Background of the ECA Study on IAP and Vlore PPT

- 2011 – Ministerial Council of the Energy Community mandates the Secretariat to conduct activities to attract investors in power generation in the Western Balkan countries and to advance the development of the so-called *Gas Ring Concept;*
- The Secretariat, with support letters from the WB6 countries, applied for a WBIF regional study *South East Europe Gas Power Consortium;*
- 2012 – WBIF Steering Committee approves the application in 2012 for **two study phases;**
- World Bank nominated as implementer of the study, with the Secretariat being a partner. The World Bank contracted ECA to carry out the study;
- 2015 – based on the findings of the *Interim Report – South East Europe Gas Power Consortium study* and based on the presentation of ECA to the WBIF SC, EC as financier of the study, recommended to deepen the analysis in the 2nd phase to the *feasibility analysis of the Vlora PPT and its connection to TAP* and the *update of the feasibility analysis of the IAP project*
- 2016 – The World Bank and ECS agreed, and cooperated in defining the scope of the 2nd phase and the EC gave final go ahead in May
- 2016 – 2017 ECA carried out the analysis and submitted the two reports: IAP financial FS and Vlore TPP FS

In agreement with project partners, focus shifted on gas development opportunities arising from Trans Adriatic Pipeline

- Scope of work for Phase I of the study covered the potential for gas to power. The results of interim report indicated that the geographic scope should be narrowed on opportunities arising from the Trans Adriatic Pipeline (TAP) – Gas interconnector Greece-Albania-Italy (part of Southern Gas Corridor with TANAP)
- **Phase II consequently focuses primarily on two following tasks:**

1. Prospects of Gas to Power in Albania, focus on CCGT in Vlore

a) Refurbishment, potential expansion and pipeline to TAP offtake
b) Definition and assessment of the economic and financial feasibility
c) Ownership and financing structures & identifying potential investors
d) Proposal for a realistic approach to implementation

2. Review of 2014 study on Ionian Adriatic Pipeline

a) Update economic and financial component of the feasibility study
b) Focus will be on throughout volume projections, impact on transmission tariffs, and on changes in the price assumptions

Presentation to WBIF Project Financiers' Group

Gas to Power Phase 2

Skopje, 26 April 2018

Project managed by the World Bank

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Western Balkans Investment Framework WBIF

Energy Community

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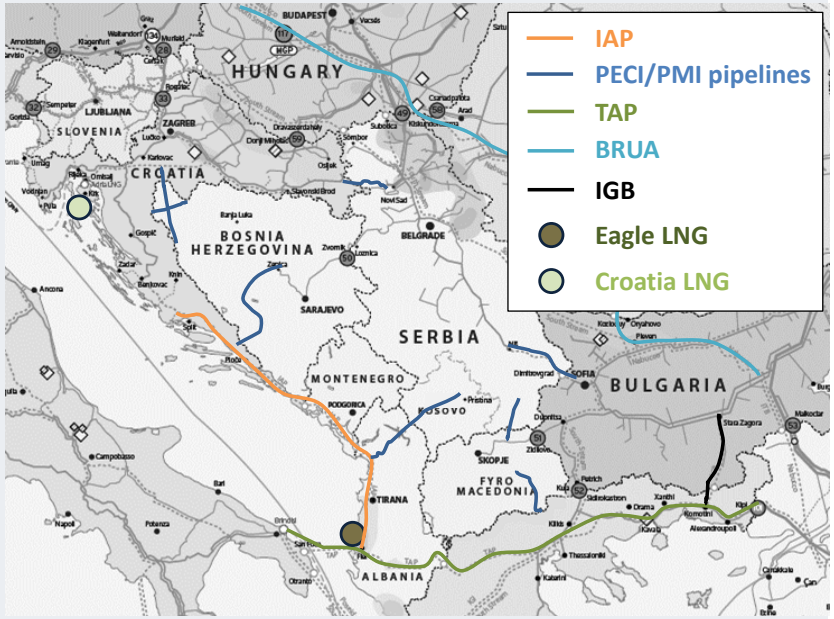
Contents

IAP's strategic importance – a key channel for Caspian gas to Central Europe

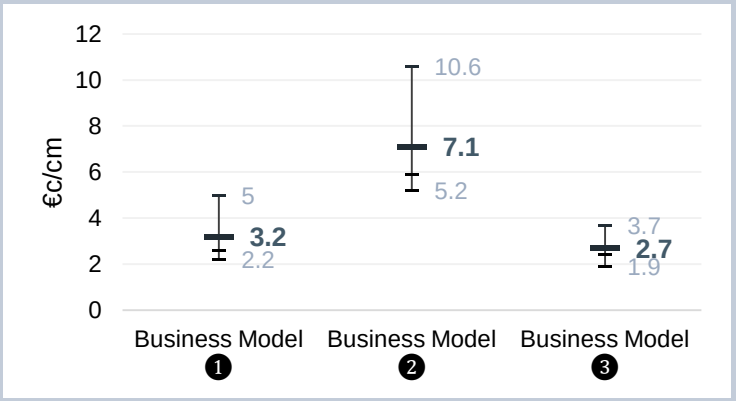
- 5 Bcm/y pipeline with tie in points in AL, ME, HR, BiH and possibly Kosovo
- Supported by WBIF *(Feasibility Study in 2014; current study on ME and AL sections)*
- Project Company to be established in 2018 *(SOCAR as engineering consultant)*
- IAP's strategic importance:
  - Can play a pivotal role for **gasification of West Balkan region**
  - Can be considered part of the **EU's Southern Gas Corridor**
  - Can support **decarbonisation of West Balkans**
  - With TAP expansion to 20 Bcm, can support **EU supply diversification**



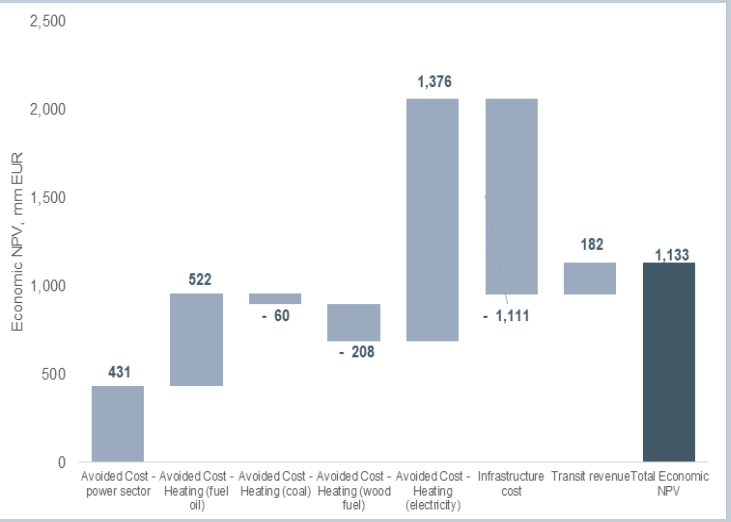
Integrating IAP with the Southern Gas Corridor will ensure viability

- **Cost recovery tariffs for IAP would need to be high**
  - not unusual for international pipeline projects
  - Low throughput volumes - Offtake markets along its route alone are too small
- **Integrating project with Southern Gas Corridor ensures viability**
  - International transmission of Caspian gas to European markets will be key
  - Takes advantage of TAP and of possible capacity expansion to 20 Bcm
- **Project is economically feasible**
  - Economic NPV: €1.3 billion
  - CO2 reduction from switching to gas for heating is key driver

IAP Transmission tariff ranges



Economic NPV breakdown



Conditions that can ensure feasibility of IAP (1/2)

1 Secure throughput for IAP in short term

- **Strengthen Croatian transmission** *(to max south-north transit)*
- Ensure **TAP capacity expansion** to 20 Bcm
- Ensure significant volumes of **Croatia's demand** is met by IAP *(Between 40% and 50% of demand)*
- **Expedite gas to power developments** in Montenegro, Croatia, Albania and BiH *(~1,5 GW extra capacity until 2025)*
- **Accelerate gasification efforts** of distribution consumers in Montenegro, Albania and BiH

2 Provide grant funding

- **Grant funding needs** to ensure competitive transmission tariff: 60% (~€370 million)
- Could be partially covered by **WBIF and CEF** , however gap remains

3 Apply tariff minimising business model

- **Split the CAPEX treatment** of the project:
  - Croatian segment integrated into Plinacro's asset base
  - AL-ME section as an international pipeline
- Does not require separate development, but only applies for tariffication purposes

Conditions that can ensure feasibility of IAP (2/2)

4 Facilitate financability of the project

- Provide **regulatory exemptions**
- **Attract investors** that would see IAP as part of a portfolio
  - IAP on its own does not need to generate high returns, but can be considered as a means to attract higher returns ‘downstream’
  - Involve **Caspian and Middle Eastern gas suppliers** could act as project sponsors
- Ensure high **equity portion** of the investment
- Provide **concessionary loans** with low interest rates reducing the debt repayment obligation

IAP grant funding requirements - €370 million could be partially covered by WBIF and CEF

- Grant funding can be secured from three main sources:
  - **Western Balkan Investment Framework (WBIF)**
    - can support up to 20% of total project cost
    - Could be used for Albania and Montenegro
  - **Connecting Europe Facility (CEF)**
    - CEF can provide grants of up to 50% of CAPEX for PCI projects
    - Would requires Croatian section to be considered a PCI – currently it is not
  - **IPA country allocations**
    - Could be used for Albania and Montenegro section

Cost component		AL	ME	HR	Total
Total investment costs	€mm	192	121	298	611
Estimated grant funding requirement	€mm	115 *(60% of total)*	73 *(60% of total)*	179 *(60% of total)*	**366**

Gas to Power Phase 2

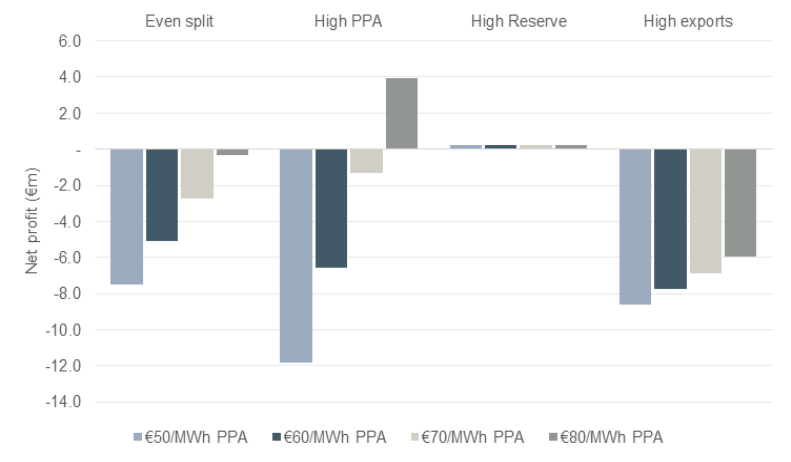
IAP Feasibility

Vlore conversion to gas

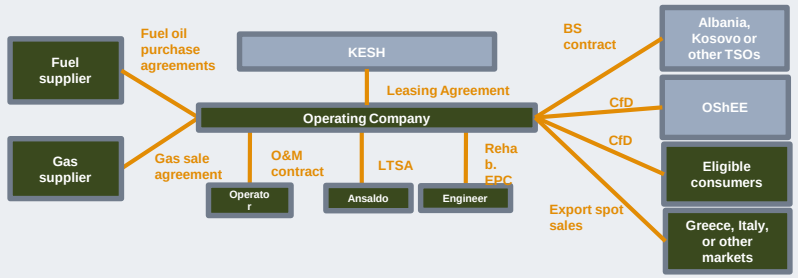
Summary points for Vlore gas conversion

- **Commercial viability of Vlore with gas is at best marginal**
  - PPAs likely to be reliant on OSHEE and KESH who can blend it with hydro
  - Balancing market, spot sales and export sales volumes likely to be very small
- **Preferred private participation option is leasing model**
  - KESH leases the plant to a private operator including all contracts
  - If not attractive, a tolling model should be considered
- **Government reforms needed to attract private operators**
  - Balancing market and electricity market rules

Vlore TPP net profits



Leasing model



Roadmap – GoA actions to needed to mitigate risks

Electricity market reforms

- Enable Vlore to negotiate long term PPAs – if not possible with eligible consumers – KESH to relinquish some of its OSHEEE contracts
- Finalise electricity market rules in line with AMM
- Clarify and implement Balancing market provisions, pricing and processes
- Coupling between Albania and Kosovo market
- Integration of Albania into wider regional electricity market
- Determine transitionary leasing agreement for private entities until gas becomes available

Gas market reforms

- Finalise HGA to enable gas contract negotiations
- Design a realistic gasification strategy for Vlore and Fier areas
- Draft gas transmission codes and tariffs *(tariff regulation passed in late 2017)*
- Assign responsibility of gas transmission development *(decided to be the TSO – Albgaz)*
- Continued support for IAP to secure diversity of gas supply

Role for WBIF funding could be to support Vlore's feeder pipeline from TAP

- **Limited generation means low throughput volumes for Fier – Vlore pipeline**
  - Unless high volume PPA subsidised by KESH/OSHEE are secured
  - Feeder pipeline to Vlore from TAP
  - Non-gas demand likely to be limited
  - Risk of high tariff penalising Vlore offtake even more
- **Fier – Vlore pipeline could be supported**
  - CAPEX not certain yet – currently investigated by SECO *(Swiss Development Cooperation)*
  - ~40 km Extension of IAP
  - Electricity exports into region could displace coal fired power generation
  - SOCAR support secured by Albgaz as lead engineer

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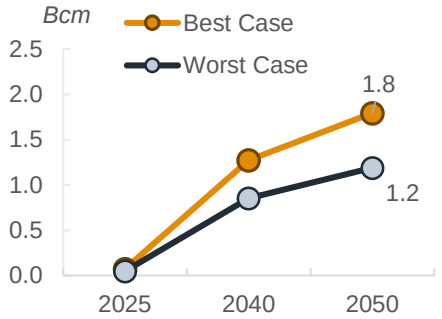
Background slides

Key drivers for the development of IAP

- **Croatia as anchor offtake market**
  - Only established and sizable gas market connected to IAP
  - IAP as diversity and security of supply option for Croatia
- **Expansion of TAP and access to wider gas sources**
  - 90% of TAP already contracted for the Italian market – expansion to 20 BCM is a precondition for IAP
  - Other supply sources (Iran, Iraq, Kurdistan) or SOCAR Azeri gas needed
- **International transmission through Croatia**
  - Prohibitively high tariffs required if IAP does not serve gas beyond Croatia
  - Planned Croatian transmission strengthening by Plinacro
- **Competitiveness of gas supplies through IAP**
  - Would be same as TAP, which are linked Italian spot market
- **Gasification strategies of Albania, Montenegro, and BiH**

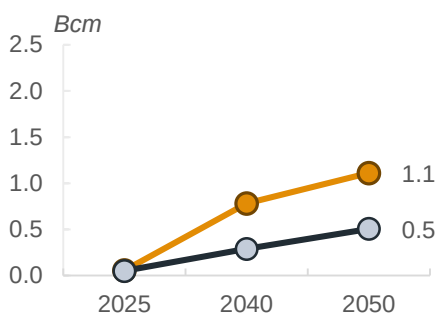
IAP offtake potential along IAP route is small – Will depend on gasification policies

Albania



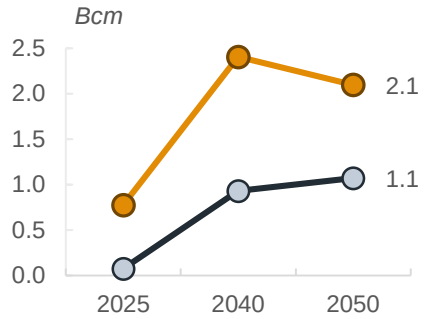
- Main potential offtakers (power + industry) covered by TAP
- IAP throughput depends on distributed users in northern part
- Very limited short-run demand

Montenegro



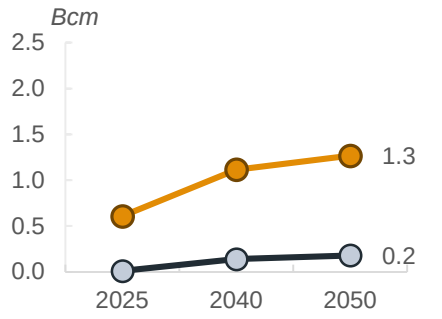
- Montenegro demand can be fully covered by IAP
- Offtake will depend on gas to power strategy
- Overall, small demand potential

Croatia



- Largest potential offtake market
- Gas on gas competition will require competitive IAP supply
- Stagnant gas demand since 2009 (~3 Bcm)
- Gas to power plans have stalled

BiH



- Highly uncertain, as no gasification plans
- Gas to power potential could provide necessary anchor load
- Uncertainty around gas to power plans
- Treated as a separate sensitivity in our study

Transit beyond Croatia is key for IAP to be viable – IAP to form part of the Southern Corridor

1 Can sufficient transit be secured to bridge low initial offtake from West Balkan markets?

- Transit to overcome initial phase of very low throughputs
- Possible offtake markets: Hungary *(9 Bcm/y)*, Slovenia *(1 Bcm/y)*, Austria *(9 Bcm/y)* and CEGH
- Offtake will depend on IAP tariffs and ability to compete with existing suppliers
- Displacing existing supplies however will take more than just low prices

2 Can transmission bottlenecks in Croatia be overcome?

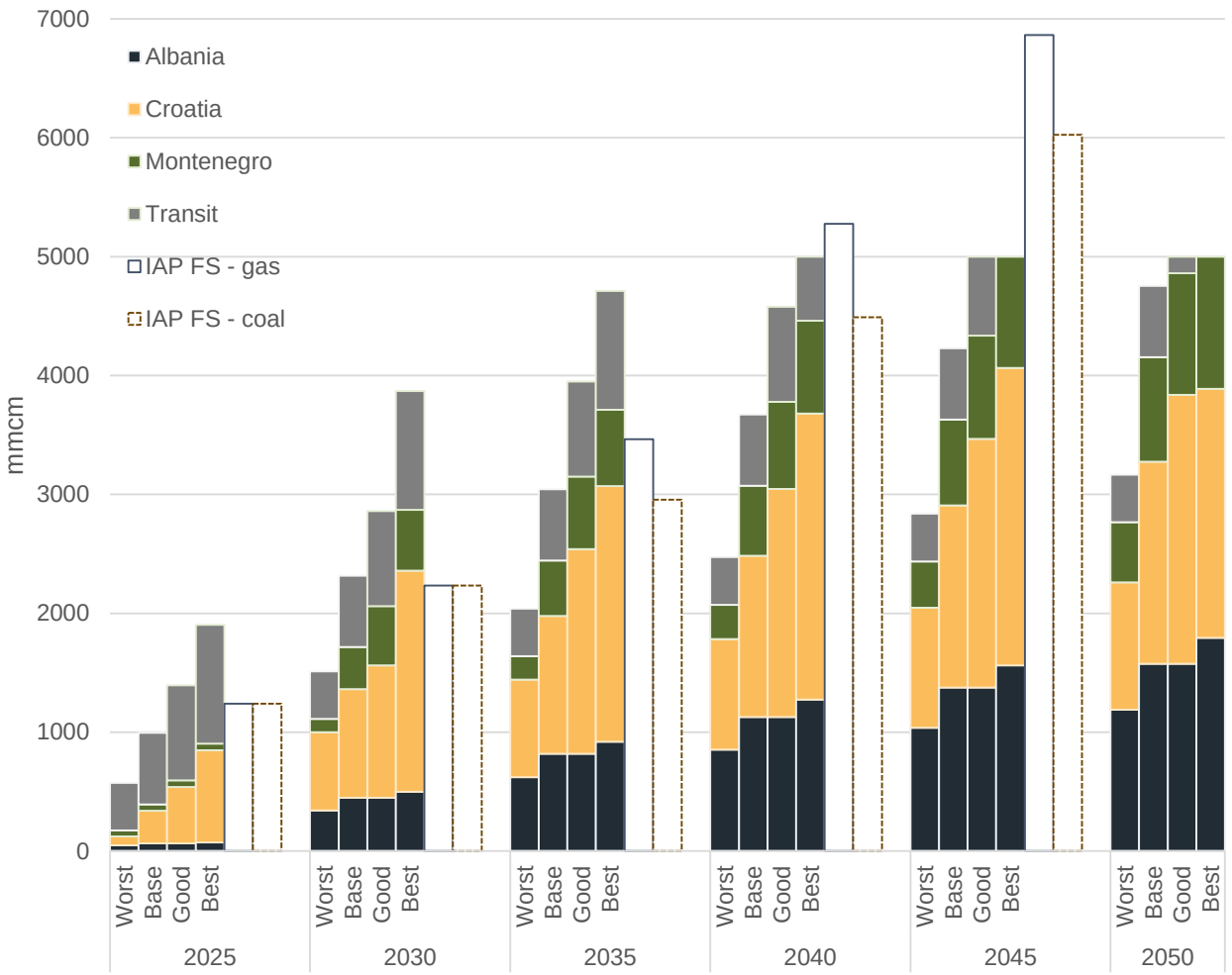
- Plinacro does not perceive this to be a problem
- Existing connection to Hungary would be sufficient for exports up to 3 Bcm/y – this is even strengthened with LNG development package
- To Slovenia, €60 million additional investment is needed

3 Can IAP supplied gas compete on Central European Gas Hubs?

- This will crucially depend on the IAP transmission tariff
- We use the combined Italian and Slovenian transmission tariffs as comparator
- Uncertainty of IAP tariff and possible offtake means that we have treated international transit as a sensitivity parameter

Total potential throughput as estimated by ECA

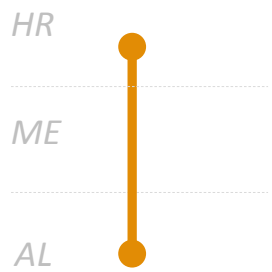
- Higher short-medium-run demand than FS due to transit flows
- **High dependence on Croatian demand and transit flows in short-run**
- Optimistic cases see IAP's 5 BCM capacity reached by 2040



Approach to tariff analysis – three separate business models

Business model 1

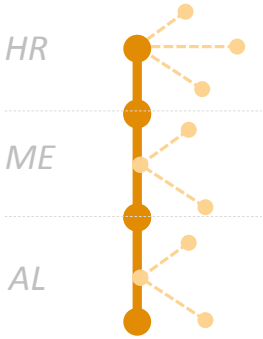
IAP Company



- Project treated as a standalone
- IAP Company develops, owns and operates the pipeline
- One cost recovery tariff applies for the whole pipeline on the basis of a regulated return
- Postage stamp tariff

Business model 2

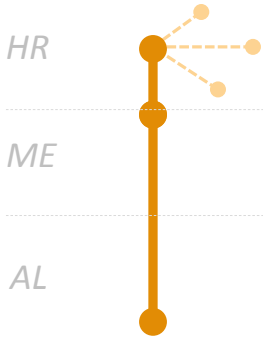
Regulated TSO



- IAP split in three segments
- Each segment developed and financed by national TSOs.
- Tariffs apply that are in line with national regulated transmission tariffs
- IAP segments integrated into national networks

Business model 3

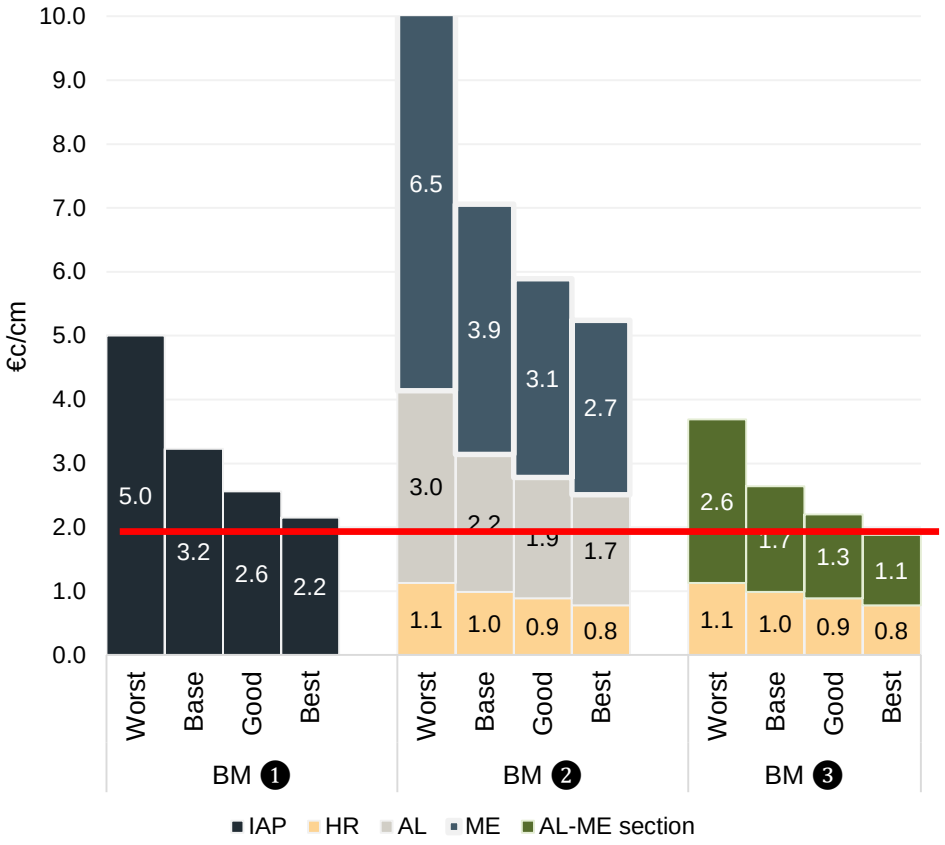
AL-ME as IAP Company + HR section as regulated TSO



- Combination of 1 and 2
- Croatian segment integrated in Croatian asset base
- Segments in ME and AL combined as a ‘small IAP’ and treated as standalone
- Tariff in Croatia based on existing tariff regime
- Tariffs for AL-ME section: postage stamp cost recovery

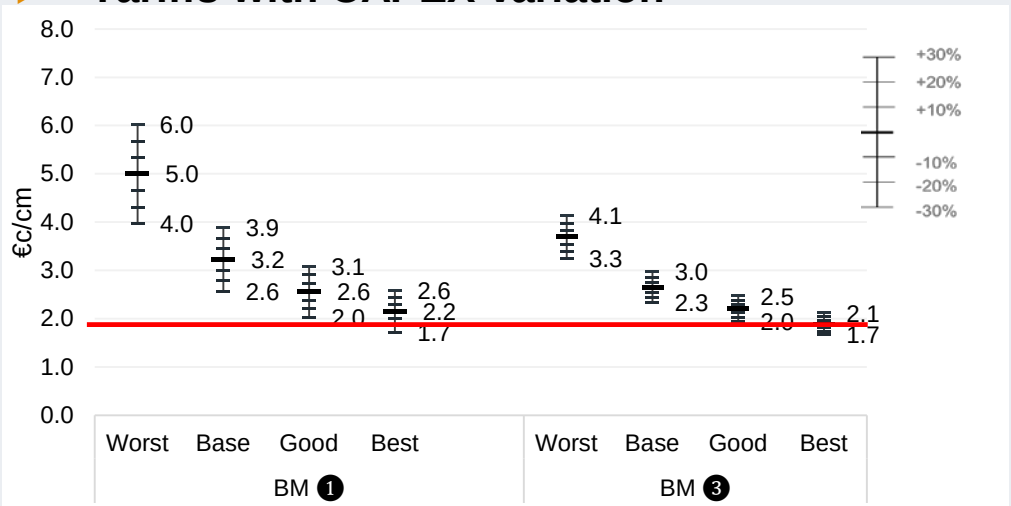
Combination of ME-AL as standalone and the HR segment integrated yield lowest tariffs

- **All business models above critical threshold level of 1.9 €c/cm**
  - Based on combined Italian and Slovenian transmission tariffs
- **Small IAP yields lowest tariffs**
  - Despite additional Croatian investments assumed for northern
- **Regulated TSO worst outcome**
- BM ❸ implies that non-IAP consumers in Croatia subsidise the Croatian segment

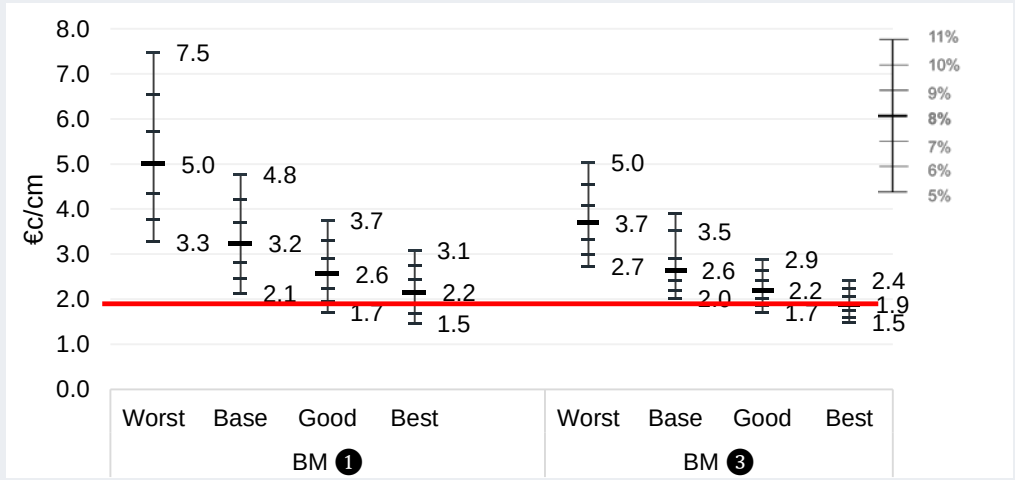


Sensitivity – tariffs only fall under the threshold level under the most optimistic of cases

Tariffs with CAPEX variation



Tariffs with rate of return variation

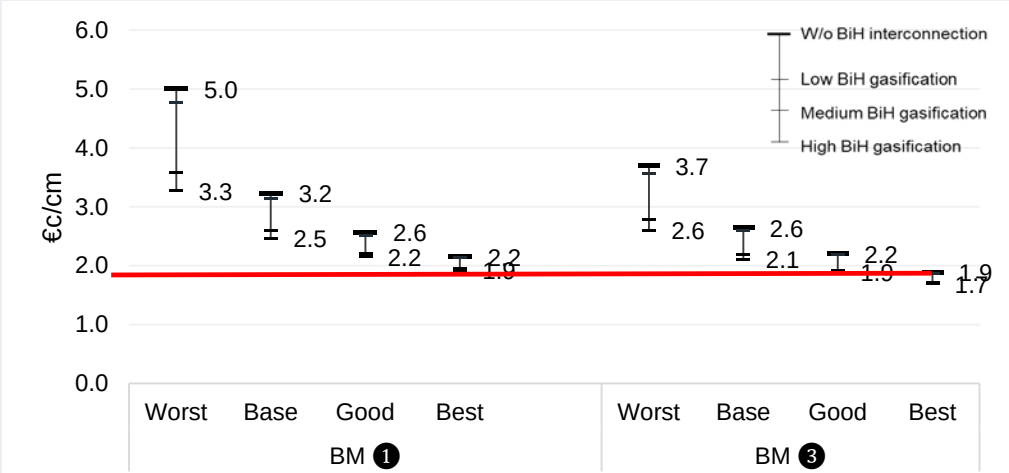


- Tariff only sufficiently low if CAPEX assumed to be 30% lower ***and*** assuming the most optimistic demand scenario
- Under Base Case, CAPEX would need to be 50% lower

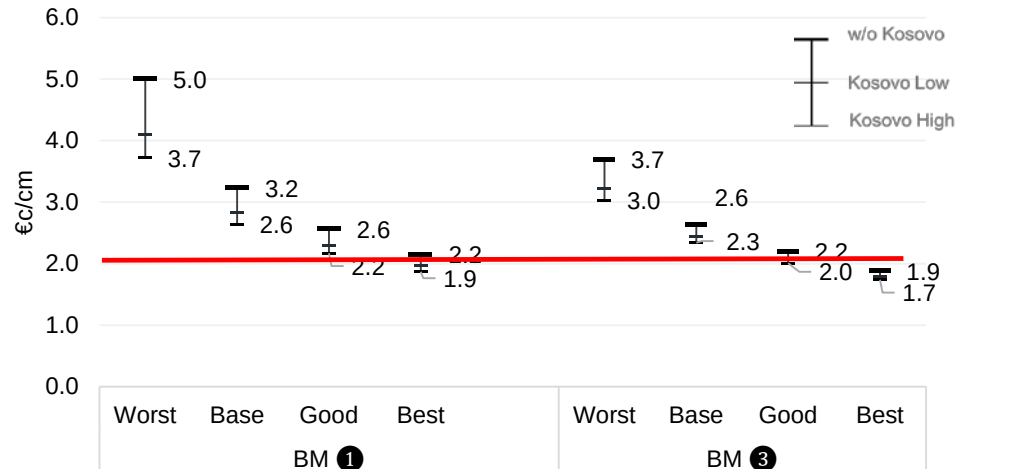
- Tariff low enough under high throughput and 5-6% rate of return scenarios
  - ***But*** setting 5-6% rate of return gives ***IRR below 2%***

Sensitivity – Additional interconnector to BiH can make a difference, less so for Kosovo

- **Tariffs with BiH interconnector**



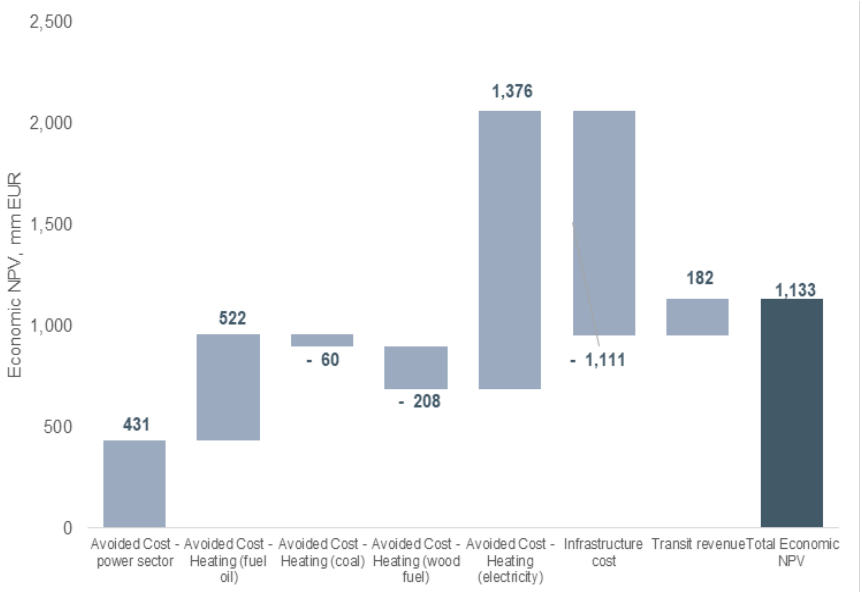
- **Tariffs with Kosovo Interconnector**



- Tariff becomes competitive in the most optimistic BiH gas demand scenarios and most optimistic other throughput scenarios
- Kosovo demand would only be significant if coal fired power generation is replaced by gas - unlikely

IAP is economically viable – CO2 reduction from switching to gas for heating is key driver

- Economic NPV: EUR 1.1 billion
- Remains positive across different sensitivity analyses
- Key driver: environmental benefits from switching to gas through Co2 reduction



Approach

1. **NPV of avoided cost of gas to power** — *Displaces coal fired power generation*

\+ 2. **NPV of gas used for heating** — *Separate calculations for the displacement of fuel oil, coal, wood fuel and electricity*

\+ 3. **NPV of transit revenue** — *Transit tariff calculated as cost recovery tariffs*

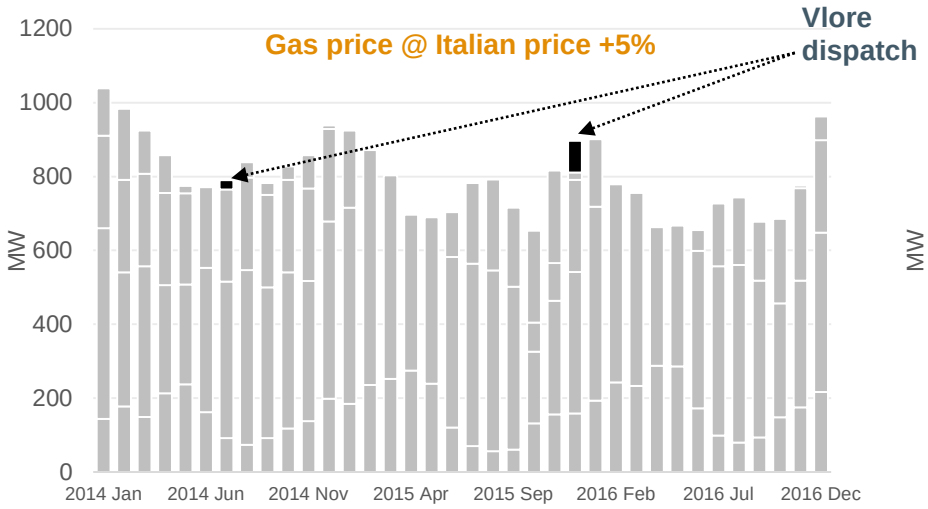
− 4. **NPV of total infrastructure cost** — *As estimated in the previous sections and the Gas Masterplans*

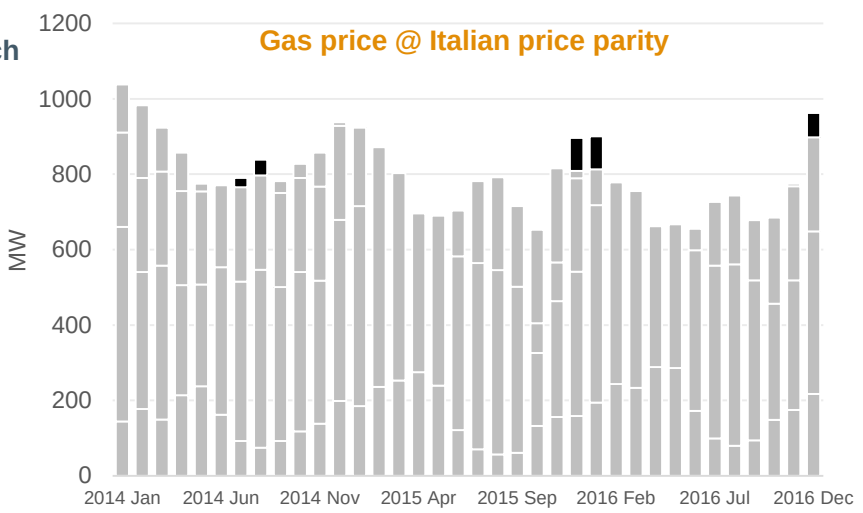
= **Economic NPV of IAP**

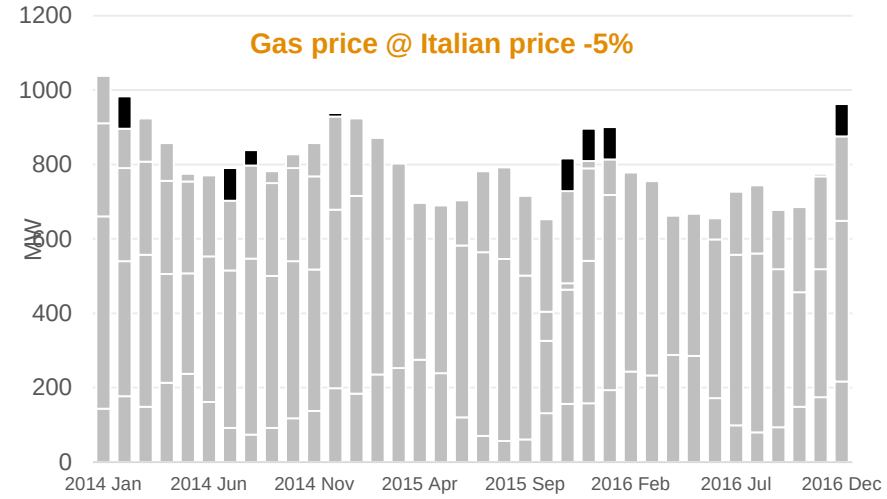
Four potential offtake options for Vlore power

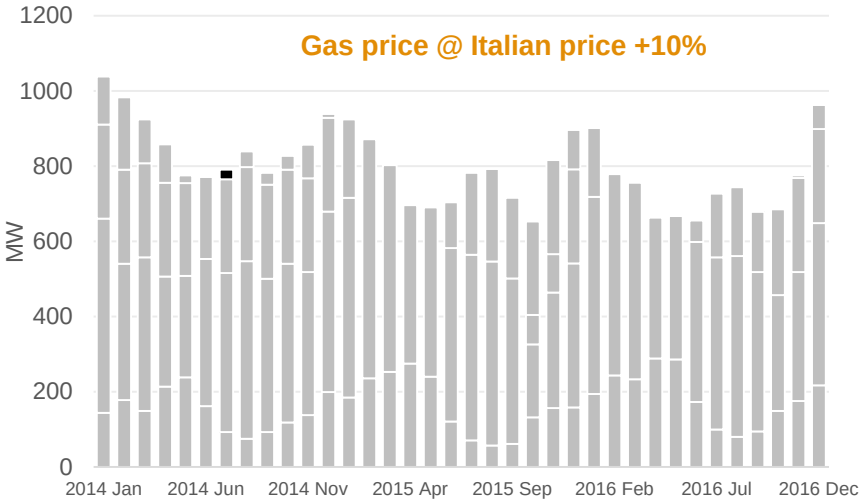
Option 1 Spot market sales on APE	▶ Vlore to compete with imports, which is feasible for gas, difficult with fuel oil ▶ Small volumes: dispatch results have very few months where Vlore is highly utilised	Low potential
Option 2 PPA/CfD with: • OShEE • Eligible customers	▶ KESH could blend hydro and Vlore prices – however, would result in price increases ▶ *Current household price*: 69 EUR/MWh; *Vlore VC*: 77 EUR/MWh (fuel oil) / 66 EUR/MWh (gas)	Medium potential
Option 3 Balancing service contracts • Kosovo • Albania	▶ ENTSO-E requirements mean 150 MW of reserve in Albania and 270 MW for Kosovo ▶ Requires the set up of Balancing Market	High potential
Option 4 Exports to Kosovo, Macedonia, Italy (via Montenegro) and Greece	▶ Once gas supply secure, exports are feasible but crucially depend on price of gas ▶ Vlore will have to trade flexibly and short term	Medium potential

Results of dispatch model – in a competitive power market Vlore would hardly be dispatched





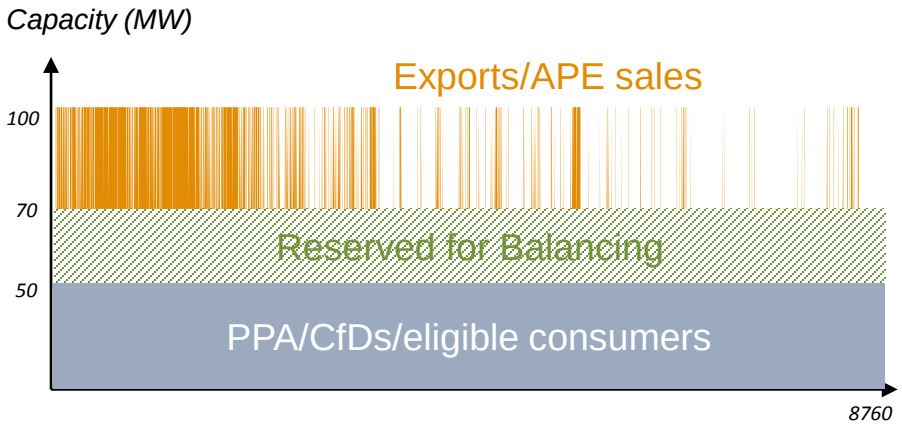




Proposed commercial strategy for Vlore – mix of PPA, Balancing Service and exports

Post-gas supply offtake:

- Vlore TPP standalone PPA/CfD
- Participate in Balancing Market in Kosovo and Albania
- Exports to Kosovo, Macedonia, Greece, Italy



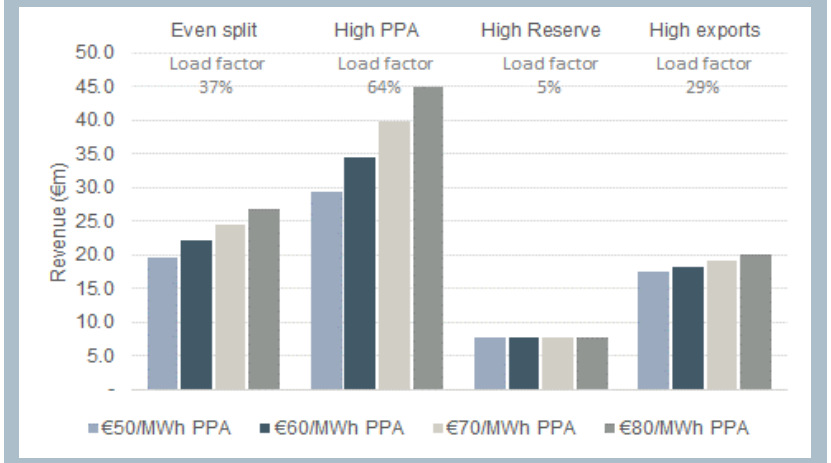
- Vlore power standalone CfDs to provide baseload for gas contract negotiation
- If gas CfD with eligible consumers not possible, requires KESH or OShEE to blend Vlore gas with hydro
- Participation in Balancing markets in Kosovo and Albania – this could be one common market
- Remaining production exported at short term and hourly basis
- Securing CfD/PPA is key for:
  - Continuous operation and therefore faster reaction time to export spreads
  - Bargaining position for gas contract negotiation

Vlore unlikely to recover costs – even with high proportion of balancing or a high-priced PPA

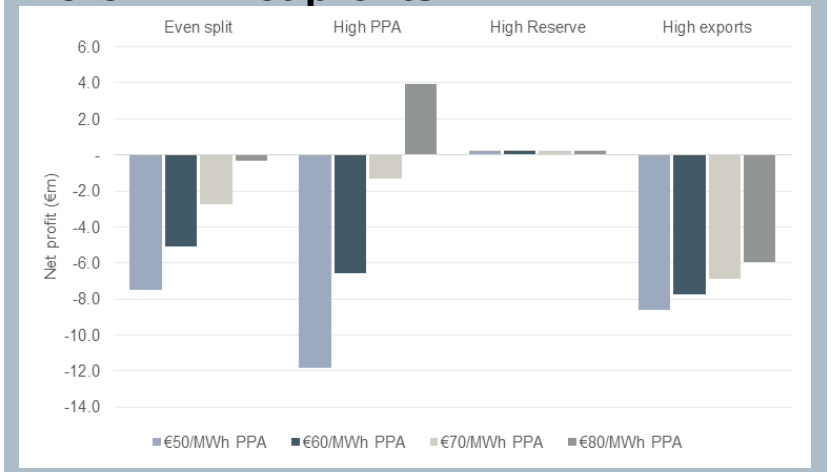
- Revenues across different contract mixes shown
- Includes annualised fixed O&M costs (4.5 million EUR/y)
- Excludes annuity of investment
- Commercial case for Vlore difficult unless:
  - Regulated tariffs for balancing services (BS) to recover fixed cost
  - High value PPAs
  - Commercially optimised export strategy

	PPA	BS	Exports
Even split	34 MW	34 MW	32 MW
High PPA	75 MW	12.5 MW	12.5 MW
High Reserve	0 MW	100 MW	0 MW
High Exports	12.5 MW	12.5 MW	75 MW

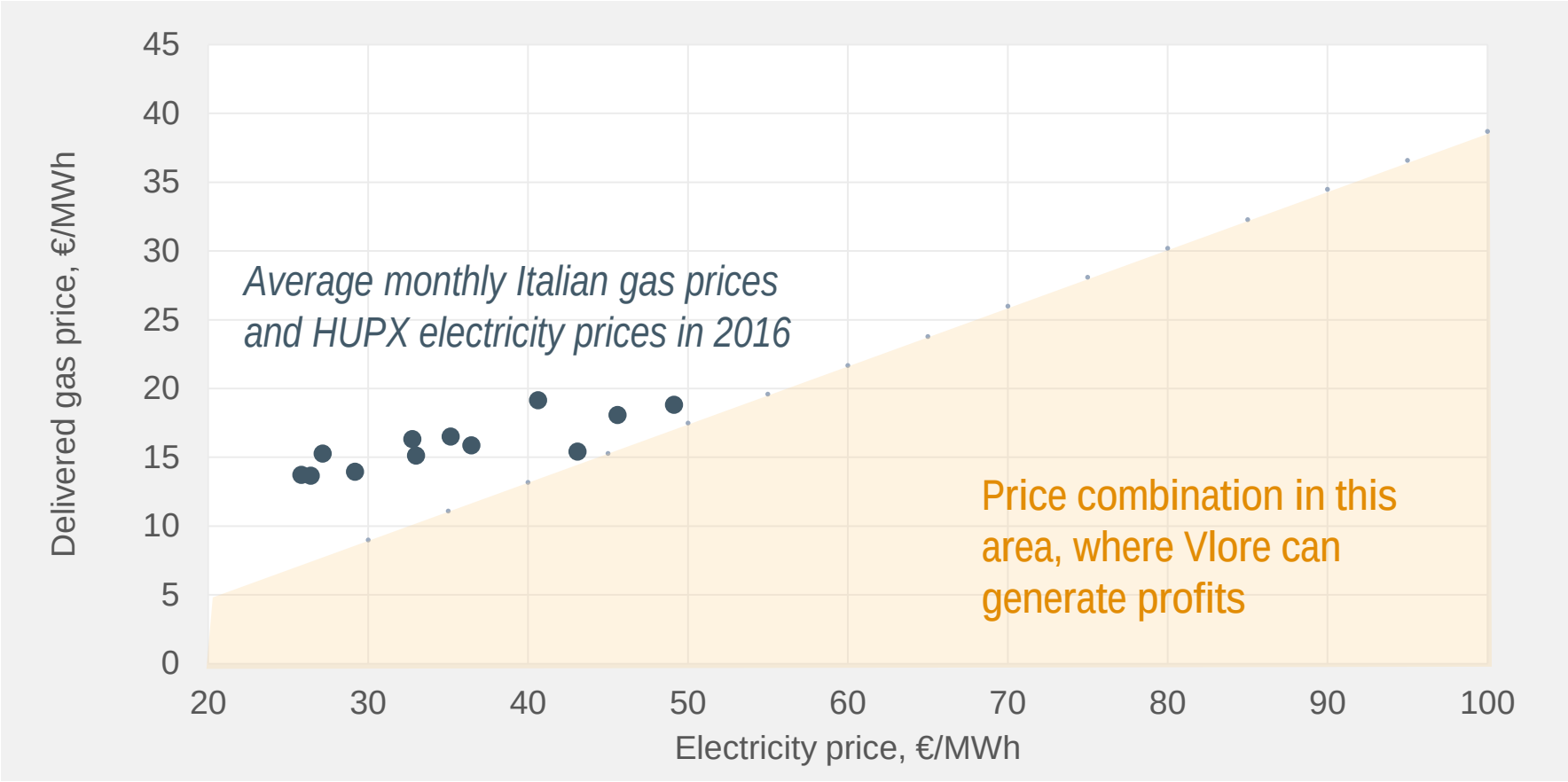
Vlore TPP revenues



Vlore TPP net profits



Key factor for Vlore competitiveness is the combination of electricity and gas prices

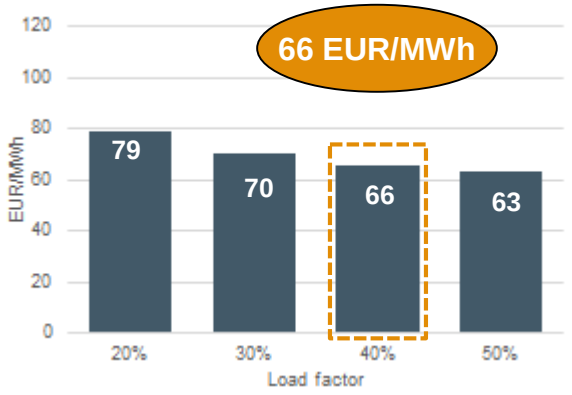


- Analysis for base case scenario assuming 75% of capacity sold as export or PPA
- Gas price/electricity price combination in 2016 would not have been favourable

Vlore status quo with gas switching is lowest cost option

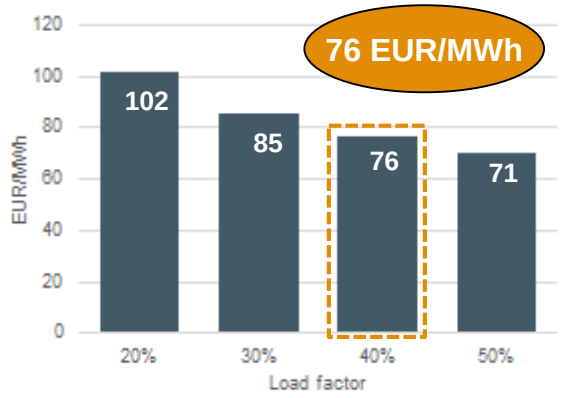
1 100 MW at Vlore with gas

- Sunk investment cost **112 mm EUR**
- Gas Pipeline cost **~35 mm EUR**
- Annual Fixed cost **4.5 mm EUR**
- Non-fuel Variable cost **138 EUR/OH**
- Net efficiency **42%**



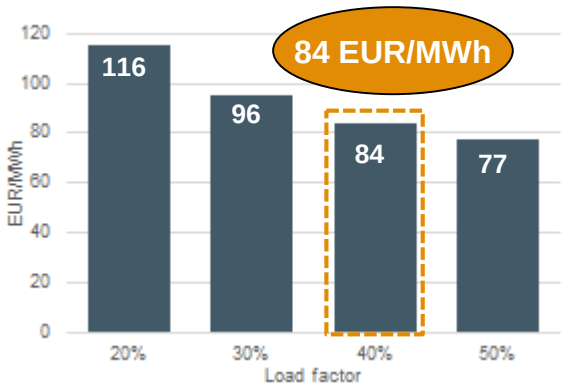
2 Expansion to 300 MW at Vlore with gas

- Sunk Investment cost **112 mm EUR**
- Gas Pipeline cost **~35 mm EUR**
- Expansion cost **248 mm EUR**
- Annual Fixed cost **6.8 mm EUR**
- Non-fuel Variable cost **138 EUR/OH**
- Net efficiency (old 100 MW) **42%**
- Net efficiency (new 200 MW) **50%**



3 New build 200 MW at Fier

- Sunk Investment cost **112 mm EUR**
- Expansion cost **263 mm EUR**
- Annual Fixed cost **8 mm EUR**
- Non-fuel Variable cost **138 EUR/OH**
- Net efficiency (diesel) Vlore **44.8%**
- Net efficiency Fier **50%**



Five business models were assessed and risks analysed to recommend on suitable structure

Business model options

- **Option 1: Status Quo**
- **Option 2: Tolling model**
- **Option 3: Leasing model**
- **Option 4: Partial privatisation**
- **Option 5: full privatisation**

Risk assessment

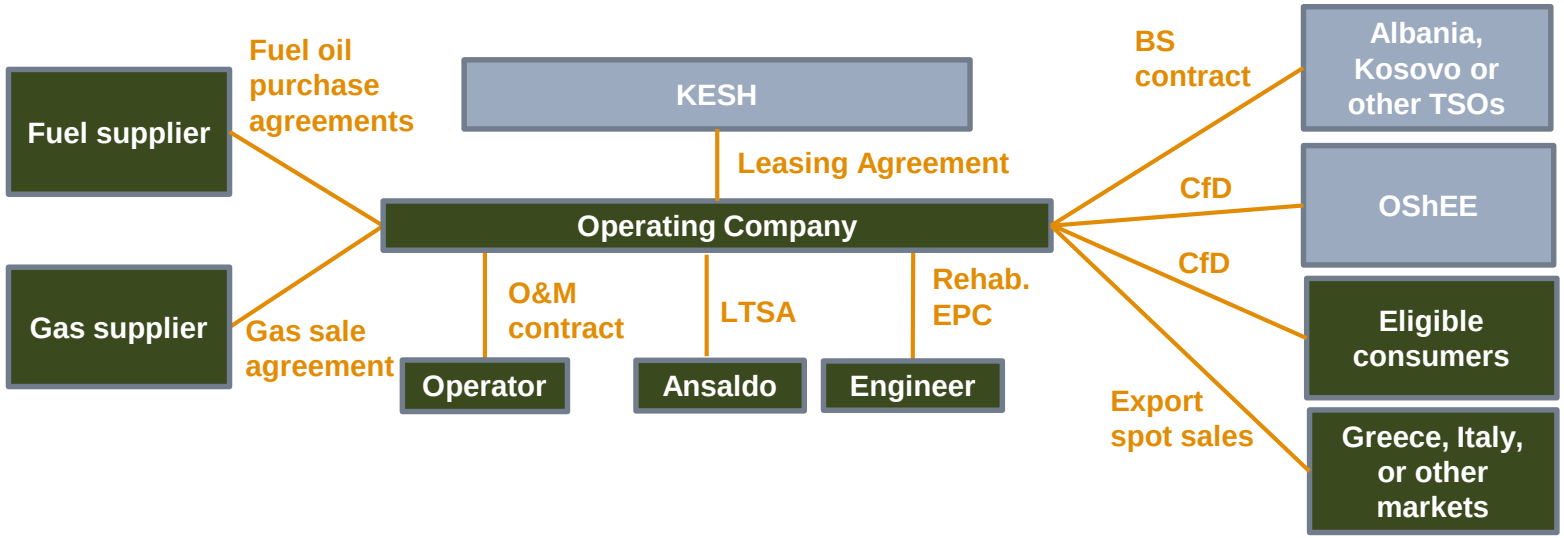
- Offtake risk
- Financing risk
- Gas supply risk
- Fuel oil risk
- Contract risk
- Operational risk
- Regulatory risk
- Price risk

Recommended Business model based on:

- Risk analysis
- Feasibility
- Ease of implementation

ECA favoured option: leasing model

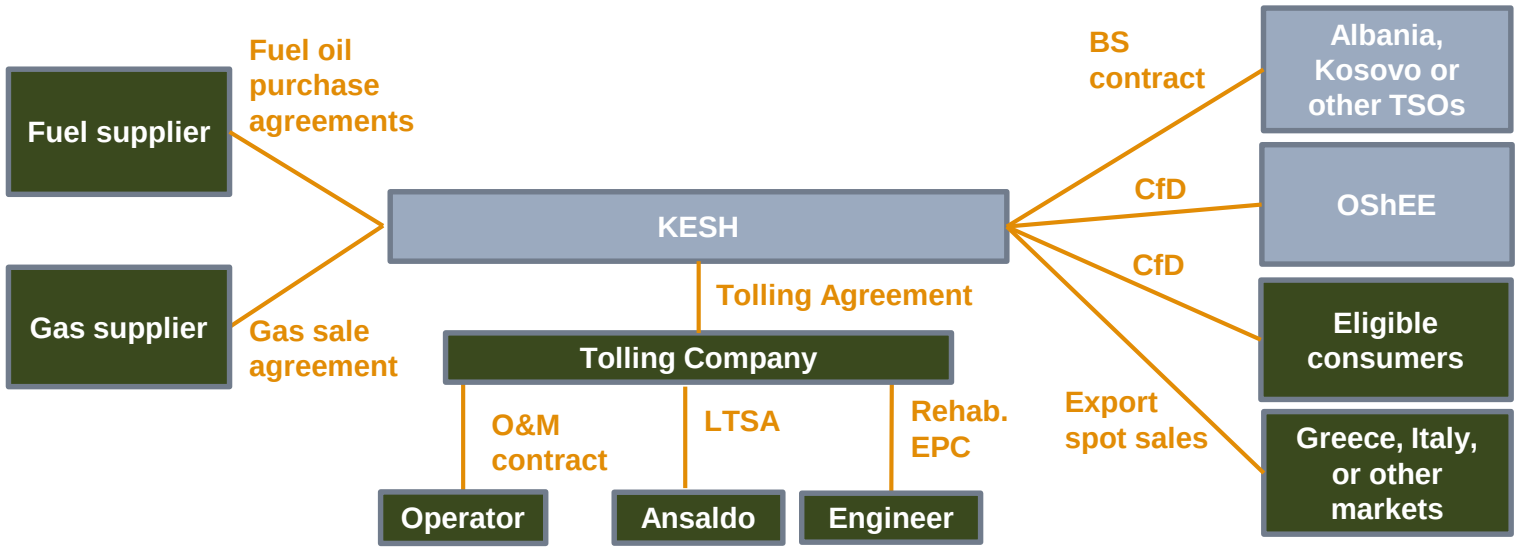
KESH owner without commercial or technical risk



- KESH remains owner of the plant, but leases asset to an operating company at a fee
- No upfront cost for private entity – financing debt remains with KESH
- Risks (and commercial rewards) borne by private operator:
  - Gas contract negotiation
  - Power contract mix to be optimized by private entity
- KESH/GoA no role in operations
- Recovered through regulated tariffs – net of leasing fee
- Gas pipeline treated separately – developed by AlbGas

Second-best option: Tolling model

KESH owner with commercial risk, operational risk for tolling company



- KESH owns the plant, contracts for fuel, and sells electricity – commercial risk
- Tolling company receives tolling fee and carries operational and technical risks of plant
- O&M, rehabilitation and LTSA to be contracted by private tolling company
- GoA still plays an important role in the value chain through KESH
- Will require a non-standard tolling arrangement incl. rehabilitation costs
- TEC-Vlore could take over from tolling company at a predetermined point