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North Lebanon Alternative Power
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In cooperation with Lebanese University

Environmental Impact Assessment

for an academic mobile municipal waste incinerator

Waste incinerator max. 5 ton/day refused waste (waste after recycling)

تقييم الاثر البيئي

Authors: Dr. Eng. Samir Mourad

Hiyam El Kurdi

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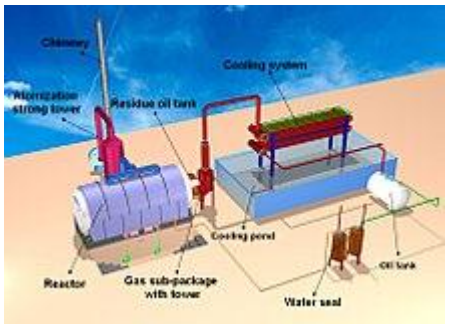
Content

1 Introduction

Waste-to-energy (**WtE**) or **energy-from-waste** (**EfW**) is the process of generating energy in the form of electricity and/or heat from the primary treatment of waste, or the processing of waste into a fuel source.

The first incinerator or "Destructor" was built in Nottingham, UK, in 1874 by Manlove, Alliott & Co. Ltd. to the design of Alfred Fryer.

The first US incinerator was built in 1885 on Governors Island in New York, New York.



The first waste incinerator in Denmark was built in 1903 in Frederiksberg.

During the 2001–2007 period, the waste-to-energy capacity increased by about four million metric tons per year.

Japan and China each built several plants based on direct smelting or on fluidized bed combustion of solid waste. In China there were about 434 waste-to-energy plants in early 2016. Japan is the largest user in thermal treatment of municipal solid waste in the world, with 40 million tons.

As of June 2014, Indonesia had a total of 93.5 MW installed capacity of waste-to-energy, with a pipeline of projects in different preparation phases together amounting to another 373MW of capacity

Biofuel Energy Corporation of Denver, Colorado, opened two new biofuel plants in Wood River, Nebraska, and Fairmont, Minnesota, in July 2008. These plants use distillation to make ethanol for use in motor vehicles and other engines. Both plants are currently reported to be working at over 90% capacity. Fulcrum BioEnergy incorporated located in Pleasanton, California, is building a WtE plant near Reno, NV. The plant is scheduled to open in 2019 under the name of Sierra BioFuels plant. BioEnergy incorporated predicts that the plant will produce approximately 10.5 million gallons per year of ethanol from nearly 200,000 tons per year of MSW.

Waste to energy technology includes fermentation, which can take biomass and create ethanol, using waste cellulosic or organic material. In the fermentation process, the sugar in the waste is converted to carbon dioxide and alcohol, in the same general process that is used to make wine. Normally fermentation occurs with no air present.

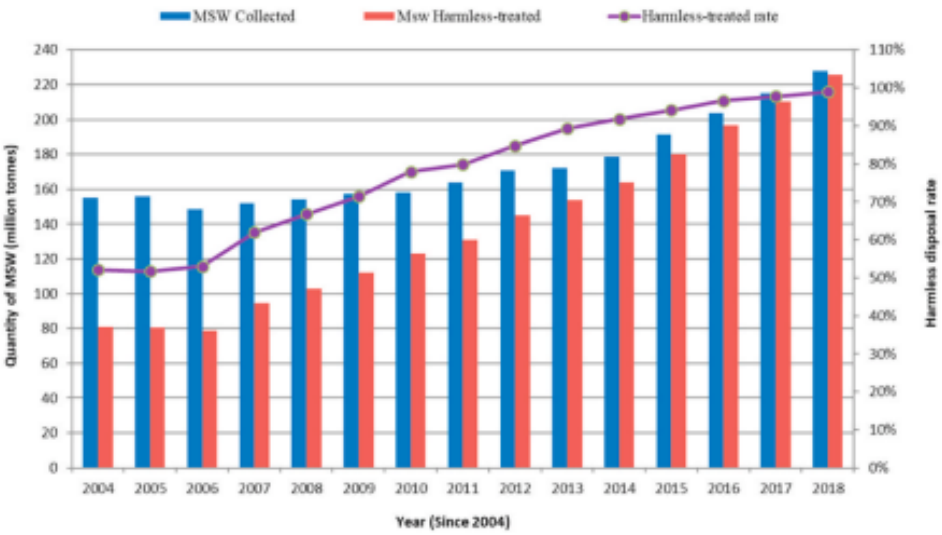
International success stories:

1- China

To accommodate the rapidly increasing amount of municipal solid waste (MSW) sustainably and effectively, public-private partnership (PPP) waste-to-energy (WTE) incineration has achieved rapid growth in China. This provides an insight into current practice and identifies key opportunities and major challenges in the further development of PPP implemented in China's WTE incineration industry. The statistic results show that the publicprivate-partnership market is currently under a period of rapid expansion, with a large number of well-funded and highly professional public-private partnership suppliers emerging in recent decades, but at a level of market concentration that is significantly lower than in mature markets such as in the United States and Japan.

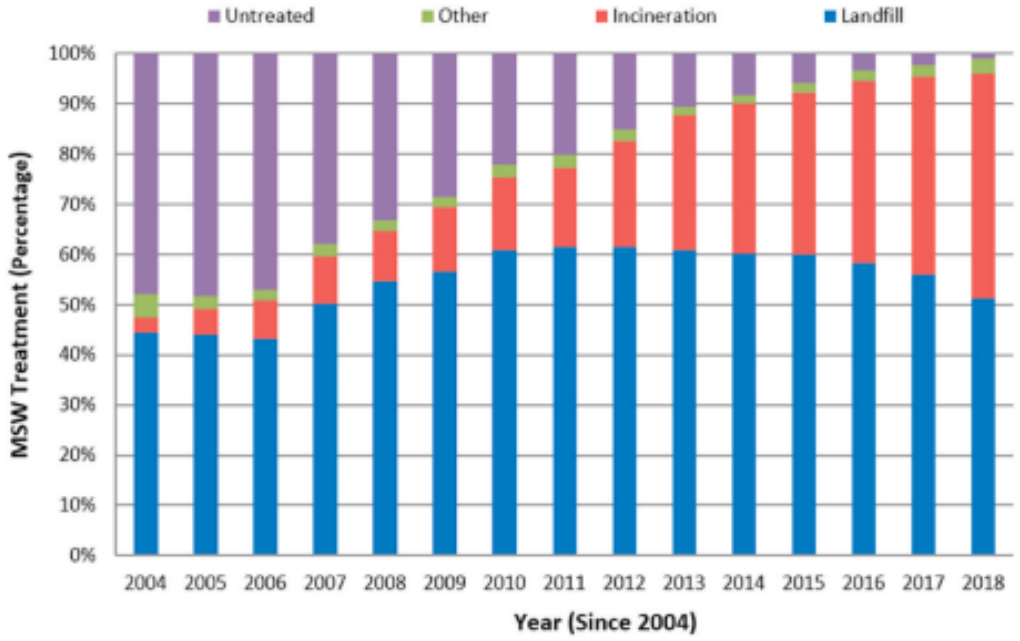
Waste-to-energy (WTE) incineration provides an effective solution for achieving both "Prevention" and "Recovery", because of its advantage of unlocking useable energy stored in MSW , especially in nonrecyclable waste. In recent years, WTE incineration has developed rapidly worldwide to provide an effective solution for governments to alleviate the pressure on MSW disposal and provide a diversified renewable and sustainable energy supply. In China, WTE incineration plants have grown rapidly, increasing from 3.70 to 133.08 million metric tons of designed capacity between 2003 and 2018, respectively

Over 80 projects with a total investment of CNY 35 billion are planned or constructed in 2019, with at least 80% of WTE incineration projects in China procured and operated through PPP



MSW collection and treatment in China. (Source: China Statistical Yearbook 2005–2019)

The annual quantity of MSW increased from 155.1 to 228.0 million metric tons between 2004 and 2018–with an annual rate of increase of 3.1%–and an increase from 80.9 to 225.7 million metric tons of harmless-treated MSW over the same period, at an 11.9% average annual rate of increase.



Capacity/disposal quantity of incineration and number of incinerators in China. (Source: China Statistical Yearbook 2005–2019)

Effective and efficient MSW management, as well as a reliable renewable energy supply, are considered key issues in achieving China's sustainable development goals, and PPP WTE incineration provides an effective and integrated solution. By using up-to-date data drawn from 2004 to 2019 Chinese Statistical yearbooks, such industry associations and authorities as governments and PPP operators, and current practices, the market prospects and main obstacles for the PPP WTE incineration industry have been summarized. The results show the PPP WTE incineration market in China is currently under a period of rapid expansion, and a large number of well-funded and highly professional PPP suppliers have emerged during recent decades, while its market concentration is significantly low. Meanwhile, the great market potential and preferential policies promulgated by the central and local governments, as well as booming technological innovations, provide sufficient motivation for further development.

This document is the first document concerning the process to get permission from Lebanese Government to operate NLAP-IPP.

2 Summary

2.1 The mobile Incinerator

In cooperation the the Lebaness University and USJ (…).

2.2 Flue Gas Treatment (Filter System)

2.3 Ashes Treatment

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Ashes Recycling

Poster 3

INTRODUCTION مقدمة

Waste to energy is an environmentally friendly method of reducing the mass and volume of non-recyclable waste that would otherwise require landfill. The resulting ash, although largely inert, may contain heavy metal concentrations that require processing to comply with regulations, meet production standards for a usable product, and ensure the long-term stability of the metals when the ash is used. Heavy metals such as lead and cadmium can be toxic to biological systems if they are present in high enough concentrations. Fly and bottom ashes from fuel oil power plants and oil refineries may contain hazardous trace elements, such as heavy metals, which have a negative impact on the environment with time.

تحويل النفايات إلى طاقة هي طريقة صديقة للبيئة لتقليل كتلة وحجم النفايات غير القابلة لإعادة التدوير والتي قد تتطلب دفن النفايات. قد يحتوي الرماد الناتج ، على الرغم من أنه خامل إلى حد كبير ، على تركيزات معادن ثقيلة تتطلب معالجة لتتوافق مع اللوائح ، وتفي بمعايير الإنتاج لمنتج قابل للاستخدام ، وتضمن استقرار المعادن على المدى الطويل عند استخدام الرماد. يمكن أن تكون المعادن الثقيلة مثل الرصاص والكادميوم سامة للأنظمة البيولوجية إذا كانت موجودة بتركيزات عالية بما يكفي. قد يحتوي الرماد المتطاير ورماد القاع من محطات توليد الطاقة من زيت الوقود ومصافي النفط على عناصر خطرة ، مثل المعادن الثقيلة ، والتي لها تأثير سلبي على البيئة مع مرور الوقت.

Figure 1: Bottom ashes

In order to recover usable materials from ashes, recycling technology must be used. (Figure 2)

Figure 2: Ashes recycling plant

من أجل استعادة المعادن الثقيلة ، يجب استخدام تقنية إعادة تدوير الرماد.

Technology of separation تقنية الفصل

Solvent extraction, or liquid-liquid extraction is a separation technique isothermal in a heterogeneous liquid medium.
The method is based on the existence of a difference in the solubility of a substance in two immiscible liquids. The process has three steps, as shown in Figure 3(b):
- Mixture of the two immiscible liquids, one of them containing the solute(ashes),
- Obtaining physico-chemical equilibrium, leading to demixing,
- Separation of the two new liquid phases obtained based on the difference of densities.

الاستخلاص بالمذيب ، أو الاستخلاص السائل – السائل هو تقنية فصل متساوي الحرارة في وسط سائل غير متجانس.
تعتمد الطريقة على وجود اختلاف في قابلية ذوبان مادة ما في سائلين غير قابلين للامتزاج.
تتكون العملية من ثلاث خطوات ، كما هو موضح في الشكل 3 (ب):
– خليط من سائلين غير قابلين للامتزاج يحتوي أحدهما على المذاب (الرماد).
– الحصول على توازن فيزيائي – كيميائي يؤدي إلى إزالة المزج.
– تم الحصول على فصل طوري السائل الجديدين على أساس اختلاف الكثافات.

System of recycling نظام إعادة التدوير

Samples of fresh bottom ash are taken from the incinerators and dried at 25 °C. Then manually separate unburned parts such as screw, wire and plastic. The sample are reduced to a size of 500 µm using a shredder to remove the magnetic content (iron removal). Bottom ash samples (tailings and concentrates) were subjected to filtration tests in order to observe the mineral recoverability of the samples and to improve the parameters. It is important to reduce the size to 500 microns by using a shredder to remove the magnetic content. The solution is filtered and placed in a series of columns when the liquid is mixed with suitable liquid extractors to separate the minerals from the solution.

يتم أخذ عينات من رماد القاع الطازج من المحارق وتجفيفها عند 25 درجة مئوية ثم فصل الأجزاء غير المحترقة يدويًا مثل اللولب والأسلاك والبلاستيك. يتم تصغير العينة إلى حجم 500 ميكرومتر باستخدام آلة التقطيع لإزالة المحتوى المغناطيسي (إزالة الحديد). تم إخضاع عينات رماد القاع (المخلفات والمركزات) لاختبارات الترشيح من أجل مراقبة قابلية استعادة المعادن للعينات وتحسين المعلمات. من المهم تقليل الحجم إلى 500 ميكرون باستخدام آلة التقطيع لإزالة المحتوى المغناطيسي. يتم ترشيح المحلول ووضعه في سلسلة من الأعمدة عند خلط السائل بمستخلصات سائلة مناسبة لفصل المعادن عن المحلول.

Extraction column عمود الاستخراج

Extraction column is a kind of column extraction equipment of mechanical stirring, it is composed by upper settling chamber, emulsion chamber and bottom settling chamber. the emulsion chamber is cylinder type, and is divided into several extraction chambers by static ring baffle, there is a fixed turn plate between two static ring baffles, and rotating with shaft together. When work, heavy phase(aqueous)and light phase(organic phase) enter the equipment from column top and bottom respectively, and contact counter currently in column. Under fixed turn plate stirring, the dispersed phase formed small droplets, to enlarge mass transfer area and finished extraction process, and then Heavy phase and light phase discharge from the different exits.

عمود الاستخراج هو نوع من معدات استخراج العمود من التحريك الميكانيكي ، ويتكون من غرفة الترسيب العلوية ، وغرفة المستحلب ، وغرفة الاستقرار السفلية. حجرة المستحلب من النوع الأسطواني ، وتنقسم إلى عدة غرف استخلاص بواسطة حاجز دائري ثابت ، وهناك لوحة دوران ثابتة بين اثنين من حواجز الحلقة الثابتة ، وتدور مع العمود معًا. عند العمل ، يدخل الطور الثقيل (المائي) والمرحلة الخفيفة (الطور العضوي) إلى المعدات من أعلى العمود وأسفله على التوالي ، وعداد التلامس الموجود حاليًا في العمود. تحت التحريك الثابت للصفائح الدورانية ، شكلت المرحلة المشتتة قطيرات صغيرة ، لتوسيع منطقة نقل الكتلة وعملية الاستخراج النهائية ، ثم تفريغ الطور الثقيل والمرحلة الخفيفة من المخارج المختلفة.

Process control system نظام التحكم في العمليات

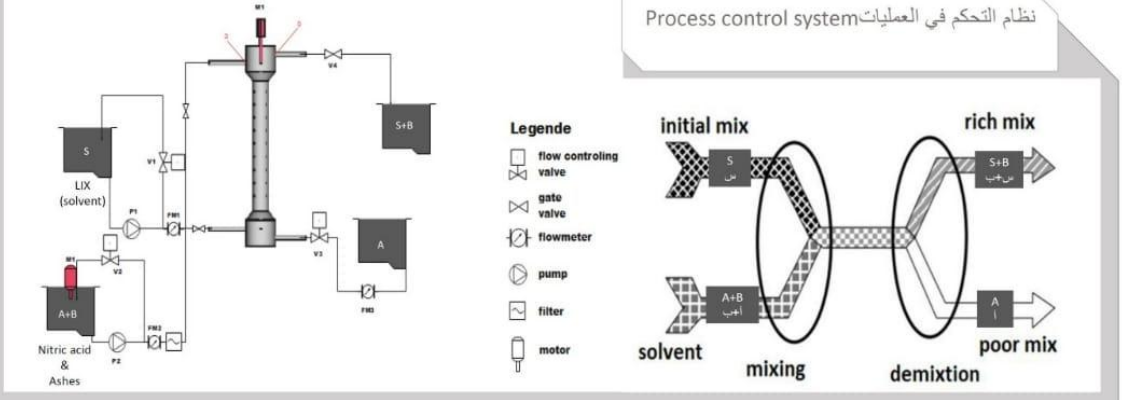


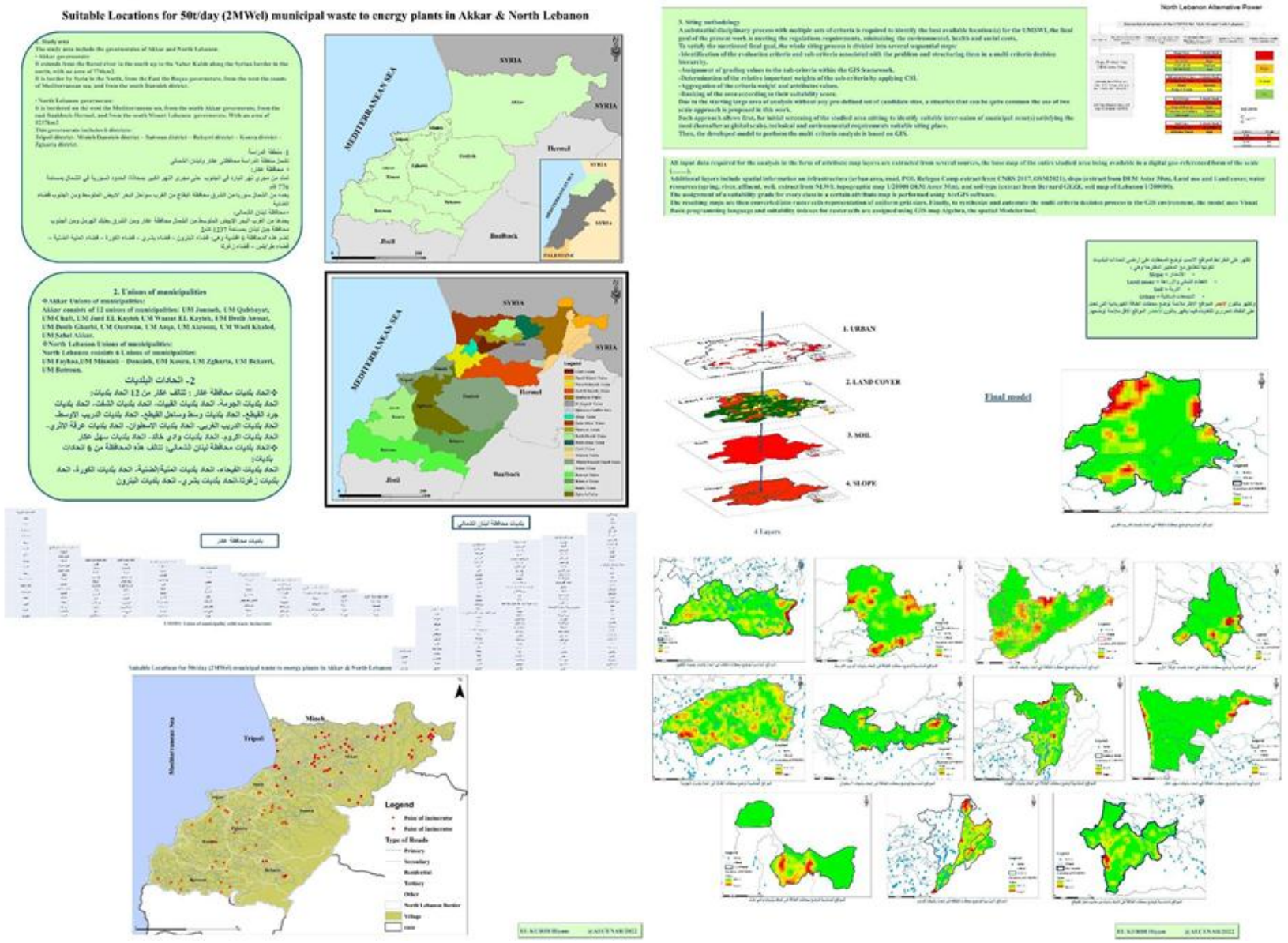
Figure 3: Principle of a separationstage by obtaining a balance

Practically, the initial mix ,containing solute B dissolved in the diluent A, is contacted with the solvent S. The solute B (generally more soluble in the solvent 'S' than in the diluent 'A'), passes from the solution (A+B) in the solvent (S+B) , the solvent enriched in solute (S+B) is the extract (rich mix) while the diluent depleted solute is the residue (poor mix).
So the substance B placed in contact with two partially miscible solvents or immiscible S and A is distributed unequally between the two phases that are formed when the physicochemical balance is reached.
In order to transport the material as quickly as possible, the area of the transfer surface is increased by various artifices. These objectives can be obtained in a column.

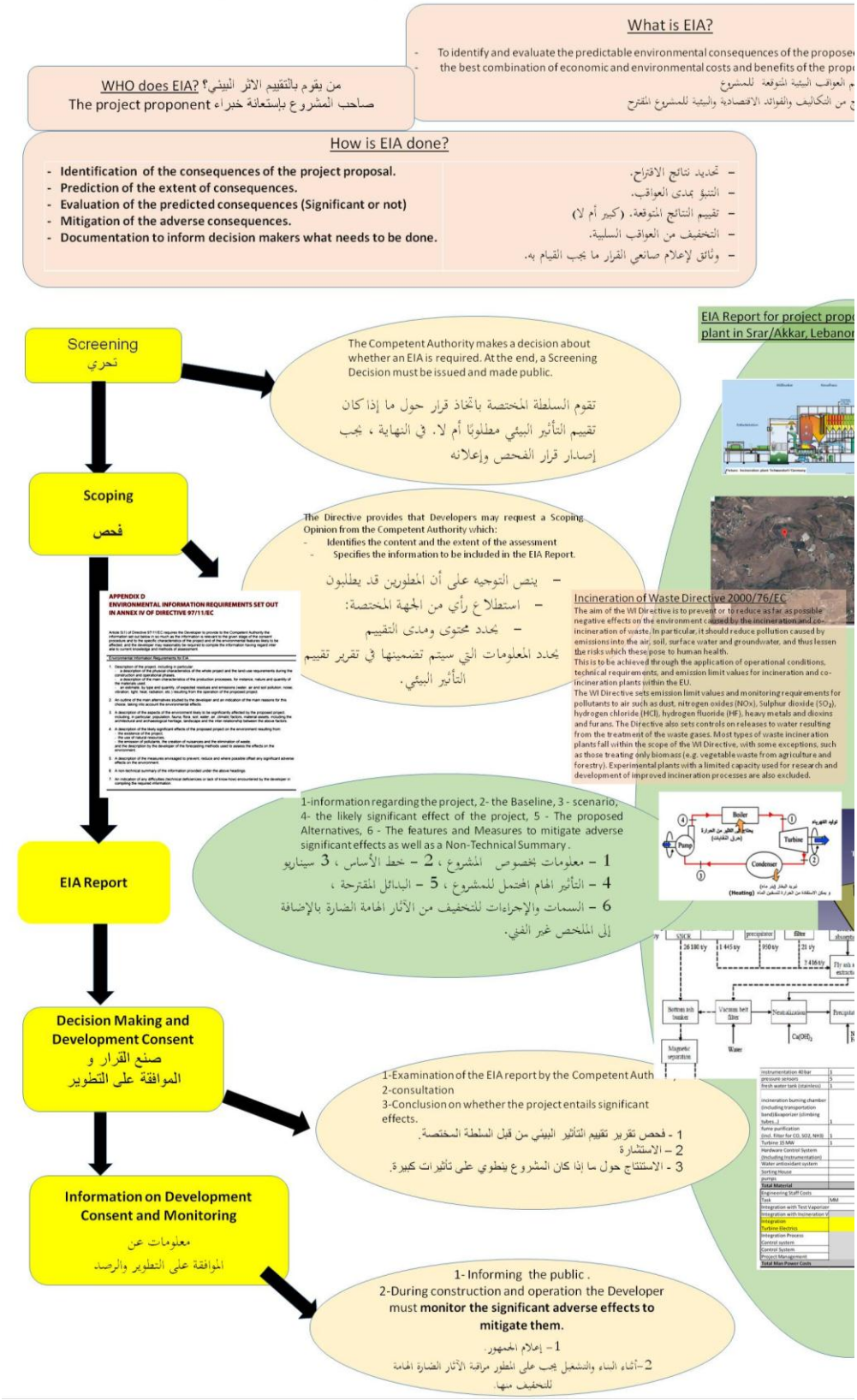
عمليًا ، المزيج الأولي ، المحتوي على المذاب «ب» المذاب في المادة المخففة «أ»، يتم ملامسته للمذيب «س» . والمذاب «ب» (بشكل عام أكثر قابلية للذوبان في المذيب «س» منه في المادة المخففة «أ») ، يمر من المحلول «أ+ب» في المذيب «س+ب»، المذيب المخصب في المذاب هو المستخلص (المزيج الغني) بينما المادة المخففة المستنفدة المذابة هي البقايا (المزيج الفقير).
لذلك فإن المادة «ب» المذابة المذيبين قابلين للامتزاج جزئيًا «أ» و «س» أو غير قابلين للامتزاج يتم توزيعها بشكل غير متساو بين المرحلتين اللتين تتشكلان عند الوصول إلى التوازن الفيزيائي الكيميائي.
من أجل نقل المواد في أسرع وقت ممكن ، يتم زيادة مساحة سطح النقل بواسطة مصنوعات مختلفة. يمكن الحصول على هذه الأهداف في عمود.

Mounira Sayah / Nidaa Fatfat, Aecenar November 2021

2.4 Suitable Locations



2.5 Relevant Norms



Incineration of Waste Directive 2000/76/EC

The aim of the WI Directive is to prevent or to reduce as far as possible negative effects on the environment caused by the incineration and co-incineration of waste. In particular, it should reduce pollution caused by emissions into the air, soil, surface water and groundwater, and thus lessen the risks which these pose to human health.

This is to be achieved through the application of operational conditions, technical requirements, and emission limit values for incineration and co-incineration plants within the EU.

The WI Directive sets emission limit values and monitoring requirements for pollutants to air such as dust, nitrogen oxides (NOx), Sulphur dioxide (SO_2), hydrogen chloride (HCl), hydrogen fluoride (HF), heavy metals and dioxins and furans. The Directive also sets controls on releases to water resulting from the treatment of the waste gases. Most types of waste incineration plants fall within the scope of the WI Directive, with some exceptions, such as those treating only biomass (e.g. vegetable waste from agriculture and forestry). Experimental plants with a limited capacity used for research and development of improved incineration processes are also excluded.

APPENDIX D
ENVIRONMENTAL INFORMATION REQUIREMENTS SET OUT IN ANNEX IV OF DIRECTIVE 97/11/EC

Article 5(1) of Directive 97/11/EC requires the Developer to provide to the Competent Authority the information set out below in so much as the information is relevant to the given stage of the consent procedure and to the specific characteristics of the project and of the environmental features likely to be affected, and the developer may reasonably be required to compile the information having regard *inter alia* to current knowledge and methods of assessment.

Environmental Information Requirements for EIA

1. Description of the project, including in particular:
   - a description of the physical characteristics of the whole project and the land-use requirements during the construction and operational phases,
   - a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used,
   - an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed project.

2. An outline of the main alternatives studied by the developer and an indication of the main reasons for this choice, taking into account the environmental effects.

3. A description of the aspects of the environment likely to be significantly affected by the proposed project, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.

4. A description of the likely significant effects of the proposed project on the environment resulting from:
   - the existence of the project,
   - the use of natural resources,
   - the emission of pollutants, the creation of nuisances and the elimination of waste,

   and the description by the developer of the forecasting methods used to assess the effects on the environment.

5. A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.

6. A non-technical summary of the information provided under the above headings.

7. An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

2.5.1 Incineration of Waste Directive 2000/76/EC[1]

2.5.1.1 Summary of Directive 2000/76/EC on the incineration of waste (the WI Directive)

The WI Directive entered into force on 28 December 2000. It repealed former directives on the incineration of hazardous waste (Directive 94/67/EC) and household waste (Directives 89/369/EEC and 89/429/EEC) and replaced them with a single text. The aim of the WI Directive is to prevent or to reduce as far as possible negative effects on the environment caused by the incineration and co-incineration of waste. In particular, it should reduce pollution caused by emissions into the air, soil, surface water and groundwater, and thus lessen the risks which these pose to human health.

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The WI Directive makes a distinction between:

a) incineration plants (which are dedicated to the thermal treatment of waste and may or may not recover heat generated by combustion) and

b) co-incineration plants (such as cement or lime kilns, steel plants or power plants whose main purpose is energy generation or the production of material products and in which waste is used as a fuel or is thermally treated for the purpose of disposal).

The WI Directive provides for public consultation, access to information and participation in the permitting procedure.

Transposition into national legislation was necessary by 28 December 2002. From this date on new incinerators have had to comply with the provisions of the WI Directive. The deadline to bring existing plants into compliance was 28 December 2005.

2.5.1.2 Legislation Summary - Waste incineration[2]:

The European Union (EU) has introduced measures to prevent or reduce air, water and soil pollution caused by the incineration or co-incineration of waste, as well as the resulting risk to human health. These measures specifically require a permit be obtained for incineration and co-incineration plants, and emission limits for certain pollutants released to air or to water.

[1] http://ec.europa.eu/environment/archives/air/stationary/wid/legislation.htm

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:l28072

ACT

Directive **2000/76/EC** of the European Parliament and of the Council of 4 December 2000 on the incineration of waste [**See amending act(s)**].

SUMMARY

Incineration of both hazardous and harmless wastes may cause emissions of substances which pollute the air, water and soil and have harmful effects on human health. In order to limit these risks, the European Union (EU) shall impose strict operating conditions and technical requirements on waste incineration plants * and waste co-incineration plants *.

Plants

This Directive not only applies to solid or liquid waste incineration plants, but also to co-incineration plants.

Experimental plants which aim to improve the incineration process and which treat less than 50 tonnes of waste are excluded from the scope of the Directive, as are plants which only treat:

- vegetable waste from agriculture and forestry;
- vegetable waste from food processing, if the heat generated is recovered;
- certain fibrous vegetable waste from pulp paper or paper production if it is co-incinerated at the place of production and the heat generated is recovered;
- certain wood waste;
- cork waste;
- radioactive waste;
- animal carcasses;
- waste resulting from the exploration of oil and gas and incinerated on board off-shore installations.

Permits

All incineration or co-incineration plants must have a permit to carry out their activities. The permit will be issued by the competent authority on the condition that the requirements defined in this Directive are complied with. The permit specifies the categories and quantities of waste which may be treated, the plant's incineration or co-incineration capacity and the procedures for sampling and measuring air and water pollutants to be used.

Delivery and reception of waste

During delivery and reception of waste, the operator of the incineration plant or co-incineration plant shall take all necessary precautions to prevent or limit negative effects on the environment and risks to people.

Furthermore, prior to accepting hazardous waste at the incineration plant or co-incineration plant, the operator of the plant must have at their disposal the administrative information on the generating process, the physical and chemical composition of the waste, as well as on the hazardous characteristics of the waste.

The operating conditions

In order to guarantee complete waste combustion, the Directive requires all plants to keep the incineration or co-incineration gases at a temperature of at least 850°C for at least two seconds. If hazardous waste with a content of more than 1 % of halogenated organic substances, expressed as chlorine, is incinerated, the temperature has to be raised to 1 100 °C for at least two seconds.

The heat generated by the incineration process has to be put to good use as far as possible.

Air emissions limit values

The limit values for **incineration plant** emissions to air are set out in Annex V to the Directive. They concern heavy metals, dioxins and furans, carbon monoxide (CO), dust, total organic carbon (TOC), hydrogen chloride (HCl), hydrogen fluoride (HF), sulphur dioxide (SO2) and the nitrogen oxides (NO and NO2).

The determining of limit values for **co-incineration plant** emissions to air is set out in Annex II. In addition, special provisions are laid down relating to cement kilns and combustion plants which co-incinerate waste.

Water discharges from the cleaning of exhaust gases

Incineration and co-incineration plants must have a permit which authorises them to discharge used water caused by exhaust-gas clean-up. This permit will ensure that the emission limit values set out in Annex IV to the Directive are complied with.

Residues

Incineration or co-incineration residues must be reduced to a minimum and, as far as possible, recycled. When dry residues are transported, precautions must be taken to prevent their dispersal in the environment. Tests must be carried out to establish the physical and chemical characteristics, and polluting potential, of residues.

Monitoring and surveillance

The Directive requires the installation of measurement systems to monitor the parameters of an installation and relevant emissions. Emissions to air and to water must be measured continuously or periodically in accordance with Article 11 and Annex III of the Directive.

Access to information and public participation

Applications for new permits must be made accessible to the public so that the latter may comment before the competent authority reaches a decision.

For plants with a nominal capacity of two tonnes or more per hour, the operator must provide the competent authority with an annual report on the functioning and monitoring of the plant, to be made available to the public. A list of plants with a nominal capacity of less than two tonnes per hour must be drawn up by the competent authority and made available to the public.

Implementation reports

By 31 December 2008, the Commission must report to Parliament and the Council on the application of the Directive, progress achieved in emission control techniques and experience with waste management. This report has been included in the Communication COM(2007) 843 final.

Other reports on the implementation of the Directive will also be produced.

Penalties

The Member States must determine the penalties applicable to breaches of the Directive.

Context

This Directive aims to integrate into existing legislation technical progress in terms of monitoring emissions from incineration processes and to ensure compliance with the international commitments made by the Community with regard to reducing pollution, specifically concerning the setting of emissions limit values for dioxides, mercury and dust produced by waste incineration. The Directive is based on an integrated approach: limits relating to water discharges have been introduced alongside value limits set for emissions into air.

Key terms of the Act

- Incineration plant: any stationary or mobile technical unit and equipment dedicated to the thermal treatment of wastes with or without recovery of the combustion heat generated. This includes the incineration by oxidation of waste as well as other thermal treatment processes such as pyrolysis, gasification or plasma processes in so far as the substances resulting from the treatment are subsequently incinerated.
- Co-incineration plant: any stationary or mobile plant whose main purpose is the generation of energy or production of material products and:

References

Act	Entry into force	Deadline for transposition in the Member States	Official Journal
Directive 2000/76/EC	28.12.2000	28.12.2002	OJ L 332 of 28.12.2000

Amending act	Entry into force	Deadline for transposition in the Member States	Official Journal
Regulation (EC) No 1137/2008	11.12.2008	-	OJ L 311 of 21.11.2008

The successive amendments and corrections to Directive 2000/76/EC have been incorporated in the original text. This consolidated version is of documentary value only.

RELATED ACTS

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) [Official Journal L 334 of 17.12.2010].

Commission Decision **2006/329/EC** of 20 February 2006 laying down a questionnaire to be used for reporting on the implementation of Directive **2000/76/EC** on the incineration of waste [Official Journal L 121 of 06.05.2006].

See also

- Integrated pollution prevention and control (IPPC Directive)
- Framework Directive on Waste

2.5.1.3 Legislation Summary - Incinération des déchets[3]

L'Union européenne (UE) fixe des mesures visant à prévenir ou réduire la pollution de l'air, de l'eau et du sol résultant de l'incinération et de la coïncinération des déchets, ainsi que les risques pour la santé humaine qui en résultent. Ces mesures imposent notamment l'obtention d'un permis pour les installations d'incinération ou de coïncinération et des limites d'émission pour certaines substances polluantes rejetées dans l'atmosphère et dans les eaux.

ACTE

Directive 2000/76/CE du Parlement européen et du Conseil du 4 décembre 2000 relative à l'incinération des déchets [Voir acte(s) modificatif(s)].

SYNTHÈSE

L'incinération des déchets dangereux et non dangereux peut donner lieu à des émissions de substances polluant l'air, l'eau et le sol et ayant des effets nocifs sur la santé humaine. Pour limiter ces risques, l'Union européenne (UE) impose des conditions d'exploitation et des exigences techniques strictes aux installations d'incinération * et de coïncinération * de déchets.

Les installations

La présente directive s'applique non seulement aux installations destinées à l'incinération des déchets solides ou liquides mais aussi aux installations de coïncinération.

Sont exclues du champ d'application de la directive les installations expérimentales visant à améliorer le processus d'incinération et traitant moins de 50 tonnes de déchets par an, ainsi que les installations traitant seulement:

- des déchets végétaux agricoles et forestiers;

[3] https://eur-lex.europa.eu/legal-content/FR/TXT/HTML/?uri=LEGISSUM:l28072&from=EN

- des déchets végétaux provenant de la transformation alimentaire si la chaleur produite est valorisée;
- certains déchets végétaux fibreux issus de la production de la pâte à papier ou du papier s'ils sont coïncinérés sur le lieu de production et si la chaleur produite est valorisée;
- certains déchets de bois;
- des déchets de liège;
- des déchets radioactifs;
- des carcasses d'animaux;
- des déchets provenant de l'exploitation de pétrole et gaz et incinérés dans des installations offshore.

Les permis

Toutes les installations d'incinération ou de coïncinération doivent posséder un permis pour exercer leurs activités. Ce permis est délivré par une autorité compétente sous réserve du respect des conditions définies dans la présente directive. Le permis spécifie les catégories et les quantités de déchets qui peuvent être traités, la capacité d'incinération ou de coïncinération de l'installation et les procédures d'échantillonnage et de mesure des polluants de l'air et de l'eau qui vont être utilisées.

La livraison et la réception des déchets

Lors de la livraison et de la réception des déchets, l'exploitant de l'installation d'incinération ou de coïncinération prend les précautions nécessaires afin de prévenir ou limiter les effets négatifs sur l'environnement et les risques pour les personnes.

Par ailleurs, avant que des déchets dangereux puissent être acceptés dans une installation d'incinération ou de coïncinération, l'exploitant de l'installation doit avoir à sa disposition des informations administratives sur le processus de production, sur la composition physique et chimique des déchets, ainsi que sur les risques inhérents à ces déchets.

Les conditions d'exploitation

Afin de garantir l'accomplissement total de la combustion des déchets, la directive prévoit une obligation pour toutes les installations de maintenir les gaz résultant de l'incinération et de la coïncinération à une température minimale de 850 °C pendant au moins 2 secondes. S'il s'agit de déchets dangereux avec une teneur en substances organiques halogénées, exprimée en chlore, supérieure à 1 %, la température doit être amenée à 1 100 °C pendant au moins deux secondes.

La chaleur résultant du processus d'incinération devra être valorisée autant que possible.

Les valeurs limites des émissions dans l'air

Les valeurs limites des émissions atmosphériques pour les **installations d'incinération** sont indiquées à l'annexe V de la directive. Elles portent sur les métaux lourds, les dioxines et furannes, le monoxyde de carbone (CO), les poussières, le carbone organique total (COT), le chlorure d'hydrogène (HCl), le fluorure d'hydrogène (HF), le dioxyde de soufre (SO2) et les oxydes d'azote (NO et NO2).

La détermination des valeurs limites d'émissions atmosphériques pour les **installations de coïncinération** est indiquée à l'annexe II. Des dispositions spéciales relatives aux fours de ciment et aux installations de combustion coïncinérant des déchets y sont aussi indiquées.

Rejets d'eaux usées provenant de l'épuration des gaz d'échappement

Les installations d'incinération ou de coïncinération doivent posséder un permis qui les autorise à rejeter les eaux usées résultant de l'épuration des gaz d'échappement. Ce permis doit garantir que les valeurs limites d'émission indiquées dans l'annexe IV de la directive sont respectées.

Les résidus

Les résidus du processus d'incinération ou de coïncinération doivent être réduits au minimum et recyclés dans la mesure du possible. Au moment du transport des résidus secs, des précautions doivent être prises pour éviter leur dispersion dans l'environnement. Des essais doivent être faits pour connaître les caractéristiques physiques et chimiques des résidus, ainsi que leur potentiel de pollution.

Le contrôle et la surveillance

La directive prévoit l'installation obligatoire des systèmes de mesure permettant de surveiller les paramètres d'exploitation et les émissions pertinentes. Les émissions dans l'air et dans l'eau sont mesurées en continu ou périodiquement conformément à l'article 11 et à l'annexe III de la directive.

L'accès à l'information et la participation du public

Les demandes de permis pour des nouvelles installations seront mises à disposition du public pour que celui-ci puisse émettre des observations avant que l'autorité compétente ne prenne une décision.

Les installations avec une capacité nominale égale ou supérieure à deux tonnes par heure doivent mettre à disposition de l'autorité compétente et du public un rapport annuel concernant leur fonctionnement et leur surveillance. La liste des installations qui n'atteignent pas les deux tonnes est établie et rendue publique par l'autorité compétente.

Les rapports d'application

Avant le 31 décembre 2008, la Commission doit présenter un rapport au Parlement européen et au Conseil concernant l'application de la directive, les progrès réalisés dans le contrôle des émissions et l'expérience dans la gestion des déchets. Ce rapport a été inclus dans la communication COM(2007) 843 final.

D'autres rapports sur la mise en œuvre de la directive seront aussi établis.

Les sanctions

Les États membres déterminent les sanctions applicables aux violations des dispositions établies par la directive.

Contexte

La présente directive vise à intégrer dans la législation existante les progrès techniques en matière de contrôle des émissions des procédés d'incinération et à assurer le respect des engagements internationaux pris par la Communauté en matière de réduction de la pollution, notamment ceux concernant la fixation de valeurs limites pour les émissions de dioxines, de mercure et de poussières occasionnées par l'incinération de déchets. La directive se fonde sur une approche intégrée: aux valeurs limites mises à jour pour les émissions atmosphériques s'ajoutent des limites relatives aux rejets dans l'eau.

Termes-clés de l'acte

- Installation d'incinération: tout équipement ou unité technique fixe ou mobile destiné spécifiquement au traitement thermique de déchets, avec ou sans récupération de la chaleur produite par la combustion. Le traitement thermique comprend l'incinération par oxydation ou tout autre procédé de traitement thermique, tel que la pyrolyse, la gazéification ou le traitement plasmatique, dans la mesure où les substances qui en résultent sont ensuite incinérées.
- Installation de coïncinération: une installation fixe ou mobile dont l'objectif essentiel est de produire de l'énergie ou des produits matériels et:

Références

Acte	Entrée en vigueur	Délai de transposition dans les États membres	Journal officiel
Directive 2000/76/CE	28.12.2000	28.12.2002	JO L 332 du 28.12.2000

Acte(s) modificatif(s)	Entrée en vigueur	Délai de transposition dans les États membres	Journal officiel
Règlement (CE) n° 1137/2008	11.12.2008	-	JO L 311 du 21.11.2008

Les modifications et corrections successives à la directive 2000/76/CE ont été intégrées au texte de base. Cette version consolidée n'a qu'une valeur documentaire.

ACTES LIÉS

Directive 2010/75/UE du Parlement européen et du Conseil du 24 novembre 2010 relative aux émissions industrielles (prévention et réduction intégrées de la pollution) [Journal officiel L 334 du 17.12.2010].

Décision 2006/329/CE de la Commission du 20 février 2006 établissant un questionnaire à utiliser pour rendre compte de la mise en œuvre de la directive 2000/76/CE sur l'incinération des déchets [Journal officiel L 121 du 6.5.2006].

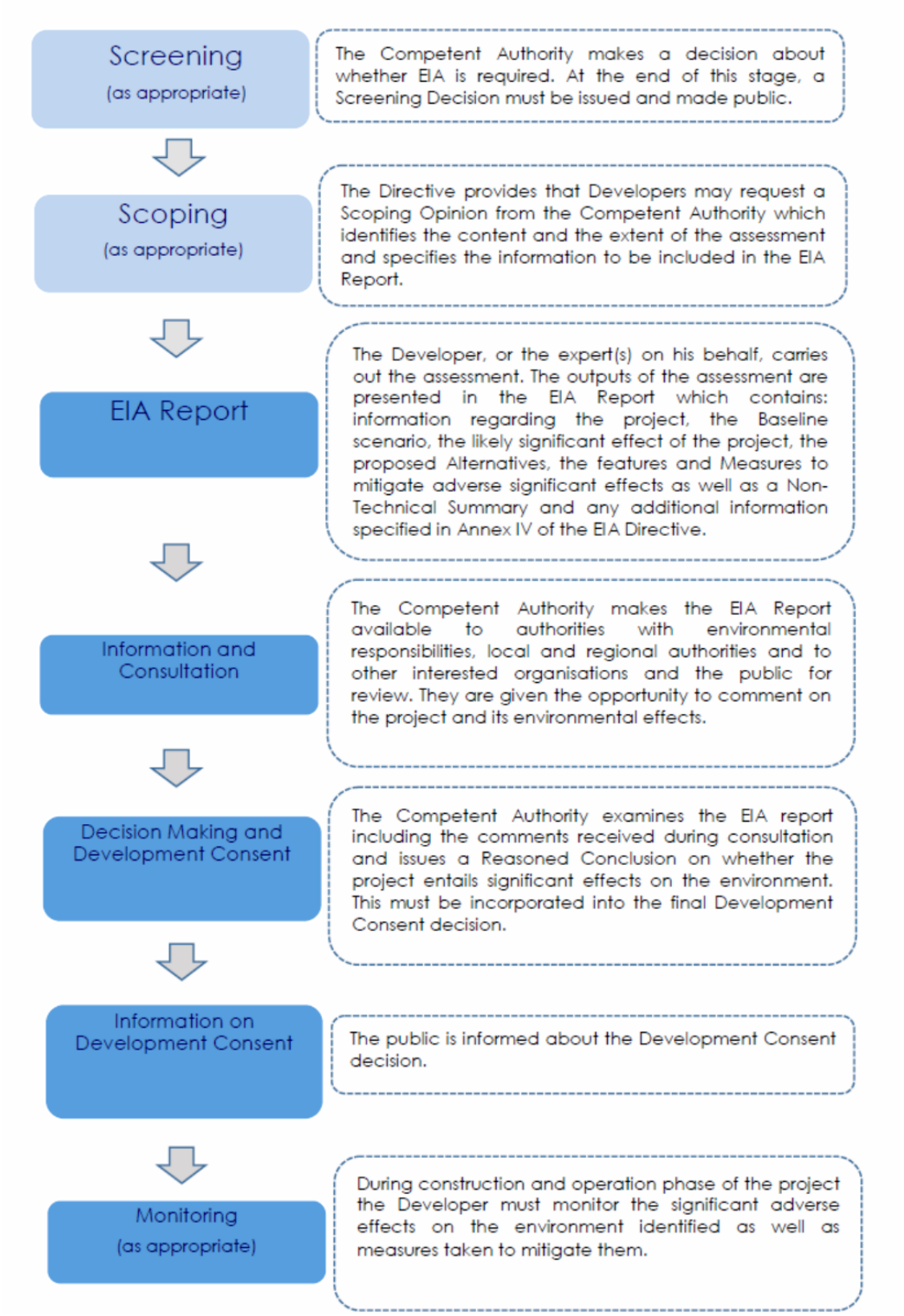
See also

- Prévention et réduction intégrées de la pollution (directive IPPC)
- Directive-cadre sur les déchets

3 Description to write an Environment Impact Assessment

http://ec.europa.eu/environment/eia/eia-support.htm

3.1 Steps of EIA



3.2 THE REVIEW CHECKLIST

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
The Objectives and Physical Characteristics of the Project				
1.1	Are the Project's objectives and the need for the Project explained?			
1.2	Is the programme for the Project's implementation described, detailing the estimated length of time (e.g. expected start and finish dates) for construction, operation, and decommissioning? (this should include any phases of different activity within the main phases of the Project, extraction phases for mining operations for example)			
1.3	Have all of the Project's main characteristics been described? (for assistance, see the Checklist in Part C of the Scoping Guidance Document in this series)			
1.4	Has the location of each Project component been identified, using maps, plans, and diagrams as necessary?			
1.5	Is the layout of the site (or sites) occupied by the Project described? (including ground levels, buildings, other physical structures, underground works, coastal works, storage facilities, water features, planting, access corridors, boundaries)			
1.6	For linear Projects, have the route corridor, the vertical, and horizontal alignment and any tunnelling and earthworks been described?			
1.7	Have the activities involved in the construction of the Project (including land-use requirements) all been described?			
1.8	Have the activities involved in the Project's operation (including land-use requirements and demolition works) all been described?			
1.9	Have the activities involved in decommissioning the Project all been described? (e.g. closure, dismantling, demolition, clearance, site restoration, site re-use, etc.)			
1.10	Have any additional services, required for the Project, been described? (e.g. transport access, water, sewerage, waste disposal, electricity, telecoms)			
1.11	Are any developments likely to occur as a consequence of the Project identified? (e.g. new housing, roads, water or sewerage infrastructure, aggregate extraction)			
1.12	Have any existing activities that will alter or cease as a consequence of the Project been identified?			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.13	Have any other existing or planned developments, with which the Project could have cumulative effects, been identified?			
1.14	Has the 'whole Project' been described, e.g. including all associated/ancillary works?			
1.15	Are any activities described as part of the 'whole Project' excluded from the assessment? Are such exclusions justified? (e.g. associated/ancillary activities can be included either because they fall under the scope of the Directive (Annex I or II) or because they can be considered as an integral part of the main infrastructure works using the 'centre of gravity test'. Guidance on associated and ancillary works has been published by the European Commission in an Interpretation Line available at: http://ec.europa.eu/environment/eia/pdf/Note%20-%20Interpretation%20of%20Directive%2085-337-EEC.pdf)			
The Size of the Project				
1.16	Is the area of land occupied by each of the permanent Project components quantified and shown on a scaled map? (including any associated access arrangements, landscaping, and ancillary facilities)			
1.17	Has the area of land required temporarily for construction been quantified and mapped?			
1.18	Is the reinstatement and after-use of the land occupied temporarily for the operation of the Project described? (e.g. land used for mining or quarrying)			
1.19	Has the size of any structures or other works developed as part of the Project been identified? (e.g. the floor area and height of buildings, the size of excavations, the area or height of planting, the height of structures such as embankments, bridges or chimneys, the flow or depth of water)			
1.20	Has the form and appearance of any structures or other works developed as part of the Project been described? (e.g. the type, finish, and colour of materials, the architectural design of buildings and structures, plant species, ground surfaces, etc.)			
1.21	For urban or similar development Projects, have the numbers and other characteristics of new populations or business communities been described?			
1.22	For Projects involving the displacement of people or businesses, have the numbers and other characteristics of those displaced been described?			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.23	For new transport infrastructure or Projects that generate substantial traffic flows, has the type, volume, temporal pattern, and geographical distribution of new traffic generated or diverted as a consequence of the Project been described?			
Production Processes and Resources Used				
1.24	Have all of the processes involved in operating the Project been described? (e.g. manufacturing or engineering processes, primary raw material production, agricultural or forestry production methods, extraction processes)			
1.25	Have the types and quantities of outputs produced by the Project been described? (these could be primary or manufactured products, goods such as power or water or services such as homes, transport, retailing, recreation, education, municipal services (water, waste, etc.)			
1.26	Have the types and quantities of resources, e.g. natural resources (including water, land, soil, and biodiversity), raw materials, and energy needed for construction and operation been discussed?			
1.27	Have the environmental implications of the sourcing of resources, e.g. natural resources (including water, land, soil and biodiversity), raw materials, and energy been discussed?			
1.28	Have efficiency and sustainability in use of resources, e.g. natural resources (including water, land, soil and biodiversity), raw materials, and energy been discussed?			
1.29	Have any hazardous materials used, stored, handled or produced by the Project been identified and quantified? • during construction; • during operation; • during decommissioning.			
1.30	Has the transportation of resources, including natural resources (including water, land, soil, and biodiversity) and raw materials to the Project site, and the number of traffic movements involved, been discussed? (including road, rail and sea transport) • during construction; • during operation; • during decommissioning.			

SECTION 1 DESCRIPTION OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
1.31	Have the Project's environmentally relevant social and socio-economic implications been discussed? Will employment be created or lost as a result of the Project, for instance? • during construction; • during operation; • during decommissioning.			
1.32	Have the access arrangements and the number of traffic movements involved in bringing workers and visitors to the Project been estimated? • during construction; • during operation; • during decommissioning.			
1.33	Has the housing and provision of services for any temporary or permanent employees for the Project been discussed? (this is relevant for Projects that require the migration of a substantial, new workforce into the area, either for construction or in the long term)			
Residues and Emissions				
1.34	Have the types and quantities of solid waste generated by the Project been identified? (including the construction or demolition of wastes, surplus spoil, process wastes, by-products, surplus or reject products, hazardous wastes, household or commercial wastes, agricultural or forestry wastes, site clean-up wastes, mining wastes, decommissioning wastes) • during construction; • during operation; • during decommissioning.			
1.35	Have the composition and toxicity, or other hazards from all solid wastes produced by the Project, been discussed?			
1.36	Have the methods for collecting, storing, treating, transporting, and finally disposing of these solid wastes been described?			
1.37	Have the locations for the final disposal of all solid wastes been discussed, in consideration with the Waste Management Plan(s) concerned?			
1.38	Have the types and quantities of liquid effluents generated by the Project been identified? (including site drainage and run-off, process wastes, cooling water, treated effluents, sewage) • during construction; • during operation; • during decommissioning.			

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SECTION 2 DESCRIPTION OF ENVIRONMENTAL FACTORS LIKELY TO BE AFFECTED BY THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Baseline: Aspects of the Environment				
2.1	Have the existing land uses on the land to be occupied by the Project and the surrounding area described and are any people living on or using the land been identified? (including residential, commercial, industrial, agricultural, recreational, and amenity land uses and any buildings, structures or other property)			
2.2	Have the topography, geology and soils of the land to be occupied by the Project and the surrounding area been described?			
2.3	Have any significant features of the topography or geology of the area described and are the conditions and use of soils been described? (including soil quality stability and erosion, agricultural use and agricultural land quality)			
2.4	Has the biodiversity of the land/sea to be affected by the Project and the surrounding area been described and illustrated on appropriate maps?			
2.5	Have the species (including their populations and habitats), and the habitat types that may be affected by the Project been described? (Particular attention should be paid to any species and habitats protected under the Habitats and Birds Directives (Directives 92/43/EEC and 2009/147/EC).			
2.6	Have the Natura 2000 sites that may be affected by the Project been described?			
2.7	Has the water environment of the area been described? (including reference to any River Basin Management Plans/Programme of Measures under the WFD, running and static surface waters, groundwaters, estuaries, coastal waters and the sea and including run off and drainage. N.B. not relevant if water environment will not be affected by the Project)			
2.8	Have the hydrology, water quality, and use of any water resources that may be affected by the Project been described? (including any River Basin Management Plans/Programme of Measures under the WFD, use for water supply, fisheries, angling, bathing, amenity, navigation, effluent disposal)			
2.9	Have local climatic and meteorological conditions in the area been described? (N.B. not relevant if the atmospheric environment will not be affected by the Project)			
2.10	Has existing air quality in the area been described, including, where relevant, limit values set out by Directives 2008/50/EC and 2004/107/EC as well as relevant Programmes adopted under this legislation? (N.B. not relevant if the ambient air will not be affected by the Project)			

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SECTION 3 DESCRIPTION OF THE LIKELY SIGNFICANT EFFECTS OF THE PROJECT				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Scoping of Effects				
3.1	Has the process by which the scope of the information for the EIA Report defined been described? (for assistance, see the Scoping Guidance Document in this series)			
3.2	Is it evident that a systematic approach to Scoping has been adopted?			
3.3	Was consultation carried out during Scoping?			
3.4	Have the comments and views of consultees been presented?			
Prediction of Direct Effects				
3.5	Have the direct, primary effects on land uses, people, and property been described and, where appropriate, quantified?			
3.6	Have the direct, primary effects on geological features and characteristics of soils been described and, where appropriate, quantified?			
3.7	Have the direct, primary effects on biodiversity been described and, where appropriate, quantified? (if relevant, are references made to Natura 2000 sites? (Directive 2009/147/EC and Directive 92/43/EEC))			
3.8	Have the direct, primary effects on the hydrology and water quality of water features been described and, where appropriate, quantified?			
3.9	Have the direct, primary effects on uses of the water environment been described and, where appropriate, quantified? (if relevant, are references made for River Basin Management Plans/Programmes of Measures under the WFD (2000/60/EC))			
3.10	Have the direct, primary effects on air quality been described and, where appropriate, quantified? (if relevant, are references made to Air Quality Plans under Directives 2008/50/EC and 2004/107/EC))			
3.11	Have the direct, primary effects on climate change been described and, where appropriate, quantified?			
3.12	Have the direct, primary effects on the acoustic environment (noise or vibration) been described and, where appropriate, quantified? (if relevant, are references made to Action Plans/Programme under the Environmental Noise Directive (2002/49/EU))			
3.13	Have the direct, primary effects on heat, light or electromagnetic radiation been described and, where appropriate, quantified?			

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SECTION 4 CONSIDERATION OF ALTERNATIVES				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
4.1	Have the different Alternatives suggested during Scoping been considered and assessed, and if not has justification been provided?			
4.2	Have the Developer and practitioners, who are preparing the EIA Report, identified and assessed additional Alternatives (to the ones suggested during Scoping)?			
4.3	Have the process by which the Project was developed been described and are the Alternatives to the design of the Project considered during this process been described? (for assistance, see also the guidance on types of Alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.4	Have the Alternatives to the design considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.5	Have the Alternatives to technology been considered during this process? (for assistance, see also the guidance on types of Alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.6	Have the Alternatives to the location considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.7	Have the Alternatives to the size considered during this process been described (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.8	Have the Alternatives to the scale considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)			
4.9	Has the Baseline situation in the 'do-nothing' scenario been described?			
4.10	Are the Alternatives realistic and genuine Alternatives to the Project? (i.e. feasible Project options that meet the objectives)			

...

SECTION 5 DESCRIPTION OF MITIGATION				
No.	**Review Question**	**Relevant?**	**Adequately Addressed?**	**What further information is needed?**
5.1	Where there are significant adverse effects on any aspect of the environment, has the potential for the mitigation of these effects been discussed?			
5.2	Have the measures that the Developer has proposed to implement, in order to mitigate effects, been clearly described and is their effect on the magnitude and significance of impacts clearly explained?			
5.3	Have any proposed mitigation strategy's negative effects been described?			
5.4	If the effect of Mitigation Measures on the magnitude and significance of impacts is uncertain, has this been explained?			
5.5	Is it clear if the Developer has made a binding commitment to implement the mitigation proposed or acknowledged that the Mitigation Measures are just suggestions or recommendations?			
5.6	Do the Mitigation Measures cover both the construction and operational phases of the Project?			
5.7	Have the Developer's reasons for choosing the proposed mitigation been explained?			
5.8	Have the responsibilities for the implementation of mitigation including roles, responsibilities, and resources been clearly defined?			
5.9	Where the mitigation of significant adverse effects is not practicable, or where the Developer has chosen not to propose any mitigation, have the reasons for this been clearly explained?			
5.10	Is it evident that the practitioners developing the EIA Report and the Developer have considered the full range of possible approaches to mitigation, including measures to avoid, prevent or reduce and, where possible, offset impacts by alternative strategies or locations, changes to the Project design and layout, changes to methods and processes, 'end of pipe' treatment, changes to implementation plans and management practices, measures to repair or remedy impacts and measures to compensate impacts?			
Other Questions on Mitigation				

SECTION 6 DESCRIPTION OF MONITORING MEASURES				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
6.1	Where adverse effects on any aspect of the environment are expected, has the potential for the monitoring of these effects been discussed?			
6.2	Are the measures, which the Developer proposes implementing to monitor effects, clearly described and has their objective been clearly explained?			
6.3	Is it clear whether the Developer has made a binding commitment to implement the proposed monitoring programme or that the Monitoring Measures are just suggestions or recommendations?			
6.4	Have the Developer's reasons for choosing the monitoring programme proposed been explained?			
6.5	Have the responsibilities for the implementation of monitoring, including roles, responsibilities, and resources been clearly defined?			
6.6	Where monitoring of adverse effects is not practicable, or the Developer has chosen not to propose any Monitoring Measures, have the reasons for this been clearly explained?			
6.7	Is it evident that the practitioners developing the EIA Report and the Developer have considered the full range of possible approaches to monitoring, including Monitoring Measures covering all existing environmental legal requirements, Monitoring Measures stemming from other legislation to avoid duplication, monitoring of Mitigation Measures (ensuring expected significant effects are mitigated as planned), Monitoring Measures capable of identifying important unforeseen effects?			
6.8	Have arrangements been proposed to monitor and manage residual impacts?			
Other Questions on Monitoring Measures				

SECTION 7 QUALITY				
No.	Review Question	Relevant?	Adequately Addressed?	What further information is needed?
Quality of presentation				
7.1	Is the EIA Report available in one or more clearly defined documents?			
7.2	Is the document(s) logically organised and clearly structured, so that the reader can locate information easily?			
7.3	Is there a table of contents at the beginning of the document(s)?			
7.4	Is there a clear description of the process that has been followed?			
7.5	Is the presentation comprehensive but concise, avoiding irrelevant data and information?			
7.6	Does the presentation make effective use of tables, figures, maps, photographs, and other graphics?			
7.7	Does the presentation make effective use of annexes or appendices to present detailed data that is not essential to understanding the main text?			
7.8	Are all analyses and conclusions adequately supported with data and evidence?			
7.9	Have all sources of data been properly referenced?			
7.10	Has terminology been used consistently throughout the document(s)?			
7.11	Does it read as a single document, with cross referencing between sections used to help the reader navigate through the document(s)?			
7.12	Is the presentation demonstrably fair and, as far as possible, impartial and objective?			
Non-Technical Summary				
7.13	Does the EIA Report include a Non-Technical Summary?			
7.14	Does the Summary provide a concise but comprehensive description of the Project, its environment, the effects of the Project on the environment, the proposed Mitigation Measures, and proposed monitoring arrangements?			
7.15	Does the Summary highlight any significant uncertainties about the Project and its environmental effects?			
7.16	Does the Summary explain the Development Consent process for the Project and the EIA's role in this process?			
7.17	Does the Summary provide an overview of the approach to the assessment?			

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3.3 Example section: Waste Framework Directive

Name used	Formal name
WasteFD	■ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives
Relevant EU guidance:	■ Application of EIA Directive to the rehabilitation of landfills.

The WasteFD establishes a legal framework for the management and treatment of most waste types. The Directive sets out a waste hierarchy that ranges from prevention to disposal. Waste management under the Directive must be implemented without endangering human health and without harming the environment (e.g. without risk to water, air, biodiversity, and without causing nuisance). It also sets out rules for extended producer responsibility, effectively adding to the burdens of manufacturers to manage products returned after use.

Opportunities for synergy

The WasteFD requires the adoption and implementation of Waste Management Plans and Waste Prevention Programmes at the national and local levels. These plans and programmes should analyse the current situation with regards to waste treatment, as well as identify the measures needed to carry out waste management in the context of the WasteFD's objectives. This includes existing and planned waste management installations, which are likely to constitute Projects subject to the EIA Directive. As waste installations should be provided for under Waste Management Plans, they are also subject to the requirements of the SEA Directive (see above).

The EIA Directive may also bear relevance for any Project with regard to the waste produced not only during the construction and operation of the Project, but also, in particular, with regard to the decommissioning and/or rehabilitation of the site.

During the preparation of the EIA Report, the waste produced and returned to the Project location must be taken into consideration in assessing the Project's significant effects on the environment, and would be relevant for the establishment of Alternatives and Mitigation as well as Compensation Measures.

3.4 Environmental Components

3.4.1 Physical Resources

28 Description of Existing Environment

A. Physical Environment

Components/ Parameters	☐ Yes	☐ No	Remarks
1. What is the general elevation of the proposed *gasoline station project site*? <100 m 100-300 301-500 501-1,000 1,000-1,500 >1,500 (To determine elevation, refer to the topographic map where the elevation per	….		

contour line is indicated)			
2. Slope and Topography of the area *(within 50 meter radius from center of site)* ☐ Terrain is flat or level (0-3% slope) ☐ Gently sloping to undulating (3-8% slope) ☐ Undulating to rolling (8-18% slope) ☐ Rolling to moderately steep (18-30% slope) ☐ Steeply rolling (30-50% slope) ☐ Very steep to mountainous (>50% slope)	☐ …….		
3. Are there areas in the site where indications of soil erosion are occurring? If yes, what activities are causing erosion?			

Causes of erosion:	☐ Heavy Rains	☐ Unstable Slopes	☐ Others, pls. specify

Do you know of any land sliding occurring or that has occurred in the site? ……..

Cause of Landslide:

☐ Earthquake	☐ Unstable slopes	☐ Earthmoving	☐ Others, pls. specify

Has the area experienced any flooding during the wet season?	

If yes, when was the last time the area was flooded? Period(s) of flooding:

Causes of flooding:		☐ low area	☐ poor drainage	☐ water logged areas
Soil type of the area	☐ Clayey soil	☐ Sandy loam soil	☐ Sandy soil	☐ Other soil types:

Is there an access road going to the project site? If yes, what is its distance to the site _____km.	Type of access road: ……..
Does the site conform to the approved land use of the municipality? Yes	
Are there existing structures or developments around the project site? If yes, please list them	…….. …….

Project Activities Affecting the Physical Environment	☐ **Yes**	☐ **No**

Cooling water cycle

Waste inputmanegement

Aches manegemengt

Waste water manegement

Are there any structures on the proposed site?

Will there be demolition of existing structures?

If yes, what types of structures will be demolished? Types of Structures:

11. Is there a need to construct an access road going to the site? … If Yes, what type of access road:

[ ] all weathered road, length _____(m) width ____, [ ] concrete, [ ] asphalt

B. Biological Environment	☐ **Yes**	☐ **No**
Are there any trees and other types of vegetation in the *project site*? If yes, please *identify*.	….	
Are there birds and other forms of wildlife found in the area? Please *identify*.	….	
Are there fishery resources in the water bodies found near or within the site? Please *identify*.		
Is the site near or within a watershed or forest reservation area? If near, only, how near? _____ m or km If within, indicate name of the watershed or forest reservation area		
Are there any reserved forests or protected area within 1,000 m of the proposed site?		

What is the present land use in the vicinity (roughly a radius of 500m) of the proposed site?

Coastal/ Marine	Residential	Forest	Mangrove	Grassland	Agriculture

Project Activities Affecting the Biological Environment	**Yes**	**No**
Type of vegetation on site		
1. Will there be vegetation clearing?		
2. Will clearing activities affect any critical wildlife habitats?		
3. Will clearing activities affect any rare, threatened or endangered plant and animal species?		
4. Will there be trees to be affected (e.g. cut down; remove) during clearing? If yes, how many and what are these species of trees?		
Will the project cause an increase in traffic or disrupt traffic in major routes due to the entry and exit of construction equipment?	…	
Is the available domestic water supply enough to meet the maximum projected water consumption of the petrol station?		

For any agricultural farmland on the proposed site and/or a radius of 500m around it, provide the following information:

Main crop(s) and average yield----------

Source of irrigation water----------

Area attached by salinity or water logging----------

C. Socio-Economic Environment

1. Are there existing settlements in the proposed station? If yes, indicate the number of: (within 50m radius) ……

Households/Families:___, Legitimate landowners: ____; Tenants:_____; Squatters:_____

Are there existing social or cultural infrastructures within 1000m of the proposed site or in the area?				
Type	Names and number if more than 1	Size (No. of students or beds)	Location (village, road, district, etc.)	Distance from Site
Schools/College				
Hospitals				
Health centers/clinics				
Communications library				
Churches/Mosques				
Archeological site				
Others				

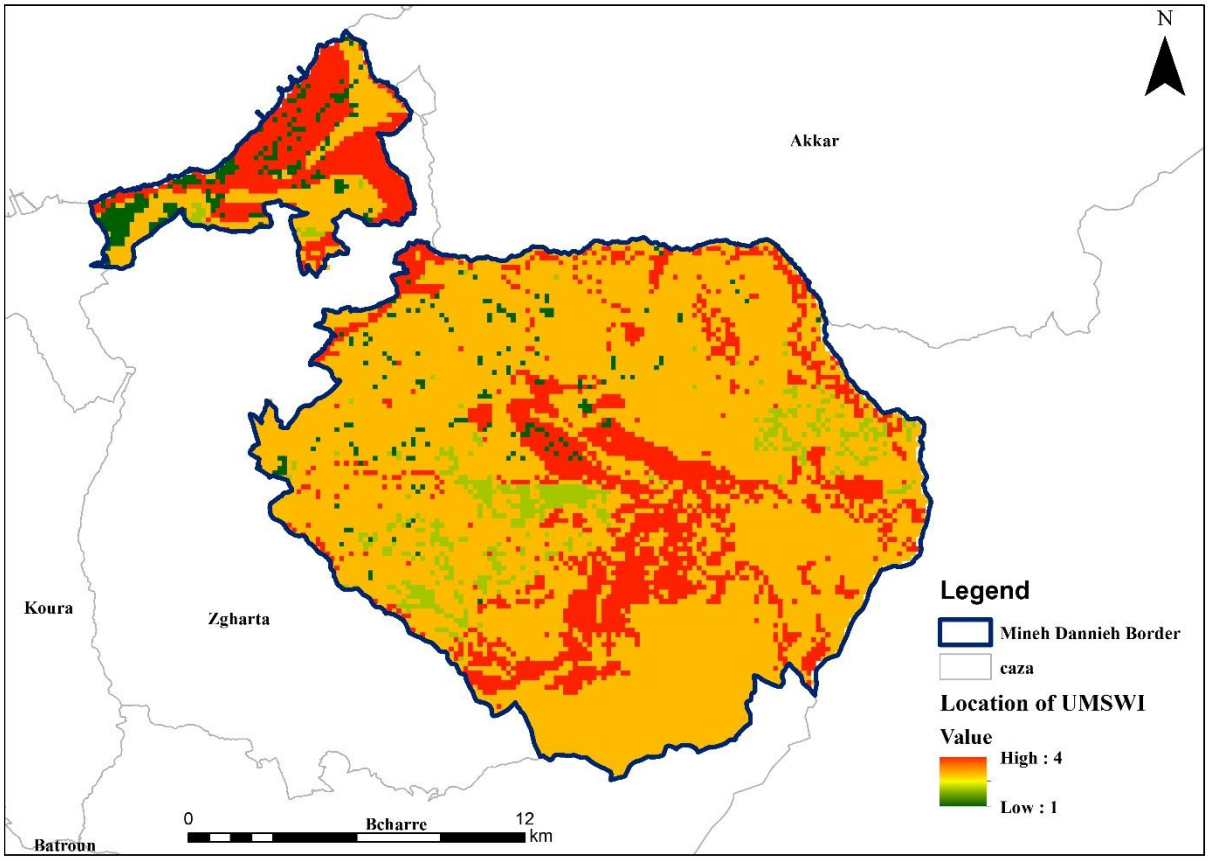
Project Activities Affecting the Socio-Cultural and Economic Environment	**Yes**	**No**
Will the project cause or increase traffic in the areas?	Yes	
Are there existing transport services/facilities routing the areas?		
Will the project cause an increase in traffic or disrupt traffic in major routes due to the entry and exit of construction equipment?		
Is there a prevailing water shortage or water supply problem in the area?		No
Are there already existing commercial establishments within the vicinity of the project area?		

4 Description of the Project

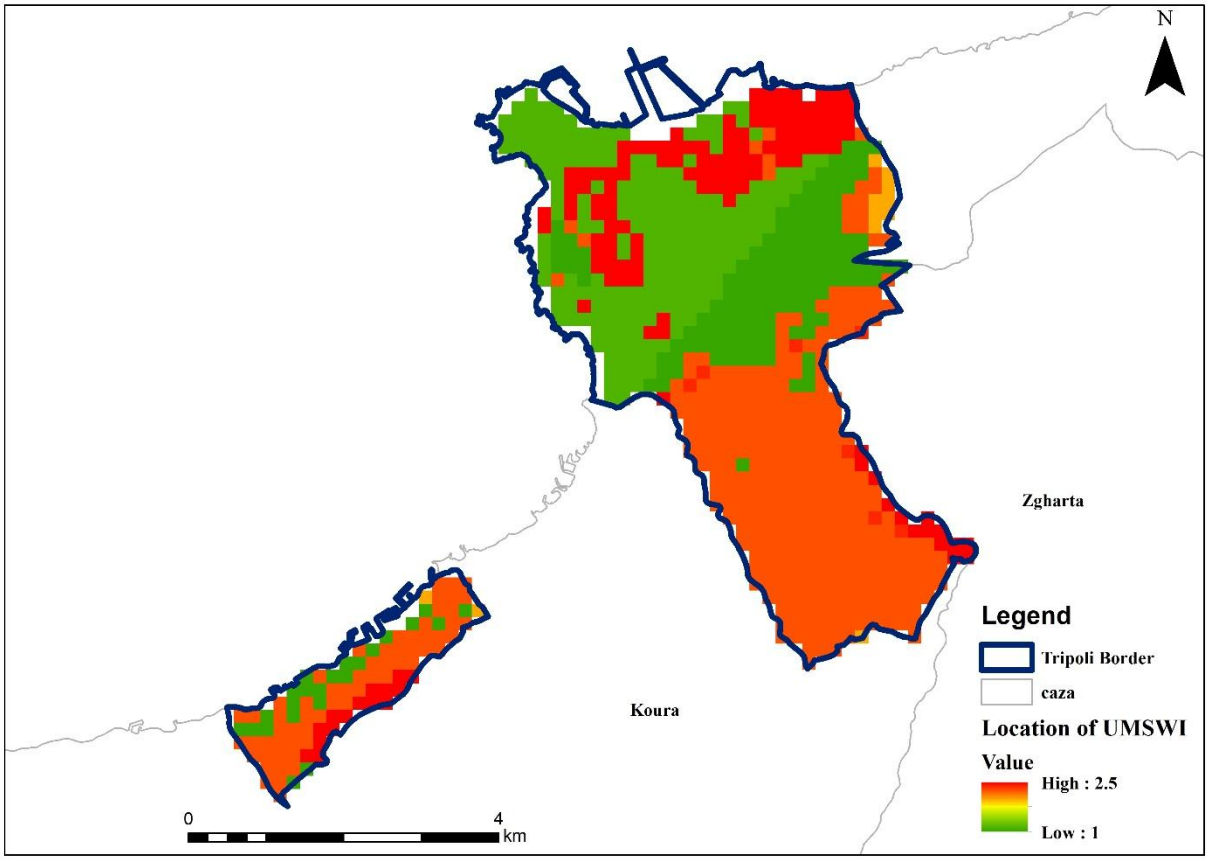
4.1 Suitable Locations in North Lebanon for the Mobile Plant

In a master thesis from Hiyam el Kurdi at USJ University there were identified suitable locations for an incinerator in North Lebanon according to the directions of the Lebanese government. Especially the constraint, that the incinerator has to have a minimal distance of 1 km to any public building or private house.

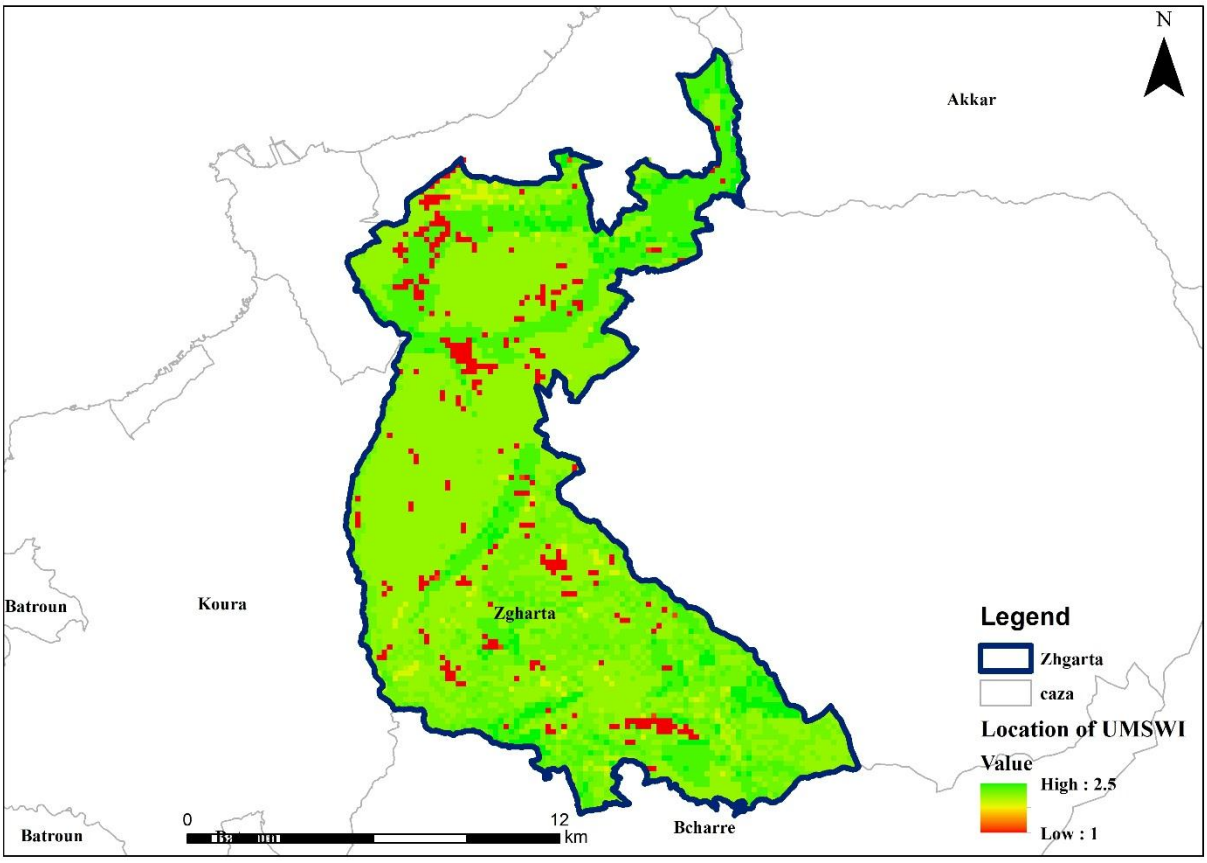
4.1.1 UMSWI Minieh – Dannieh:



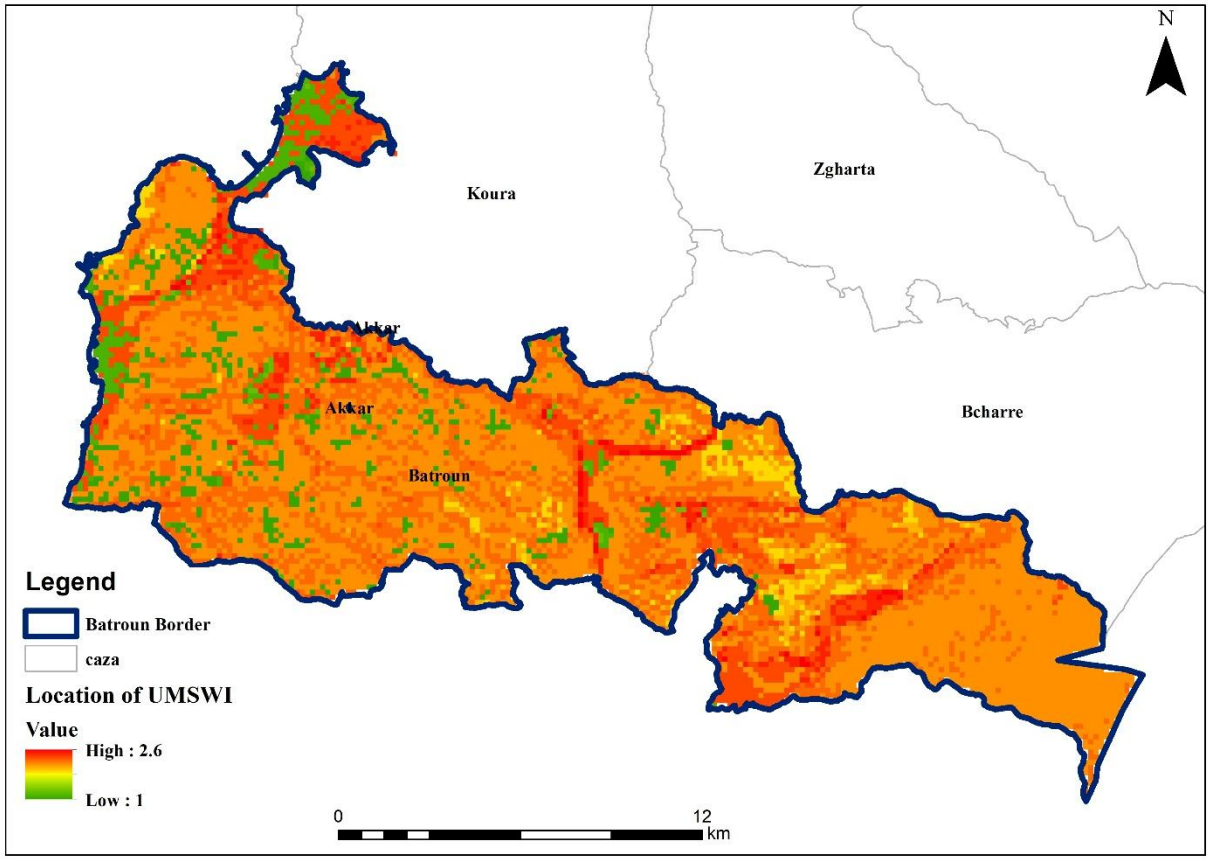
4.1.2 UMSWI Fayhaa:



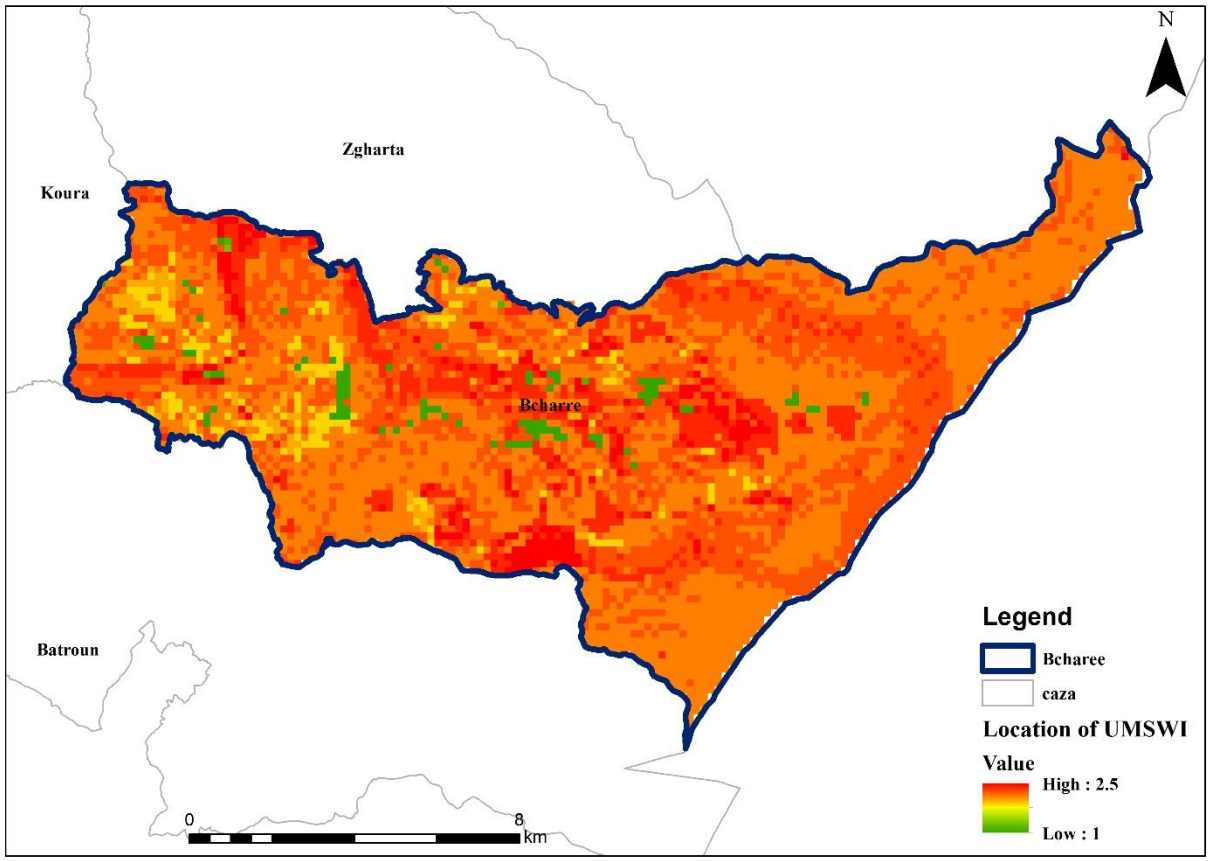
4.1.3 UMSWI Zgharta:



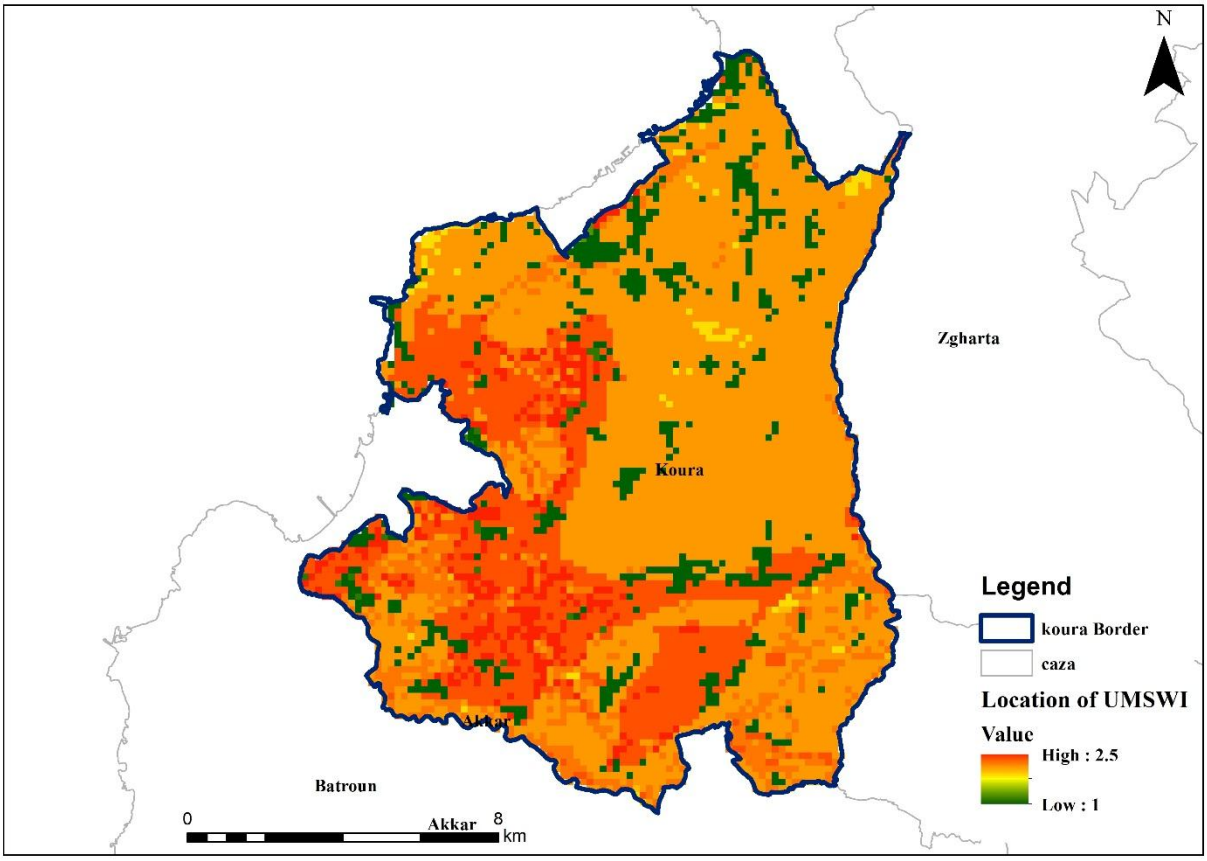
4.1.4 Batroun UMSWI:



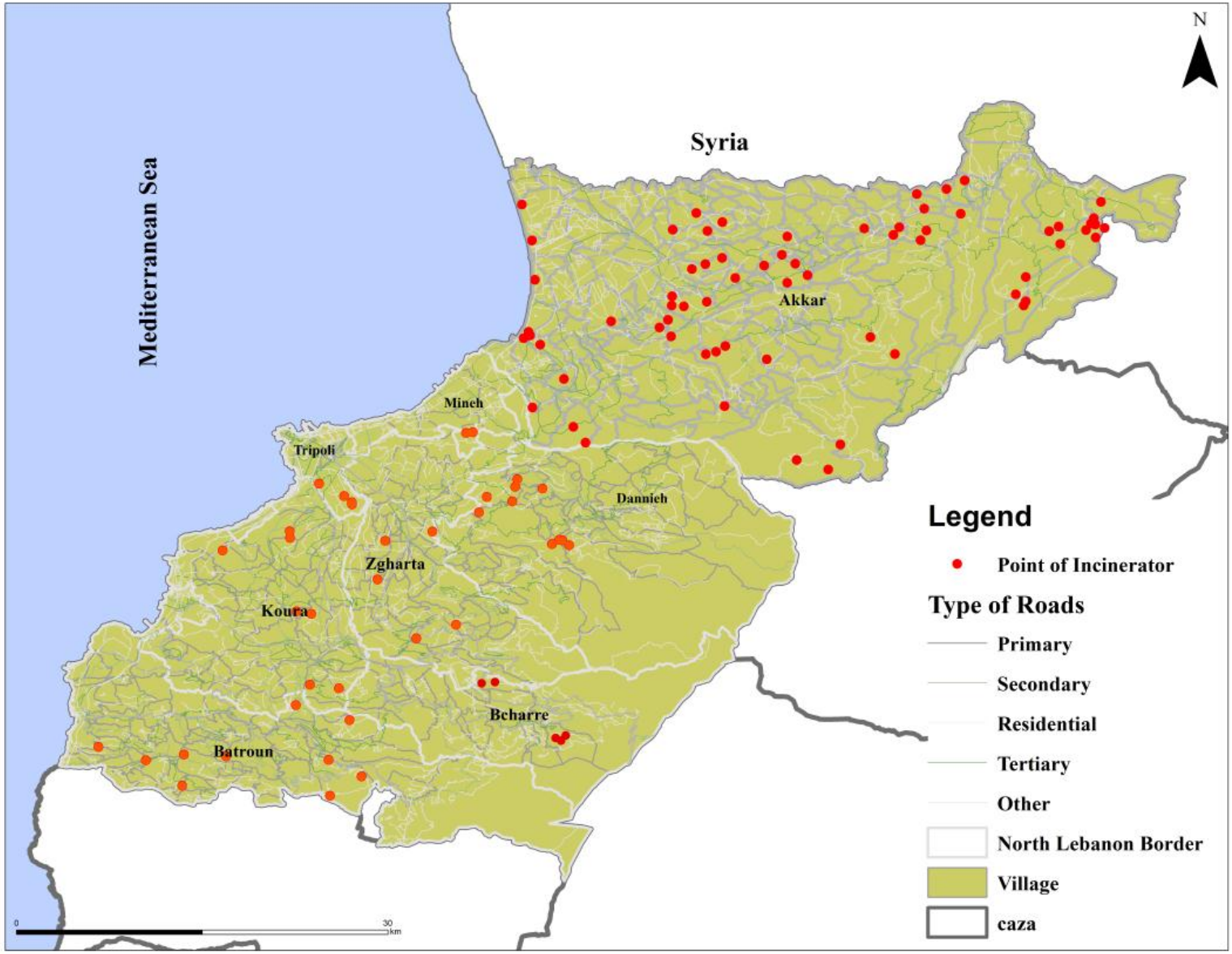
4.1.5 UMSWI Bcharri:



4.1.6 UMSWI Koura:



4.1.7 Overview of all suitable places for waste incinerators in North Lebanon



4.2 Type of Project (Size and Magnitude of the Project)

The project is the commisioning of a academic mobile waste incinerator. It is a mobile plant on a standard truck trailer (with overhangs 14mx3m). It is suitable for 5 tons/day of municipal waste (refused waste after recycling).

4.3 Need of the Project

To convince Lebanese authorities that a waste incineration plant with the appropriate waste remnats treatment is one of suitable solutions for the Lebanese waste problem this pilot project shall be undergone.

4.4 Collected Data from Experiments and practical master thesis

4.4.1 Long-enduring test at Bqaa Sfrin from 20.7.22 to 3.9.22.

There it was tried to incinerate all waste from street. The result was, that it is not suitable to incinerate waste without prior waste sort by the source (فرز من المصدر).

AECENAR
Association for Economical and Technological Cooperation in the Euro-Asian and North-African Region
www.aecenar.com

طاقة الشمال
North Lebanon Alternative Power

طرابلس في 24 تموز 2022

تلفون: 76 34 15 26

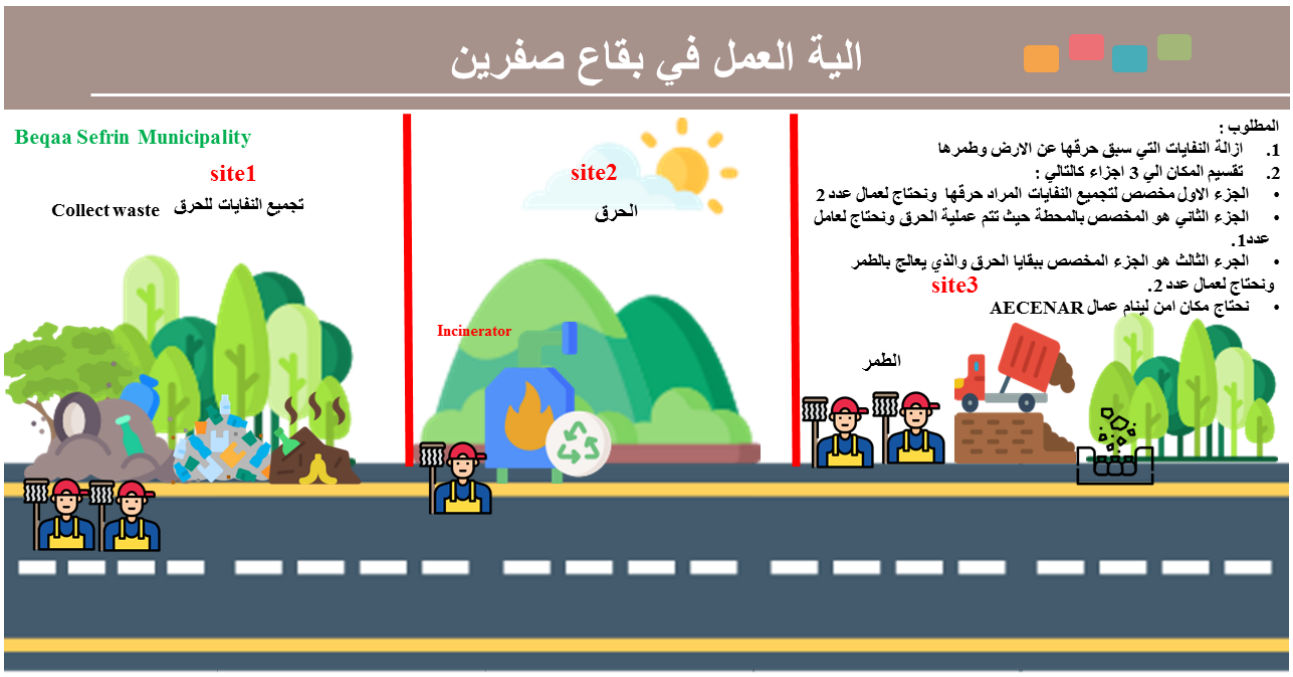
واتساب: +49 178 7 28 55 78

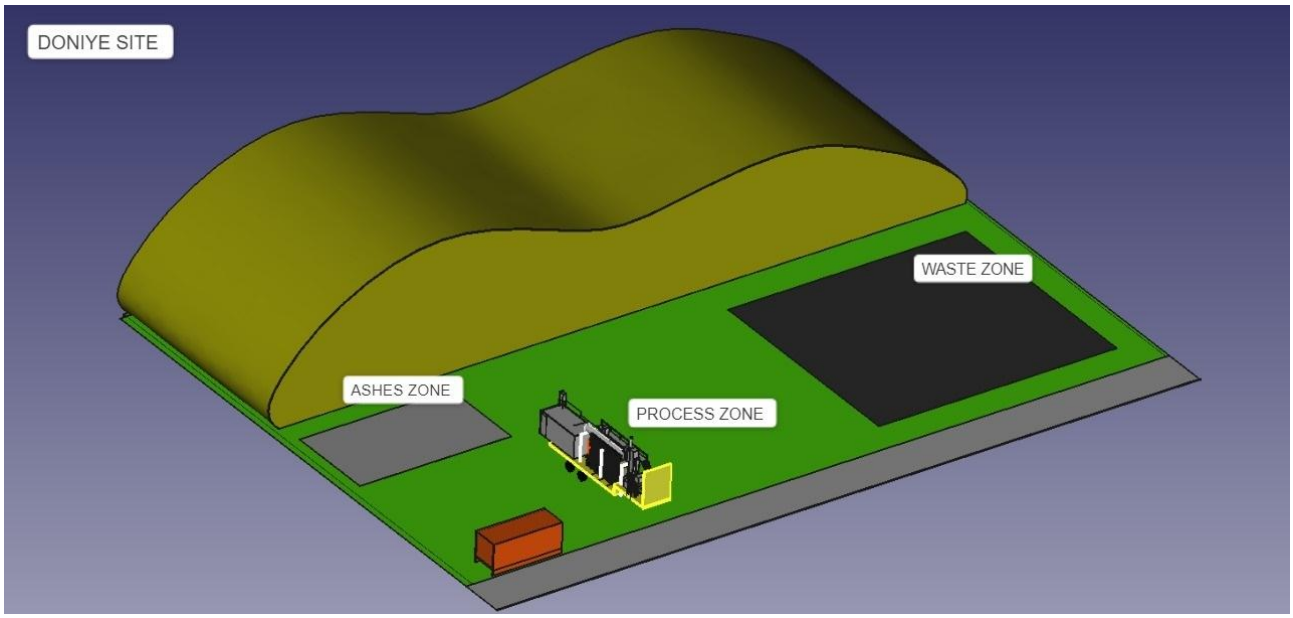
المطلوب من بلدية بقاع صفرين:

1. الموافقة على حرق النفايات الموجودة في بلدية بقاع صفرين بشكل اولي فقط.
2. تحضير عقود للعمل بطرقة رسمية.
3. توسيع المكان وتقسمته الى 3 اجزاء بما يتناسب مع متطلبات المحطة.
4. رفع النفايات الموجودة حاليا وطمرها في مكان مناسب.
5. الحراسة على عاتق بلدية بقاع صفرين.
6. تعيين عمال (من 3 الى 5 عمال) بأجرة 3 ملايين شهريا للعامل الواحد.
7. التكاليف **لمدة شهر كامل فقط** تتكفل بها الجمعية العلمية الالمانية **AECENAR** ومؤسسة طاقة الشمال **NLAP** باستثناء تكاليف تجهيز الارض بشكل ميداني.
8. استجرار المياه من مغارة بيت زود الى المحطة (تتكفل AECENAR بتامين المضخة فيما تتكفل بلدية بقاع صفرين بتامين النباريج).
9. يعتبر هذا الاتفاق مبدئي.

د.سمير مراد
رئيس الجمعية الالمانية AECENAR ومدير مؤسسة طاقة الشمال NLAP

أ. بلال زود - رئيس بلدية بقاع صفرين


الية العمل في بقاع صفرين
Beqaa Sefrin Municipality
site1
Collect waste تجميع النفايات للحرق
site2
الحرق
Incinerator
المطلوب :
1. ازالة النفايات التي سبق حرقها عن الارض وطمرها
2. تقسيم المكان الي 3 اجزاء كالتالي :
• الجزء الاول مخصص لتجميع النفايات المراد حرقها ونحتاج لعمال عدد 2
• الجزء الثاني هو المخصص بالمحطة حيث تتم عملية الحرق ونحتاج لعامل عدد1.
• الجزء الثالث هو الجزء المخصص ببقايا الحرق والذي يعالج بالطمر ونحتاج لعمال عدد 2.
• نحتاج مكان امن لينام عمال AECENAR
site3
الطمر


DONIYE SITE
WASTE ZONE
ASHES ZONE
PROCESS ZONE

4.4.2 Comparing waste burning on ground and waste incineration with our mobile incinerator:

Figure1+2: non-organized burning of waste on the ground

Figure 3 and 4: Waste incineration with the mobile incinerator

After filtering white smoke can be seen.

4.5 Methodology

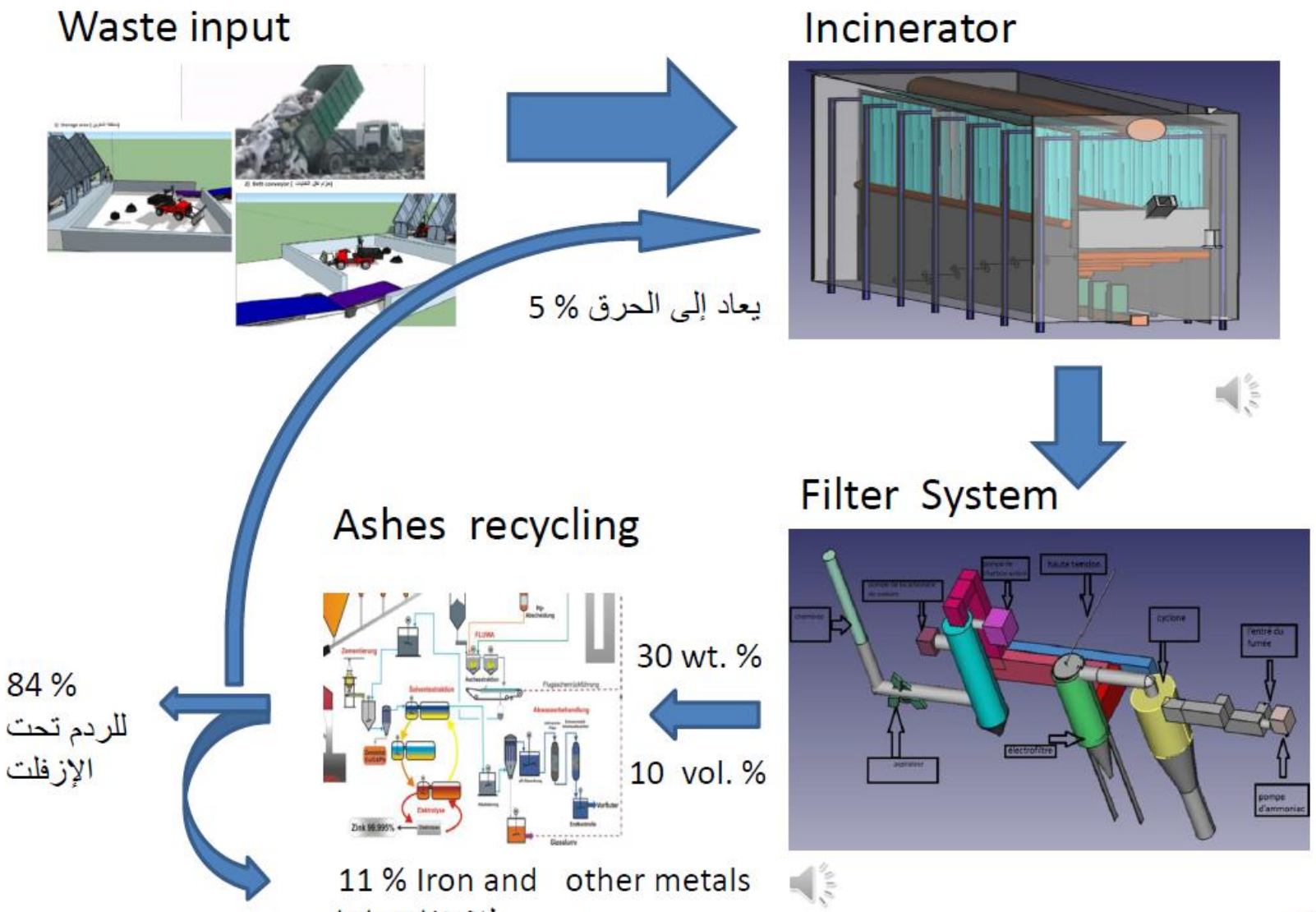
After commisioning the plant shall be operated for 8 hours a day. During operation the exact waste volume per day needed to generate the power the will be known insha Allah.

4.6 Description of the Project

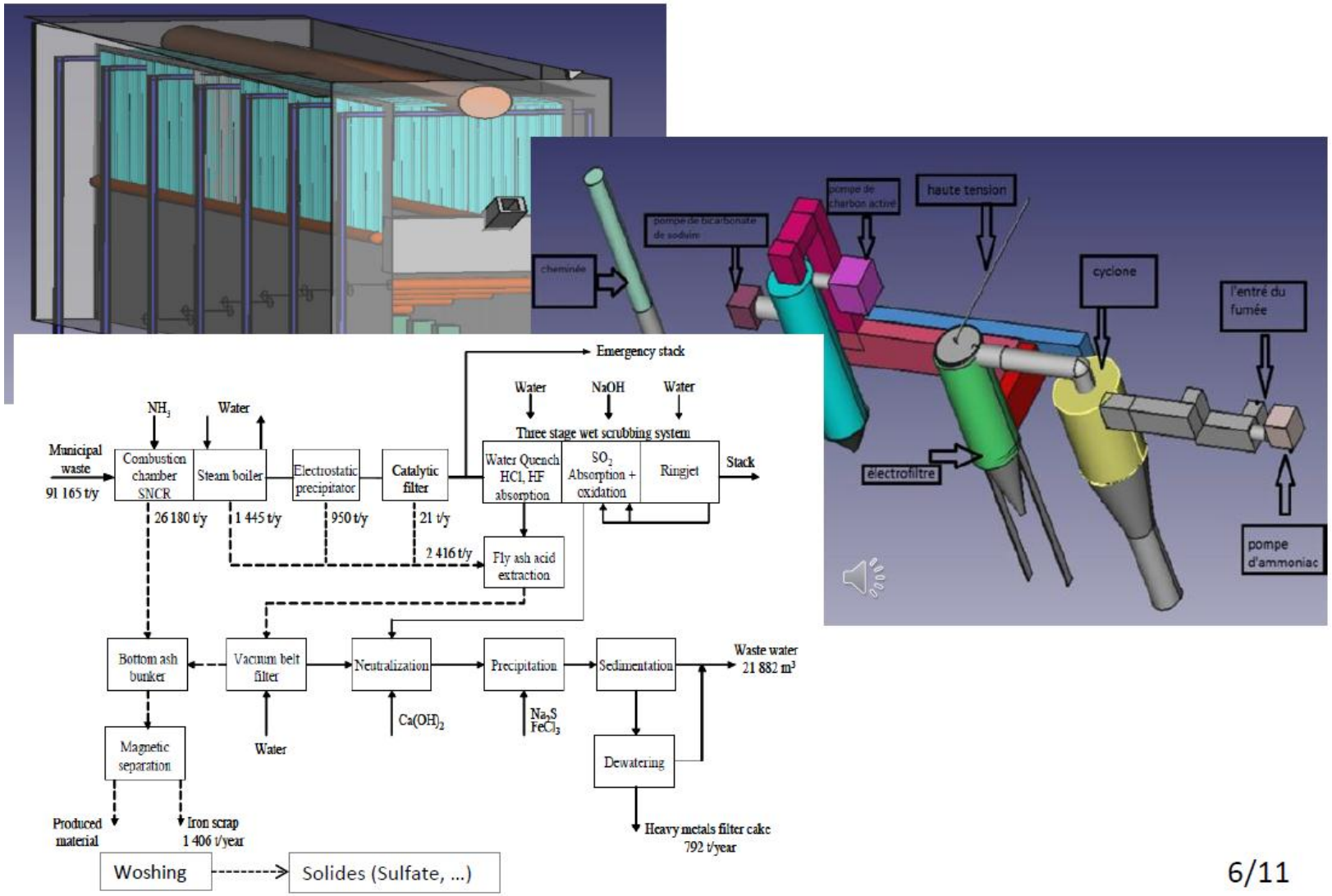
An already built waste-to-electricity small scale mobile pilot plant shall be commisioned. The operation is planned for 8 hours a day. The refused waste (after of a small village shall be treated and the generated electricity shall be offered for free to the refugees camp.

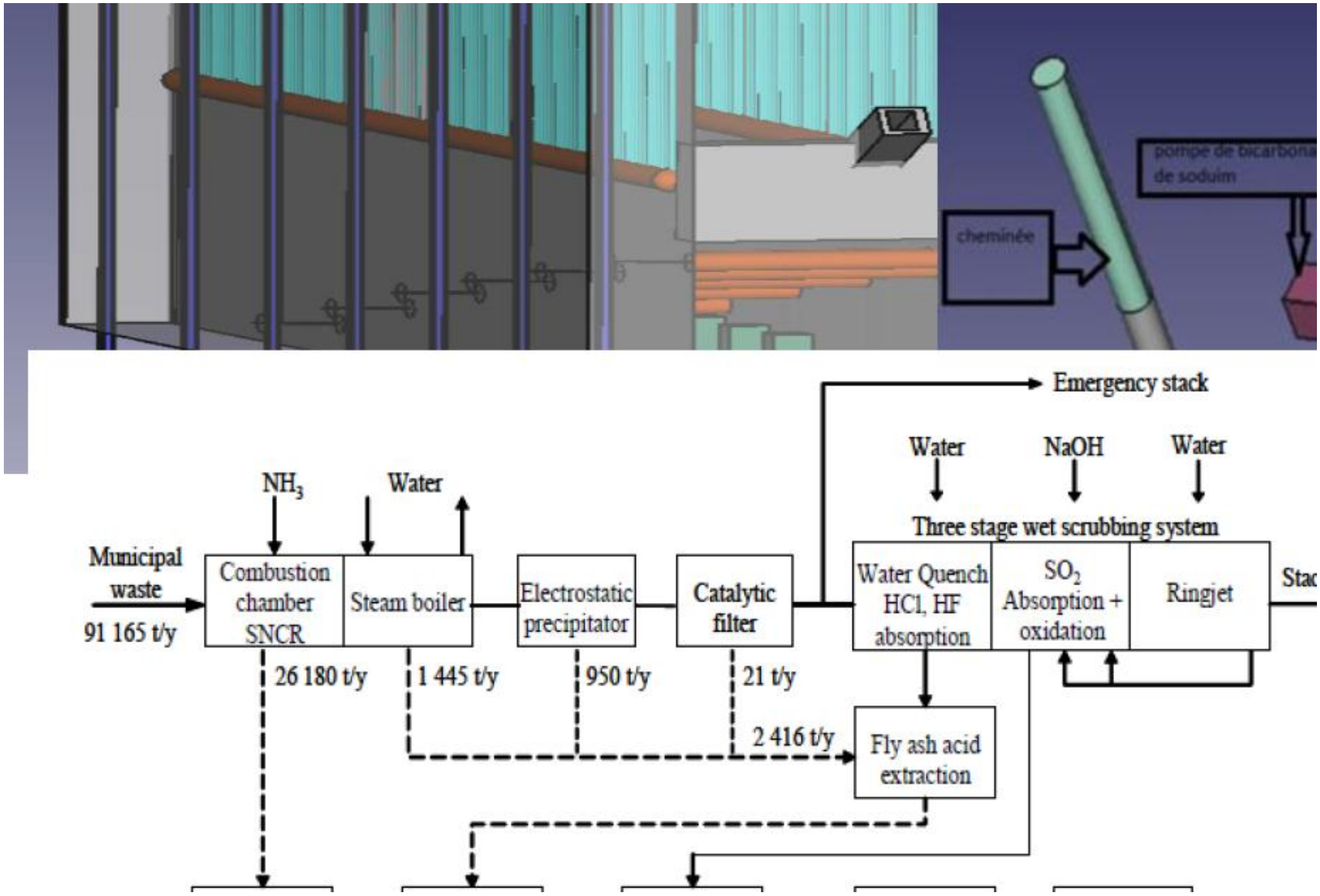
- The plant eliminates about **1 (tons/day)** of camp waste (depending on their type).
- The plant includes a **filtration system** to fulfill the Lebanese and International requirements and norms concerning smoke emissions.
- Incineration remnant (**Smoke and Ashes**) are **recycled**. Waste water is treated.

4.6.1 Waste material cycle

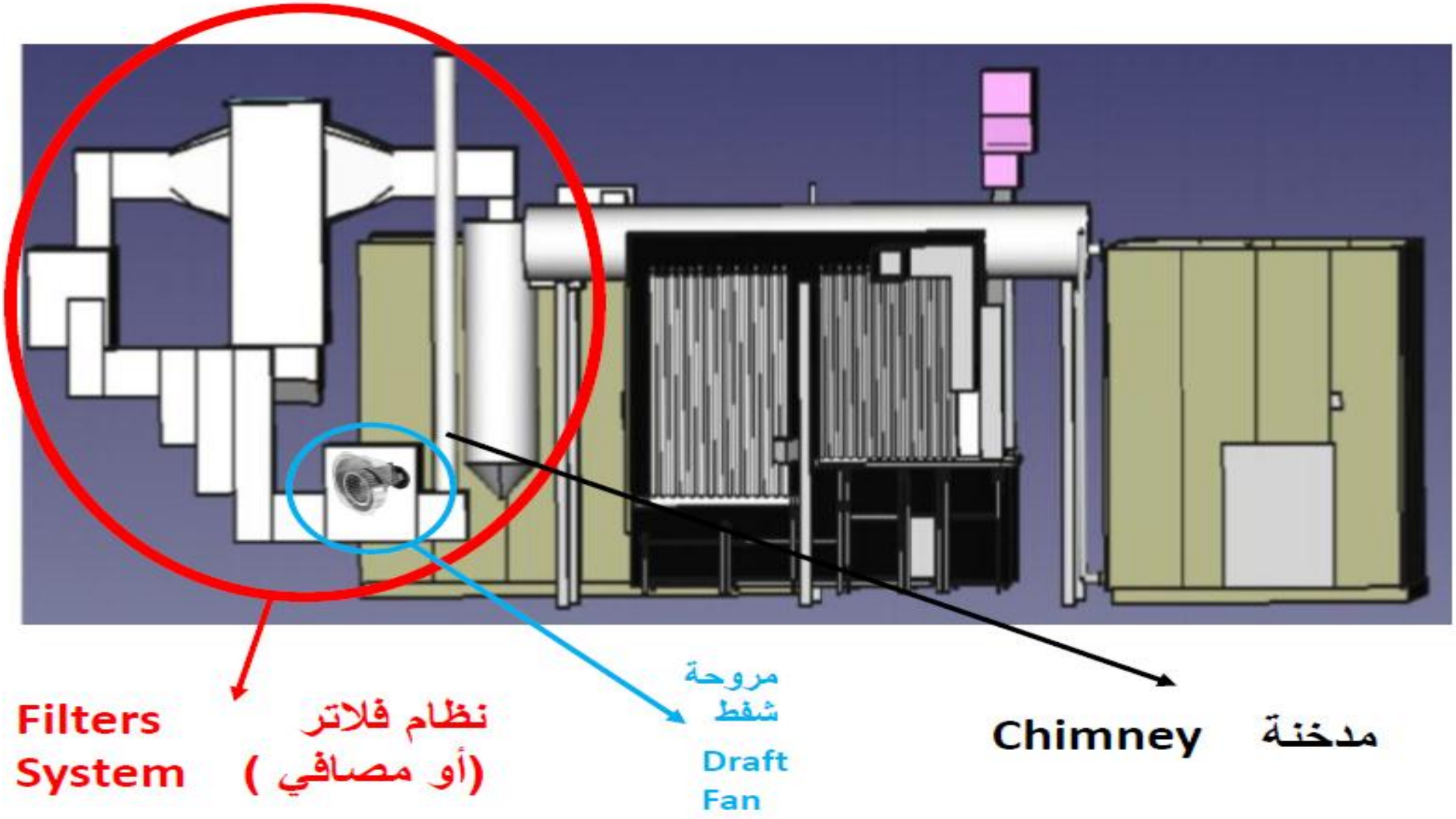


4.6.2 Incinerator (Burning chamber) and filters





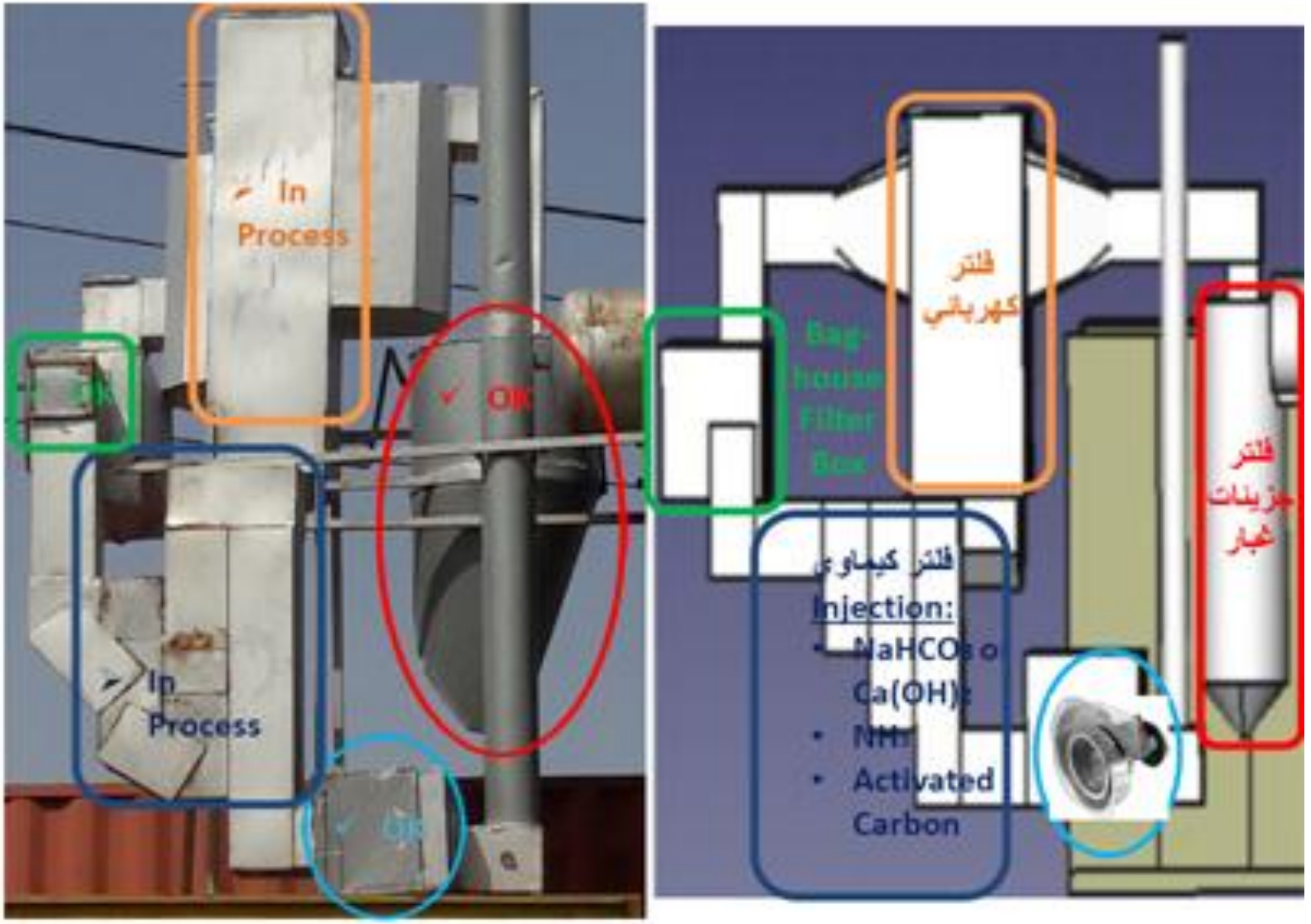
above mass flow data for a **250t**/day incinerator

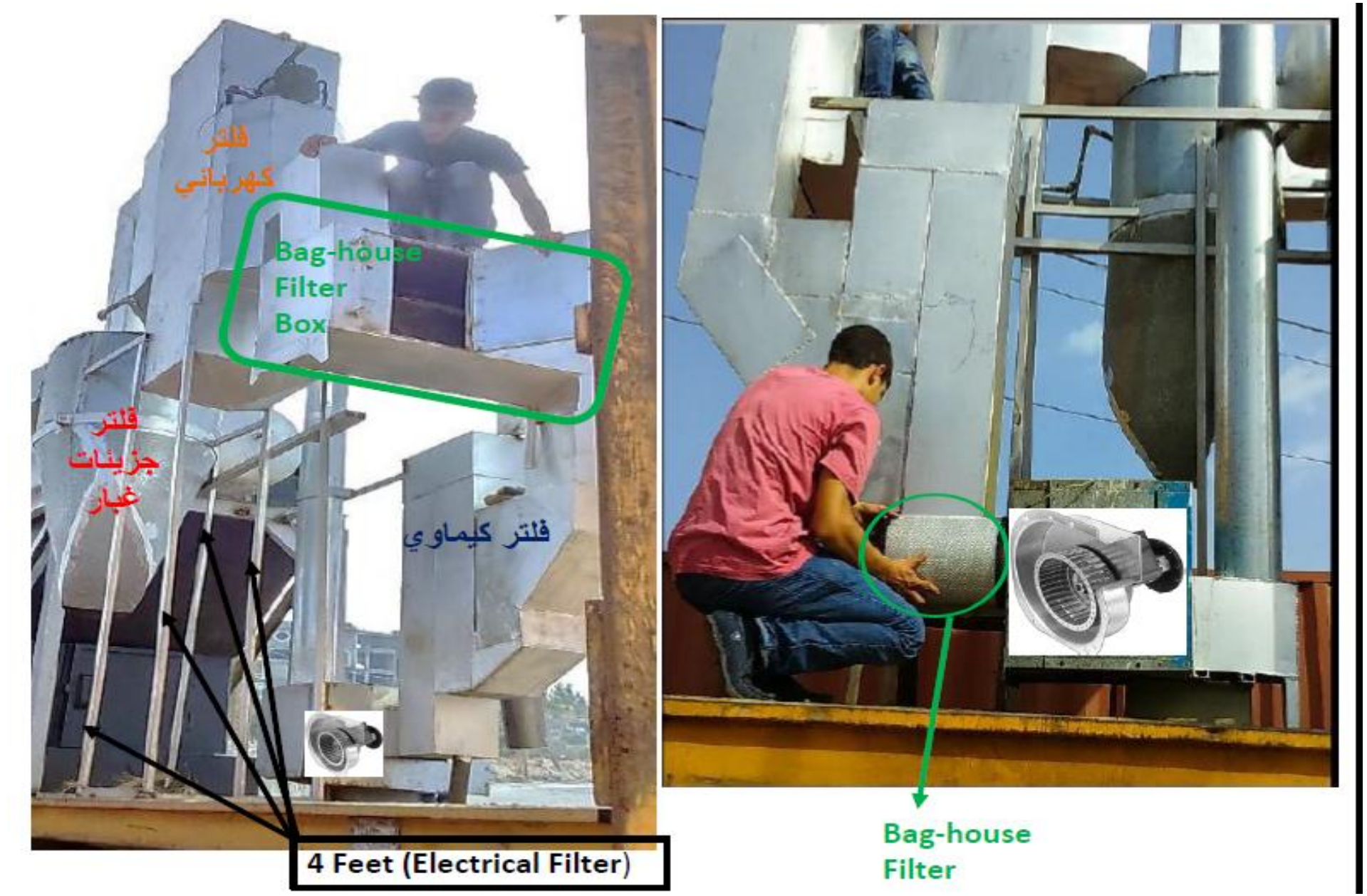

Filters System
نظام فلاتر (أو مصافي)
مروحة شفط
Draft Fan
Chimney
مدخنة

Evacuations system (Chimney, Filters & Ducts)

نظام سحب الدخان (مدخنة، فلاتر و أنابيب)

- نظام فلاتر
- Filters System
- مدخنة
- Chimney
- Burning Chamber
- Evaporator
- Turbine
- Electrical-Generator
- Condenser


In Process
OK
In Process
OK
فلتر كهربائي
Bag-house Filter Box
فلتر جزيئات غبار
فلتر كيماوي
Injection:
• NaHCO3 o Ca(OH)2
• NH3
• Activated Carbon


فلتر
كهربائي
Bag-house
Filter
Box
فلتر
جزيئات
غبار
فلتر كيماوي
4 Feet (Electrical Filter)
Bag-house
Filter

4.7 Layout Specifications

- الارتفاع = 620 cm
- الطول = 1400cm
- العرض = 280 cm

ألان لننظر إلى :
محطة نظام حرق النفايات المتحركة
mobile NLAP-IPP unit

4.7.1 Construction Material

Mostly steel/stainless steel

4.7.2 Construction Equipment

Equipment is available at site.

4.7.3 Construction of the sewage collection network

See Ashes Recycling plant

4.8 Commisioning Cost

The incinerator needs two workers per shift (1000$ per months) + material & repairing costs (500$).

4.9 Site Visit

- Ras Nouhash

- Ras Nhache

- Rayhaniye Camp

- Beqaa Sefrin

- Masjid El Salam – El Mina

- 

4.10 Processing Techniques and Unit Operations (Size and Magnitude of the Project) & Human Resource

Please refer to 4.8.2 " Updated **Funding utilization and milestones** (last update 8.10.18)", Section " Commisioning and Operating of Plant"

For preparing&installation:

2 engineers, 3 workers

For operation:

about 2 engineers, 4 workers

4.11 Infrastructure Services (Proposed Infrastructure/Utilities and layout)

4.11.1 Environmental Aspects

Not relevant because of filters and internal heavy metal recovery plant.

4.11.2 Power Supply

No external power supply needed

4.11.3 Water Supply

5 t/ day cooling water, to be taken from local water supply pipe.

4.11.4 Sewerage Services

1 time per week about 2 tons solid waste remnant has to be taken to final destination.

4.11.5 Solid and Liquid Waste Management

Heavy Metals recovering plant under development and construction

4.11.6 Proposed Wastewater Treatment Plant

tbd