DELIVERABLE D7.5

DEFINITION OF EUROPEAN AND LOCAL LEGAL AND NON-LEGAL (ENVIRONMENTAL AND/OR SOCIAL AND ECONOMIC) LIMITATIONS, BARRIERS AND STANDARDS FOR BLAZE

DISSEMINATION LEVEL: CONFIDENTIAL

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Document Control Sheet

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1 OBJECTIVES AND SCOPE OF THE DOCUMENT

Planning, building, commissioning, and operating biomass gasification plants (BGPs) are activities that are subject to European and national regulations.
Health, Safety and Environmental (HSE) issues could be important barriers to deploy a new technology and, at this specific juncture, BGPs. In several cases, the lack of awareness and understanding of the HSE issues results in neglecting these issues, in long and complicated procedures, high costs and sometimes cancellation of the initiative. For the same reasons Authorities tend to have unrealistic and costly requirements for gasification plants, so it's very important incorporate clear HSE procedures and requirements in the design and manufacturing of of BGPs and contribute to the development of a safe and environmentally-friendly technology.

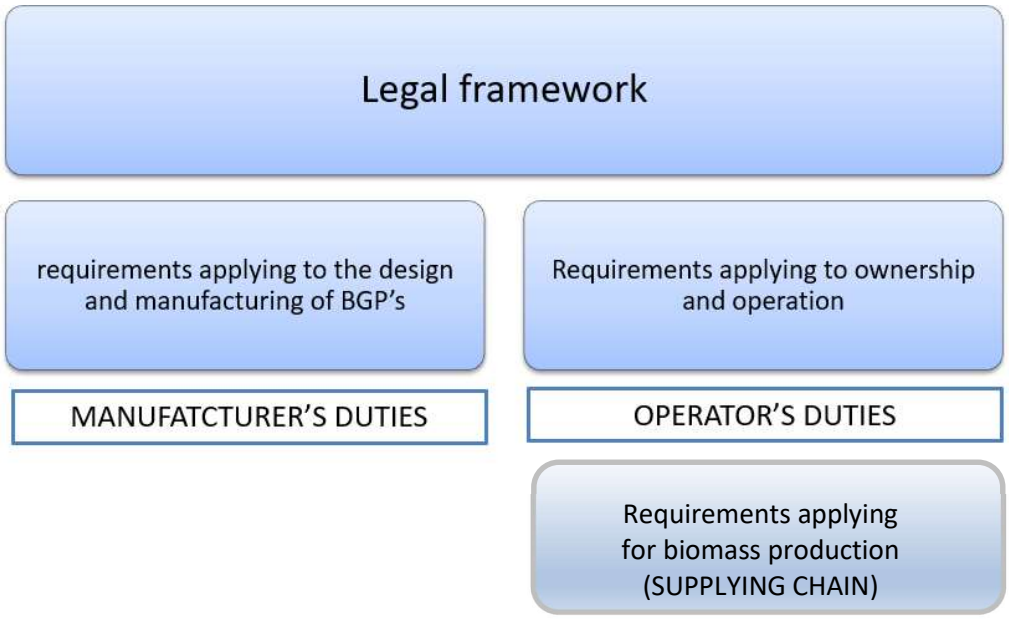
For a sustainable industrial-scale application of the technology, the biomass supply chain also plays an important role. In fact, production of agricultural biomass in the EU has to meet a series of statutory environmental rules regarding the quality of water, soils and air.

Only in this way it will be possible to create a situation in which all interested parties have a precise vision of their obligations but also of the positive expectations related to the implementation of this technology.

PLEASE NOTE THAT ALL ACTIVITIES RELATED TO THIS DELIVERABLE AND TASK WERE PERFORMED DURING THE CONTINUOUS REPORTING PERIOD AND COMPLETED IN M51

1.1 Structure of the deliverable

In the following paragraphs the current European legislative framework will be analyzed from the point of view of both the manufacturers and the plant operators.



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The HSE European and national norms and standards will be identified, and it will be explained how they could apply to Blaze project.

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2 MANUFACTURER' HSE DUTIES

The manufacturer's HSE duties related to biomass gasification plants (BGP) arise from European directives according to Article 95 of the Maastricht Treaty, which define essential health and safety requirements that have to be fulfilled by products intended for the European market.
Directives that may be particularly relevant for BGPs are listed in Table 2.1:

Directive: Number, Scope	Examples of application (BGP equipment)
73/23/EEC: Low voltage equipment [2014/35/UE]	Electrical instruments, drives, control systems, generator
89/336/EEC: Electromagnetic compatibility [2014/30/UE]	Electrical instruments, drives, control systems
98/37/EC: Machinery [2006/42/UE]	Drives, pumps, blowers, moving mechanical parts, gas engine, fuel feeding system, ash removal system
94/9/EC: Equipment for use in potentially explosive atmospheres (ATEX directive) [2014/34/UE]	Blowers, measuring devices, flame arrestors
Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC	CE marking

Table 2.1 - European Directives that may be applicable to biomass gasification plants

Common elements of these directives include the assessment of conformity with the essential health and safety requirements set out in the directives. Technical specifications of products meeting the essential requirements are laid down in harmonised standards. Application of harmonised or other standards remains voluntary, and the manufacturer may always apply other technical specifications to meet the requirements.
A BGP manufacturer will have to identify those units or pieces of equipment in the biomass gasification plant that are devices or assemblies covered by New Approach Directives (NADs), and to supply the required CE marking and declarations of conformity (DoC) for these parts. The manufacturer may choose to install pieces of equipment from third-party suppliers that already bear CE marking and that come with declarations of conformity. There is no requirement for a manufacturer to deliver an all-inclusive declaration of conformity for an entire biomass gasification plant. Nevertheless, the manufacturer has to supply operating instructions, possibly in the form of an operating manual, which cover all hazards of the plant and all safeguards and precautions that are required for safe operation, including start-up, shut-down, and maintenance.

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3 CONSTRUCTION AND OPERATION OF BGPs – PERMITS AND PROCEDURES

Construction and operation of a biomass gasification plant are affected by various regulations that may have a direct impact on the design of the plant and its operation scenario. The most important European legal reference regarding environmental protection and technical safety are:

- Environmental Impact Assessment
- IPPC (Integrated Pollution and Prevention Control)
- Risk Assessment
- Occupational Safety and Health

Main subject	EU Directive	Relevance for biomass gasification plants
Environmental Impact Assessment (EIA)	Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment	As per Annex II (point 3b) "Industrial installations for the production of electricity, steam and hot water" that are not included in Annex I, are classified as a type of project that requires EIA Screening.
IPPC	Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)	Although BGPs are not in the scope of the IPPC directive, national regulations may require integrated permits or special permits.
Risk Assessment	Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC	Could become relevant if large amounts of hazardous substances are stored on site or in relation with the production of syngas.
Occupational Safety and Health	Council Directive of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work (89/391/EEC)	Prevent or minimize occupational risks, provide information and training, provide the necessary organization and means.

Table 3.1 - Major EU Directive relevant for BGP

The environmental reports or documentation of the EIA and IPPC procedures are focused on environmental effects and measures for prevention and reduction of these effects, whilst the Seveso reports are focused on the risk analysis and safety conditions (this is also an EIA and IPPC objective if the project has such characteristics). In comparison with the EIA Directive, the IPPC Directive gives more emphasis to the Best Available Techniques and technical processes, (i.e. it refers to the effects of the emissions on the environment to be protected as a whole) whereas Seveso focuses on the risks (to limit the consequences of major accidents for man and the environment). In this context the scope of the information required under the EIA procedure is the widest and is largely comprehensive of the documentation required under the other Directives.

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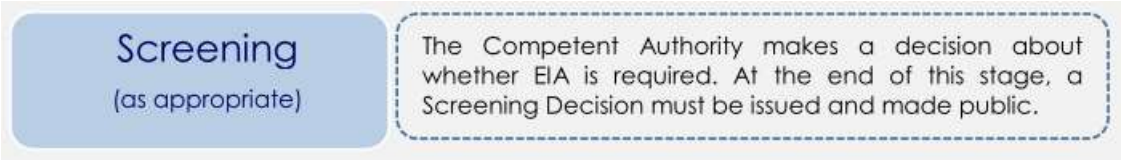
3.1 EIA Screening - DIRECTIVE 2011/92/EU

The Environmental Impact Assessment (EIA) of Projects is a key instrument of European Union environmental policy. It is currently governed by the terms of European Union Directive 2011/92/EU, as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private Projects on the environment (EIA Directive).
The 'Screening stage' ascertains whether the Project's effects on the environment are expected to be significant, i.e. the Project is 'Screened' to determine whether an EIA is necessary. Projects listed in Annex I to the Directive are automatically subjected to an EIA because their environmental effects are presumed to be significant. Projects listed in Annex II to the Directive require a determination to be made about their likely significant environmental effects. The Member State's Competent Authority make that determination through either a case-by-case examination or set thresholds or criteria.



The 2014 revisions to the EIA Directive introduced several amendments (e.g. to Annex III, which lays down the criteria to determine whether the Projects listed in Annex II should be subject to an EIA) and added a number of new provisions to the Screening process, including a **timeframe within which the Member State's Competent Authority must reach a decision on whether an EIA is required or not**. This update is very important as it drastically reduces the time needed to complete the procedure, in fact this update is very important as it drastically reduces the time needed for the procedure, in fact the new Article 4(6) requires the Competent Authority to make its determination within **90 days** from the date the Developer has submitted all of the information required in Annex IIA.
In order to ensure the correct application of Directive 2011/92/EU, some Member States (including Italy) have supplemented the technical-dimensional and locational criteria used for the establishment of the thresholds set out in Annex II of the Directive, by identifying other relevant and pertinent criteria for the identification of projects to be subject to screening or EIA, although they are not directly traceable in Annexes I and II respectively.
The criteria to be taken into account include:

- proximity to, or interference, with protected or sensitive areas;
- cumulation with other projects located in the same territorial context;
- the risk of accidents.

<u>Choosing the most suitable site for the construction of Blaze could be a crucial step in obtaining an exclusion from the EIA procedure and thus limiting the time for authorization procedures.</u>

Following the aforementioned criteria, within EIA procedure and reports the following potential issues have to be analyzed:

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ENVIRONMETAL COMPONENT	POTENTIAL IMPACT
Emissions to atmosphere: gases, dust, smell	Emissions in normal operation from engines, flares, or from storage; start-up and shutdown may also cause relevant emissions emissions from construction site vehicles during construction emission from trucks
Noise emission	Noise from equipment (gas engines, blowers, coolers), from material handling and vehicles noise from construction site vehicles during construction
Major Accident Hazards	Could become relevant if large amounts of hazardous substances are stored on site
Waste production and treatment	Waste from plant operation may include ashes, tar, and contaminated cleaning fluids. Special considerations may be required if intermediates are recirculated (e.g. tar from the gas cleaning system)
Water protection	Process waste water may require special treatment to reach the limits of acceptability for wastewater Tar, cleaning liquids, water treatment chemicals; use of cooling water Handling of substances hazardous to water / protection of water bodies requirements for discharge to sewer
Soil protection	excavated earth and rocks management during construction Spill prevention
Biodiversity	need to cut tree specimens avoid protected areas when choosing the site

Table 3.2 - Potential issues to be analyzed into an EIA and/or IPPC report

3.2 IPPC - DIRECTIVE 2010/75/EU

The IPPC Directive focuses on the environmental impact of the operation of new and existing installations. The control of emissions to air, water and soil is complemented by provisions concerning energy use, waste flows and accident prevention. Installations under this Directive need an integrated permit and are subject to ongoing monitoring and updating of the permit conditions.
Directive 2010/75/EU concerning integrated pollution prevention and control (the 'IPPC Directive') lays down measures designed to prevent or, where that is not practicable, reduce emissions in the air, water and land from certain industrial activities to achieve a high level of protection of the environment as a whole.

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In some European states, Annex 1 of the European IPPC Directive (categories of industrial activities) has been transposed into national law on a 1:1 basis, which means that BGPs are not in the scope of these national regulations. Other European states have combined the obligations from the IPPC Directive with their national schedules for plants and activities subject to licensing. Even if a BGP is not in the scope of national regulations transposing the IPPC Directive, individual permits for construction and operation (e.g. building permits) or notification of regulatory authorities may still be required due to other national or regional regulations, since it is a fact that every discharge or emission point must be authorized. Therefore, when planning to build and operate a biomass gasification plant, it is recommended that discussions are held with the local regulator at an early stage and advice is sought on the specific statutory regulations.

3.3 Safety Analysis Directives

The European Seveso III Directive (DIRECTIVE 2012/18/EU) is applicable to the plants where a large number of hazardous substances are stored on site. The expected quantity of dangerous materials to be stocked for the Blaze small-scale biomass gasification plant should not exceed the threshold quantities indicated in the Directive, then these types of plants may not be subject to the Seveso III itself.

In case of non applicability, the general approach indicated in the Seveso Directive should be carried out, i.e. to perform a hazard/risk assessment, with the aim to analyze the consequences for the people safety, environment and asset, in case of a release incident scenario, in order to verify if adequate prevention and/or mitigation measures are in place.

Considering that small-scale biomass gasification plants are a unique and relatively new technology, no specific risk assessment technique or guidance is available.

The “Guideline for Safe and Eco-friendly Biomass Gasification” recommends a risk assessment methodology which is practicable and sufficient to be applied to such plants (see Figure 3.1). The chosen approach is based on functional analysis of the plant. It follows principally the Hazard and Operability Studies (HAZOP) and Failure Modes Effects and Criticality Analysis methods, as well as recommendations given by an expert commission.

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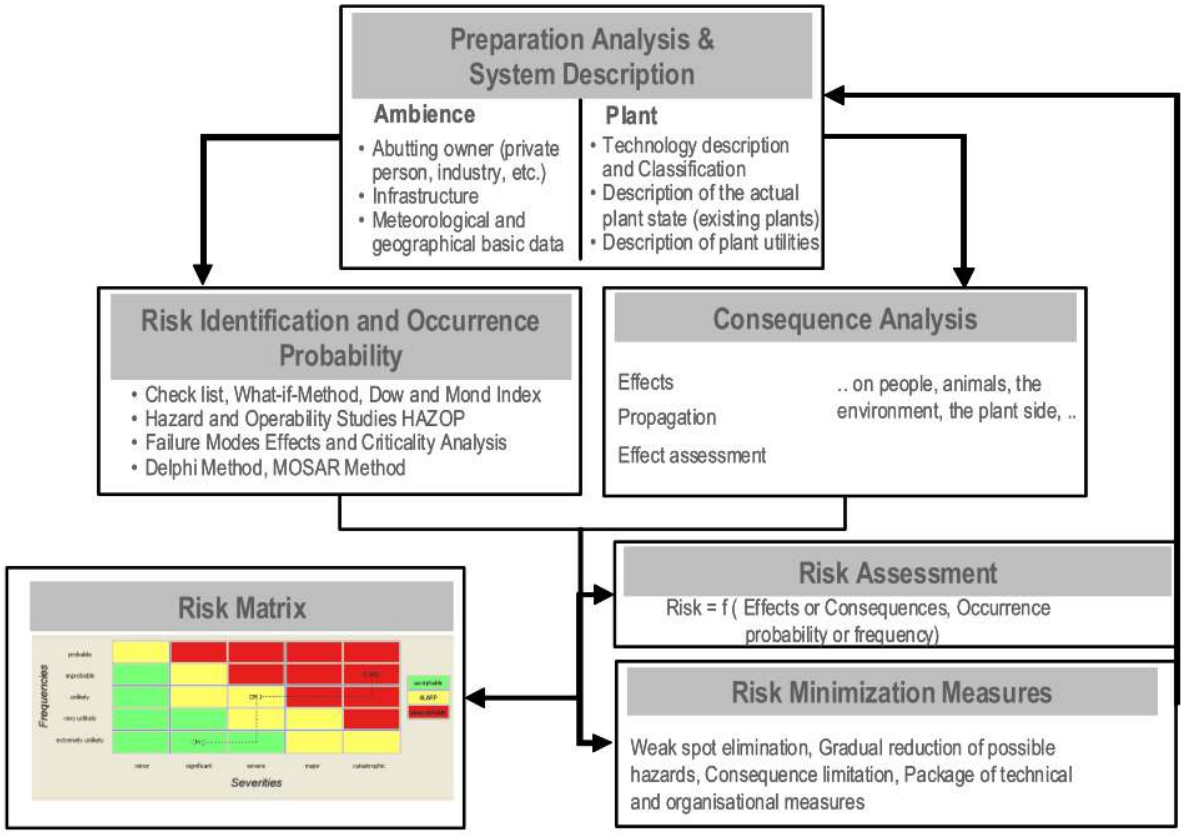

Figure 3.1 - Systematic approach for the risk assessment of biomass gasification plants

For the Pilot Blaze Project, HAZID and HAZOP sessions have been carried out as preliminary hazards assessment analysis (refer to DELIVERABLE D7.4).
In addition, depending on the Blaze project location, the local / national regulations shall be verified and applied (if any), since local / national authorities may require to follow specific authorization procedures prior to plant construction and operation (e.g. in Italy, the Italian Fire Prevention Code DPR 151/2011 has to be applied; refer to para. 5.1.7).
In each European state, individual permits for construction and operation or notification to regulatory authorities may be required due to relevant national or regional regulations. Therefore, when planning to build and operate a biomass gasification plant, it is recommended that discussions are held with the local regulator (for example local Fire Brigade) at an early stage and advice is sought on the specific statutory regulations.

3.4 Occupational Safety and Health – DIRECTIVE 89/391/EEC

National regulations on occupational safety and health (for the subjects listed in Table 3.2) require the employer to prevent or minimize occupational risks, to provide information and training, and to provide the necessary organization and means. To this end, the employer will need to perform hazard identification and risk assessment and draw up documents on the results of this assessment and on the protective measures and safeguards that need to be used. With regard to biomass gasification plants, these documents have to include:

- a registry of hazardous substances used on the premises;
- an explosion protection document;

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- written company-specific operating instructions.

In addition to statutory regulations, it is necessary to take account of HSE requirements set out by insurers in order to obtain liability or damage insurance for a biomass gasification plant.
Occupational health and safety issues should be considered to be part of a comprehensive hazard or risk assessment, including, for example, a hazard identification study [HAZID], hazard and operability study [HAZOP], or other risk assessment studies.

The areas that appear to be the most important in terms of occupational safety and health are:

Main subject	Subject	Relevance for biomass gasification plants
Occupational safety and health	Health and safety at work, general	Risk assessment, protective measures, operating instructions, personal protective equipment, emergency procedures
	Substances hazardous to health	Intermediates: producer gas (CO), tar; handling of chemicals used in the plant, e.g. cleaning liquids, water treatment chemicals, biological agents (storage of feedstock)
	Fire and explosion hazards; explosion protection	Flammable producer gas; special precautions for gasifier start-up and shutdown; assessment of areas at risk from hazardous explosive atmospheres (zone classification)
	Installations subject to monitoring	Special monitoring may be required for certain types of equipment and installations
	Pressure equipment	Requirements towards installation and maintenance, (regular) testing
	Electrical equipment	Requirements towards installation and maintenance, (regular) testing
	Machinery	Requirements towards installation and maintenance, (regular) testing
Other Regulations Verifica by ENE?	Renewable energies and biomass	Possible effects of plant design, type of feedstock, and mode of operation: feed-in tariffs, combined heat and power, guarantee of origin renewables) distinction: (natural) biomass / waste
	Energy feed-in	Requirements towards feeding electrical energy to the power grid
	Land use planning	Selection of appropriate site (Industrial activity)
	Safety of buildings	Fire safety, building stability

Table 3.3 - Most important areas to investigate in terms of occupational and safety and health

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3.5 Environmental and safety permits and requirements

The previous paragraph can be used as a checklist to determine the statutory obligations that may become relevant for a specific BGP installation in a European state.
It is recommended to consult the competent local Authority or Authorities at an early stage in order to identify the regulations and procedures that apply.
A basic question that needs to be answered at an early stage of planning concerns the type of permit(s) that will be required for an individual BGP installation. For small and medium BGPs, an environmental permit will be necessary in many cases, and limit values for emissions of noise and substances to the atmosphere and water will be fixed in the permit.
Classification criteria which have the most significant impact on legal requirements towards BGP construction and operation, including the decision on whether or not a permit is required and what type of permit is needed, are listed below:

- Type of gasifier feedstock: natural biomass or (biomass) waste, solid or liquid;
- Thermal input rating (thermal capacity) of the BGP with regard to gasifier feedstock;
- Thermal output rating (thermal capacity) of the BGP with regard to the produced gas;
- Is the BGP operated as a stand-alone unit or as part of a larger installation;
- Electrical rating of the CHP gas engine;
- Gas engine type (e.g. compression ignition, spark ignition);
- Plant operation scenarios: operating time per year of the gas engine (peak load operation, continuous operation, maintenance cylcle);
- Date of putting the plant into service;
- Properties of the site and its surroundings (e.g. soil use, environmental constrain, protected areas, types of crops, archeological or cultural sites, public health, geological and hydrogeological features, etc….)

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4 BIOMASS IN THE EU GREEN DEAL

The resolution on the European Green Deal was adopted by the European Parliament in January 2020, emphasizing the need for more ambitious actions to address European, and global, climate change and meeting environmental objectives.

The transition to a low carbon economy, through a wide range of interacting policies and instruments, is consolidating in the European Union (EU). Increasing evidence of climate change, growing dependence on energy, made even more pronounced by the consequences of the recent Russian-Ukrainian conflict, has underlined the EU's determination to become a low-energy economy and to consume energy that is secure, safe, competitive, locally produced and sustainable.
On conflict in Ukraine and the consequent price increase of fossil fuels pushed the **European Commission** to an official position with its Communication to **European Parliament**: **REPowerEU: common European action for safer energy, more sustainable and at more affordable prices.**
The energy sector is responsible for more than 75 per cent of the EU's greenhouse gas emissions (GHG). Renewable energy has a key role in tackling climate change by reducing the EU's dependency on imported fossil fuels.
Under the European Green Deal, the EU Commission has committed to reduce the EU's GHG by at least 55 per cent by 2030 - and ultimately become climate neutral by 2050.

The Renewable Energy Directive is the legal framework for the development of renewable energy across the EU. The first Renewable Energy Directive (RED) entered into force in 2009 and set a target of 20 per cent renewables in the EU energy mix by 2020. In 2018, the recast Renewable Energy Directive (REDII) entered into force and set a new binding target of 32 per cent renewables in the EU energy mix by 2030, which is likely to be further increased (§ 6.1.1).
The RED II defines a series of sustainability and GHG emission criteria that operators have must comply with to be counted towards the overall 32 per cent target and to be eligible for financial support by public authorities.
Voluntary and national certification schemes of EU countries help operators to verify that energy produced from biofuel (bioliquid and/ or biomass) are sustainably produced and sourced. By using schemes that are recognized by the European Commission, operators can ensure that their use of biofuel complies with the EU sustainability criteria (article 29 REDII).
Several schemes also consider additional sustainability aspects such as soil, water, and social criteria. While the schemes are run privately, the European Commission can recognize them as an accepted implementation tool within REDII.
EU countries may accept voluntary schemes as sufficient evidence if the EU Member States' competent authorities are confident about the quality of these certification schemes.
The recast Renewable Energy Directive 2018/2001 extends sustainability criteria to cover also large-scale biomass for heat and power, in addition to biofuels and bioliquids for transport.
It also adds new interest criteria listed below:

- agriculture waste and residues, requiring evidence of the protection of soil quality and soil carbon, and for agriculture biomass, requiring evidence that the raw material is not sourced from highly biodiverse forests
- new biofuels plants need to deliver at least 65% fewer direct greenhouse gas (GHG) emissions than the fossil fuel alternative. New biomass-based heat and power plants need to deliver at least 70% (80% in 2026) fewer GHG emissions than the fossil fuel alternative
- bioelectricity, requiring that large scale plants (above 50 MW) apply highly efficient cogeneration technology, or apply Best Available Techniques (BAT) or achieve 36% efficiency

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(for plants above 100 MW-), or use carbon capture and storage technology.

These criteria are being implemented by EU countries, who were obliged to transpose the directive at the latest by end of June 2021. They can introduce more stringent sustainability criteria.
The criteria are complementary to the safeguards set out by EU climate and environmental legislation, in particular by the Regulation on Land Use, Land Use Change and Forestry 2018/841 (LULUCF).

4.1 Sustainability schemes for solid and gaseous biomass

Voluntary schemes and national certification schemes of EU countries help to ensure that **biofuels, bioliquids and biomass fuels fuels are sustainably produced** by verifying that they comply with the EU sustainability criteria.
As such, the schemes check that:

- production of feedstock for these fuels does not take place on land with high biodiversity
- land with a high amount of carbon has not been converted for such feedstock production
- biofuel, bioliquid and biomass fuel production leads to sufficient greenhouse gas emissions savings

Several schemes also take into account additional sustainability aspects such as soil, water, air protection and social criteria. For the certification process, an external auditor verifies the whole production chain from the farmer growing the feedstock to the biofuel producer or trader.
While the schemes are run privately, the European Commission can recognize them as valid.

4.1.1 Voluntary schemes under the revised Renewable Energy Directive

The EU sustainability criteria are extended to cover biomass for heating and cooling and power generation in the revised Directive (EU) 2018/2001. EU countries were required to transpose the new rules by 30 June 2021, and the voluntary schemes have to adjust the certification approaches to meet the new requirements. Additional rules are enshrined in the Implementing Regulation on sustainability certification, which is foreseen to be adopted in the second half of 2022, and which envisages an transition period of 18 months from the date of its publication to allow sufficient time for the implementation of the new rules by economic operators, voluntary schemes, certification bodies and the competent authorities in EU countries.
Interested voluntary schemes are invited to apply for recognition by the Commission under the new sustainability framework. More information about the recognition process can be found in the call for interest and the updated assessment protocol.

4.1.2 Recognition criteria

For a scheme to be recognised by the European Commission, it must fulfil criteria such as

- feedstock producers comply with the sustainability criteria of the revised Renewable Energy Directive and its implementing legislation;
- information on the sustainability characteristics can be traced to the origin of the feedstock;
- all information is well documented;
- companies are audited before they start to participate in the scheme and retroactive audits take place regularly;
- the auditors have both the generic and specific auditing skills needed with regards to the scheme's criteria.

The decision recognising a voluntary scheme has usually a legal period of validity of 5 years.

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The European Commission has so far formally recognized **13 voluntary schemes**

Voluntary scheme
Biomass Biofuels voluntary scheme (2BSvs)
Better Biomass
Bonsucro EU
International Sustainability and Carbon Certification (ISCC EU)
KZR INiG system
REDcert
Red Tractor Farm Assurance Combinable Crops & Sugar Beet Scheme (Red Tractor)
Roundtable of Sustainable Biofuels EU RED (RSB EU RED)
Round Table on Responsible Soy EU RED (RTRS EU RED)
Scottish Quality Farm Assured Combinable Crops (SQC)
Trade Assurance Scheme for Combinable Crops (TASCC)
Universal Feed Assurance Scheme (UFAS)
Sustainable Resources (SURE) voluntary scheme

The Commission's decisions on the recognition of these voluntary schemes were published on 12 April 2022.

In addition, the Commission has received **applications** for recognition under the directive from the following voluntary schemes and national certification schemes

Applications
Austrian Agricultural Certification Scheme (AACS)
U.S. Soybean Sustainability Assurance Protocol EU (SSAP EU)
Sustainable Biomass Program (SBP) (only for certification of solid biomass fuels, ligno-cellulosic material derived from forest and non-forest land and processing residues from forest and agriculture related industries outside forest and agricultural land)
Programme for the Endorsement of Forest Certification (PEFC)
European Renewable Gas Registry (ERGaR) (only for certification of cross-border trade of biomethane)

The draft decisions regarding AACS, SBP and SSAP EU, will be subject to a vote of the RED II Committee on the sustainability of biofuels, bioliquids and biomass fuels after the internal consultation process of the implementing acts is completed.
The recognition by the Commission is not a pre-requisite for certification. EU countries may accept evidence from voluntary schemes or national certifications schemes set up by EU countries not recognized by the Commission if the competent authorities in those countries are confident about the quality of the certification services provided by these schemes.

The progress of bioenergy is larger and more efficient when country specific biomass support schemes are compatible with the different EU frameworks, flexible and respond to falling production costs on the country level.

4.2 Biomass supply chain

Crucial to the management of biomass as a fuel is the realization thatit is renewable, yet it is also

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functionally finite in that they need time to regrow or recover. This constrains the availability and sustainability levels of biomass resources. It is therefore essential that the harvesting of biomass does not exceed the natural regeneration rate needed to maintain biodiversity and ecosystem structure, functioning, and productivity.
Natural resources needed for biomass growth, such a soil and water, are also renewable but functionally finite. Soil fertility and productivity are vital to biomass supply, biodiversity and ecosystem functioning as soils underpin the delivery of a range of regulating ecosystem services (e.g. nutrient cycling and water regulation).

4.2.1 Biomass and ecosystem resilience

Biomass harvesting depends on healthy ecosystems while simultaneously having significant impact on them. These impacts must be considered and adequately managed both to ensure biomass use is not at odds with biodiversity protection goals and to secure its future viability. Ecological boundaries refer to the environmental limits beyond which ecosystems become destabilized. For biomass, these limits include:

- the regeneration rate of biomass,
- the renewal of other resources needed for biomass growth,
- the availability of land and, underpinning the rest,
- losses of biodiversity and ecosystem services from areas from which resources are extracted.

The use of biomass is not sustainable by default and changes in land use and management (even where the land cover remains the same, e.g. forest) can push ecological boundaries such as through unsustainable agriculture and forestry practices which are the largest threat to biodiversity in the EU.
Considerations for environmentally sustainable biomass supply potentials:
The key condition for bioenergy development is the availability of **reliable, economically viable, and environmentally sustainable biomass**.
Each step in the biomass supply chain poses different sustainability challenges that need to be managed to ensure long-term availability and sustainability of biomass for energy and material use. Based on several existing assessments of understanding and estimating the sustainable biomass supply.

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5 OVERVIEW OF MEMBER STATES' LEGISLATION ON PERMITS AND HSE PROCEDURES

The situation of licensing (permit) requirements for biomass gasification plants resulting from national or regional legislation transposing the IPPC Directive and defining integrated permit procedures is given in Table 5.1 for a number of European countries..

Table 5.1: National regulations transposing the IPPC Directive; pertaining permit requirements for small and medium BGPs using natural biomass

State	Regulation(s) transposing the IPPC directive	Permit requirements for biomass gasification plants
Austria	Trade, Commerce and Industry Regulation Act 1994, last amended 2006 [Gewerbeordnung GewO 1994, zuletzt geändert 2006] Immission Protection Act – Air [IG-L Immissionsschutzgesetz - Luft]	Yes, but specific requirements for IPPC installations do not apply to BGPs Yes
Belgium (Example: Brussels)	Environmental Permit Order [Ordonnance du 5 juin 1997 relative aux permis d'environnement du Ministère de la Région de Bruxelles-Capitale] Schedule of classified installations [Arrêté du Gouvernement de la Région de Bruxelles-Capitale fixant la liste des installations de classe IB, II et III]	Yes, for gasification of carbonaceous material (< 500 t/d) (No. 39, class IB)
Bulgaria	Environmental Protection Act (SG 91/2002) [Закон за опазване на околната среда (ДВ 91/2002)] Regulation №5 on risk assessment (SG 47/1999) [Наредба №5 за оценка на риска (ДВ 47/1999)]	Yes
Denmark	Environmental Protection Act 2006 Statutory Order no. 1640 of 13 December 2006 from the Ministry of the Environment on Approval of Listed Activities (Approval Order) [BEK nr 1640 af 13/12/2006 (Godkendelsesbekendtgørelsen)]	Yes, if thermal rating is > 1 MW (Annex 2, G 202)

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State	Regulation(s) transposing the IPPC directive	Permit requirements for biomass gasification plants
France	Environmental Act [Code de l'environnement] Schedule of classified installations [Nomenclature des installations classées pour la protection de l'environnement] [Arrêté du 2 février 1998 relatif aux prélèvements et à la consommation d'eau ainsi qu'aux émissions de toute nature des installations classées pour la protection de l'environnement soumises à autorisation]	Yes, for production of flammable gas (1410) and for combustion of non-standard fuel if thermal rating is > 0.1 MW (2910)
Germany	Federal Immission Control Act [Bundesimmissionsschutzgesetz, BImSchG] Ordinance on Installations Requiring a Permit [4. BImSchV]	Yes, if thermal rating of the produced gas is > 1 MW (Annex, No. 1.4 and 1.13)
Ireland	Protection of the Environment (PoE) Act 1992 and 2003	(BGPs not in the scope)
Italy	IPPC Act 2005 [Decreto Legislativo 18 febbraio 2005, n. 59 "Attuazione della direttiva 96/61/CE relativa alla prevenzione e riduzione integrate dell'inquinamento"] Environmental Protection Ordinance [Decreto Legislativo 152 del 3 aprile 2006 recante norme in materia ambientale]	(BGPs not in the scope) Yes (Art. 269)
Netherlands	Environmental Act [Wet milieubeheer, Wm] Ordinance on Installations and Permits [Inrichtingen- en vergunningenbesluit milieubeheer (Ivb)] Water Act [Wet verontreiniging oppervlaktewateren, Wvo]	Yes (internal combustion engines > 1.5 kW) (Cat. 1, 1.1b)
Spain	IPPC Act [Ley 16/2002 de 1 de julio de Prevención y Control Integrados de la Contaminación (Ley IPPC)] Air Quality Act [LEY 34/2007, de 15 de noviembre, de calidad del aire y protección de la atmósfera]	(BGPs not in the scope) Needs to be discussed with competent authority: dry distillation of wood (annex IV, 1.1.3, group A); conventional heat and power stations < 50 MW thermal (2.1.1, group B); gasifiers (3.1.2, group C)

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State	Regulation(s) transposing the IPPC directive	Permit requirements for biomass gasification plants
Sweden	The Environmental Code [SFS 1998:808 Miljöbalk] Ordinance on environmentally hazardous activities [Förordning (1998:899) om miljöfarlig verksamhet och hälsoskydd]	No, for gasifiers and gas engines < 10 MW, but notification required (40-5 and 40.1-2) [from 01/01/2008: yes, if more than 150.000 m3 flammable gas per year is produced – 40.10 (B)]
Switzerland	(No Swiss transposition of IPPC directive!) Environmental Protection Act [Bundesgesetz über den Umweltschutz (Umweltschutzgesetz, USG)]	Yes; building laws of the Swiss cantons determine the authorization procedure

In some European states, Annex 1 of the European IPPC Directive (categories of industrial activities) has been transposed into national law on a 1:1 basis, which means that BGPs are not in the scope of these national regulations. Other European states have combined the obligations from the IPPC Directive with their national schedules for plants and activities subject to licensing.
Even if a BGP is not in the scope of national regulations transposing the IPPC Directive, individual permits for construction and operation (e.g. building permits) or notification of regulatory authorities may still be required due to other national or regional regulations.

If a permit is required for the construction and operation of a biomass gasification plant, the applicant has to provide detailed information on the planned activity. The procedures are country-specific e.g. in terms of

- the competent authorities;
- the information that has to be provided in the written application for permit;
- application forms to be used;
- the number of copies to be provided by the applicant.

In Table 5.2, official sources of information (web_links) and search strategies for relevant official information on permit procedures and application forms have been compiled for a number of European states.

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Table 5.2: Overview of sources of information concerning the required specifications in applications for permits

State	Scope / type of installation; source of information regarding application for (environmental) permit
Austria	Commercially operated BGP installations: Sections 353 and 353a of the Trade, Commerce and Industry Regulation Act (GewO 1994): **http://www.ris2.bka.gv.at/Bundesrecht/** Detailed information on permit procedures has been compiled in the Austrian "Guideline on safety and authorisation of biomass gasification plants" [Leitfaden - Anlagensicherheit und Genehmigung von Biomassevergasungsanlagen]: http://www.nachhaltigwirtschaften.at/edz_pdf/leitfaden_biomassevergasungsa nlagen.pdf
Belgium (Example: Brussels)	Permit procedures for classified installations: **http://www.ibgebim.be/Templates/Professionnels/Informer.aspx?id=1210&langtype=2060**
Denmark	Heat and power plant, gas turbine or gas engine installation in the 1–5 MW (thermal) range: Annex 5 Section 3 of the Approval Order (BEK No. 1640 of 13/12/2006) **https://www.retsinformation.dk/Forms/R0710.aspx?id=13040**
France	Permit procedures for classified installations: **http://installationsclassees.ecologie.gouv.fr/-Regime-d-autorisation-.html** Information on details required in the permit application: **http://installationsclassees.ecologie.gouv.fr/Comment-constituer-ledossier-de.html**
Germany	Gasifiers and gas engines > 1 MW (thermal): Ordinance on Permit Procedures (9. BImSchV), Sections 3, 4 and 4a) to 4e) **http://bundesrecht.juris.de/bundesrecht/bimschv_9** Additional information and application forms can be found on the websites of *Laender* Environmental Ministries. (Search keywords: "Antrag Genehmigung Immissionsschutz <*Land*>") e.g. for Northrhine-Westphalia: **http://www.umwelt.nrw.de/umwelt/immissionsschutz/genehmigungsverfahren/index.php**
Ireland	General information on licensing: Environmental Protection Agency (Ireland) **http://www.epa.ie/downloads/advice/**
Italy	Installations subject to environmental permits: Environmental Agencies of the provinces (Search keywords: "autorizzazione ambiente <province>")
Netherlands	Installations subject to environmental permits: Application forms for environmental permits can be downloaded from community websites in the Netherlands. (Search keywords: "aanvraag vergunning milieubeheer <community>")
Spain	General information: Spanish Ministry of the Environment: **http://www.mma.es/portal/secciones/** (New authorisation requirements have been imposed by the Air Quality Act of 15/11/2007.)

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Sweden	Installations subject to environmental permits: General information on permit procedures can be downloaded from the Swedish Environmental Ministry website **http://www.naturvardsverket.se/sv/Verksamheter-medmiljopaverkan/Tillstand-och-anmalan-for-miljofarlig-verksamhet/** Additional information and application forms can be found on the websites of county administrative boards [länsstyrelsen]. (Search keywords: "tillstånd miljöfarlig verksamhet <county>")
Switzerland	Industrial installations: Building permits, declarations on emissions, permits for industrial installations: Special application forms and guidelines can be found on the websites of the Swiss cantons. (Search keywords: "Baugesuch Industrie <canton>"; "Plangenehmigung Betriebsbewilligung <canton>")

Typically, the application for a permit to construct and operate a biomass gasification plant will have to include the items listed below:

- information on the applicant (name, address),
- specific reference to the relevant regulations, e.g. classification of the installation and of the type of industrial activity according to national schedules,
- description of the plant location, supplemented with maps and site plans in different scales,
- description of plant layout and plant operation (text, flowsheets, equipment lists, layout plans),
- mass and energy balances of the entire plant (feedstock, emissions, waste, auxiliary materials, energies that are used and delivered), demonstrating that all emission streams have been considered,
- description of general occupational safety measures,
- description of special hazards (fire, explosion, hazardous substances) and precautionary measures,
- description and assessment of potential effects on the environment (e.g. noise emissions, emissions to atmosphere),
- description of waste and waste-water management.

Occasionally, additional third-party certificates and expert opinions may be required, e.g. on noise emissions and on fire and explosion protection.

5.1 Summary of Italian Directives that may be applicable to Blaze

5.1.1 NATIONAL RECOVERY AND RESILIENCE PLAN - PNRR (NRP)

On 30 April 2021, the Italian government officially transmitted the text of the PNRR to the European Commission, which proposed an overall positive assessment on 22 June 2021.
On 13 July 2021 Italy's PNRR was definitively approved by a Council Implementing Decision, which transposed the European Commission's proposal for a decision. The Decision is accompanied by an annex that defines, in relation to each investment and reform, precise objectives and targets, cadenced in time, to the achievement of which the allocation of resources, scheduled on a six-monthly basis, is linked.

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The Plan outlines an articulated package of reforms and investments in order to access the financial resources made available by the European Union with the Recovery and Resilience Facility (RRF), the pivot of the post-pandemic recovery strategy financed through the Next Generation EU (NGEU) programme.
The measures envisaged by the RRF are structured around three strategic axes shared at European level: digitization and innovation, ecological transition, and social inclusion. Following the guidelines defined by European regulations, the Plan groups the investment projects into 6 Missions, divided into 16 Components, for a total of 43 areas of intervention.

5.1.2 D.L. 77/2021 - PNRR governance and simplifications

On 28 July 2021, Decree-Law No. 77 of 31 May 2021 (the so-called Simplification Decree) was definitively approved. The measure contains, first of all, provisions on the organisation of the management of the National Recovery and Resilience Plan, defining the roles played by the various administrations involved, as well as the modalities for monitoring the Plan and for dialogue with the European authorities. Governance is centred on the establishment of a Steering Committee, chaired by the President of the Council of Ministers, with the participation from time to time of the ministers and undersecretaries responsible for the issues addressed at each meeting.

The second part of the decree provides for simplification measures affecting some of the sectors covered by the NRP (including the ecological transition, public works, digitalization) in order to facilitate their full implementation.
Article 18 of the DL states:
"*The works, plants and infrastructures necessary for the realization of the strategic projects for the country's energy transition included in the National Recovery and Resilience Plan (NRP) and to the achievement of the objectives set by the National Integrated Plan for Energy and Climate (PNIEC), prepared in implementation of Regulation (EU) 2018/1999, as identified in Annex I-bis, and works related to them* ***constitute interventions of public utility, non-deferrable and urgent***."
<u>This results in simplified and faster authorization procedures</u>

5.1.3 Environmental Protection Ordinance D. Lgs 152/2006 "consolidated act" on environmental matters (consolidated test)

It is a set of regulations of the Italian Republic, on the subject of the environment, issued with Legislative Decree no. 152. The topics addressed are: the procedures for environmental authorization and environmental impact assessment; water protection and management of the water service; the regulation of waste and the management of excavated earth and rocks; procedures for remediation and repair of environmental damage; emissions into the atmosphere; the sanctioning system, between the consolidated act and law no. 68/2015 on new environmental crimes. The guide finishes with a look at the possible upcoming legislative and regulatory changes.

A recent regulation, came into force on 1 August 2023, lays down the conditions for using glulam in the form of wood chips as a combustible biomass pursuant to Part V of Legislative Decree 152/2006.
The regulation applies to wood residues from the processing of glued wood boards, cross-laminated wood boards and joinery wood (formerly UNI EN 942).
The conditions for qualification as combustible biomass concern the type of treatment undergone by the residues (and virgin wood), the hardeners used (no heavy metals or halogenated

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compounds) and compliance by the residues, following treatment, with certain limit values.
Biomass may be used as fuel 'only in the plant in which the wood residues were produced'. For combustion in thermal plants with an output of more than 500 kW, an efficiency of at least 85% is required.

5.1.4 *Ministerial Decree D.M. 264/2016 "Regulation which consists of indicative criteria to facilitate the demonstration of the existence of the requirements for the qualification of production residues as by-products and not as waste."*

This Decree applies to Blaze as the biomass that is to be converted into electrical and thermal energy are hazelnut shells derived from other production processes. Such biomass is therefore exempt from waste regulations.

The Decree defines:

- **product**: any material or substance that is deliberately obtained as part of a production process or as a result of a technical choice
- **production residue**: any material or substance which is not deliberately produced in a production process and which may or may not be a waste
- **by-product**: a production residue which does not constitute waste within the meaning of Article 184a of Legislative Decree 152 of 2006

Production residues are by-products and not waste when the following conditions are met:

- The substance originates from a production process, of which it is an integral part and whose primary purpose is not the production of that substance or object. The decree reiterates that the by-product must be the result of a production process; in fact, it does not apply to residues resulting from consumption activities.
- The use of the substance or object is certain within the same or a subsequent production or use process by the producer or a third party.

5.1.5 *Presidential Decree DPR 120/2017 "Regulation of excavated earth and rocks"*

The Decree No. 120/2017 aims to reorganize and simplify the regulations concerning the management of excavated earth and rocks, with particular reference to:

- the management of excavated earth and rocks qualified as by-products, pursuant to Article 184-bis, of Legislative Decree No. 152 of 3 April 2006, from small, large and large construction sites not subject to EIA or AIA, including those aimed at the construction or maintenance of networks and infrastructures;
- the regulation of temporary storage of excavated earth and rocks qualified as waste;
- the use in the production site of excavated earth and rocks excluded from the waste discipline;
- the management of excavated earth and rocks in sites subject to reclamation.

The obligations required for the management of excavated earth and rocks vary according to the type of construction site.
The principles contained in the Decree must be compulsorily applied and the procedures indicated must be carried out before plant construction begins.

5.1.6 *Dlgs 387/2003 "Implementation of Directive 2001/77 / EC on the promotion of electricity produced from renewable energy sources to the internal electricity market.*

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This decree, in compliance with the national, Community and international regulations in force, and in compliance with the principles and guidelines established by Article 43 of Law No. 39 of March 1, 2002, aims to:

a) to promote a greater contribution of renewable energy sources to electricity production in the relevant Italian and Community market;
b) promote measures to achieve the national indicative objectives referred to in Article 3, paragraph 1;
c) contribute to the creation of the foundations for a future Community framework in this field;
d) encourage the development of electricity microgeneration plants powered by renewable sources, in particular for agricultural and mountain uses
The works for the construction of plants powered by renewable sources, as well as related works and infrastructure essential to the construction and operation of the same plants are of public utility and unavoidable and urgent.

- The Legislative Decree, in addition to the definition of national indicative objectives and promotion measures to be taken for the development of energy production from the above sources, has introduced "additional measures" aimed at perfecting specific provisions relating to individual energy sources, simplification rules and streamlining of authorisation procedures, the provision of an information and communication campaign in favour of these sources, and the inclusion of waste as an energy source eligible under the renewable energy regime.
- The decree in extreme summary provides for the following:
    - the increase of the minimum share of 2%, of energy from renewable sources to be fed into the electricity grid, pursuant to art. 11, D.Lgs. n. 79/99 (art. 4, c. 1) from the year 2004 until 2006, equal annually to 0.35 percentage points;
    - the guarantee of origin of electricity produced from renewable sources issued by GRTN in the presence of an annual production, or imputable production, not less than 100 MWh;
    - the simplification of the authorisation procedures for installations powered by renewable sources and the granting of a single authorisation by the region or other institutional entity delegated by it, for the construction and operation of electricity production plants powered by renewable sources; for the conduct of the procedure, guidelines must be approved at the Unified Conference, on a proposal from the Minister of Productive Activities, in agreement with the Minister for the Environment and Territorial Protection and the Minister for Cultural Heritage and Activities.

5.1.7 D.P.R. 151/11 – Fire Prevention Code

DPR 151/2011 operates in relation to the activities subject to fire prevention inspections; the verification of the fire safety conditions, on the basis of current Italian legislation, is attributed to the competence of the National Fire Brigade, which authorizes the issue of the Fire Prevention Certificate. Within the scope of this regulation are included all activities subject to prevention of fires listed in Annex I of the Code it-self.
The Decree of 7th August 2012 provides the procedures for submitting applications concerning fire prevention and the relevant documentation required.
In accordance with Decree 151/2011, the main activity subject to control by fire brigade in biomass gasification plant should be the following:

- **1.1.C**: Factories and plants where flammable and / or oxidizing gases are produced and / or used with overall quantities in the cycle exceeding 25 Nm^3/h.

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This activity is applicable in case the gas flow is above the mentioned limit of 25 Nm^3/h (e.g. for gasifier, reformer, fuel cell, etc).
Below is reported a summary table of the Italian authorization process to follow:

	Project Evaluation related to fire prevention	**SCIA related to fire prevention** (certified notice for the start of plant operation)
Objective	Obtaining permit for construction	Obtaining permit for plant operation
Content	Compliance reports for plant activities subject to "vertical" fire prevention rules, plot plan, isometrics / P&IDs, fire prevention systems, F&G, escape routes, hazardous areas classification, lightning risk assessment, etc.	Technical documentation relevant to safety/firefighting systems, consisting of certifications and declarations in order to prove the conformity with current legislation of project installations, materials used and systems installed.
Duration of the process	90 days overall (maximum duration) from the documentation submission to the fire brigade command.	Upon presentation, the command verifies the formal completeness of the application, documentation and attachments by site survey. In case of positive outcome, the Provincial Command releases the SCIA which allows plant operations.

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6 SUMMARY OF MAIN EUROPEAN DIRECTIVES, STANDARDS AND REGULATIONS, THAT MAY BE APPLICABLE TO BLAZE

6.1 Environmental protection

6.1.1 Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (Renewal Energy Directive – RED)

The Renewable Energy Directive is the legal framework for the development of renewable energy across all sectors of the EU economy. It establishes common principles and rules to remove barriers, stimulate investments and drive cost reductions in renewable energy technologies, and empowers citizens, consumers and businesses to participate in the clean energy transformation.
In April 2009, the Renewable Energy Directive (RED-1) was published. The RED-1 defines support schemes as "means any instrument, scheme or mechanism applied by a Member State or a group of MS, that promotes the use of energy from renewable sources by reducing the cost of that energy, increasing the price at which it can be sold, or increasing, by means of a renewable energy obligation or otherwise, the volume of such energy purchased. This includes, but is not restricted to, investment aid, tax exemptions or reductions, tax refunds, renewable energy obligation support schemes including those using green certificates, and direct price support schemes including feed-in tariffs and premium payments".
The 2021 revision of the directive raises the ambition of the existing legislation to align it with EU's increased climate ambition. It also introduces new measures to complement the already existing building blocks established by the 2009 and 2018 directives, to ensure that all potentials for the development of renewable energy are optimally exploited – which is the necessary condition to achieve the EU's objective of climate neutrality by 2050.

6.1.2 Directive 2008/50/EC on ambient air quality and cleaner air for Europe

This Directive defines objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole. To this end, it sets out measures for the assessment of ambient air quality in Member States as well as for obtaining information on ambient air quality in order to help combat air pollution and nuisance. The Directive aims at increasing cooperation between the Member States in reducing air pollution.
The Directive 2008/50/EC on ambient air quality covers in particular nitrogen dioxide (NO_2) and particulate matter or fine dust (PM_{10}) which is emitted by traffic and combustion engines.
The NEC Directive 2001/80/EC covers substances sulphur dioxide (SO2), nitrogen oxide (NOx), ammonia (NH3) and volatile organic solvents (VOCs).

6.1.3 Directive 2008/98/EC on waste and repealing certain Directives

It establishes a legal framework for treating waste in the EU.
The framework is designed to protect the environment and human health by emphasising the importance of proper waste management, recovery and recycling techniques to reduce pressure on resources and improve their use.
The directive establishes a waste hierarchy: prevention; reuse; recycling; recovery for other purposes, such as energy; and disposal.

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It confirms the 'polluter-pays principle' whereby the original waste producer must pay for the costs of waste management.
It introduces the concept of 'extended producer responsibility'.
It makes a distinction between waste and by-products.
Waste management must be carried out without any risk to water, air, soil, plants or animals, without causing a nuisance through noise or smells, or harming the countryside or places of special interest.
Producers or holders of waste must treat it themselves or have it handled by an officially recognised operator. Both require a permit and are inspected periodically.
Competent national authorities must establish waste-management plans and waste-prevention programmes. Special conditions apply to hazardous waste, waste oils and bio-waste.
It introduces recycling and recovery targets to be achieved by 2020 for household waste (50%) and construction and demolition waste (70%).
The legislation does not cover certain types of waste such as radioactive elements, decommissioned explosives, faecal matter, waste waters and animal carcasses.

6.1.4 *Directive 2002/49/EC relating to the assessment and management of environmental noise*

Directive 2002/49/EC relating to the assessment and management of environmental noise (the Environmental Noise Directive – END) is the main EU instrument to identify noise pollution levels and to trigger the necessary action both at Member State and at EU level.
To pursue its stated aims, the Environmental Noise Directive focuses on three action areas:

- the determination of exposure to environmental noise
- ensuring that information on environmental noise and its effects is made available to the public
- preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good

6.1.5 *COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT Accompanying document to the Report from the Commission to the Council and the European Parliament on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling*

The European Commission has published a report in February 2010, formulating recommendations on sustainability criteria for Member States wishing to implement a national system for solid and gaseous biomass for electricity, heating and cooling. The Commission had to report in 2011, for the second time, on sustainability criteria and, if considered necessary, propose schemes to be applied to solid and gaseous biomass for heat and electricity. Regarding solid and gaseous biomass use for electricity, heating and cooling production, the implementation of a harmonized EU sustainability framework is in line with the following principles:

- Harmonization - avoiding EU internal trade distortions caused by incompatible national requirements;
- Flexibility - adopting existing schemes, relevant national legislation and sustainable forest management initiatives;
- Equal level playing field - avoiding the excessive overlapping of different rules for the same raw material and aiming at the progressive application of the criteria to all biomass independently of its' final use;

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- Cost effectiveness and proportionality - avoiding excessive administrative burden and costs, in particular for small market actors.

The increased demand for biomass and the expansion of international trade of biomass may lead to higher risks for unsustainably produced biomass. Legislation should address sustainability issues before environmental impacts discredit the whole bioenergy sector, implying potentially significant market impacts for the whole bioenergy industry.
As a result, the main importing countries of biomass have started to develop national sustainability requirements for bio-energy. This has led to certification schemes (voluntary and mandatory) in the agriculture, forestry and energy sectors which are not necessarily complementary or compatible [6]. This in turn has led to calls from utilities, environmental organisations and biomass importing countries for a common sustainability scheme for biomass in order to limit intra-EU cross-border barriers in setting up bio-energy projects.

6.1.6 Urban and territory planning

Today's territory are "complex urban regions" where varied episodes and dissonant experiences reach a very high intensity; an intensity that clearly shows us that the traditional identification and planning criteria are today strongly under discussion. The new settlement models assume the appearance of "nebulas". The new way of "functioning" of the city, the new form that urban armor is taking, produces deep changes in the social and spatialconfiguration of the material and immaterial relations of the community. Investigating the potentialities inherent in the settlement-functional system both in representing paradigms for the readingand interpretation of territory, and at the same time in becoming tools through which to direct their development. The possibilities and methods through which the infrastructures and energy services and the qualitative and quantitative consistency of activities and innovativefunctions can be assumed as indicators of the degree of a territory and, consequently, be identified as "strategic levers" by which to guide the government and the urban transformations (Bellone 2019).

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7 CONCLUSION

Biomass for energy must be produced, processed and used in a sustainable and efficient way in order to optimise greenhouse gas savings and maintain ecosystem services.
Bioenergy can play a key role in achieving the EU's renewable energy targets for 2030 and beyond. However, biomass for energy must be produced, processed and used in a sustainable and efficient way in order to optimise greenhouse gas savings and maintain ecosystem services.
The REDII revisions implicitly recognize that biomass use is not sustainable by default and although it is a preferable source of energy to non-renewable ones, a central issue in most bioenergy debates is the fact that agricultural land is often converted to the production of these biomasses, to the detriment of food supply. One obvious way to avoid this 'food/fuel dilemma' (and reduce carbon emissions in the process) is to derive bioenergy from waste. This is the philosophy inherent in the design of Blaze.

The design of Blaze converges towards environmental sustainability objectives through a comprehensive view of economic, social and environmental aspects in order to contribute to the energy independence of EU countries.
This paper focuses attention on the tasks associated with the design and construction of Blaze, which must be taken into account from the outset. In the current prototype development, in fact, action must be taken to ensure the environmentally friendly and eco-friendly performance of the equipment. In the future, construction and operation of Blaze installations in different European countries will require the fulfilment of a whole series of obligations, which, although deriving from common European Directives, have been interpreted differently by the individual Member States.

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