Ideas towards immediate actions for renewable gases in Greece

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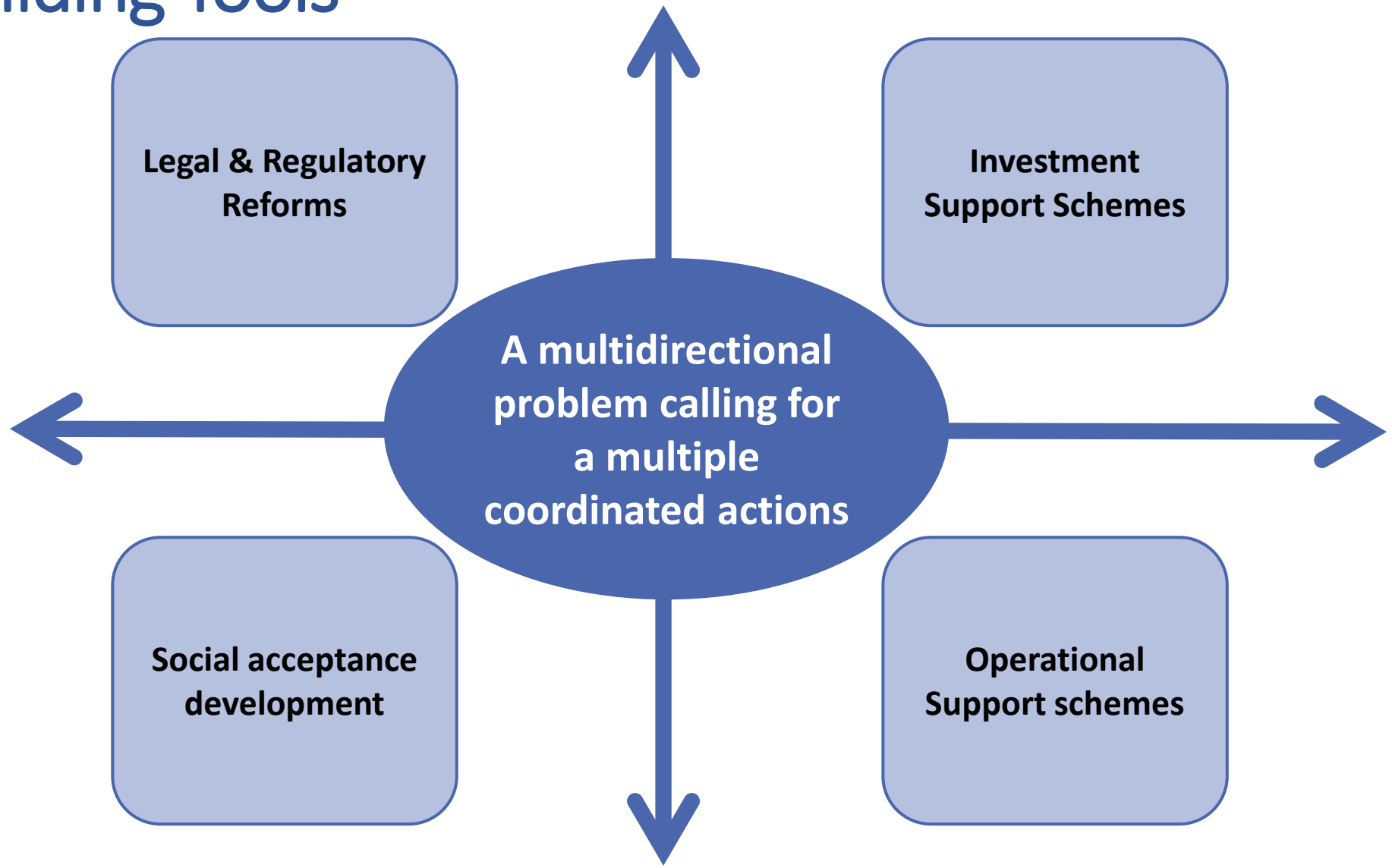
Building Tools



Legal and Regulatory reforms

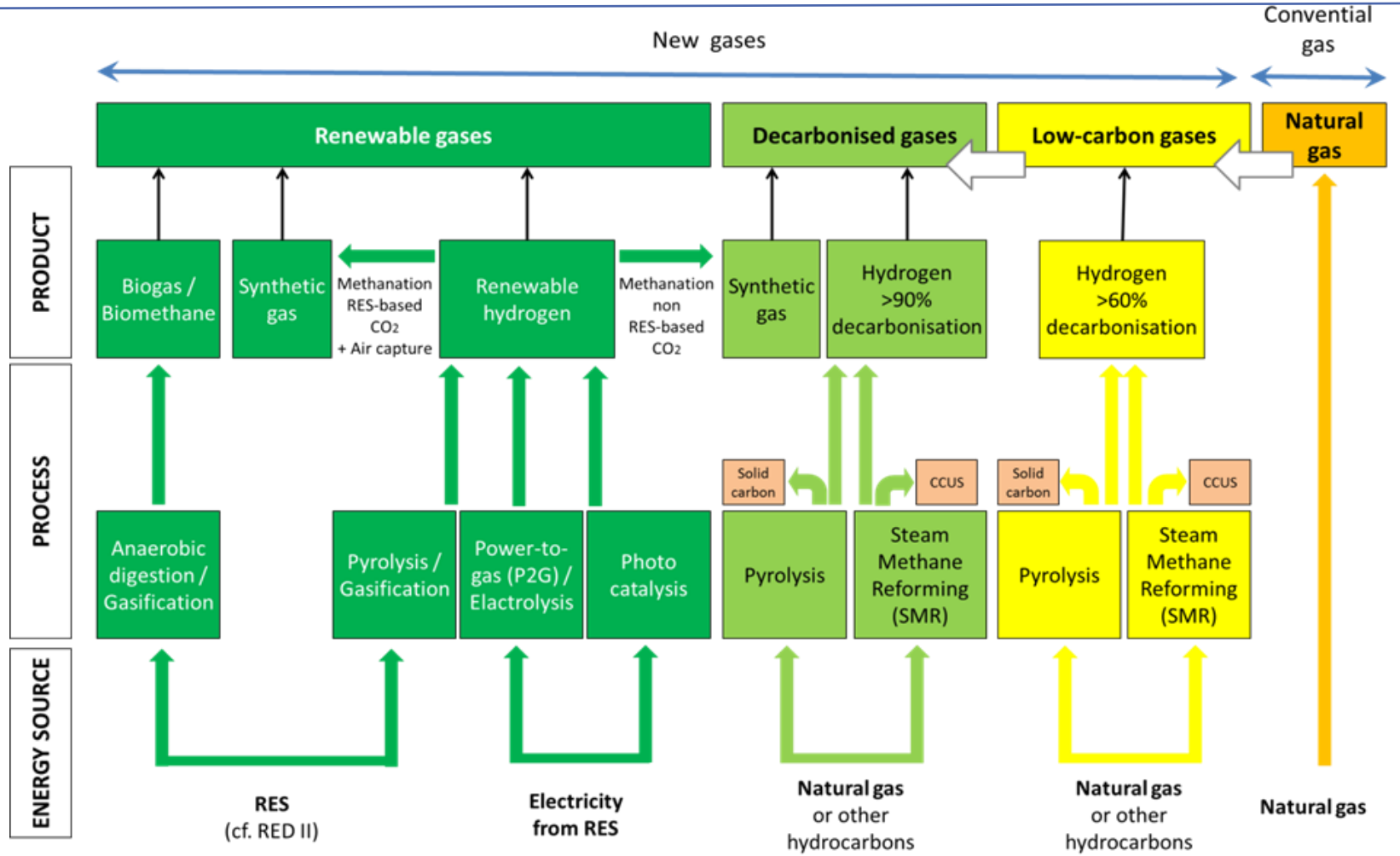
An amendment of Law 4001/2011 shall need to be initiated together with changes in the Licensing regulation, the transmission and distribution network codes and the tariff regulations

Definitions (1/3)

Key Issues

- The legal framework refers solely to natural gas i.e. a fossil fuel
- New gases encompass many different types of gases

Key Points



Source: CEDEC, 32nd Madrid Forum

Definitions (2/3)

Key Issues	Recommendations
• The legal framework refers solely to natural gas i.e. a fossil fuel • New gas encompass many different types of gases	• Definition of new gases: ○ **1st approach:** – Ensure that Natural Gas as referred to in the Law 4001/2011 also includes the provisions of Article 92 on biogas and other types of gases in so far as such gases can technically and safely be injected into, and transported through, the natural gas system – Specific reference to hydrogen – This approach may endure an automatic extension of secondary legislation to encompass new gases ○ **2nd approach:** – Inclusion of a definition of "new gases" in the Law: terminology, taxonomy & classification provided by international organizations/institutions/industry (e.g. the Florence School of Regulation, the International Council on Clean Transportation), European Standards – Possible inconsistency between the Greek framework and the potential future amendment of Directive 2009/73/EC

Definitions (3/3)

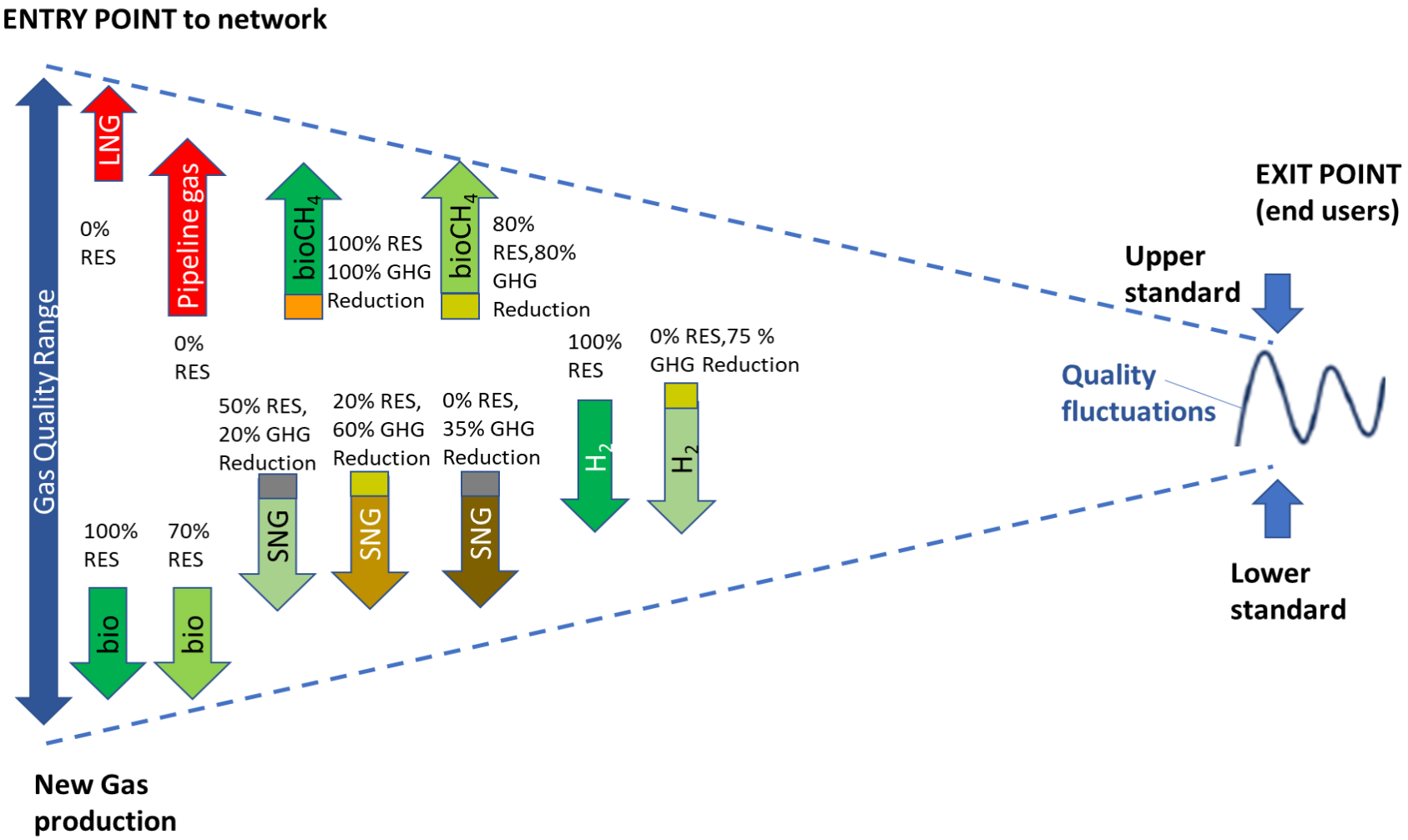
Key Issue	Recommendations
• Further issues with new gas definitions	• Forthcoming transposition of Directive 2018/944/EU with regard to the definition of energy storage facility and energy storage including power-to-gas production units. *'**energy storage**' means, in the electricity system, deferring the final use of electricity to a moment later than when it was generated, or the conversion of electrical energy into a form of energy which can be stored, the storing of such energy, and the subsequent reconversion of such energy into electrical energy or use as another energy carrier;* ○ Care is needed when transposing Directive 2018/944/EU and in any other future amendment of Law 4001/2011 that the definition of a new-gas production facility is general enough so as not to foreclose any type of facility, technology or type of gases

Mixture disclosure (1/2)

Key Issue

- Mixture disclosure obligations and guarantees of origin

Key Points



Mixture disclosure (2/2)

Key Issue	Recommendations

• Mixture disclosure obligations and guarantees of origin	• Introduction of a mix disclosure obligation upon gas suppliers should be considered so that the amount of renewable gas and the carbon footprint of the gas consumed are made known to consumers
	• Guarantees of origin (GOs) that reflect the carbon footprint over the entire lifecycle of each type of gas injected to the grid are a necessity:
	  ○ Extension of the existing GOs system in accordance with Directive 2018/2001 and transposition into the Greek legislation to cover renewable gas
	  ○ Follow-up EU developments towards gas GOs
	• Currently although GOs for gas are issued at country level across EU, there still misalignment across the various schemes
	• Consideration of the role of the National Managing Body for Renewables and Guarantees of Origin (DAPEEP) as the central authority for gas GOs

New-gas plants ownership

Key Issue	Recommendations
• New gas production plants - definitions & ownership	• The petroleum and petroleum product law 3054/2002 includes a definition of a biofuel production facility which adequately refers to a production facility of gaseous biofuels but fails to address all other types of gases • Introduction of such a definition in Law 4001/2011 and alignment of the new provisions with law 3054/2002 is recommended • Concerning the ownership and operation of power-to-hydrogen and power-to-gas facilities, the Directive imposes unbundling of production from the activities of system operators • Overall, it is preferable for production facilities to be developed under market conditions by gas producers/suppliers and not regulated monopolies • It is expected that the issue of unbundling shall be addressed at an EU level at a future amendment of Directive 2009/73/EC, probably in alignment to the provisions of the new electricity Directive which foresees ownership of storage facilities by system operators only under special conditions, in the absence of market interest and for a limited time period • In the case of Greece, system operators could become involved in R&D projects or pilot projects as members of a consortium or shareholders for a limited period of time to be specified in the law which should not exceed 5 years on first instance – with period to be revised based on progress. RAE should be obliged to issue relevant guidelines, monitor the process and report

Location and access rules for biomethane plants

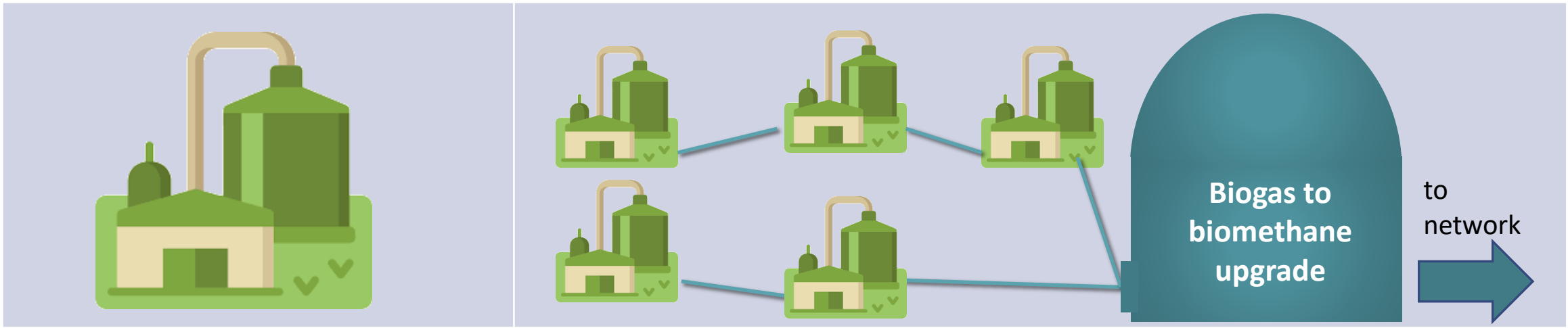
Key Issues

- Few locations for biogas in Greece
- Biogas upgrading to biomethane may not be in the core business of biomass activity firms.
- The location of biomethane facilities has to be reasonably close to a gas network

Recommendations

- Introduce a framework allowing for auctioning procedures may help exploiting the most advantageous locations in a cost-effective manner
- Consider introducing provisions allowing for gathering systems collecting biogas from several small-scale plants with a large scale biomethane plant offering an “upgrade service”. Third party access rules to the gathering system and the biomethane facility may be necessary
- The relevant system operator shall be responsible for the connection of the plant to the grid

A new gas producing plant	Several biogas producing plants connected to a gathering system feeding a biomethane plant



Location and access rules for P2X plants

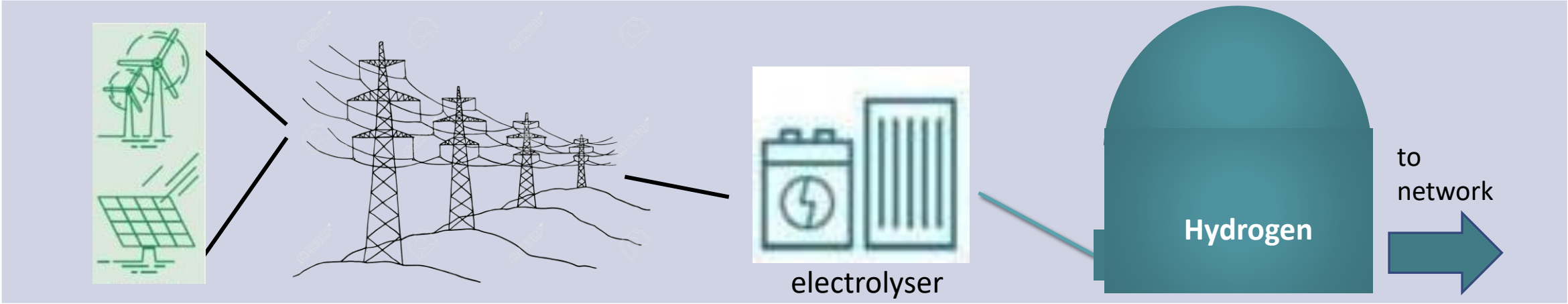
Key Issues

- There are no particular locational restrictions subject to water access (and any environmental restrictions related to water consumption)
- Access to transmission may be preferable to exploit economies of scale and smooth out fluctuations in RES production

Recommendations

- There is no reason to allow gas DSOs or TSOs to become H_2 or synthetic methane producers
- Obligations for electricity GOs shall be necessary to prove hydrogen greenness. A relevant accounting system, rules and reporting obligations shall be necessary. Follow up evolution at EU level is required
- In case P2X qualifies as an energy production plant, it becomes an electricity consumer obliged to face connections, grid costs, charges and levies undermining investment economics
- A regulatory approach for P2X require further studies to set up a suitable system of dedicated codes, as even the legal status is ambiguous

P2X production facilities



Licensing and Monitoring

Key Issue	Key Points & Recommendations

• Licensing regulation.
• Monitoring of new-gas production facilities and new gas production
	• There is regulatory scope for supervising competition regarding the location of new-gas production facilities, in order to avoid abuse of dominant position by certain market participants, and to enable maximum exploitation of the advantageous locations
	• The appropriate regulatory approach for locational and competition supervision has to be further studied:
	  ○ A bureaucratical approach, such as the production licensing that has applied to the power sector, is probably not suitable but at the same time an approach that relies only on ex-post supervision is not sufficient. The competences of RAE should be extended to include locational supervision for new-gas facilities
	  ○ A combination of the licensing procedure with an auctioning procedure in case of subsidy policies help the exploitation of the most advantageous locations in a cost-effective manner
	• There is a clear need for an update in the licensing procedure under Law 3054/2002 to expand scope beyond gaseous biofuels
	• Reliable fundamental data on gas production facilities in place and planned should be systematically collected by TSOs, DSOs and reported to the national regulator. RAE shall maintain a gas production registry to include the status of the various licenses that need to be granted to the investor, connection times, actual production output, shareholding structure, business model and market participation

Network and Tariff Codes

Key Issue	Key Points & Recommendations
• Significant revisions are necessary particularly related to network development and new connections	• Legal provisions in Law 4001/2011 for the review of transmission and distribution network codes and tariff regulations to account for connection of production facilities and new gas injection • Further provisions for additional criteria for the development and approval of development plans for the connection of new gas facilities • Extensions of the network to accommodate new gas facilities should be subject to CBA with clear criteria on cost allocation

Gas quality and technical standards

Key Issues

- Current standards refer to fossil based natural gas
- There are no legal provisions for operators to initiate network readiness assessments

Key Points & Recommendations

- An obligation for network operators (both transmission and distribution) to assess network readiness for the immediate adoption of the standard for biomethane injection EN 16723-1 should be included in a future amendment of Law 4001/2011
- A future amendment of Law 4001/2011 should include an obligation for system operators (both transmission and distribution) to assess system readiness to accept natural gas/hydrogen blends and to provide a roadmap and relevant costs for the gradual transformation of the system to hydrogen ready (e.g. initial 2%, 4%, 10% etc..)
  - A deadline for the assessments and the roadmap preparation of the system should be included in the law (e.g. by 2024)
  - A costs and benefit assessment for the transformation of the networks to hydrogen compatible should accompany the roadmap
  - A procedure for the regular update of the roadmap should be established (e.g. every two years) taking into account EU experience and technology readiness. Different roadmaps for transmission and distribution networks should be considered
  - Provisions for blending shall need to be carefully considered and also included in a future amendment of the network codes
  - RAE, network operators and the Greek Standardisation Office should follow up the progress at EU level (Commission, ACER, Madrid Forum, CEN working groups, ENTSOG, GERG, MARCOGAZ)

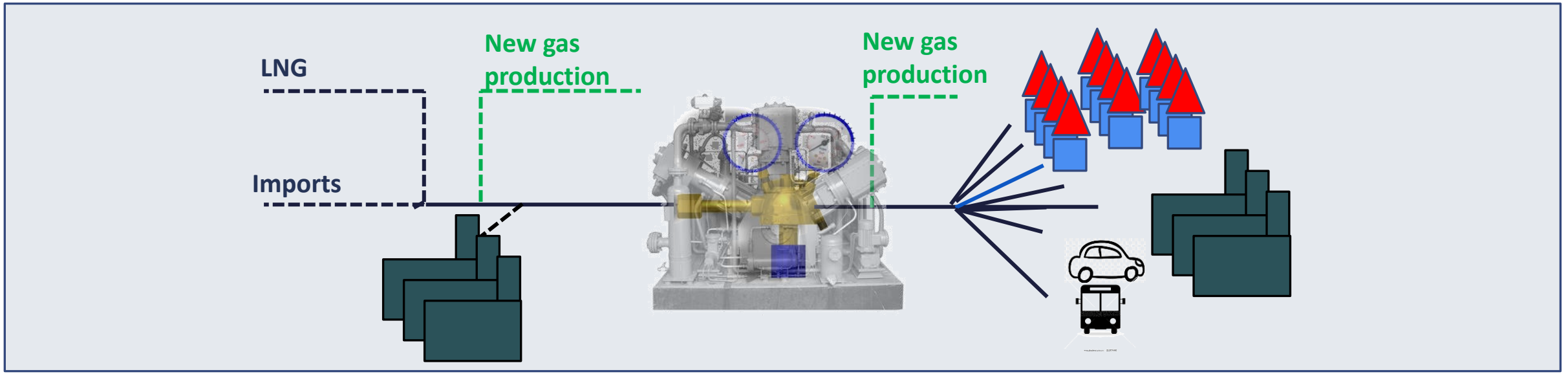
Market access (1/2)

Key Issue

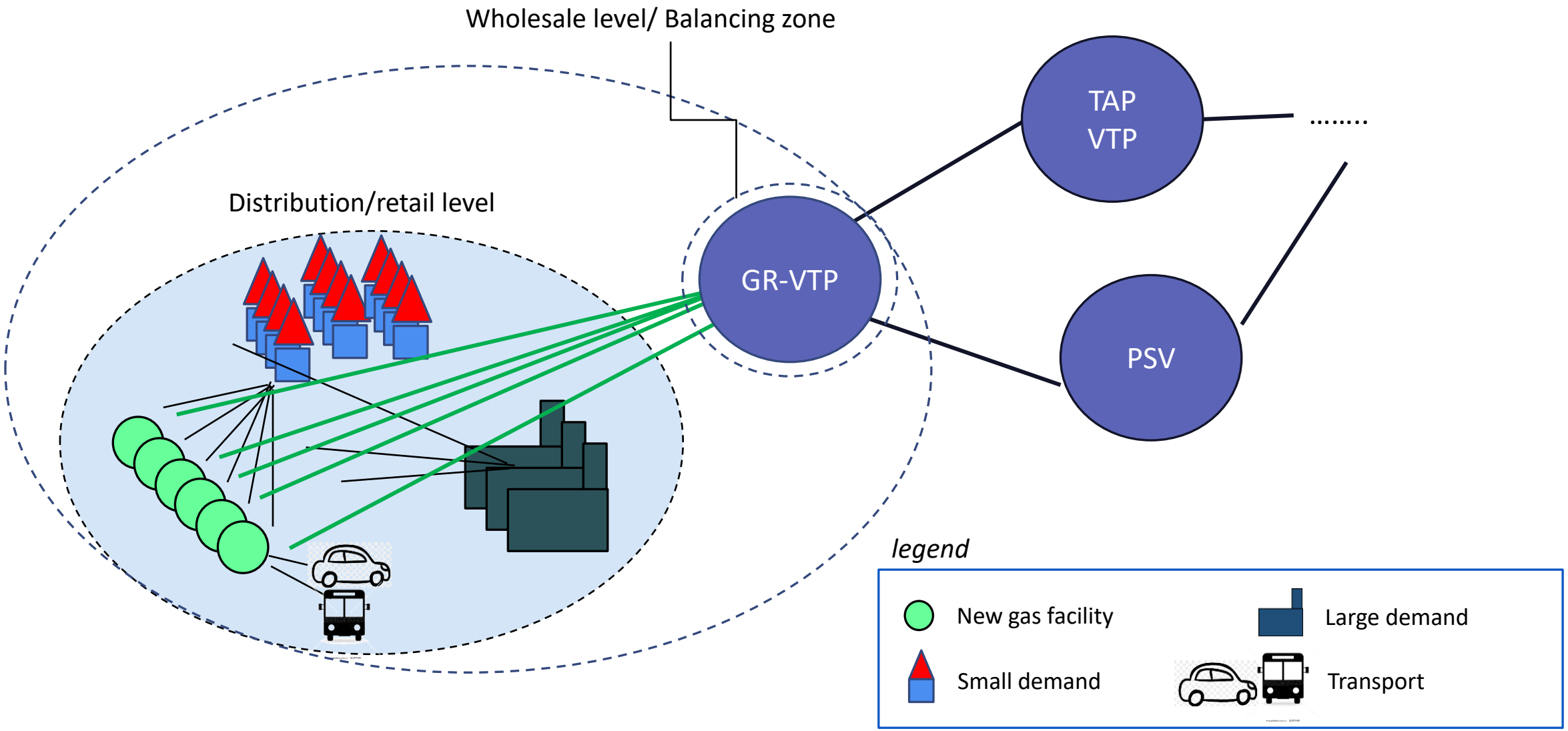
- Facilitating a competitive retail market
- Short term intermediate arrangements may be necessary

Key Points & Recommendations

- Currently there is no gas hub functioning in Greece. New gas producers, even at distribution level, in the long term shall need to access the gas trading platform (when this materialises)
- Provisions in the law should ensure that physical networks are decoupled from commercial routes and that gas injected at distribution may be also traded at the gas exchange in the long term
- Facilitating participation of new-gas producers in the wholesale market may require in the long-term investment in the transmission system to ensure reverse flows from distribution to high pressure pipelines



Market Access (2/2)



The new role of the Distribution System Operators

Key Issue

- Traditionally DSOs were responsible for the connection of demand and had no obligations on gas quality
- Facilitators of the new-gas market

Key Points & Recommendations

- Gas quality:
  - Specific responsibilities on gas quality monitoring, development of appropriate methodologies for the calculation of the quality of delivered gas and on taking actions when quality is not of the anticipated standards
  - Costs borne by the DSOs for the installation/replacement of the gas quality monitoring equipment would need to be remunerated through network tariffs
- Connection requirements:
  - Development of rules for the connection of new-gas facilities to the network, standardised connection agreements and a methodology for the estimation of connection costs:
    - Non-discrimination among new gas facilities and technologies employed
  - Provision of information on connection rules, available capacity, costs, timing and quality of gas accepted to new-gas producers wishing to connect to the distribution network
  - Development of a methodology for the calculation of the available capacity per pressure level to accommodate the injection of new gases without compression to transmission
  - Publication and transparency of the aforementioned topics
- Active role in the new-gas market design as “new-gas” aggregators on behalf of suppliers and end consumers

Network Development (1/2)

Key Issues

- For transmission, some of the methodology for assessing the economic efficiency of a new connection and connection charges is already implemented, but further clarity maybe necessary
- For distribution, connection of production has never been in the scope of the development plan

Key Points & Recommendations

- Network operators should start considering the connection of new gas facilities to their network in network development plans
- A specific obligation introduced in Law 4001/2011 may be necessary. Network developments should be justified and subject to a cost benefit analysis
- In the development plan, network operators should also include a long-term gas quality outlook for each system (transmission/distribution). A relevant provision should be included in the legal/regulatory framework.
- The timing, costs and benefits from a potential conversion of natural gas networks to hydrogen should be considered in the context of the roadmaps taking into account developments in EU level including technology readiness and costs related to production facilities.
- Network operators and also RAE follows developments at EU level regarding hydrogen networks and storage
- RAE and Distribution system operators should develop a methodology to compute and publish available capacity and agree on transparent conditions for refusal of access and new investments (e.g. develop a procedure for selecting relevant scenario to be addressed by hydraulic simulations in the longer term)

Network Development (2/2)

Key Issue	Key Points & Recommendations
• Network Planning and DSO/TSO coordination	• Consultation of gas DSOs with all relevant system users (current and potential new-gas producers, upstream TSOs) on the network development plan • Approval of the network plans by NRA • Formal coordination of DSOs & TSOs for the preparation of their development plans • Consideration of the interactions between the electricity, gas, heating and cooling systems and ensure full coherence between network planning exercises and other relevant developments including local and regional urban planning when developing network plans in the long term

Overall new role of System Operators

Key Issue	Key Points & Recommendations
• New role of System Operators	• The role of system operators (if any) would also need to be determined with regard to the potential construction and operation of dedicated hydrogen networks, biomethane liquefaction plants, hydrogen liquefaction and several other facilities that are intended to supply transport sector hubs, of medium to large scale, such us for ports, rail stations, bus stations and truck refuelling stations • The blending of liquefied gases of different origins falls into this category • The business model to follow is unknown today and a cost-benefit analysis study is needed for this • Involving DSOs and TSOs in this infrastructure business has the merit of investment security, but also has drawbacks regarding obstruction of competition and the risk of high costs and tariffs • Private investment interest exists, but the legal, market and licensing uncertainties should be removed

Third party access

Key Issue	Key Points & Recommendations
• Third party access, capacity allocation and congestion management	• Reinforcements/capacity expansions of all networks should be subject to a CBA • DSOs should determine and publish available capacity at distribution level and report to RAE refusals of connection or capacity allocation to new gas facilities • DSOs should report to RAE cases where they refused the injection of new gases into the network due to operational issues • Consideration of interruptible contracts or injection management procedures at a future stage

Operation

Key Issues	Key Points & Recommendations
• Network Operation	• The DSO shall need to collect and publish gas quality data and pressure in their networks • Network operators shall provide RAE with information on all new gas plants connected to the system in terms of technology, production capacity, monthly production and connection date
• Network Operation and Flexibility	• Following the connection of new gas production facilities to distribution, linepack should be gradually calculated and published also by DSOs for transparency and regulatory reasons (also for assessing connection/access and injection refusals).
• Balancing	• The operation of new-gas facilities is expected to be to a large extent continuous whereas demand at distribution level is highly seasonal • Substantial daily variations are also noted. • Our review of national cases in the context of this study has shown that a number of EU MS have already adopted more flexible balancing rules applicable to new-gas producers

Closed distribution systems

Key Issue	Key Points & Recommendations
• The current legal framework both EU and national does not impose 3rd party access for Closed Distribution Systems and direct line connections	• No grounds to change the regulatory status of existing hydrogen networks and no need for additional rules to systems servicing one or very few users • The industrial sector and mainly petrochemical industry, fertilisers and iron and steel may find a wealth of decarbonisation opportunities within the production of blue or green hydrogen • Energy intensive industries, which are currently also the owners and operators of closed hydrogen systems, should be facilitated in the installation of new-gas facilities that contribute towards decarbonisation • Limited reporting obligations should be imposed upon closed networks in relation to their capacity, network length, customers' services, types and number of customers connected, types of gases in the networks. Information is required on the hydrogen production facilities (existing or under development) and on their carbon footprint ○ Information should be submitted to RAE and relevant provisions could be included in a future revision of Law 4001/2011

The role of RAE

Key Issues	Key Points & Recommendations
• Extension of the role of RAE	• The role of RAE regarding monitoring of new-gas facilities should be strengthened. RAE should act as facilitator to new-gas producers taking into account that they are also new entrants to the market • RAE shall need to approve rules for connection and connection tariffs, capacity allocation and congestion management in relation to new gas injections and supervise the cooperation between DESFA and DSOs as well as the cross-sectoral cooperation between the operators of the gas and electricity sectors • Level and effectiveness of market opening and competition at wholesale and retail levels, including the penetration of new gases and switching rates should be also monitored through properly designed KPIs. Once again relative progress at European level and ACER recommendations should be taken into account • Relative progress at European level and ACER recommendations should be taken into account
• Incentive regulation for network operators supporting research and innovation projects	• The Gas Directive provides for shall ensure that transmission and distribution system operators are granted appropriate incentive, over both the short and long term, to increase efficiencies, foster market integration and security of supply and support the related research activities • RAE may consider the trade-off between CAPEX and OPEX at national level when incentivizing innovation

Data management and procedures for access to data

Key Issue	Key Points & Recommendations
• Data management and procedures for access to data	• Proposal of a formal cooperation of DSOs (both electricity and gas) targeting cybersecurity and, data management • Articles 23, 24 and 34 of Directive (EU) 2019/944 could provide a useful framework for data management and access to data also for the gas sector: ○ Relevant provisions should also apply to gas DSOs

Conclusions on legal & regulatory recommendations

- An amendment of Law 4001/2011 shall need to be initiated together with changes in the Licensing regulation, the transmission and distribution network codes and the tariff regulations to accommodate new gas injection.
- Alignment (or replacement) of Law 3054/2002 by an amended Law 4001/2011 shall also be required
- Overall, clarity in the legal and regulatory framework is necessary to initiate new-gas penetration.
- A new-gas market design may need to be considered (probably also at EU level)