual CO2 variation from market simulation (ktonnes / year) | average | -314 | -161 | ENTSO-E assessment |
| B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) | CO2 price 60€/ ton<br>100€/ ton<br>189€/ ton | 2<br>15<br>43 | 4<br>10<br>25 | ENTSO-E assessment |

### Integration of renewable energy sources

| | | | | |
|---|---|---|---|---|
| B3 Annual avoided curtailment (RES integration) (GWh / year) | average | 359 | 390 | ENTSO-E assessment |
| B3a Connected RES (MW) | - | | | ENTSO-E assessment |

## Benefits submitted by promoters based on scenarios other than

## the TYNDP2020 scenarios

| | 2025 | 2030 | |
|---|---|---|---|
| B7 System Flexibility – Balancing Energy Exchange | ++ | ++ | Qualitative assessment by ENTSO-E, based on the study and values provided by the project promoter(s). ENTSO-E confirms the consistency of the proposed indicator with the CBA Guideline 3.0. About the computation of this indicator by the project promoter(s) |

This indicator was computed based on Vision 1 (V1) and Vision 1 (V1), in a study performed by Terna in 2017. The promoter(s) stated that the submitted value was computed in accordance with the CBA Guideline and explained it as follows:

*The indicator B7, adopted in Italian NDP, defines the cost variation for dispatching services, with reference to reduction of internal congestion and ancillary services*

The promoter(s) certified that the values submitted and assessed in the study relate to countries located within the ENTSO-E perimeter only.

## Non scenario-dependent indicator(s)

| B8.0 Stability (Transient, Voltage and Frequency Stability) | Transient stability | Voltage stability | Frequency stability | |
|---|---|---|---|---|
| 86 (New AC line) | ++ | ++ | 0 | Qualitative assessment by ENTSO-E based on information on the project technology provided by the project promoter(s). This indicator is not dependent on scenarios or time horizons. |
| 96 (New AC line) | ++ | ++ | 0 | |

## Sensitivity Study: Current Trends

'Current Trends' describes a future where the energy transition is slower than planned.

| | CT2030 | |
|---|---|---|

### Increase in socio-economic welfare

| | | |
|---|---|---|
| B1 Annual Socio-Economic Welfare (SEW) increase (M€ / average | 6 | ENTSO-E assessment |

| | | | |
|---|---|---|---|
| year) | | | |
| B1_CO2 Annual Socio-Economic Welfare increase resulting from CO2 emissions reduction | average | 2 | ENTSO-E assessment |
| B1_RES Annual Socio-Economic Welfare increase resulting from RES integration | average | 0 | ENTSO-E assessment |

## Reduction of CO2 and GHG emissions

| | | | |
|---|---|---|---|
| B2a Annual CO2 variation from market simulation (ktonnes / year) | average | -57 | ENTSO-E assessment |
| B2a_€ Annual Societal cost variation resulting from CO2 variation from market simulation monetised (M€ / year) | CO2 price 60€/ ton<br>100€/ ton<br>189€/ ton | 2<br>4<br>9 | ENTSO-E assessment |

## Integration of renewable energy sources

| | | | |
|---|---|---|---|
| B3 Annual avoided curtailment (RES integration) (GWh / year) | average | 3 | ENTSO-E assessment |
| B3a Connected RES (MW) | - | | ENTSO-E assessment |

## Comments on the CBA results by the project promoter(s)

About B6 - Annual Socio-Economic Welfare increase resulting from reduction in Energy Not Served monetised):

In Italy a different parameter is used for the monetization of the Expected Energy Not Served (EENS) variation due to this project, because the current parameter used by ENTSOE in this project sheet (10 k€/MWh) is not compliant with National regulations in force in Italy n°627/2016 ("Minimum Requirements for the preparation of the Ten Year Development Plan of the National

Transmission Network" according to which benefits related to reduction of EENS is monetized through a Value of Lost Load (VOLL) in a range between 20 k€/MWh and 40 k€/MWh.

# Residual impact

Information on the residual impact of the project was provided by the project promoter(s).

## Residual environmental impact

| Investment | Investment status | Distance (km) | Type of sensitivity |
|---|---|---|---|
| 86 | In Permitting | 8 | - |
| 96 | Under Construction | 22 | - |

## Residual social impact

| Investment | Investment status | Distance (km) | Type of sensitivity |
|---|---|---|---|
| 86 | In Permitting | 0 | |
| 96 | Under Construction | 0 | |

# Project Costs

The project costs were provided by the project promoter(s).

| | CAPEX (Meuro) | Uncertainty range (%) | OPEX |
|---|---|---|---|
| 86. 86 | 397 | | 3.17 |
| 96. 96 | 190 | | 1.74 |
| Total | 587 | | 4.91 |

## Explanation provided by the project promoter on the CAPEX uncertainty range:

86 Uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permit grating process.

96 Uncertainty regarding extra costs due to safety, environmental or legal requirements imposed during permit grating process.