SOLéHO ENVIRONNEMENT

CLEAR IMPACT STATION ©

CIS ALPHA©

Project Context and Challenges

1. **Technological, Strategic, and Socio-environmental Considerations Related to the Project**:

- Technological: Implementation of the CIS Alpha© technology addresses the intricate challenges of industrial effluent treatment by optimizing filtration and pollutant reduction.
- Strategic: The project aligns with the increasing demand for sustainable innovations in the industrial sector, positioning user companies as pioneers of sustainability.
- Socio-environmental: The project directly contributes to environmental protection by reducing harmful discharges and promoting the reuse of water resources, all while meeting the growing expectations for corporate social and environmental responsibility.

2. Preliminary Phases of the Project:

- Financing: The project has secured significant investments (bank loan) from SOLéHO Environnement to support research, development, and modeling of the CIS Alpha© technology.
- Results: Successful trials have been conducted, substantiating the solution's effectiveness. Collaborations with companies such as Smurfit Kappa have validated the technology on an industrial scale.

3. Regulatory Context:

- Challenges to Address: The project must adhere to strict environmental standards(*) concerning industrial discharges, water quality, and the preservation of aquatic ecosystems.
- Expected/Required Approvals: Environmental authorizations are necessary to implement the technology on a large scale. This involves collaboration with regulatory authorities and demonstrating compliance with prevailing standards.

(*) Decree No. 2023-835 of August 29, 2023, concerning the uses and conditions of use of rainwater and treated wastewater.

CLEAR IMPACT STATION© - CIS Alpha©

In a world facing mounting environmental challenges, the CIS Alpha(c) project emerges as a beacon of hope and innovation, setting new standards in wastewater treatment and environmental sustainability. Developed by SOLéHo Environnement, CIS Alpha(c) represents a groundbreaking solution that transcends conventional wastewater treatment methods to address the pressing issues of our time.

Pollutant Reduction and VOC Mitigation through CIS Alpha© Technology

CIS Alpha© has demonstrated remarkable efficacy in reducing various pollutants and volatile organic compounds (VOCs). This success can be attributed to the combined processes at play, with natural zeolites forming a significant component of the system.

- **Dissolved Oxygen (DO) Demand (DBO_5):** The CIS Alpha© technology has substantially decreased the levels of Dissolved Oxygen Demand (DBO_5) in wastewater. This reduction indicates a more efficient breakdown of organic matter, making the effluent less oxygen-depleting when discharged into aquatic ecosystems.
- **Chemical Oxygen Demand (COD) Reduction:** CIS Alpha© has achieved significant reductions in Chemical Oxygen Demand (COD), a measure of the oxygen required to chemically break down pollutants in water. This translates to a cleaner effluent with lower environmental impact.
- **Total Suspended Solids (TSS) and Heavy Metals:** The system has proven effective in removing Total Suspended Solids (TSS) and heavy metals, alleviating the burden of these contaminants on receiving water bodies and ecosystems.
- **Volatile Organic Compounds (VOCs):** CIS Alpha© has also demonstrated its capability to reduce Volatile Organic Compounds (VOCs) in industrial wastewater. This reduction not only ensures compliance with environmental regulations but also contributes to improved air quality around treatment facilities.
- **Colloidal Matter Reduction through CIS Alpha© Treatment**

The CIS Alpha© treatment process has demonstrated remarkable efficacy in significantly reducing colloidal matter in wastewater. This reduction in colloidal matter not only enhances water quality but also contributes to the overall efficiency of the treatment process. This achievement underscores the environmental and operational benefits of the CIS Alpha© technology.

Target market(s)

The CIS Alpha© technology targets the industrial effluent treatment market, both nationally and internationally. Industries from various sectors, including pulp and paper, chemicals, agri-food, and more, are concerned with the sustainable management of their effluents.

Market Overview(s):

The industrial effluent treatment market is continuously growing due to increasing environmental awareness and the need to comply with increasingly stringent environmental regulations.

Market Segment Sizes:

The market size varies depending on the targeted industrial sectors, but it represents a global market worth several billion Euros.

Customer Profiles and Identified Needs:

The target customers are industries requiring an efficient, sustainable, and compliant solution for their effluent treatment. Identified needs include reducing pollutant discharges, regulatory compliance, water quality management, and operational cost reduction.

Product Pricing and Competitive Benchmarking:

The product's pricing will depend on the installation size and specific customer requirements. It will be competitive compared to existing solutions on the market while offering significant advantages in terms of performance and sustainability.

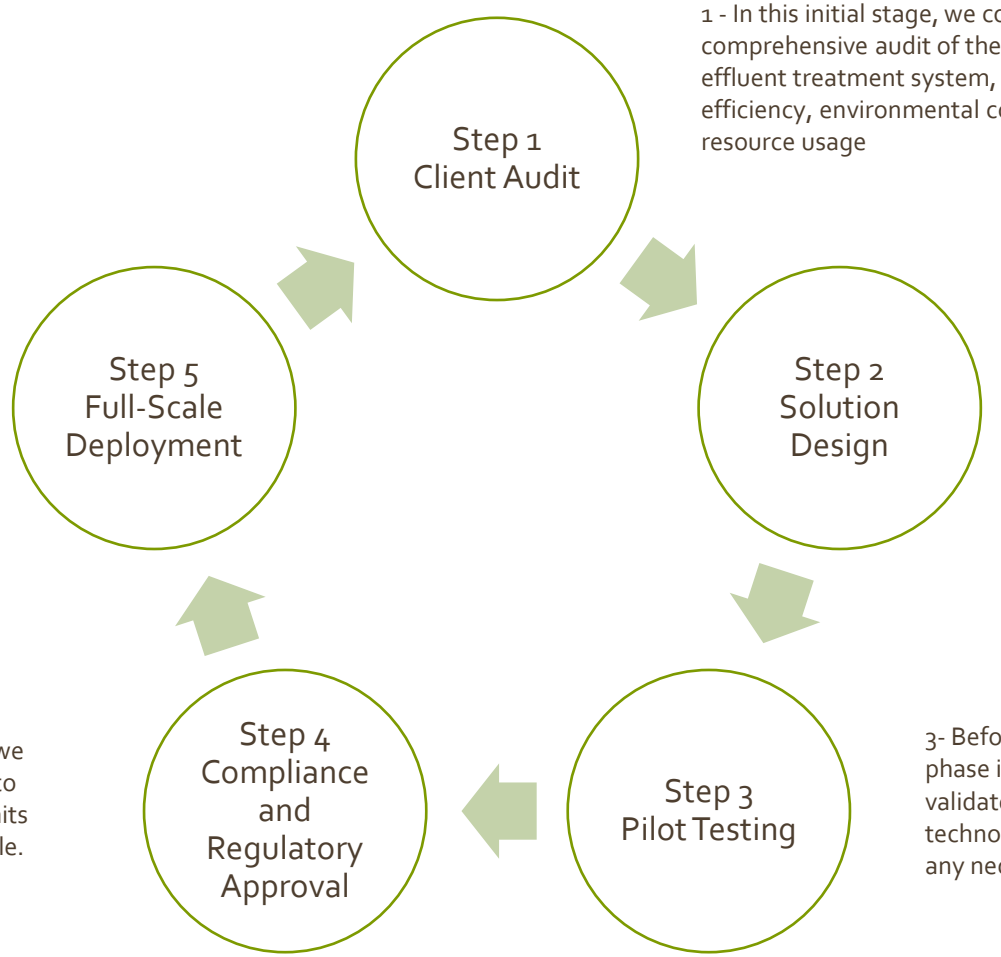
Distribution Channels:

Distribution channels include local partners, water management companies, industrial effluent treatment centers, and other industry stakeholders.

Regulatory Considerations:

The CIS Alpha© technology addresses regulatory challenges in industrial effluent treatment by helping companies comply with existing environmental standards, such as ICPE (Installations Classées pour la Protection de l'Environnement) and market authorizations. The solution is designed to meet regulatory requirements and contribute to environmental protection.

The 5 steps of the solution introduce by CIS Alpha©



1 - In this initial stage, we conduct a comprehensive audit of the client's existing effluent treatment system, assessing its efficiency, environmental compliance, and resource usage

2- After the audit, we design a tailored CIS Alpha© solution that addresses the specific needs and challenges identified in the client's effluent treatment process.

3- Before full-scale deployment, a pilot testing phase is initiated. This phase allows us to validate the effectiveness of the CIS Alpha© technology on the client's effluents and make any necessary adjustments

4- Once the pilot tests prove successful, we work closely with regulatory authorities to obtain the necessary approvals and permits for deploying the solution on a larger scale.

5- The final step involves the full-scale deployment of the CIS Alpha© solution. This entails the installation, monitoring, and management of the system to ensure optimal performance, compliance with environmental regulations, and maximum benefits for the client.

These steps ensure a systematic and effective implementation process that aligns with the client's goals and regulatory requirements.

Test préliminaires de la technologie sur effluents SMURFIT KAPPA

Analyses bactériologiques

		Mesures laboratoires des effluents sortie de la Station d'épuration de Smurfit Kappa					***Essais CIS Alpha©***
Unité			mai-22	sept-22	nov-22	janv-23	**CIS Alpha© août 2023**
UFC/100 ml	Bactéries coliformes/100ml		1900	19000	4700	4500	**4**
/100 ml	Eschérichia Coli		292	357	78	470	**3**
/100 ml	Entérocoques		254	163	40	40	**0**
/ufc/100ml	spores		non mesuré	non mesuré	non mesuré	non mesuré	**12**
micro organismes revivifiables 22°C							**300**
micro organismes revivifiables 36°C							**300**

Les micro-organismes revivifiables, également appelés "micro-organismes viables totaux" ou "micro-organismes aérobies mésophiles revivifiables", sont une mesure de la quantité de bactéries présentes dans un échantillon d'eau. Cette mesure est souvent utilisée pour évaluer la qualité microbiologique de l'eau. La norme recommandée pour les micro-organismes revivifiables à 22° C dans l'eau potable varie généralement de 100 à 500 unités formant colonie par millilitre (UFC/mL), en fonction des réglementations locales et nationales. Idem pour 36° C dans l'eau potable généralement dans une plage allant de 10 à 500 unités formant colonie par millilitre (UFC/mL).

(*) La limite réglementaire de qualité des eaux potables

Bactéries choliformes : 50 UFC/ 100 ml

Eschérichia Coli 20 UFC/100 ml

Entérocoques 20 UFC/100 ml.

Test préliminaires de la technologie sur effluents SMURFIT KAPPA

		Pramètres globaux					
		Mesures laboratoires des effluents sortie de la Station d'épuration de Smurfit Kappa					***Essais CIS Alpha©***
Unité		mai-22	sept-22	nov-22	janv-23	Mesures Step Biganos du 19/07/2023 à 9H00	**CIS Alpha© août 2023**
mg O^2/l	DBO_5	110	96	87	64	123	**1,1**
mg/l	Mes	61	65	72	48	66	**0**
mg O^2/l	DCO	378	372	266	254	362	**19**
mg N/l	Azote Kjeldahl	18,2	11,6	8,25	10,2		**<0,5**

(*) Concernant la valeur de la DBO5 mesurée (E32 CIS Alpha©), et d'après la norme AFNOR EN 1899-1 et 1899-2, 03/98) :
- Notre résultat s'inscrit entre une eau naturelle vive et une eau ''légèrement polluée''.

(*) Limites réglementaires :
DCO 30 mg O^2/l
DBO5 < 3 (Groupe A1)
MES 25 mg/l (Groupe A1)
Azote Kjeldahl 1 mg N/l (Groupe A1)

Test préliminaires de la technologie sur effluents SMURFIT KAPPA

			Métaux				
			Mesures laboratoires des effluents sortie de la Station d'épuration de Smurfit Kappa				***Essais CIS Alpha©***
Unité			mai-22	sept-22	nov-22	janv-23	**CIS Alpha© août 2023**
µg/l	Aluminium		1440	1320	1260	902	**12**
µg/l	Chrome		2	2,02	2	2	**0,13**
µg/l	Cuivre		2	2	2	2	**0**
µg/l	Mercure		0,0326	0,078	0,0453	0,0619	**0**
µg/l	Nickel		5	5	5	5	**7,5**
µg/l	Plomb		5	5	5	5	**0,8**
µg/l	Zinc		10,5	15,9	10,5	15,4	**4,7**
µg/l	Fer		non mesuré	non mesuré	non mesuré	non mesuré	**18**
µg/l	Manganèse		non mesuré	non mesuré	non mesuré	non mesuré	**24,5**
					Produits minéraux		
µg/l	Arsenic		5	5	5	5	**5,38**
mg/l	Phosphore		2,33	1,5	1,05	0,686	**0,13**

(*) La limite réglementaire de qualité pour l'Aluminium est de 200 mg/l.

Test préliminaires de la technologie sur effluents SMURFIT KAPPA

Indices globaux			
		Step Bignos 01/2023	**CIS Alpha août 2023**
mg C/l	Carbone Oxygène Total	73,4	**9,7**
µg/l	Cyanures totaux	<10	**<10**

(*) COD ou COT, l'atteinte du bon état dans l'eau potable est de 7 mg/ l, La CIS Alpha© obtient un score de 9.7 mg/l ce qui démontre l'efficacité de la microfiltration à Zéolites.
Une filtration de 4µ des zéolites permet l'absorption de Réfractaire (CODR) et Biodégradable (CODB).
Cette performance à des avantages environnementaux et économiques importants, notamment en réduisant les charges polluantes rejetées dans l'environnement et en permettant une réutilisation plus étendue des eaux traitées.
Nous avons atteint un potentiel REDOX ***de 650 mili-Volt ce*** *qui est un très bon signe concernant le bon état des eaux traitées.* ***(mesures en temps réel)***

Test préliminaires de la technologie sur effluents SMURFIT KAPPA

Dérivés Phénoliques						
		mai-22	sept-22	nov-22	janv-23	**CIS Alpha© Août 2023**
mg/l	Indice phénol	0,065	0,01	0,06	0,045	**0,01**

(*) Limites réglementaires : 0,01 mg/l (Groupe A2 l).

Test préliminaires de la technologie sur effluents SMURFIT KAPPA

	Physicochimiques Généraux					
		CIS Alpha© août 2023				
NFU	Turbidité	**0,6**				
	pH	**8,1**				
°F	TAC	**12,5**				
mg/l	fuorures	**0,1**				
mg/l	magnesium	**11**				
mg/l	calcium	**220**				
mg/l	potassium	**18**				
mg/l	chlorures	**330**				
mg SO_4/l	Sulfates	**300**				
mg S/l	Sulfure Hydrogène H_2S		**<10**			
			Azotés et phosphorés			
			CIS Alpha© août 2023			
mg NH_4/l	Ammonium		**<0,05**			
mg NO_3/l	Nitrates		**<0,5**			
mg NO_2/l	Nitrites		**0,03**			
mg PO_4/l	Orthophosphates		**<0,02**			
			Micropoluants minéraux			
µg/l	chrome VI		<10			
		Trilométhanes				
		mai-22	sept-22	nov-22	janv-23	**CIS Alpha©**
µg/l	Bromodichlorométhane				<1	**<0,50**
µg/l	Bromoforme Tribrométhane					**2**
µg/l	Chloroforme Trichlorométhane				5,51	**<0,50**
µg/l	Dibromochlorométhane				<1	**0,29**
µg/l	Somme Tri Halo Méthanes					**2,29**

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