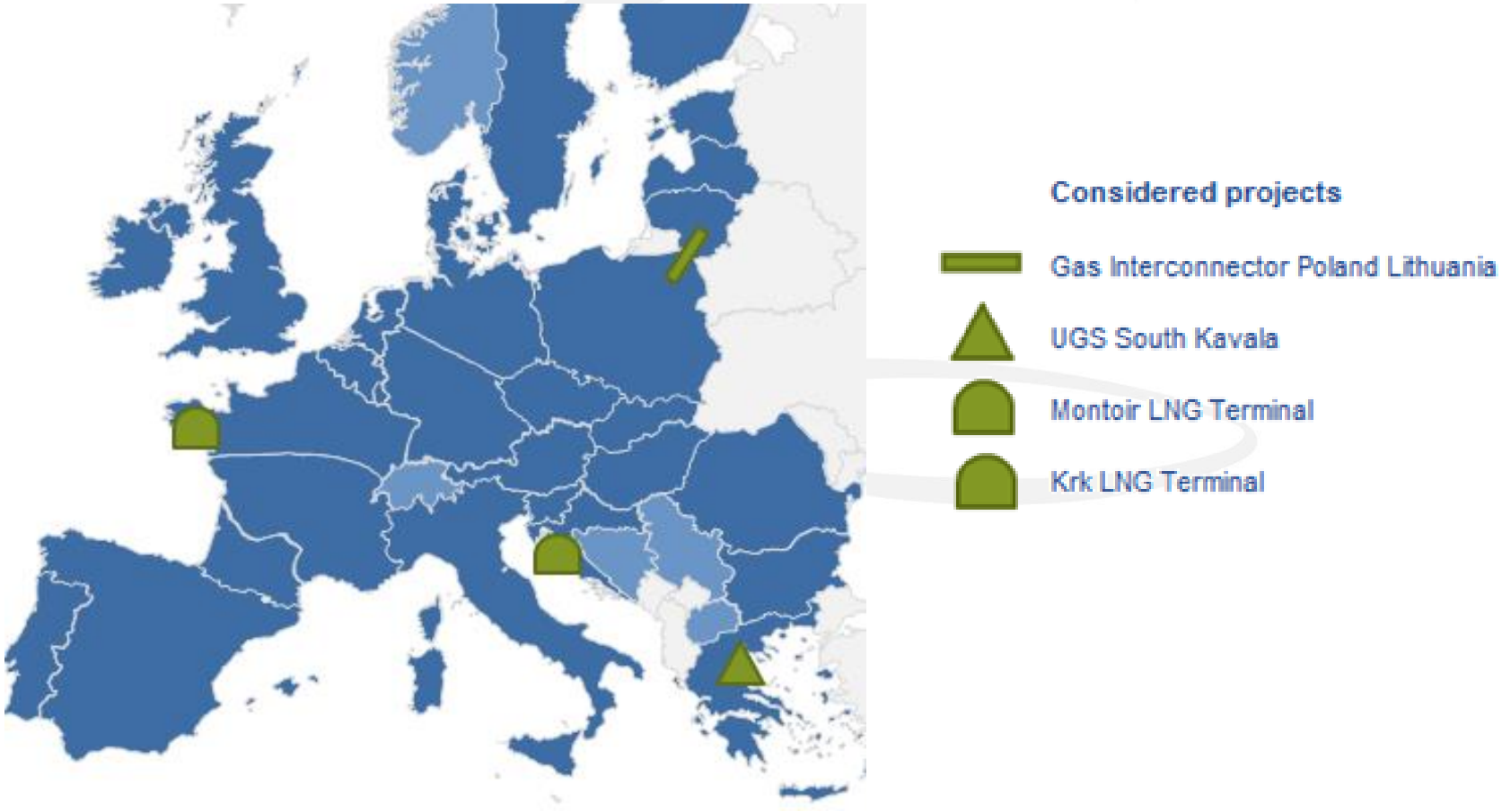
Cost-Benefit Analysis

Capacity-based indicators

TYNDP/CBA SJWS 6 – 13 May 2014

Projects selected for the case-study



Limitation of capacity-based indicators

Capture of direct impact

Elements used the formula of the indicator

- UGS, LNG and national production capacity of the considered country
- Transmission capacity at the cross-borders of the considered country
- Demand of the considered country

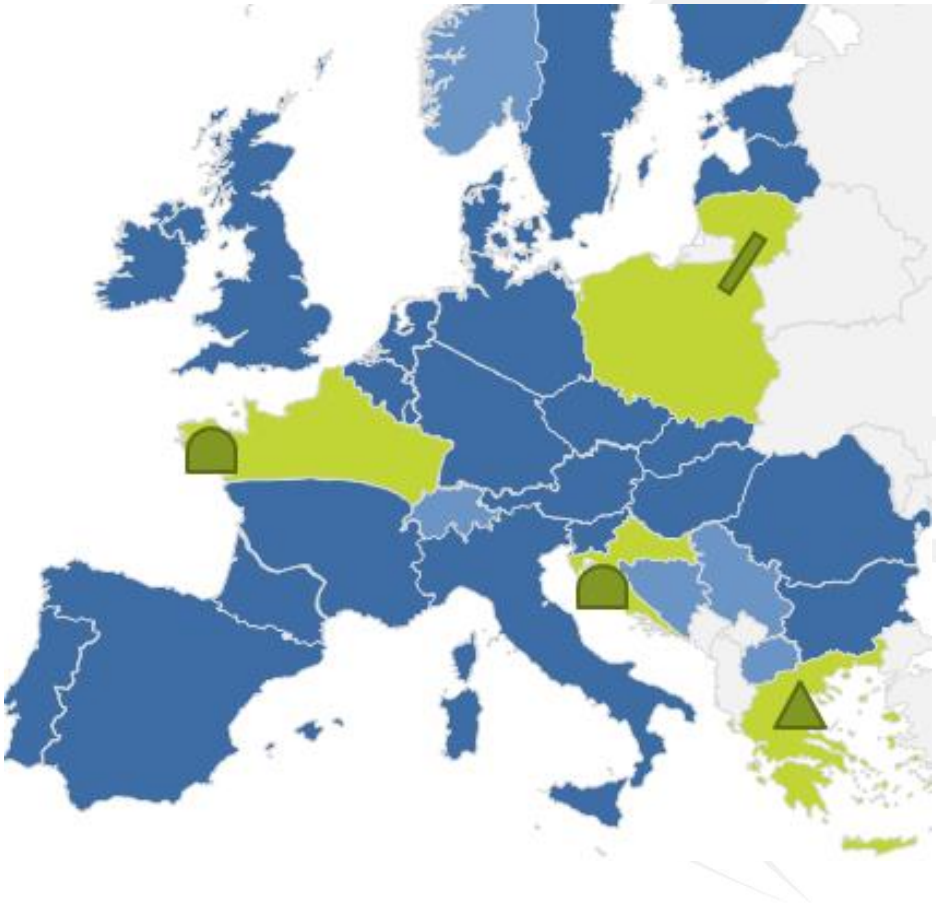
Impact of the project

- Given the elements used in the formula:
  - UGS and LNG projects can only change the value of the indicators for single country where they are built
  - Transmission projects can only change the value of the indicators for the countries they are directly interconnecting

Limitation of the direct impact

- Direct impact is related to the capacity increment and as shown above countries not directly connected to the project will not see the value of their indicator change
- Project impact is often related to the availability and origin of gas flows that cannot be describe by such indicators

Potentially directly impacted countries



Countries where static indicators are

able to show a potential impact

unable to show a potential impact

The drawback of regional calculation

Regional calculation

- The idea is to apply the formula of an indicator to a group of interconnected countries as if it was a single one
- Enlarging this group of country, the indicator is able to show an impact within a bigger area
- Cross-border capacity between these countries is ignored in the formula

Cross-border capacity

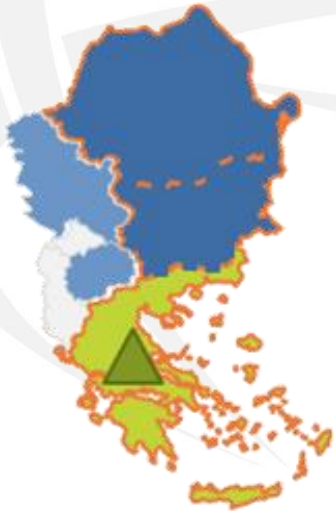
- The above regional calculation disregards the potential capacity limitation to flow between countries
- It provides a too optimistic view of project impact
- It may gives the impression that some countries are impacted when an existing congestion prevent the propagation of project benefits

Example for N-1 on UGS South Kavala

Formula is usually applied at national level where the additional withdraw capacity improves the indicator for Greece

Area on which the indicator is calculated

The regional calculation show an improvement for the group of countries GR/BG/RO…



… but it ignores potential cross-border limitation to the propagation of benefits.

This example does not mean that the project has no cross-border impact but only that the regional calculation of N-1 indicator can be misleading

Example of calculation

Import Route Diversification – Krk LNG Terminal

Indicator formula

$$\sum_l^{Xborder}\left(\sum_k^{IP} \%\, IP_k\, Xborder_l\right)^2 + \sum_j^{Source}\sum_i^{IP}\left(\%\, IP_i\, from\ source_j\right)^2 + \sum_m (\%\, LNG\ terminal_m)^2$$

Calculation of the indicator only serves the purpose of illustrating the methodology and is in no way an assessment of project value

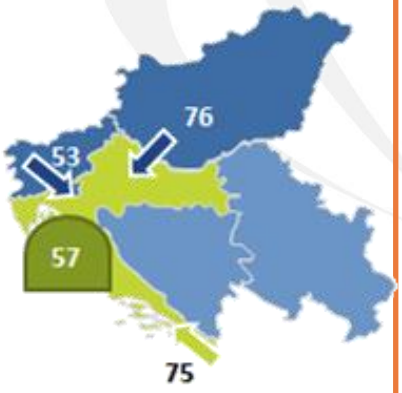
TYNDP-step

Low Infra. Scenario

Total import capacity: 76+53=129 GWh/d

IRD = $(100*76/129)^2 + (100*53/129)^2 = 5159$

High Infra. Scenario



Total import capacity: 261 GWh/d

IRD = 2563

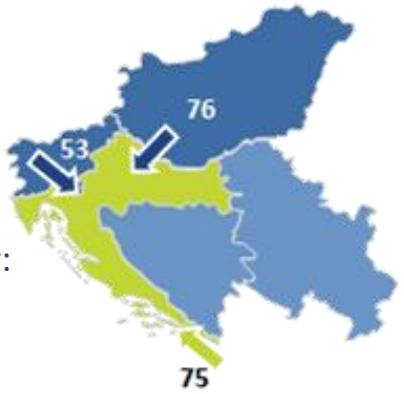
PS-step

Low Infra. Scenario + project

Total import capacity: 186 GWh/d

IRD = 3421

High Infra. Scenario - project



Total import capacity: 204 GWh/d

IRD = 3415

Project impact

under

Low Infra. Scenario 5159-3421= **1738**

High Infra. Scenario 3415-2563= **852**

N-1 indicator – UGS South Kavala

Indicator formula

$$N-1=\frac{IP+NP+UGS+LNG-I_m}{Dmax}*100$$

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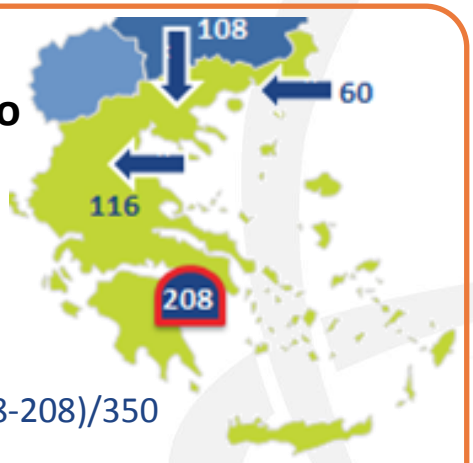
TYNDP-step

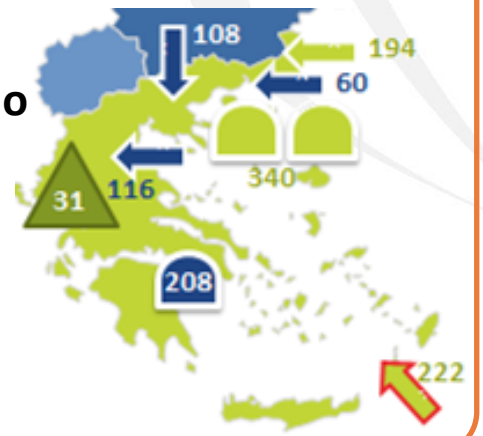
Low Infra. Scenario



Peak demand
350 GWh/d

N-1=
(108+60+116+208-208)/350
= 81%

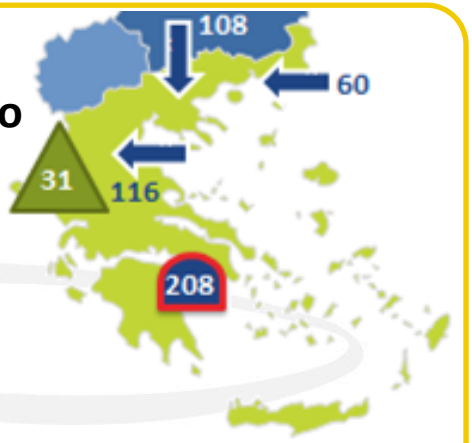
High Infra. Scenario



N-1= 302%

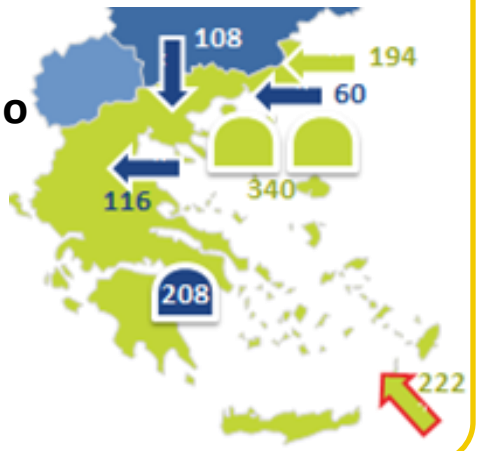
PS-step

Low Infra. Scenario + project



N-1= 90%

High Infra. Scenario - project



N-1= 293%

Project impact

under

Low Infra. Scenario
90 – 81 =
9%

High Infra. Scenario
302 – 293 =
9%

Summer Average Capacity Balance – LNG Montoir

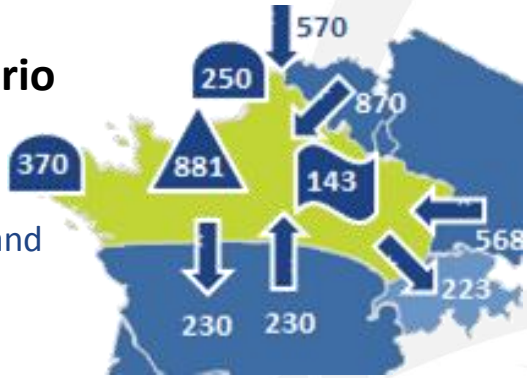
Indicator formula

$$\frac{Min(EX \quad ; NP \quad + \frac{N-1}{N} * IMP \quad + LNG \quad - INJ - Dsa\ )}{Dsa}$$

Calculation of the indicator only serves the purpose of illustrating the methodology and is in no way an assessment of project value

TYNDP-step

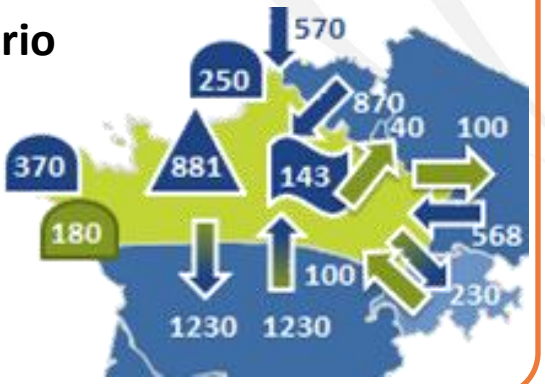
Low Infra. Scenario



Summer demand 535 GWh/d

SACB= min(230+223;143+3/4*(570+870+568+230)+250+370-77957/183-535)/535 = 0.85

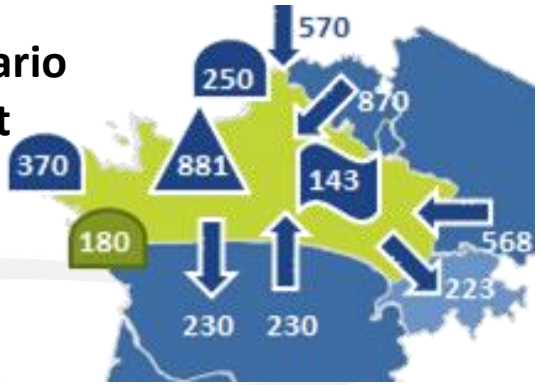
High Infra. Scenario



SACB = 2.99

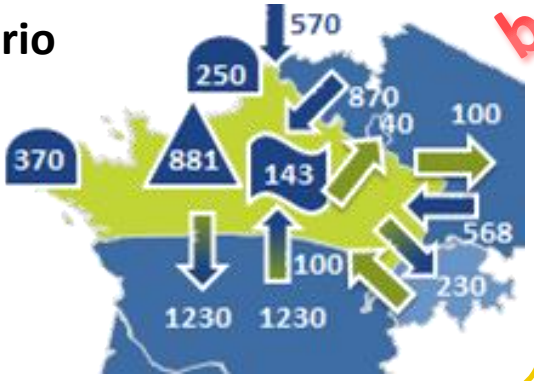
PS-step

Low Infra. Scenario + project



SACB= 0.85

High Infra. Scenario - project



SACB= 2.99

Project impact

under

Low Infra. Scenario 0.85-0.85= **0**

Indicator to be confirmed

High Infra. Scenario 2.99-2.99= **0**

Bi-directional indicator – GIPL

Indicator formula

$$Min\left(1; \frac{Added\ Capacity\ at\ IP\ to\ other\ direction}{Existing\ Pipeline\ capacity\ in\ prevailing\ direction}\right)$$

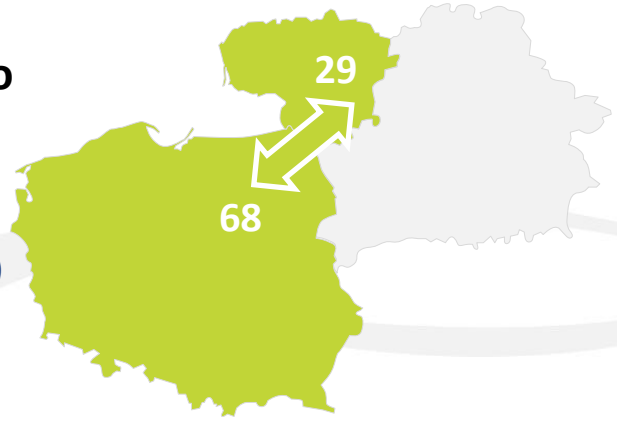
Calculation of the indicator only serves the purpose of illustrating the methodology and is in no way an assessment of project value

TYNDP-step

No TYNDP-step as formula applied directly to project increment

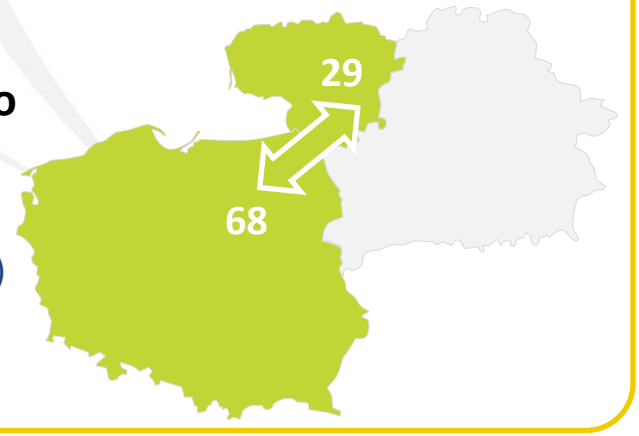
PS-step

Low Infra. Scenario



BDI = min(1;29/68) = 0.43

High Infra. Scenario



BDI = min(1;29/68) = 0.43

Project impact is the same under Low and High Infra. Scenarios as there is no other project across the border

IP and cross-border calculation provide the same results as there is a single IP

Thank You for Your Attention

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