



Phosphate Value Chain Agreement

The following industrial companies, knowledge institutions, government authorities and NGOs:

1. Dutch Farmers organisation (LTO-Nederland)
2. Royal COSUN
3. Union of Water Authorities (Unie van Waterschappen)
4. Union of Water Works companies (VEWIN & Reststoffenunie)
5. Twence Afval en Energie BV
6. Van Gansewinkel
7. VION Ingredients
8. NV Slibverwerking Noord-Brabant
9. HVC
10. Thermphos International BV
11. ICL Fertilizers Europe
12. Wageningen UR (University & Research Centre)
13. Deltares
14. Nutrient Management Institute (NMI)
15. State Secretary for Infrastructure and the Environment, acting in unison with the Minister and the State Secretary for Economic Affairs, Agriculture and Innovation
16. Biorenewables Business Platform
17. InnovatieNetwerk
18. WASTE
19. Aqua for All
20. Nutrient Platform

hereafter jointly called Parties,

share the ambition of creating a sustainable market within two years, where as many reusable phosphate streams as possible will be returned to the cycle in an environment-friendly way and where the secondary (recycled) phosphate – as long as a surplus exists in the Dutch market – will be exported to the fullest extent possible. This, in order to contribute elsewhere to soil improvement and food production. This approach will give substance to the creation of a raw materials roundabout.

Within Europe, sustainable phosphorus management has been addressed not homogeneously. Regarding the institutionalization of nutrient management, the Netherlands can be seen as a frontrunner with the signing of this value chain agreement. The Netherlands offers to share the lessons learned from this innovative approach to speed up the transition towards sustainable nutrient management and strengthen the governance in this field with (stakeholders from) countries within as well as outside the European Union.

From a governmental perspective this includes for example the initiative to redesign the national legislative framework from a Cradle to Cradle perspective. The Netherlands is willing take a leading role in taking this further to the European and International level.

Other parties are welcome to join this initiative to establish a sustainable market for secondary phosphate raw materials.

In this agreement the Parties are focusing on phosphate streams. It is also important to deal sustainably with other nutrients (e.g. nitrogen, potassium and micronutrients), but they are not the basis for creating this market. However, this does not alter the fact that parties will search continuously for the most sustainable handling of all nutrients.

Background

In the Netherlands we have a surplus of nutrients. We import nutrients in different forms such as food, animal feed and ores and are using fewer and fewer primary phosphate fertilizers and feed additives in the agricultural sector partly because of stringent European directives and innovation. Over the coming years this surplus is expected to increase significantly because import of biomass is expected to increase (feed, food, non food). The costs of dealing with these nutrients for Dutch society are significant (the environmental costs of treating waste, waste and surface water and the costs of incineration, processing and transporting manure). This situation exists even though elsewhere in the world there is a growing need for nutrients (fertilisers and soil improvers) due to the expanding world population, the growth of emerging economies, the declining quality of soil, diet changes, ageing and urbanization. As only few countries in the world have large reserves of fossil phosphate rock (especially Morocco/Western Sahara and China) and global demand is growing, there may be a decline in the security of supply of phosphate because of geopolitical developments. This will jeopardise the food security of countries and regions like Europe that do not have any or little reserves. Many countries already have to contend with relatively high prices for (phosphate) fertilisers. Moreover, the quality of reserves is already decreasing (resulting in more pollution and a greater energy requirement) and they eventually run out, certainly given the speed at which they are currently being used, especially in the production of fertilisers, but also in other applications in the Agro & Food and Chemical sectors. The need to use phosphate carefully is underlined by the circumstance that phosphate is an essential building block for all growing life on Earth and there are no alternatives that can take over the function of phosphate when fossil reserves run out. Fortunately phosphate is recyclable.

Goal

Utilising specific residual organic flows in the Dutch economy as a source of phosphate will make it possible to produce exportable products of good quality and thus create a sustainable market. This will enable the Netherlands to concentrate, scale up, increase the value of, and export green recycled flows of residual materials that are not currently being usefully (re)used in the Netherlands. The value chain agreement is broadly structured and embraces various residual flows of phosphate from the food industry, households (kitchen and garden waste), livestock farming (manure), water sector (wastewater, sewerage sludge) to the processing industry and has a link to knowledge institutions and civil society organisations. This way forward was chosen with a view to leveraging the potential of a large and innovative export market (with economies of scale and efficient processing techniques) and broadly based support.

A market of this kind can only be created if Parties trust each other, commit to their own ambitions and contribute concretely to achieving the common goal, and if they agree clear mutual arrangements for what they will do for each other in the coming two years (2012-2013).

Establishing this sustainable recycled phosphate market is not merely a question of the right technology. Moreover, it is a matter of creating the required demand and creating more insight in supply chain and market information. It is a matter of investing in the required processing industry, in forming new partnerships and in creating a sophisticated mix of market interventions by authorities. We need to drive gradual market growth and improvement by applying acquired knowledge and experience. Innovative companies will be able to create the market if supported in this endeavour by the right kind of knowledge and technology (knowledge institutions) and the right preconditions in policy and the legislative environment (government). Therefore, the market can be established only by a joint effort by the business community, knowledge institutions and government (the 'Golden Triangle') and NGOs, platforms and parties. In the Netherlands, but also in other countries. We are dealing with a system innovation, a radical process of change with many actors, interdependencies and interests, but with a common goal and the will to achieve it.


Parties shall jointly endeavour to close the phosphate cycle and for that purpose shall establish within two years a sustainable phosphate market. A market in which phosphate is recycled and reused. A market in which secondary phosphate is recovered from organic materials such as residual flows and by-products.

The process arrangements adopted in this value chain agreement represent the first step towards the plan of action for phosphate announced in the Dutch Cabinet's raw materials memorandum (Lower House of Parliament, parliamentary papers 2010-2011, 32 852, No. 1, 15 July 2011).




Parties hereby agree the following process arrangements

- a. Within two months, the Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, Agriculture and Innovation will organise a conference, in association with the Nutrient Platform, to flesh out this agreement and accelerate establishment of the sustainable market for secondary phosphate raw materials. The goal will be to identify clearly the issues, processes and outcomes that need to be arranged and the dilemmas Parties are facing. Arrangements will be agreed for a detailed elaboration of the further process. There will also be an examination of how capacity can be created to speed up the process.
- b. Within six months, the Nutrient Platform will compile, together with Parties, an initial 'information document' that sets out all basic details on phosphate availability, present use and future reuse opportunities in The Netherlands relevant to establishing a sustainable market for phosphate endorsed by all Parties. The information document will provide a clear picture of the quantities and qualities of existing flows and, if possible, the likely impact of various investments made by Parties.
- c. Platforms that address nutrients, renewable energy and bio-based economy (including the Nutrient Platform and the Biorenewables Platform) will join forces in order to secure the involvement of all relevant parties that can contribute to an efficient and sustainable market for secondary phosphate raw materials.
- d. Parties will engage with each other to achieve synergies in their activities and investments, e.g. LTO (Dutch farmers organisation) and the Waterschappen (Dutch Regional Water Authorities) will start an exploratory study to examine whether synergy benefits can be obtained through joint recovery of phosphate out of manure and sewage water.
- e. Parties will contribute actively to the process of examining relevant legislation by identifying bottlenecks as clearly as possible and by brainstorming with the Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, Agriculture and Innovation with a view to presenting joint and widely supported solutions to the House of Representatives in mid-2012 if possible.
- f. Twice a year the process of fulfilling the chain agreement will be the central subject at the spring and autumn general meetings of the Nutrient Platform.
- g. Parties share the ambition of organising a European conference in autumn 2012 in order to establish links with other countries, companies, NGOs and knowledge institutions within and outside Europe.
- h. The results of this value chain agreement will be presented at the next Innovation Relay conference in autumn 2013, organised by the Ministry of Infrastructure and the Environment. Parties will exercise their best efforts to launch at that time an international documentary to help promote greater international awareness about the global phosphate problem and the possible solutions. It outlines the knowledge and skills and unique cooperation between parties in the Netherlands during the implementation of this value chain agreement.

Signed on 4 October 2011:

	Organisation	Name	Signature
	LTO Nederland	A.J.M. (Noud) Jansen	

	Royal Cosun	Dr. A.M.M. (Ad) de Laat	
	Dutch union of Water Authorities	P.C.G. (Peter) Glas	
	Dutch union of Water Works (VEWIN), also on behalf of Reststoffenunie	T. J. J. (Theo) Schmitz	
	Twence Afval en Energie BV	P.F. (Peter) de Noord	
	van Gansewinkel	A. (Toon) Beeks	
	VION Ingredients	D. (Dirk) Kloosterboer	
	NV Slibverwerking Noord-Brabant	M.M. (Marcel) Lefferts	
	HVC	A.R. (Albrecht) Bresters	
	Thermphos International BV	R. (Rob) de Ruiter	
	ICL Fertilizers Europe	C.P. (Cees) Langeveld	
	Wageningen UR (University & Research centre)	Prof. M.J. (Martin) Kropff	
	Deltares	A.J. (Harry) Baayen	
	Nutrient Management Institute (NMI)	Dr. D. (Daan) Kuiper	
	State Secretary for Infrastructure and the Environment, also on behalf of the Minister and the Secretary for Economic Affairs, Agriculture and Innovation	J.J. (Joop) Atsma	
	Biorenewables Business Platform	A.J. (Ton) Runneboom	
	InnovatieNetwerk	Dr. G. (Ger) Vos	

	WASTE	S. M. (Stan) Maessen	
	Aqua for All	H.J. (Hester) Foppen	
	Nutrient Platform	L.G. (Lennart) Silvis	

Ambitions and goals of Parties

In the sections that follow the Parties describe their long-term (LT) ambitions, how they can contribute in the coming two years to close the phosphate cycle, and what they expect of other parties. It is set up in a way that ensures that all Parties can confidently invest in the creation of a sustainable, large market (including exports) for secondary phosphate raw materials. Under the Phosphate Value Chain Agreement Parties will commit to their own ambitions, their goals and their expectations of other parties, but will not have to commit to the statements made by other parties, although these expectations will be seriously factored into the overall process.

PROVIDERS OF RESIDUAL FLOWS

Dutch farmers organisation (LTO Nederland)

- Ambitions (LT):

The Dutch farmers organisation (LTO Nederland) is working on sustainable solutions for eliminating the surplus of manure in 2015. Several approaches are being followed to eliminate the expected phosphate surplus of 50 million kg. Besides measures for reducing the excretion of phosphate via animal feed and for optimising the domestic sale of customised manure-based products, the need to place phosphate outside the Dutch agricultural sector is an important driver of the creation of a new balance. LTO's ambition is for livestock farmers in the Netherlands to be using only minerals of animal origin in 2015¹.
- Goals (2 years):

Farmers and parties in the chain are investing in a few dozen regional manure processing plants to produce fertiliser substitutes (basis for increasing the value of N and K). This will better serve the domestic sales market. They are also investing in a few supra-regional conversion factories (basis for increasing the value of phosphate) to turn the fertilisers into useful products², e.g. to make them exportable. The manure processing plants and conversion factories will be operational not later than in 2018. One example of this approach is that agricultural entrepreneurs and parties in the chain in the east of the Netherlands are setting up an integral manure processing chain so as to process one million tons of manure into high-quality products in 2015.
- What is expected of other parties:
 - a. The noncommittal days are gone. All livestock farmers share a responsibility. Consequently, there must be mandatory manure processing by companies with a surplus of manure. There is no longer any place for free riders. Central government and LTO bear a joint responsibility for making these arrangements.
 - b. The effective processing of manure by the aforementioned plans will be enhanced if there are more incentives for end-users to reuse energy and raw materials, including secondary phosphate raw materials. Examples are the use of soil improvers all year round on all types of land.
 - c. Greater legal scope in order to experiment with new techniques and installations under controlled and certificated conditions. This will facilitate onward development of the sustainable market for secondary phosphate raw materials. Scope for experiments of this kind need to be created on 5% of Dutch agricultural acreage.
 - d. Appropriate regulation is a precondition for quickly establishing regional manure processing initiatives. So local, regional, national and European authorities need to cooperate in the granting licences and in framing stimulating legislation. Failure to meet this expectation will seriously hamper the building of the required plants.
 - e. Optimum use of secondary fertilisers necessitates using only techniques whereby the nitrogen precipitates and is retainable as good quality fertiliser.
 - f. Volume limitation and concentration of minerals obtained from manure is necessary in order to create a larger market reach. Organic manure pellets must be manufactured at places close to industrial processes where a lot of residual heat is available so as to take full advantage of the economies of scale.

Royal COSUN

- Ambitions (LT):

Royal COSUN's ambition is to make maximum use of biomass, including production of energy from low-quality secondary streams. The vision of Royal COSUN calls for the most rigorous possible pursuit at sector level of closing the cycle through the reuse of minerals (including phosphate) and residual organic material so as to retain soil fertility. Biomass production can be sustained at a high level only by assuring soil quality by closing the cycle.

¹ Untreated as basic fertilization with slurry, treated as part of a derogation package, or processed into a fertiliser substitute.

² Soil improvers, fertiliser substitutes, phosphate granules, etc.

- Goals (2 years):
 - a. The object when growing crops (production of green biomass) is to reduce dependency on artificial fertilisers and – specifically for phosphorus – on fertilisers made from imported phosphate ore.
 - b. The nutrients released when processing biomass must be available in such a way that their use as fertiliser substitutes – especially in arable farming – is possible regionally and also at a distance. The greatest effort will be required for the two new biomass fermentation plants being built for the production of green gas at SuikerUnie at Dinteloord in 2011 (operational in 2012) and at Groningen in 2012 (operational in 2013). The digestate released from these digesters will be converted to a usable fertiliser/soil improver, wherever possible with direct utilisation in a small radius around the plants.
 - c. Royal COSUN wants to participate in the field study into the use of bio-based fertiliser substitutes in arable farming (growing of beets) and the use of specific struvite as a fertiliser substitute in arable farming and beyond (arboriculture, perennial pastures).
 - d. Informing Dutch arable farmers about the possibilities and benefits of reusing minerals obtained from biomass as a substitute for fertiliser and encouraging them to take advantage of those possibilities.

When pursuing these goals Royal COSUN will concentrate mainly on watery secondary streams from its own processing companies (Aviko, SuikerUnie and Sensus) and on the mineral-rich digestate obtained from biomass anaerobic digestion. Efforts need to be directed primarily towards reusing the totality of nutrients obtained from biomass, i.e. on closing the nutrient circle. In many cases the environment will not benefit from the separation and further treatment of individual nutrients (including phosphorus) so it is undesirable.

- What is expected of other parties:
 - a. The goals based on environmental technology, like those described in the targeted results by central government, must be financially feasible. Given the surplus that exists in the Netherlands, the business case might turn out to be dependent on government interventions. Conceivable scenarios might be stimulation of reusable fertilisers in relation to artificial manure and/or stimulation of export of mineral-rich streams to deficit areas outside the Netherlands.
 - b. In some cases the government will need to review the rules for bio-based substances that replace artificial manure.

Dutch Association of Regional Water Authorities (Unie van Waterschappen)

- Ambitions (LT):

The Water authorities have a statutory duty to treat sewer effluent as part of their care for the quality of water (including regional surface water). Increasingly, the water boards are regarding sewer effluent as a source of renewable energy, valuable nutrients and raw materials. One of the most important recoverable nutrients is phosphate. The water boards have taken their responsibility and want to help to close the phosphate cycle. At three levels it is possible to recover phosphate: at sewer effluent treatment, at end-processing and locally. These tracks do not necessarily obstruct each other and can be developed in parallel.
- Goals (2 years):
 - a. The ambition of the water authorities is to have three to five large sites for the recovery of phosphate from sewer sludge by 2015.
 - b. Not later than in 2012 the Association of Regional Water Authorities will determine its strategy as part of the Roadmap 2030, part of its multiannual agreement with the government, for completely closing the phosphate cycle in the water sector and will identify the concrete intermediate steps that can be taken to achieve that goal (2015 and 2020, respectively).
 - c. The Association of Regional Water Authorities will actively explore possibilities for achieving, with other sectors, the joint objective of making the phosphate cycle sustainable;
 - d. With LTO Netherlands and with central government support, the (Association of) Regional Water Authorities will search for synergy benefits and will explore opportunities for joint recovery of phosphates.

- What is expected of other parties:
The statutory restrictions on selling/trading sustainable products obtained from sewer effluent in the Netherlands and Europe need to be lifted. The joint measures for transition to the sustainable use of phosphate must ultimately have a positive effect on the quality of surface water.

VEWIN & Reststoffenuie

- Ambitions (LT):
The water works sector is striving to manage the water system and water supply chain attractively, safely, cleanly, healthily and sustainably. This is being done from the baseline of the sector's own responsibility by using our expertise and skills to fulfil this ambition with other parties. In the opinion of the drinking water companies, closing cycles, recovering nutrients and using forward-looking system innovations are essential developments towards achieving this goal.
- Goals (2 years):
 - a. the joint drinking water companies are already sustainably using, via their shared service centre called Reststoffenuie Waterleidingbedrijven BV, almost 200.000 tonnes of residual substances each year as raw material for other customers. The water works companies are keen to deploy their experience by cooperating intensively and by leveraging innovation to make the recovery of phosphate economically (more) viable;
 - b. the government's top sectors policy seeks to accelerate technological innovations in fields including membrane technology. It is necessary to speed up the attainment of greater effectiveness of available techniques and to shorten the earn-back time of investments. The Netherlands reputedly has the world's best drinking water. This is thanks to structural investments by the drinking water companies in developing high-quality knowledge of the preparation, transport and distribution of drinking water and also of asset management. Moreover, the Dutch drinking water sector possesses specific knowledge of quality differentiation for industrial and process water, and of membrane technology, small cycles and natural treatment processes. Together with partners in the phosphate chain the drinking water companies are keen to use this knowledge to come up with concrete, innovative solutions that can serve as an example internationally.
- What is expected of other parties:
 - a. The water and phosphate chains can be integrated more intensively. Together with other parties, we can pursue optimisation with the agricultural, chemical and energy supply chains. This might include using residual heat from cooling water flows in order to dry biomass, manure and sludge.
 - b. The underlying knowledge network can also be strengthened (Delft University of Technology, KWR, Deltares, STW, and Wageningen UR) in tandem with concrete cooperation arrangements for projects.
 - c. The water works sector is searching for a suitable location for a pilot project to put into practice the experience already gained in the water/phosphate chains (recovery of phosphate from urine) and to combine it with other innovations.

COLLECTORS AND PROCESSORS

Twence Afval en Energie BV

- Ambitions (LT):

Twence Afval en Energie BV has the ambition of establishing a manure-processing chain in the east of the Netherlands in cooperation with LTO-Noord and InnovatieNetwerk in order to close value chains of products and materials. The business plan that Twence has developed with business partners for processing manure and for setting up the required value chain assumes not only an optimal use of all raw materials obtained from manure through the process of manure fermentation on farms (including distribution of energy products derived from that process), but also the central processing of the surplus digestate to enable the sale of minerals/phosphate products as alternatives to artificial fertilisers. The area of operation for establishing the manure-processing chain is the east of the Netherlands, in particular the Twente region, one of the three areas in the Netherlands with a surplus of manure. As a producer of renewable energy and of raw materials from waste matter, Twence wants to take on a central coordinating role. Twence is willing to invest in establishing the manure sales chain in association with several partners (including Cogas, HoSt and ForFarmers, with which cooperation agreements have been signed).
- Goals (2 years):
 - a. Develop products (including phosphates) through the processing of manure that will satisfy the requirements of customers and enable the valorisation of manure;
 - b. Agree to long-term arrangements with customers and, where possible, get started in niche markets (also outside the agricultural sector) with high added value.
 - c. Prepare for the establishment of the manure-processing chain in the east of the Netherlands.
 - d. Build and further expand the first components of the manure processing chain in the Twente region.
 - e. Start constructing installations for fermenting and processing manure - whether independently or in association with farmers - with a view to processing one million tonnes of manure in 2015 and five million tonnes in 2020 in the east of the Netherlands (more than one fourth of the present production of manure).
- What is expected of other parties:
 - a. Adjustments in policy and regulations by the central government will help to ensure the supply of manure for processing into energy and fertilisers;
 - b. It would be helpful if market parties were to indicate explicitly and concretely which requirements the products obtained from manure-processing (both energy sources and minerals) would have to meet and under which market conditions those parties would be able to buy those products.
 - c. Market parties and especially farmers and farmers' organisations should agree to arrangements with Twence regarding the supply of manure in order to support the development of the manure-processing chain in the east of the Netherlands and to make it viable.

Van Gansewinkel

- Ambitions (LT):

The ambition of Van Gansewinkel is to fulfil an important role in the phosphate value chain, not only in the collection and transport of residual streams of phosphate, but also in their valorisation, including the recovery of raw materials. Van Gansewinkel considers it strategically important to society to recover phosphate and the company is keen to do its part in terms of research into economically feasible recovery techniques – taking into account such matters as the energy balance – and their implementation. Van Gansewinkel is convinced of the increasing importance of waste as an energy source or a source of renewable raw materials. Consequently, this ambition is entirely in line with the company's business philosophy.
- Goals (2 years):

For this business case, Van Gansewinkel will help to establish new production chains for – in this case – streams of biogenic and mineral materials by:

- a. searching with partners for ways of closing the phosphate cycle and taking the initial steps in that direction; initially, the focus will be on reducing the environmental impact, but also on recovering raw materials that will be scarce in the future, such as phosphate in the present case;
 - b. creating consortiums that will commit to this new product cycle, within the 'Golden Triangle' of government, science and business, and also allied organisations;
 - c. over the coming two years and together with partners, working out specific business cases based on new technology, examining their feasibility and, subject to a positive outcome, putting them into practice.
- What is expected of other parties:
Achieving these goals will require open innovation, and that is why it is important that all parties commit to seeing this process through to the end.

VION Ingredients

- Ambitions (LT):
VION Ingredients develops, manufactures and markets ingredients of animal origin for applications in pharmacy, food, feed, technology and energy. Energy Park 'Ecoson' is the latest company of VION Ingredients. The company was established in 2007 and produces renewable energy from natural residual products. For this purpose, the company uses anaerobic digestion and other means to convert residual products from the food industry into green electricity for 10,000 households on an annual basis.
The ambition of VION Ingredients is to use Energy Park Ecoson to help close phosphate cycles by creating a production plant for bio-phosphate obtained from animal manure. In doing so VION Ingredients intends to contribute to the transition from the problem of a manure surplus to the sustainable production of organic fertilisers. Through this approach VION Ingredients will also take another step towards the further sustaining and economic utilisation of natural residual streams.
- Goals (2 years):
 - a. VION Ingredients is currently studying the feasibility of creating an installation to produce bio phosphate from animal manure. This new activity will produce green gas and bio phosphate, a dry, phosphate-rich fertiliser of natural origin in granular form. By hygienising the granular bio phosphate manure, it will be possible to export this fertiliser to countries that have a structural shortage of phosphate. Towards the end of 2011, VION Ingredients expects to complete the study into the feasibility of this initiative. This will enable this new activity to be operational in mid-2013.
 - b. VION Ingredients wants to obtain the required quantity of animal manure locally and also sell the produced energy locally. In this way VION Ingredients will contribute significantly to closing the local energy cycle and will also reduce the local phosphate burden.
 - c. Through this product VION Ingredients wants to contribute to national development of knowledge for the large-scale and innovative processing of animal manure. By so doing VION Ingredients wants to serve as a demonstration project for other manure processing initiatives and their further development. VION Ingredients is willing to share knowledge and experience obtained through the bio phosphate project as a basis for increasing the economic value of ingredients obtained from animal manure.
- What is expected of other parties:
VION Ingredients has identified the following conditions for creating the plant to produce bio phosphate:
 - a. a constructive and stimulating role on the part of national, provincial and local authorities in the licensing of the construction and operation of the bio phosphate plant;
 - b. awarding by the Dutch government of the SDE subsidy (already requested) for the production of green gas, as a business precondition for being able to operate the plant sustainably on an economic basis;
 - c. willingness of market parties to invest in developing export and sales opportunities of the produced bio phosphate;
 - d. willingness of the agricultural sector to commit long term to supplying the required quantity of animal manure.

NV Slibverwerking Noord-Brabant (SNB)

- Ambitions (LT):

N.V. Slibverwerking Noord-Brabant (SNB) is a water board company that processes 27% of all sludge originating from waste water treatment plants in the Netherlands. SNB's ambition is to process waste water sludge with the maximum recovery of energy and raw materials. The size of SNB's processing plant allows large-scale recovery, thus making it possible to contribute significantly to closing the phosphate cycle. This recovery during the final processing of waste water sludge can be very effectively combined with other initiatives in the overall waste water chain.
- Goals (2 years):

SNB's defined objective is to use all 100% of incineration ash for the recovery of phosphate by 2015 at the latest. Nationally, this will represent 20% of all phosphate that ends up in waste water. As a water board company, this will enable SNB to fulfil the ambition of the Association of Water Boards to create between three and five recovery sites by 2015.
- What is expected of other parties:
 - a. Central government support is needed to accelerate and catalyse national procedures for approving products containing phosphate obtained from sludge, in particular by means of separate approval under Annex Aa of the Fertilisers Act Implementing Regulations and awarding of the status of 'final waste'.
 - b. Support by the national government is necessary in the process of approving animal products under the EU Fertilisers Directive 2003/2003.
 - c. Authorities should adopt a proactive stance as a catalyst for obtaining licences for the construction and operation of plants that convert ash to fertiliser.
 - d. Authorities should recognise that export opportunities exist by making new products from sewage sludge and should support the marketing of such products in the EU and beyond in the spirit of a national Raw Materials Roundabout.

HVC

- Ambition

HVC's ambition is to collect as many residual streams as possible and convert them to make them usable as a raw material in the material chain. The objective of HVC is to maximise environmental efficiency at an acceptable cost to society. HVC burns a substantial proportion of the sewage sludge released in the Netherlands in its mono-sludge incineration plant at Dordrecht. The ambition of HVC is to recover as much phosphate as possible (85%) from the ash released in the incineration process.
- Goals (2 years)
 - a. We will have a clear picture of the most suitable technique for recovering phosphate from combustion ashes in a way compatible with the basic principles defined by HVC.
 - b. Together with other parties we will have decided to invest in creating a plant for recovering phosphate.
- What is expected of other parties:

The authorities should remove barriers in national and European legislation standing in the way of the use of phosphates obtained from sewage sludge.

SELLERS & EXPORTERS

Thermphos International BV

- Ambitions (LT):
Thermphos has the ambition of producing phosphorus entirely according to the Cradle to Cradle® principle in 2020. An important step in this direction will be to replace all phosphate raw materials by secondary materials in 2020. Thermphos additionally wants to use its technology and knowhow to provide a broadly based stimulus for using and developing phosphate. Thermphos technology is distinctive for the very high quality of end-products obtained from renewable raw materials. This makes it ideally suited to recycling (including repeated recycling).
- Goals (2 years):
 - a. In 2012/2013 between 15 and 30% of input will already consist of raw materials obtained from recycled material. Long-term agreements will be concluded with suppliers for this purpose.
 - b. There will be an investment in association with chain partners in a recycling-dedicated R&D centre with a view to making secondary raw materials suitable for use in Thermphos processes and conducting systematic research into returning phosphate to the loop.
- What is expected of other parties:
 - a. Access to suitable secondary raw materials will be necessary to make this transition. This will necessitate partnerships with clearly defined arrangements for the quantities and qualities of supplied secondary materials.
 - b. Constructive cooperation with and a stimulating role on the part of the authorities will help to complete the transition to 100% input of secondary materials. Thermphos envisages a licensing system that allows for innovative transitional processes. A government-imposed obligation to recycle phosphate (as is now under consideration in Germany) may also facilitate the creation of a sustainable market.

ICL Fertilizers Europe

- Ambitions (LT):
ICL Fertilizers Europe wants to base its entire fertiliser production (100%) in 2025 on secondary phosphate. A figure of 15% is attainable in 2015.
- Goals (2 years):
ICL intends to build a plant that will allow the use of 15.000 tonnes of secondary phosphate, with an increase to 150.000 tonnes in the future. ICL is also conducting trials aimed at increasing the usability of secondary phosphate, making it possible to use these streams for more (fertiliser) purposes.
- What is expected of other parties:
 - a. ICL expects the authorities to guarantee that legislation will not create any barriers for upgrading secondary phosphate, while the authorities (EU) must set agricultural requirements for using secondary phosphate as a fertiliser in agriculture.
 - b. Central government must ensure that the procedure for licensing the plant can be completed as quickly as possible.
 - c. Central and local licensing authorities must be properly instructed on what is and is not allowed. Licensing authorities still tend to be overly cautious when issuing licences for innovative installations. Central government needs to invest in communication with the licensing authorities to avoid a situation where licence applications are rejected for spurious reasons.

The quantity, quality, storage (closed systems) and transport of supplied secondary phosphate raw materials must satisfy minimum requirements laid down by ICL, including long term security of supply.

KNOWLEDGE INSTITUTIONS

Wageningen UR (University & Research centre)

- Ambitions (LT):

Wageningen UR has considerable expertise in closing mineral cycles and is regarded worldwide as an authoritative knowledge institution in closing cycles at different levels. This enables Wageningen UR to provide broadly-based knowledge of and research into the transition to a sustainable living environment. The efficient use (and reuse) of scarce raw materials like phosphate is crucial to resolving the shortage of phosphate. This must also be seen in the light of other issues facing the world, such as food security for a growing global population and the increasing demand for raw materials for the bio-based economy. Wageningen UR is able to translate knowledge available in the Netherlands and other countries into promising potential solutions for the sustainable use of phosphate in the Netherlands and elsewhere in the world. The ambition of Wageningen UR is to build upon this expertise and to become the worlds top knowledge institutions when it comes to the sustainability of mineral cycles. Within this overall ambition, the closing of phosphate cycles will be one of the spearheads of the work at Wageningen UR.
- Goals (2 years):
 - a. Wageningen UR wants to help accelerate technological advances in the processing of phosphate streams into useful products (reducing costs, increasing efficiency and enhancing quality) and will give this goal as much substance as possible in its research programmes – some of which are agreed with central government – and for this purpose will recruit PhD students. Each year global agriculture consumes 80% of the produced raw phosphate, so the fundamental, strategic and applied research has been focused largely on reducing the use of phosphate in animal feed and fertiliser, conducting research into biorefining with a view to better utilisation of scarce and expensive raw materials and performing research into leveraging more effectively the value of animal manure as a source of energy, nitrogen and phosphate for numerous applications. Wherever possible the research programmes provide input for the innovation contracts for Agro & Food, Water and Chemicals as part of the government's approach to top sectors.
 - b. Wageningen UR wants to contribute to sustainable development by sharing knowledge of plant, animal, agro-food technology, environmental and socio-economic sciences with the Parties, thus enabling optimum use of the knowledge in the chain.
 - c. Wageningen UR wants to help to disseminate knowledge, among other things by forming networks, also with knowledge institutions in countries where there is a shortage of phosphate and where, partly due to that situation, there is or will be an urgent shortage of food. Wageningen UR will endeavour actively to help strengthen this link in the coming period.
- What is expected of other parties:
 - a. Wageningen UR is keen to cooperate with the other Parties, but also with other research institutions, companies and organisations in the Netherlands and other countries in order to form national and global partnerships.
 - b. It would be prudent to make the research programmes an integral part of the innovation contracts of the aforementioned top sectors, thus assuring their funding.

Deltares

- Ambitions (LT):

Deltares develops knowledge and innovative cost-effective solutions for the sustainable use of water, soil and eco systems so as to ensure their chemical and technological health and to use and retain ecosystem services optimally. Worldwide there is a large body of knowledge, albeit fragmented, of chemical and ecological processes in water and subsoil. Deltares concentrates on integrating this system knowledge 'from plot of land to sea' and on developing innovative solutions in the system. Innovative solutions include eco-innovations, i.e. solutions built on the combination of system knowledge and technological advances. The eco-innovations further include innovations in the system for removing phosphate from water and soil and reusing it.

The ambition of Deltares is to promote synergy between water quality management and closing the phosphate cycle, especially in the Netherlands.

- Goals (2 years):
 - a. Deltares supports PhD projects for closing the phosphate cycle in the water system and innovative measures for removing phosphate from the water system and recovering it.
 - b. Deltares is endeavouring to obtain funding from bodies including STW for a research programme centred on phosphate.
 - c. Deltares supports the central government and the Dutch Regional Water Authorities in searching for optimum solutions for water management and phosphate recovery.
- What is expected of other parties:
 - a. Water managers are receptive to the objective of integrating the development of policy on the Water Framework Directive, Marine Framework Directive, Nitrate Directive and raw materials policy.
 - b. Other organisations are cooperating with Deltares to establish a research programme that addresses phosphate cycles and shortages.

Nutrient Management Institute (NMI)

- Ambitions (LT):

Research and consultancy organisation NMI wants to promote the sustainable use of nutrients on various scales. To minimise losses of phosphate from the cycle, it is necessary to pursue vigorously the re-use of phosphate obtained from residual and waste streams. Secondary phosphate produced in this way must satisfy agricultural and environmental requirements. Only then it will be suitable for use as fertiliser. This will enable its effective use in agriculture and assure the safe and sustainable production of food for current and future generations. Through research and advice, NMI wants to contribute to fulfil this ambition.
- Goals (2 years):
 - a. NMI will set up an expertise centre for the application of residues or products obtained from them as fertiliser. The expertise centre will provide access to knowledge of:
 - legislation concerning the approval of the use of residues or products obtained from them as fertiliser;
 - current and required agricultural values of residues or products obtained from them used as fertiliser;
 - current and future market developments for products obtained from residues or waste used as fertiliser in the Netherlands and other countries;
 - embedding of products obtained from residue or waste streams used as fertiliser within a sustainable agricultural policy.
 - b. NMI will generate more knowledge of the agricultural and environmental properties of various secondary phosphate fertilisers that are being produced now and/or will be produced in the future.
 - c. NMI wants to help increase the awareness of potential producers and users of secondary phosphate fertilisers of the effective use of phosphate in Dutch agriculture and of the obstacles in current legislation and will put forward solutions to them;
 - d. NMI will identify and name obstacles in current legislation and put forward solutions.

PUBLIC SECTOR

Central government

- Ambitions (LT):

From an ecological, economic and geopolitical point of view, it is in the interests of the central government for the phosphate cycle to be closed as quickly as possible, so it wants to support the creation and enlargement of the market for secondary phosphate raw materials to cover other countries within Europe and the rest of the world, thus giving real substance to the political ambition of creating raw materials roundabouts.
- Goals (2 years):
 - a. National waste and fertiliser legislation and the related EU regulations will be examined based on the Cradle to Cradle principle to identify ways of removing unnecessary barriers. This will include integral scrutiny of the risks of polluted substances in secondary phosphate and in fertilisers. The Ministry of Economic Affairs, Agriculture and Innovation and the Ministry of Infrastructure and the Environment have included this examination in the deregulation process initiated under the coalition government agreement. The Dutch House of Representatives will be informed of its progress in mid-2012 if possible. Essential adjustments³ will be identified so as to start the procedure for their enactment as quickly as possible, insofar as they are compatible with European legislation, world trade agreements or environmental or public health interests. In the same setting there will be a review of what more can be done with output regulation instead of input regulation and technology (concerning struvite, for example). Attention will also be given to how Germany has recently been approaching this issue.
 - b. In parallel with the examination referred to above, the Ministry of Economic Affairs, Agriculture and Innovation and the Ministry of Infrastructure and the Environment will continue consultations with the European Commission and like-minded member states to ascertain how the desired sustainable market can be embedded in clearly-worded EU legislation.
 - c. In order to obtain greater experimental scope and to amend planning licenses the accelerated licence application procedure can be used more frequently than is often assumed. Within three months the central government will consider how the present possibilities can be used to better effect (e.g. guidance/Q&As for licensing authorities) and whether it is necessary to amend the relevant regulations and, if so, how. This latter point can be included in the current deregulation processes.
 - d. The Directorate for Public Works and Water Management (RWS) will facilitate and stimulate the recycling of phosphate by:
 - providing support and space for experiments on areas managed by RWS to parties that have developed and want to test innovative techniques for recovering phosphate from residual flows (biomass, water sediments, surface water), starting in 2012;
 - positively rating the return of phosphate from the above-mentioned flows to the phosphate chain in the contract awarding criteria for (innovation-led) sustainable calls for tenders;
 - introducing a ban on materials containing phosphate for – from a phosphate point of view - low-valued applications as soon as possible;
 - cooperating with the Dutch union of Water Authorities (Unie van Waterschappen) and the Dutch union of Water Works companies (VEWIN) to identify solutions that are best suited from the perspective of water management practices (synergy between phosphate recovery and water quality improvement).
 - e. Central government will promote awareness of the importance of valorising research into phosphate (in terms of technological possibilities and market creation and governance) in the agriculture, horticulture, water and chemicals top sectors, as this kind of research may be instrumental in maturing the sustainable market for secondary phosphate and is entirely in line with the philosophy of top sectors.

³ This might concern lower-level regulation.

- f. The Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, Agriculture and Innovation will engage with the Ministry of Foreign Affairs and international UN organisations and NGOs concerned with international trade and development cooperation in order to promote creation of a sustainable market for recycled phosphate materials, not only in the Netherlands, but also in other countries.
- What is expected of other parties:
 - a. Market parties must provide concrete and focused input to local licensing authorities for the examination referred to above and name concrete cases that merit action.
 - b. The other Parties must at the same time implement their concrete plans.
 - c. Within three months market parties and knowledge institutions must explicitly formulate their knowledge needs and research possibilities, respectively, in order to incorporate them in the innovation contracts with the top sectors.

PLATFORMS/NETWORKS/NGOs

Biorenewables Business Platform (BBP)

- Ambition (LT):
BBP is pursuing the sustainable development of a bio-based economy in the Netherlands from a business perspective. Cooperation between sectors is essential to fulfil this ambition. Therefore, BBP is performing a pivotal function: the platform possesses knowledge of businesses and of current issues in the market on the one hand, and is operating in the context of the government's bio-based economy programme on the other. This enables BBP to bring different parties together and build bridges between different sectors. This is precisely what we will also do under the Phosphate Recycling Chain Agreement.
- Goals (2 years):
 - a. BBP will have brought together key players in the green gas sector and the phosphate sector and inspired them to tackle concrete projects that help to close the phosphate cycle.
 - b. BBP will have helped increase support for the optimum use of fertilisers and residues.
 - c. BBP will have identified barriers to establishing a smoothly running phosphate cycle and brought them to the attention of the authorities involved.
- What is expected of other parties:
BBP is an initiator and facilitator of cross-sector cooperation and is able to support parties in carrying out projects.

InnovatieNetwerk

- Ambitions (LT)
Building on the ambition of InnovatieNetwerk to bring about breakthroughs in persistent issues, we are working on the development of sales markets for raw materials obtained from manure. In this approach manure becomes a combination of valuable raw materials instead of a waste product. We will create the link between the manure issue and the bio-based economy. Based on an analysis of opportunities for manure products in various raw materials markets, we have put various actions on the agenda of our network partners in a report entitled 'Market for manure' (2011).
- Goals (2 years):
 - a. Working together with businesses, set up at least two demand-driven chains with the prospect of generating value from manure and ensure that for livestock farmers manure is no longer waste that costs money, but an additional source of income.
 - b. Develop proposals for generating a market pull instead of market push for raw materials obtained from manure (including phosphate, but also biogas and nitrate).
 - c. Identify barriers in legislation that obstruct the use of raw materials obtained from manure and put forward concrete proposals for eliminating them and creating new business opportunities, especially for professional processors.
 - d. Establish arrangements for financing the process industry to refine manure in a cascade, whereby the different raw materials will be obtained by means of different processing stages.

- e. Establish an industry institution for the reuse of raw materials obtained from manure, bringing customers and suppliers together. The purpose of the institution will be to maximise the reuse of useful raw materials obtained from manure within and outside agriculture in demand-driven chains.
- f. Set up a public-private innovation programme, focused on practical solutions to issues related to the development of value chains for raw materials obtained from manure.
- What is expected of other parties:
InnovatieNetwerk will initiate new links between parties from different sectors of society in order to drive innovative solutions. The transition of manure from waste to raw material is a system innovation that can be accomplished only if companies, authorities, civil society organisations and knowledge institutions cooperate in the transition, each on the basis of its own particular role.

WASTE & Aqua for All

- Ambitions (LT):
WASTE and Aqua for All have are committed to making a contribution to closing the phosphate cycle worldwide and endorse the need for awareness of the shortage of and reliance on phosphate to be made the lead item in investment decisions at international conferences and talks on agriculture, water, sanitation improvement and food security. Our ambition is to help establish an independent international agency for the preparation and monitoring of conventions on nutrient management. We will also endeavour to bring about international cooperation between different sectors aimed at bringing about more sustainable use of phosphate, placing the shortage of phosphate on the agenda of various international organisations and making Dutch society aware of the present global shortage of nutrients that is obstructing opportunities for a fair distribution of supplies and protection of natural resources.
- Goals (2 years):
 - a. Link the shortage of phosphate to related subjects of environmental organisations.
 - b. Promote cooperation between Dutch initiatives for tackling the phosphate shortage in developing countries.
 - c. Make Dutch expertise in sustainable phosphate management accessible to parties in developing countries, and vice versa.
 - d. Set up joint projects of Dutch parties and parties in developing countries so that we can contribute to a cleaner living environment and provide everybody with access to clean drinking water and sanitation.
 - e. Contribute to the further development of policy on phosphate shortage within the FAO, and obtaining IFAD funds for initiatives for sustainable phosphate management.
 - f. Support and initiate applied research into phosphate management.
 - g. Embed a sustainable approach to closing the nutrient cycle in the design and implementation of sanitation projects.
- What is expected of other parties:
 - a. Conveying the importance and urgency of global and national management of phosphate cycles by means of embassy policy on economy- and development-related focus areas.
 - b. Willingness of Dutch parties to look upon the shortage of phosphate as more than an economic opportunity and to share based on the need for a fair global distribution of knowledge and opportunities.

Nutrient Platform

- Ambitions (LT):
The ambition of the Nutrient Platform is to join with the members and public-sector parties in playing a connecting and catalysing role in closing the phosphate cycle and promoting sustainable use of all nutrients through the entire value chain. In the light of this agreement, the Nutrient Platform wants to assume an independent, progress-monitoring role. To that end, the platform will further develop its network of collaborating parties from the relevant sectors in the nutrient value chain (businesses, knowledge institutions, authorities and civil society

organisations) and encourage them to cooperate in order to close the phosphate chain (and the chains of other nutrients).

- Goals (2 years):
 - a. A coordinated joint agenda for making nutrients policy more sustainable that helps individual parties to achieve their goals.
 - b. The Nutrient Platform will prove that it is an independent, sustainable network of active parties throughout the value chain that are complementary and who engage with each other in a constructive and intelligent way. We will operate as a platform for parties from different sectors and as a reliable liaison for authorities for mobilising parties throughout the chain.
 - c. The platform will help to establish at least five joint (cross-sector) business cases set up by parties in the value chain.
 - d. Sustainable nutrient usage will be put and kept on the map, nationally and at European and global levels.
- What is expected of other parties:

The Nutrient Platform will continue to be able to operate independently, authoritatively and legitimately, and will be supported in this regard by the parties concerned.