WHITE PAPER
INITIAL COIN OFFERING

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Summary

The world faces global challenges and is in the middle of a transition to a sustainable energy economy. And that's not going to be easy as on land only a few sites for wind and solar are left available and wind at sea takes a long time and only provides part of the demand. Apart from the need for a substantial additional supply to the energy mix, we also need to identify and qualify it. The power grid has a mix from coal, gas, solar, wind, etc, all over the same cable and a consumer who only wants to buy clean energy doesn't know what he gets. Even though all suppliers pretend to provide 100% green energy, there's no way to check it and he can't change suppliers to reward green energy production. Green certificates are no guarantee and don't promote green investments, while current carbon trade systems not only don't work but actually favour the fossil industry and the greatest polluters due to, among many other reasons, low carbon pricing. On top of that it's very hard to get a new green energy project financed and even when successful, it takes many long years of high interest payments, inhibiting further investments and expansion. Due to increased sustainable but fluctuating supply, the need for grid stability technology also increases. Not only additional green energy technologies are needed but also new systems to get development and exploitation financed.

The Slow Mill is a new Wave Energy Converter to operate in the North Sea at more or less similar cost as wind at sea. It is a patented wave energy technology that, unlike its competitors, also works well in a moderate wave climate like that of the North Sea. Not only the problems of wave energy are addressed but also the problems of small and irregular waves. It generates energy effectively and dampens the waves by tapping into the full orbital wave movement. The blades of the Slow Mill passively follow the wave path, allowing operations in short waves without active resonance systems. The huge forces during storms and the heavy steel needed to withstand those are addressed by a system that lets the higher waves partially flow over the Slow Mill that so avoids heavy loads and thus can be build with lighter materials. It becomes more economical to build and generates more energy as less is wasted to get the Slow Mill in motion. Not only does this open up new, hitherto non viable markets, but also allows existing ocean markets to be economically exploited, adding greatly to the green energy mix.

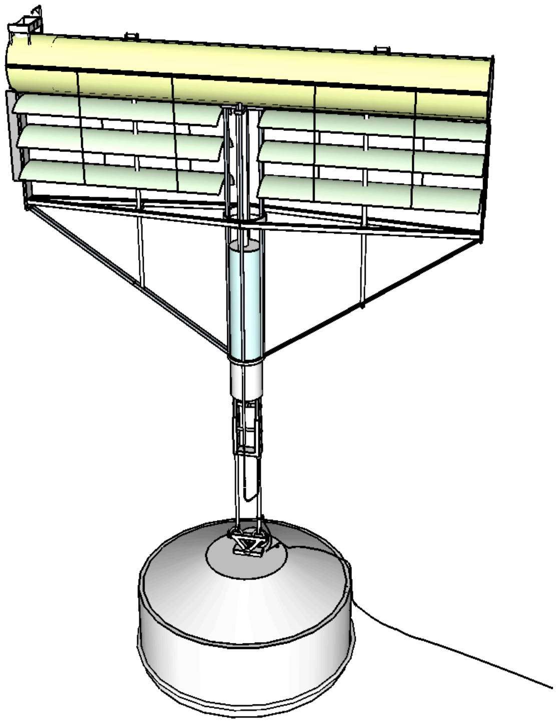
Development of a new technology is a long and costly process, most technologies take 5-10 years to fully develop and Slow Mill is no exception. The company started in 2012 and has since developed its technology to scale models operating in modest sea conditions. The next step is a model that can be connected to an offshore platform to research the best construction, transport, installation and connection procedures. It should also tell something about the expected yields in North Sea conditions. This step will be done in 2018/9 at Texel and is mainly financed by the Waddenfonds and Province NH. Launching customers in this project are RWS, who also participates, municipality of Texel also providing support, NAM (Shell) also providing access to their off-shore platforms and Texel Energy. Research institutes that participate are NLR, NIOZ and Deltares.

The main reason that it takes 7 years to get to a point where the first power delivery can be made, is lack of finance. The Dutch Government has never supported development of the Slow Mill or any other wave energy technology for that matter. But due to increased awareness of the magnitude of our climate objectives and the availability of new technologies, this will probably change. However, it won't be fast and even if government helps out, it will be in the form of SDE grants, still leaving initial cost of construction, installation and finance to the (rather conservative and expensive) financial markets.

Introduction of crypto currency for Slow Mill development and exploitation should solve most of above challenges. The availability of funds before construction and without interest is a major factor. The tremendous amounts of interest that won't have to be paid, will eventually benefit the consumer through more green energy, faster and cheaper. Another reason for tokenizing wave energy is that the smart contracts allow verification of origin, history, oversight, production, dates, predictions, supply and demand data, trades, etc, all in one system. It also provides the possibility of a fixed energy price and it becomes an incentive for further wave energy investments and growth. The system operates world wide, allowing any investor anywhere to help the Slow Mill development and create demand in every corner on earth. The idea is that the Slow Mill becomes demand driven; if a coastal community doesn't want windmills, they can invest in Slow Mill tokens and so show the need for new wave farms at their location. This system promotes wave energy, its financing and its ecological merits while (partly) replacing systems that failed to grease the energy transition.

1. Introduction

The Slow Mill is a new Wave Energy Converter to operate in the North Sea at similar cost as wind at sea. The Slow Mill is a patented wave energy converter that, unlike its competitors, also works well in a moderate wave climate like that of the North Sea. It generates energy effectively and dampens the waves by tapping into the full orbital wave movement. First calculations show that the LCOE of the Slow Mill is about the same as wind at sea. Most state of the art WEC's are designed for the oceans that usually contain 5-6x more energy than the North Sea but it's still very difficult to economically generate wave energy cost effectively, let alone in the North Sea for which the Slow Mill is designed. Because of that not much competition is expected in the near future.



Not only the problems of wave energy are to be addressed but also the problems of small irregular North Sea waves. The unique solutions found for and integrated in the award winning Slow Mill design solve both problems. The Slow Mill is made of strong durable light weight composite materials that don't degrade because of fatigue or corrosion, so less maintenance is needed and lifetime expectancy is well over 25 years. It maintains constant tension on the connection to the seabed, eliminating snaploads and allowing the machine to be build relatively light which also benefits the yields and ROI. Its low weight decreases construction cost and makes the unit also effective at lower waves as less energy is consumed for moving the construction. The design has been reengineered and adapted to provide for year round maintenance at sea level (almost) completely without any underwater works. Unlike most other WEC's the Slow Mill uses the full orbital energy of a wave at its surface and just below, where most energy is available, to also catch smaller wave tops and crests. It makes circular motions and doesn't bounce up and down nor back and forth and doesn't waste energy on constant acceleration an deceleration. Because of its orbital motion, similar to that of the waves, there's no need for matching wave frequencies. First tests are promising but testing on a larger scale is still needed. When waves get too high during storms, the Slow Mill is pulled under the wave crest, letting the waves roll partially over, avoiding huge wave loads while maintaining optimum power output. The smart hydraulic PTO with a strong flywheel effect ensures a relative constant RPM output to the variable generator. This, along with the elimination of stresses and fatigue by design, keeps construction cost low and a feasible business case ensues.

It has a patented blade construction that creates high resistance to an open flow as can be seen in the TUD report. The blades also bring the machine back when the wave recedes so no energy is wasted to return the unit to its starting position after a work stroke. IP is granted by the Netherlands and New Zealand. Australia will grant it this year. It's still pending in Europe and Canada. The prior art report by the EU Patent Office acknowledges the novelty of the invention. Due to its unique qualities and properties, there's no other technology as suitable for the North Sea as the Slow Mill. In fact, there are very little, if any, competitors even trying to do anything with the small North Sea waves. There are many technologies deployed and researched in just about all ocean side countries but those don't have great wind parks in the ocean and thus don't seem to be an issue for the second part of the innovation.

2. Businesscase

2.1 Objectives

The business case is based on an analysis of the cost and benefits of a wave park. Important factors are IRR and WACC; the higher the more likely investors will give it a go. A study will be done to find which functions of the North Sea will be effected by a wave park. Goal is to qualify and quantify most effects to compare with other situations and scenario's of development in the North Sea. Considered are effects on flora and fauna, installation, operation, shipping and safety, other functions like fishery, mining, air traffic, tourism and climate (CO2). Based on test results and modelling, the Slow Mill works well in moderate wave climates for which it was designed, unlike its competition that can't easily deal with the small, short, and irregular North Sea waves. It's expected to operate at similar cost as wind at sea.

Behind the wave park a wake forms where the water is calmer, as part of the energy is absorbed by the wave units. It can be expected that maintenance and installation in calm water is easier and more workable days become available. All construction, operation, maintenance and decommissioning of support structures, cables and turbines will benefit from this. The Slow Mill can be entered in higher wave conditions as it moves along with the waves; a 2 meter wave will be experienced as a 1 meter wave at leeside. Quality and quantity of the expected environmental impact are listed in order to make a good comparison with other scenario's of function development in the North Sea.

The end user, the power consumer is the greatest beneficiary as he will get clean power at a good price. But also our government and the EU who now pay huge subsidies and have steep sustainability targets, will benefit greatly from additional clean affordable power in the North Sea. Our government will also benefit from the knowledge that's obtained in this study as it'll attract investors which create jobs. SMS Projects is a Dutch company that holds the IP and will build the Dutch wave parks. Lots of personnel taxes will come from that, apart from the taxes on licenses that SMS Projects intends to write to Germany and England. To have a game changing technology means economic prosperity for all involved.

The potential in England is ca. 10 x greater than in the Netherlands. They have lots of ocean front coast and plan to build very large wind farms in the North Sea. The potential around the world would be a factor 10 of that as oceans contain lots more energy than the North Sea and there's not yet a WEC that performs well in this field. Emission trade and climate targets will be effected as well. The economic impact for those who now build expertise in this field might reach great heights.

2.2 Competition

Just a handful of players are active with wave energy in the North Sea and they're not commercially viable as they develop heavy steel machinery that is costly and doesn't respond well to the moderate wave climate of the North Sea. None of those that are free floating offshore devices have any ability to store energy yet nor dampen the waves to any degree and don't have the advantages of the Slow Mill; those will start to be build as soon as we make our first impact but that makes us first mover and market leader. In the North Sea wave energy market, Denmark is the main actor with a 500 kw Wave Star demonstration plant. Like wind energy, that made Denmark market leader through innovation investments, it aims to lead the wave energy field as well and actively promotes the idea of wind /wave synergy. Even though their technology is expensive as it needs huge solid structures in sea that have to withstand great storms (unlike the Slow Mill that evades heavy forces) it is the industry leader of this moment as it's heavily funded by their government. As there're no commercial actors in the North Sea (or anywhere) this would be as far as the competition analysis goes. Market share in the future will mainly go to those technologies with highest efficiencies and lowest cost, for which the Slow Mill will certainly qualify. It's relatively light (75 ton/MW) and at the end of it's learning curve it might be more economical than wind at sea.

Model	Weight (ton)	Power (MW)	Ton/MW	EU/MW
Slow Mill	30	0,4	75	1.000.000
Open Hydro	400	1	400	6.000.000
Pelamis	700	0,75	933	6.500.000
Oyster	500	0,8	625	6.000.000
Wind at Sea	1600	6	320	3.000.000
Pinguin	1600	0,5	3200	9.000.000
CETO	40	0,15	266	6.000.000
AWS	1200	2,5	480	7.000.000

2.3 Strategy
Within 5 years we like to have our first demo wave power plant operating. It'll consist of 5-7 units in line to protect one windmill and generate a max continuous output in heavy weather of 4 MW. This 5 year term will be about the period that out technology is commercial. As current project runs for 2 years, market introduction will be 3 years after that. This will already start during current project which is realty needed to convince potential buyers. The partners in this tender contribute their own share and expect to obtain work in the next phase but also gain very specific knowledge in the wave energy field. They will grow along with SMS Projects as it builds more and more units and parks. Apart from that they can sell their products to other countries and companies that hold licenses. At the moment there's no wave industry which makes them all first movers and thus potential market leaders

2.4 Financial
To build and test a full scale unit will cost about 4 M and construction of which a large portion is paid from government subsidies. Fortunately the Dutch government sees the importance of innovation, additional renewable energy and storage. As the IP is owned by SMS Projects, the funds that are not covered by grants, could be raised by an ICO. SMS Projects has already invested over 500.000,- and an additional 1 M is taken care of in the agreements with existing investors but for that to be effected the government and other investors need to take some responsibility as well. When the Slow Mill is more mature and more than 10 units have been produced, sales can start. This will likely take 4-5 years and in the meantime, the only income expected will be in the form of licenses for future deployment and equity sales. The suppliers will have income sooner as they need to deliver the parts of the first 10 units in the coming 4 years in which time they will have to earn back most of their investment in this tender. We expect the price of a 400 kw unit to be ca. 400-500k with a 20% profit margin. This is a little over the price of wind at land and by far the best deal in the entire wave energy industry where prices are often 10 fold.

The Slow Mill is at the beginning of its learning curve and we already show ca. 10% efficiency and that's for a coarse model. An optimized prototype is expected to double the efficiency, allowing a max electric capacity of 400 kw at 4m waves. Average 1,5m waves will then generate 9% of max capacity, so the expected yearly utilization rate north of the Netherlands will be around 10-12%. The expected price is hard to estimate but it will be in the order of 15-17ct/kwh not unlike early wind turbines. A steep price decline is expected when economics of scale enter the scene as the machine is relatively light and in the end, cost are directly proportional to weight. It could compete with reference investments and not only win the bid but also yield more ROI. It's not unthinkable that a wind/wave park may earn itself back within a decade. The effect on employment, development, suppliers, etc, is also hard to estimate but the potential is huge as investments go in the billions.

2.5 SWOT Analysis

Strength	Weakness
No peak loads	Early stage
No lateral stresses	Low subsidies (SDE)
High efficiency	Funding risks
Low tech	Non proven technology
Shock proof	High financial needs
No environmental hazards	Long development tracks
No fatigue	Production costs
Strong power/weight ratio	Small team, little experience
Self starting	Remote maintenance
Grid independent operations	Little knowledge
Easy & safe installation	Low solvability
Predictable output	Government dependence
Oppprtunities	**Threats**
No NZ competitors for now	Low acceptance
Large growing market	Intense storms
Strong government interest	Technical failures
Small footprint	Competitor improvements
No horizon pollution	Government permits
Enhancing biodiversity	Unexpected fatigue or damage
Power for remote locations	Delays in cable laying
High on political agenda	Conflicts fishing and wind farms
New markets like the NZ	IP infringements
New industry in Holland	Harsh maritime environment
Employment opportunity	Damage to other vessels
Single market leader	Damage to export cable

2.6 Risk Analysis

EFFECT			CHANCE		
	HIGHLY UNLIKELY	UNLIKELY	POSSIBLE	LIKELY	HIGHLY LIKELY
Disaster	Deadly accident				
Serious		Severe injury	Unknown flop		
Heavy	Negative results	Objection	Over budget	Objection fishery	
Moderate		Technical failure	Accident	Slow Permission	Slow realization
Small			Delay by wind		Technical setback

3. The Slow Mill Florin

3.1. Energy tokenization

The Slow Mill Florin (fl.) allows SMS Projects to tokenize and sell wave energy it will produce in the future. By selling before delivering, investments are raised to develop the technology and start implementing it. It's a good way to raise enough money for fast development and scale up without the hassles of interest on loans or having a guaranteed income before even getting one. For the buyer this system offers the knowledge that he will consume clean energy from a local wave farm and it provides the possibility of a fixed price.

One fl. is the amount of wave energy that can be bought for the going rate divided by € 0,04. It's a right to buy wave energy and it provides the possibility of a fixed price. It certifies that energy so bought comes from a specific local wave farm. This system is beneficial for the company as it becomes less dependent on market prices and it's good for the buyer who knows he gets local green energy. The buyer can buy a fl. and offer it to the company at the same time at the same rate and thus guarantee a fixed € 0,04/kWh. The company gets the fl. and delivers the equivalent amount of kWh wave energy after which it sells the fl. again for another future delivery. Investors are made aware that first they're mainly making it possible for the company to develop its technology and then scale up much faster than the normal route through venture capital or banks. The energy they can buy with their fl. will be available in the future and only in places where wave farms are connected to the grid.

Of course the fl. can be traded, but it can be offered to the company only in exchange for wave energy at places with wave farms and if more fl. are offered than energy can be delivered, they will enter a waiting list. Slow Mill expects to sell more fl. than the amount of energy that can quickly be delivered, necessitating a future delivery system. Investors know the risk of fluctuating rates and market entry at a later time than planned due to technical barriers that still have to be tackled. This may increase the waiting period but it is still the fasted way to large scale wave energy development as a waiting list is a constant reminder of the necessity to develop local wave sites and start delivery in time. Current and historical energy prices are visible on trading platforms. Investors gain better investment terms as well as access to wave energy across the globe in the fastest way possible.

3.2. Blockchain function

Blockchain allows:

- Provide 3rd party liquidity through exchanges and decentralized exchange protocols
- Enhanced efficiency due to smart contracts
- Enhanced security due to immutability of data
- Cheaper maintenance vs centralized database
- History of transactions and prediction of transactions

3.3 Slow Mill ICO

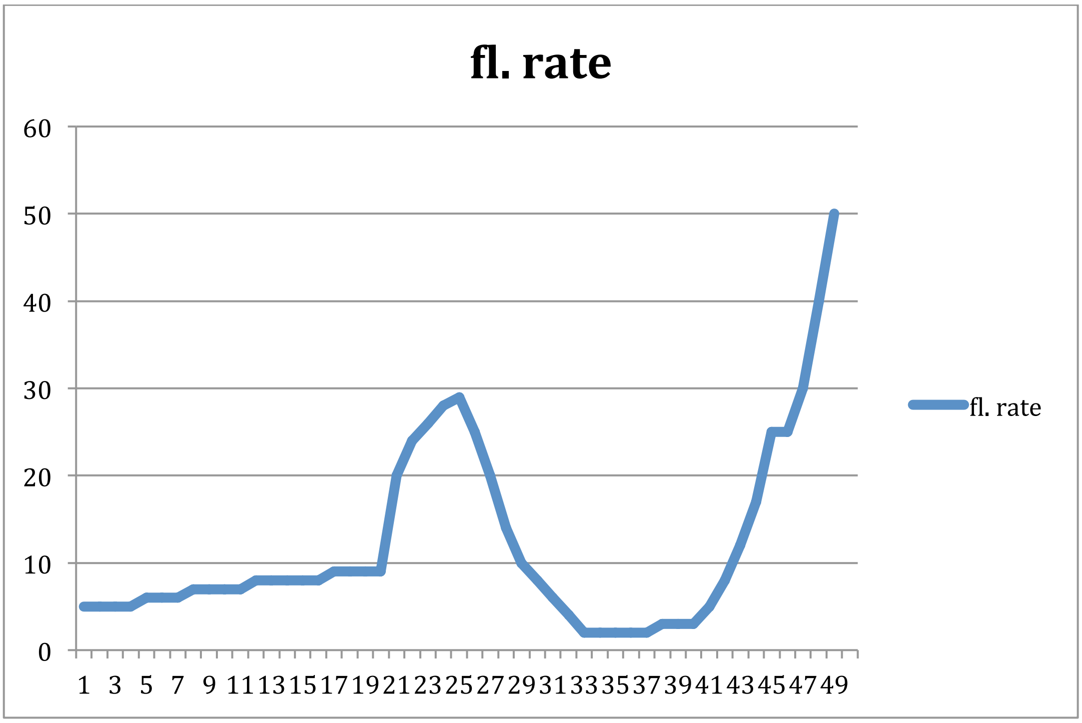
The Initial Coin Offering is due at the end of 2018 and will start at € 0,04/fl. (=1 kWh) with a soft cap at € 3 M and a hard cap of € 21 M. As of June 2018 consumers can enter a pre-sale white list and get 25% discount.

3.4 Use of Florins

The fl. owner has the following options:

1. Buy wave energy when it is produced if the energy was purchased for a development project in the buyer's home market. Note that the company will physically deliver wave energy based on fl. offerings.
2. Sell the fl. to any other user on international markets.
3. Keep fl. in possession, wait till the rates go up due to good news, buyer confidence, high demand, etc, then offer it to the company and receive more wave energy than originally expected due to the higher rates. Of course, if the rate drops, less energy will be received.
4. Offer it to the company at the going rate and so buying a certain amount kWh wave energy. And if demand is higher than production, enter a waiting list. If the rate goes up or down after that, it's the company's risk.
5. If 4 years after buying a certain amount of kWh wave energy in an owners market the company has not been able to deliver, the owner can demand that the company returns the amount of kWh back in fl. at the same rate it was bought.
6. Offer fl. to the company at the same time as buying them at the same rate, fixing the price of the wave energy so bought at € 0,04/kWh.

3.4.1 Example Florin rates



fl. rate example

One fl. is the amount of kWh wave energy that can be bought for the going fl. rate divided by € 0,05.

Profit
In above example the initial fl. rate is € 0,04/kWh, meaning that for 1 fl. you can buy € 0,04/kWh divided by € 0,04 = 1 kWh wave energy. If 1 fl. is bought on day one, it costs € 0,04. If it's offered to the company on day 19, the amount of energy obtained is; € 0,09/kWh by € 0,04 = 2,2 kWh. Due to the rising rates, wave energy has become cheaper.

Loss
But if 1 fl. is bought on day 25, it costs € 0,30 and if then offered on day 33, it will only get you € 0,02/kWh divided by € 0,04 = 0,5 kWh. Due to dropping rates, wave energy has become quite expensive; 0,5 kWh for € 0,30.

Fixed
If 1 fl. is bought on day 49, it costs € 0,50 for € 0,50/kWh divided by € 0,04 = 12,5 kWh. If it's offered to the company the same day at the same rate, the 12,5 kWh physical wave energy so bought costs €0,50 (€ 0,04/kWh). By buying and offering at the same time, a fixed € 0,04/kWh is secured for the wave energy bought, no matter how high the rates.

Waiting list
After buying a certain amount wave energy, the company might not be able to deliver the wave energy right away and you enter a waiting list, but the price is set and any rate fluctuation after buying is the company's responsibility. If 4 years after purchase of f.i. 1 kWh at € 0,04/kWh (fl. 1) still no wave energy has been delivered, the user could demand that the company returns the 1 kWh in fl. If the then going rate is € 0,03/kWh, he gets fl. 1,33 back. The fl. 1,33 represents 1,33 kWh at a then going rate of € 0,03/kWh = € 0,04 (what was originally paid).

4 Organization

4.1 Team

Managers that buy themselves in and diligently forward the company's objectives like the milestones, qualify for appreciation in shares. Thus management consists of motivated and in their respective fields of expertise knowledgeable team members.

Erwin Croughs sailed the words oceans for over a decade and then specialized in design, development, production, and marketing of products. A prolific award winning innovator, frequently introducing successful new products like the Doggy, a self adjusting outdoor table, first prize at the Horecava innovation Awards 2005. He founded SMS Projects in 2012 to develop the Slow Mill. Responsible for organization, administration, purchase and overall development

E. Croughs
Executive Director

Erwin Meijboom is cofounder and has a technical background in Wageningen, specialized in environment and sustainability issues. Founder of Elias Consulting and manager at Hoogheemraadsschap Delfland, experienced in the field of water management and as consultant for corporate issues. Responsible for scientific research, quality control and external report.

E. Meijboom
Scientific Research

Patrick Gaynor is cofounder of SMS Projects and member od the advisory board, responsible for mid and long term strategy and business development. He has cofounded and guided successful businesses with long term goals and held positions on several boards of various government water management agencies.

P. Gaynor
Business Development

Patrick Jansens has a background in steel construction and specializes in plate steel. He made the previous Slow Mill models and helped construct, install, set up and execute the lab tests. Responsible for construction, installation and maintenance of the models.

P. Jansens
Construction Engineer

4.2 Partners

As the Slow Mill opens new opportunities for wave energy application, renowned research and market parties are interested in joining the development. Partners that have signed up for cooperation, development and semi commercial application are listed below:

Deltares is an independent applied research institute, for water and underground. Worldwide we develop smart innovative solutions and applications for people, environment and society. We focus mainly on delta's, coastal and river regions. As management of heavy populated and vulnerable regions is complex, we seek cooperation with governments, knowledge institutes, businesses and universities. Our motto is; "Enabling Delta Life" and we maintain high standards for the quality of knowledge and advise.

NLR has vast expertise in composite material applications, manufacturing processes and optimization of composite and hybrid structures. It produces test articles in-house for assessment of the material choices and structural properties, as well as life cycle related issues such as wear, deterioration and estimated life time in non-optimal conditions. NLR is highly motivated to tackle the optimization issues for the Slow Mill wave unit using their existing aerospace analysis and optimization tools like our in-house developed multi-block structured CFD-system ENFLOW.

MARIN is the leading maritime research institute in the Netherlands. For more than 80 years, MARIN has been contributing to the development of safe and economic ships and offshore structures as independent advisor. With the resulting knowledge of the ocean environment and the hydrodynamics of ships and offshore structures, MARIN sees it as its responsibility to contribute to the development of renewable energy offshore from waves, tides and wind. Slow Mill is one of the energy saving devices which is obtaining energy from the waves. Within this project, MARIN will determine the efficiency and yields of the Slow Mill unit in waves and current by means of model testing. All parameters of relevance will be measured and reported.

NIOZ Royal Netherlands Institute for Sea Research is the national oceanographic institute and principally performs academically excellent multidisciplinary fundamental and frontier applied marine research addressing important scientific and societal questions pertinent to the functioning of oceans and seas. Second, NIOZ serves as national marine research facilitator (NMF) for The Netherlands scientific community. Third, NIOZ stimulates and supports multidisciplinary fundamental and frontier applied marine research, education and marine policy development in the national and international context.

Rijkswaterstaat is responsible for the design, construction, management and maintenance of the main infrastructure facilities in the Netherlands. This includes the main road network, the main waterway network and water systems. Rijkswaterstaat is part of the executive body responsible for implementing the policies and regulations of the Ministry of Infrastructure and the Environment. It conducts research and carries out tasks relating to the environment and manages programs for other clients, such as other ministries and local authorities.

Engineering Office Rotterdam has lots of knowledge and experience in infrastructure, technology and environment. It translates the ambitions of clients into robust results, working together with local businesses to come to the best possible results for our customers and people of the city. Many highly experienced, skilled and enthusiastic professionals work every day on challenging projects in Rotterdam.

NAM operates 44 offshore gas and oil production platforms in the North Sea and supports decentralized sustainable energy solutions to provide clean power to her remote locations. It will accommodate power supply works to one of the platforms and allow initial testing of wave energy delivery.

Gemeente Texel .txl

Municipality Texel has the huge ambition to become fully sustainable in 2 or 3 years and thus supports new ways of sustainable energy generation applicable to the specific conditions of the Wadden-islands. This region is world heritage and needs to preserve its scenery and tranquillity, eliminating wind turbines as an option. Thus the addition of wave energy is very welcome, not only because it has the potential of making the islands sustainable but also because the energy taken from the waves may very well protect coastlines and the concrete anchors may provide an underwater sanctuary for local flora and fauna. In order to facilitate different forms of sustainable solutions, it has created a testing area for local businesses.

mocean

Mocean Offshore BV is an engineering company with has specialized in the analysis and modeling of offshore dynamic systems. Our core business is the analysis of offshore floating bodies and their mooring and installation phases. We analyze the loads and accelerations of the various components and provide summarized design loads to other engineering teams. The main problems to be solved are the complex modeling of the system in which the wave forces on the "blades" are unique in the industry. Other problems are to model correctly the floater and the behavior of such a unit while being half-submerged. The hydrodynamic response of such units is partially defined by drag and inertia loads while also there exist relevant wave diffraction loads. Normally either of them is irrelevant however in the current type of system both are to be combined which is a large engineering challenge.

Elias Consulting
Creating value for life

Elias Consulting advises new companies, has experience in collaborate research projects, evaluating test results and reporting progress, especially pertaining to sustainable and environmental issues. It will interpret and extrapolate data provided by the partners to calculate the financials of the business plan and present various scenario's and draft progress reports.

ROTEC
Composite Group

Rotec Composite Group designs, manufactures and supplies premium quality composite flanges, fittings and pipes in Glass fibre Reinforced Vinylester - GRV - and Glass fibre Reinforced Epoxy - GRE -. We will supply products rapidly without compromising quality. By keeping many of our products, including pipes, in stock, fast delivery is one of the key benefits we offer to our customers Our team of technical specialists and service-minded staff have years of experience and are fully aware of our products' possibilities and our company's abilities. Besides the range of standard products, Rotec offers customized flanges, fittings and other custom made composite products in all sizes.

4.3 Promotion

This year a lot of promotion will be done on the Wadden-isles and especially on Texel where first delivery is expected in 2020. On 14 April the company is present in the Ridderzaal to represent and lobby for wave energy and on 15 May a it joins a trade delegation to the Wadden-isles and Leeuwarden. During the entire year of 2018 the Slow Mill can be seen in the Maritime Museum Rotterdam. In October it will be present at Innovation Expo of the Dutch government, the largest exhibition of new technology in the Netherlands. A professional movie will be made by Eef de Graaf about the energy transition of the isles in which the Slow Mill plays an important role. Local and national tv will be invited when testing at Texel starts and presence on the international currency trade platforms will increased when the fl. is up and running.

5. Transition

5.1 Financing green energy projects
The energy market today is dominated - 78,4%6 of the total energy supply -by grey energy despite the transition. This process has accelerated in the last decade with oil prices reaching record highs in 2008 and a push towards the search for alternatives. Many developed countries with the support of government during the Kyoto protocol have established renewable energy support programs with variable success to achieve protocol defined goals.

Transforming an energy market in development for over 100 years to run on clean energy is a difficult task, requiring great amounts of capital. Investment thus far, have enabled a renewable energy level of 21.6%. Moving towards a decentralized future, this market must appeal to investors. Capital availability today is the most important issue for any project developer. On different levels, this is dominated by banks, funds, etc., where the goal is always to maximize their share of profits. These high profit percentage requirement slows developers by minimizing their returns and their ability to reinvest income in new renewable projects. Debt providers (banks) are not usually open to projects without a substantial amount of equity capital already raised. Naturally, current investment consideration becomes a very difficult and lengthy process, requiring from 3 to 6 months to conclude an agreement in addition to the time a developer spends locating and researching investors.

With the increasing percentage required of initial capital for renewable energy development projects, capital availability becomes an even more important issue as banks increase the demand on higher initial capital/ debt ratio from 20:80 to close to 50:50 for new developing projects. This makes equity a very expensive source of finance, due to limited availability and increased requirement of such. 77% of the financing in previous years was done through Project financing. Changing debt structure will have a significant impact on the available debt and thus total investment in the market.

Another problem linked to the changing financing structure of energy production at market price is the participation of individuals in the market. For example, a number of peers participating in the energy market investments are negligible. High net worth individuals (HNWI) make up the majority of investors in infrastructure projects such as renewable energy production through Private Equity funds. The general public is faced with these barriers to enter the market and invest:
1. Minimum investment amount - at least 125,000 EUR
2. Long capital lock-up times - 10 years for a typical fund
3. Lack of knowledge of fund manager reputations and trust in their team

5.1.1 Current working model – attracting capital
The conventional investment process is lengthy and inefficient. In order to acquire financing, the renewable energy producer must:
1. Analyze the site of energy production compared to other sites
2. Analyze regulations to bring the project online and risks of completion
3. Analyze and selecting equipment to suit the business case
4. Analyze and selecting a construction company with experience and acceptable business practices
5. Analyze other risks that may come from development of the project

The above list may vary depending on the specifics of each project development but it is a necessary process and cannot be rushed. The next step for a developer is to search for the financing of the project. Raising capital is a gamble. Every investor and/or bank must:
1. Check if risks are acceptable for the investor considering its return
2. Compare the investment and its return with other investment opportunities with similar return and risk ratio

These projects go through technical, legal and financial due diligence. This is not a standardized process and varies from investor to investor and bank to bank. Current project cost depending on the size of financing involves:
1. Tech Due Diligence - By the third party to assess technical risks
2. Lawyer structuring fees
3. Bank lawyer structuring fees and associated cost -1.5 to 2.5% of debt size
4. Equity - Fund Structuring costs 1.5% - 4% depending on the ticket size

In many cases this is a ineffective way of raising capital and the number one issue delaying most projects. A large part of this is administrative, negotiating the acceptable risks of a project, cost of risks and their coverage, lack of initial equity capital, etc.

5.1.2 Standardization of Florin issue

Capital requirements are met by selling energy to be produced in the future in the form of fl. As capital is received prior to construction, the price of electricity to be delivered is set. This decreases the need of initial capital needed for construction. Once the delivery of energy according to the concluded initial smart contract is complete, the company sells the rest of produced energy at market price. This way the company gets the full benefits of plant energy sales, sharing the benefits of a fixed energy price with consumers and taking advantage of higher future income flow on less capital initially invested and no interest to be paid. This system simplifies the capital raising process to unlock value currently untapped by connecting wave energy with the global financial markets and every user of the internet.

5.1.3 Speed of investment

The disruption of financing has begun with further development of transaction scalability. The process will streamline further with the development of the necessary tools to make the process as smooth as possible. Reducing the time from consideration and negotiations to investment from 3-6 months to a few clicks after reviewing terms and understanding the ROI of wave energy.

5.1.4 Allocation of investments

SMS Projects will use 90% of the received funds for wave energy generation and buffering technology development and scale up (building better and more wave farms and utility integration systems). 4% of funds will be allocated to administration, operating the digital fl. technology and ensuring compliance with the energy sector requirements. 4% will be reserved for PR and media purposes to promote wave energy technology and implementation on an ever increasing public platform, ensuring higher demand and boosting fl. rates. 2% will go to the war chest defending against any threat to legal implementation and operation of the Slow Mill technology, ensuring the ethical distribution and use of its products. This comprises a rather broad area as even without anyone suing the company, it can still work legal cases to prevent future attack, stagnation or hostile take-over.

5.1.5 Investment security

Each new project aims to begin as quickly as possible and as soon as it has started, the 4 year delivery period kicks in. The aim is to always deliver the energy bought in any area it becomes available, but in case it cannot be delivered within 4 years, the company takes responsibility and returns the original investments if requested. If no refund request is filed, the energy sold will still be delivered at a later date when capacity is up.

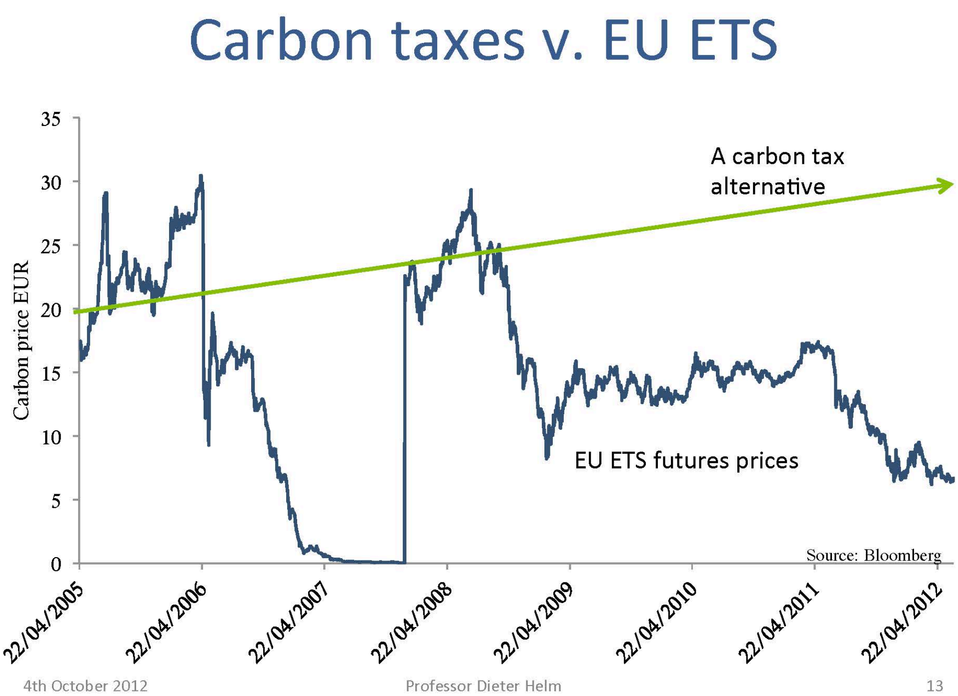
5.2 Green energy market

5.2.1 Carbon trade

The European Union Emissions Trading System (EU ETS) is the biggest CO2 emissions trading scheme in the world. It set an overall legal limit on CO2 emissions of over 11.000 power stations and factories ('installations') within 30 countries and accounts for almost half of the EU's CO2 emissions. Each 'installation' receives permits to pollute which are called European Union Allowances (EUAs). The rest is up to the market: the scarcer these permits become, the more their prices rise. This makes pollution more expensive and encourages the reduction of emissions. Installations must report their CO2 emissions and ensure that they hand in enough allowances to the authorities to cover their pollution. If emissions exceed what is permitted by its allowances, an installation must purchase permits from others. Conversely, if an installation performs well, it can sell its leftover credits. In theory, this allows the system to find the most cost-effective way of reducing emissions without significant government intervention – which is always the neoclassical red thread.

How did the ETS work out? The price of allowances increased more or less steadily to a peak level in April 2006 to about €30 per ton CO2 – according to many economists this is the minimum threshold for the trading system to become effective. Subsequently, prices dropped and never recovered. In May 2006, prices fell to under €10 per ton. One year later, in March 2007, allowances were traded for € 1.2 per ton before dropping to almost zero.

According to the European Commission, in 2010 CO2 from big emitters covered by the scheme had decreased by an average of 17,000 ton per installation, a decrease of more than 8% since 2005. Emissions from installations covered by the scheme fell by 11.6 per cent in 2009, having fallen by around 5 per cent in 2008. However, as Oscar Reyes from *Carbon Trade Watch* writes, the figures need to be set against falls in production of electricity and industrial goods of 13.85 per cent in 2009 as a result of the financial crisis. Germany consumed 4.8 percent less energy in 2011 than in 2008. This also made the prices of EUAs fall as industry required less allowances. The system did not function because the cap was way too high. This has always been the problem. Figures for 2010 show that emissions rose by over 3.5 per cent in 2010, compared to 2009 levels. The ETS miserably failed to deliver a consistently rising carbon price necessary for long-term, low-carbon investment. The third phase of the ETS will run from 2013 to 2020. The stated aim is to achieve a 20% reduction in greenhouse gases by 2020 compared to 1990 levels. As Reyes writes, this falls a long way short of what climate science suggests is needed to create significant impacts. A carbon tax would solve many problems and would potentially be extremely effective.



According to UBS Investment Research, the ETS cost $287 billion through to 2011 and had an ‘almost zero impact’ on the volume of overall emissions in the European Union. According to the UBS research, the money *could have resulted in more than a 40% reduction in emissions if it had been used in a targeted way, e.g. to upgrade power plants.* What it accomplished instead was that it rewarded major polluters with windfall profits, while undermining efforts to reduce pollution and achieve a more equitable and sustainable economy. This is a direct consequence of the market approach. All of this has very well been documented. Companies have consistently received generous allocations without having the obligation to cut emissions. Power companies gained windfall profits estimated at €19 billion in phase I and up to €71 billion in phase II. For the most part, this resulted in higher shareholder dividends. Very little of the ‘profits’ were invested in transformational energy infrastructure. The third phase of the ETS still significantly subsidizes industry. Energy companies successfully lobbied for an estimated €4.8 billion in subsidies for Carbon Capture and Storage (CCS) and biofuels. The final agreement contained a surplus of pollution permits for the cement sector that rewards the continued use of dirty and out-dated production methods.

Energy-intensive industry routinely received extremely generous allocations of permits – a structural surplus of between 20 and 30 per cent in the case of the steel sector "our competitive steel that needs protection from China’s ‘excess’ capacity, who’s government has the temerity to intervene in the economic process". Estimated value of this over-allocation to industry in phase II of the ETS is €6.5 billion, mainly for steel and chemicals. As if this is not already beyond belief, rules governing the entrance of new actors to the scheme resulted in generous awards of free certificates for hard lignite plants, which contributed to a ‘dash for coal’ in German power production. All of this – remember – in order to fight climate change.

The fossil fuel refineries and the steel sectors routinely passed on the entire “cost” of EUAs – which they received for free – to consumers. The windfall profits received by these sectors in the first phase of the scheme were estimated at €14 billion. When the third phase of the ETS was announced, full auctioning was heralded as being around the corner and, with it, the end of subsidies. However, by the time the Directive was agreed upon, industry had clawed back most of its free permits. The ETS is at the mercy of a complex interaction of state and corporate power. Those with the loudest voices have successfully pushed for rules that allow them to escape their responsibility to change industrial practices. It is a fundamentally flawed system, setting up a system of property rights for continued pollution, and transposing environmental objectives into the kind of cost-benefit trade-offs that led to the problem of climate change in the first place.

5.2.2 The current green energy certificate market

Currently, green energy certificates operate as guarantees of the origin of electricity production and are accounted for by different entities assigned to do so in each country. In the European Union, the Transmission System Operators (TSOs) are typically responsible for this task. In principle, green energy certificates are derivate energy products and can be purchased separately or together with consumed energy.

Green certificates are usually obtained on a monthly basis, if the following conditions are met:
1. The energy producer operates in the renewable energy market
2. Any subsidies must be declared on the certificate (otherwise the certificate might not be tradable as it is seen that support is granted by means of subsidies)
3. Issue of certificate is based on the principle 1 MWh – 1 certificate

There are a number of issues with the current way green energy certificates are managed:

1. Does not support further green energy production.:
Current producers and traders of green energy certificates have no formal obligation to invest the proceeds of sales of the green energy certificates into further green energy generation capacity. Furthermore, as there is no information about the geographical location of the green energy, these two aspects combined means that there is no mechanism to use the green energy certificates to further speed up the transition towards renewable energy. There is no effective mechanism to support local green energy production.

2. Transparency indicating whether green energy is subsidized or not.

In the European Union, it is up to national policymakers to decide if subsidized green energy production can receive green energy certifications or whether they can be applied only for non-subsidized energy. As a result, in some countries subsidized green energy production receives green certificates but not in others. This lack of transparency distorts the market and may miss-align incentives for further investment in green energy generation. A wider EU solution to harmonize disclosure and transparency is required. And while national solutions can be reliable, integration of the current national disclosure systems would be very costly.

3. Lack of transparency and disclosure for consumers.
Although disclosure might appear to consumers as an abstract and complicated topic, it is important that they know they can trust the system information. How the system works must be made accessible for consumers demanding this information. Consumers are becoming increasingly aware that by buying electricity based on renewables, they cannot be guaranteed they will physically consume electricity produced by renewable sources (as mentioned above - green energy certificates are derivative products). It only ensures that the same amount of electricity (which is consumed) has been generated by renewables somewhere in the electricity market.

4. Lack of details in accounting green energy.
The data concerning guarantees of origin is managed by different local institutions in each country on a private ledger. Green energy certificate production may or may not match the green energy certificate consumption in each country. In such a case, the inter-country balancing is done via cooperation of the local institutions and regional energy exchanges by adequately adjusting the ledgers for such data for each country. However, there is no single standard and source of information, therefore it is difficult for the customers to know and trust the exact source of the green electricity they consume.

5. Fragmented implementation of green energy certificates.
The implementation of the guarantee of origin system has primarily had a national focus in most countries. Customers would benefit insofar as the costs of the traded guarantee of origin would be made transparent and guarantee of origin trading could be more cost-efficient. Both energy consumers and regulators have expressed a need to introduce platforms capable of making inter-market trading of guarantees of origin more transparent, secure and non-discriminatory through harmonization.

6. Barriers to entry for smaller residential users.
Currently, one guarantee of origin equals 1 MWh which is more than the typical monthly consumption of a residential user. Further more, certificates are usually purchased for a period of 12 months (equaling their maximum longevity). This means that residential users are forced to predict their consumption and round it up to the next MW, meaning they risk overpaying for energy if they seek a 100% green energy consumption.

5.2.3 Wave energy and green certificate trading transformation
Not every country is the same; some are blessed with sunshine, others with wind and others with powerful rivers or other hydro resources. However, investments should be done where they would bring most impact producing energy at market price and without subsidies which pose the risk of Governments changing positions on subsidies or sometimes implementing extreme changes like President Trump's view on energy and climate change. With simple standardized terms of smart contracts running on the blockchain, without required trust in middlemen and with global access to investments, everyone is provided fast, secure and cheap access to wave energy. This realization has come with the growth of blockchain use. The disruption of financing has begun with further development of transaction scalability. Reducing the time from consideration and negotiations to investment from 3-6 months on average (taking into account all negotiations with funds and banks when the project is ready for investment) to a few clicks. Transparency is one of the main features of public blockchain that eliminates the need for trust. All contracts, due to their transparent nature and presence on a public blockchain, make the investment structure clear. All conditions of the power purchase agreement, which will work as a smart contract, is easily verifiable.

Clear, transparent and trustworthy electricity production disclosure, i.e. green energy certificates, are essential if a voluntary, consumer-driven market for renewables is to be created. Furthermore, green energy certificates are a fundamental tool for supporting consumer awareness and choice. The energy market requires further integration of the different disclosure systems in a more efficient and reliable way at an international level; an efficient, affordable and harmonized solution which has the potential to be established as a best practice in the industry.

The use of fl. allows;

1. Purchase of wave energy and have automated and verifiable proof of the amount of energy purchased via the information stored on the blockchain.
2. Purchase wave energy more efficiently as both the energy and method to guarantee its origin is the same product, instead of procuring energy and green certificates as two separate products.
3. Ensure that the purchase of green energy products actually promotes the development of green energy products by effectively purchasing future green energy, unlike now, where there is no legal obligation or technical way to ensure that revenue for green certificates is spent on promoting more green energy.
4. Ensure that local generation is supported, as it becomes possible to track the exact geographical origin of each green energy MWh produced.
5. Receive all information about the energy certificates purchased, the location of the production, trade data, dates, grid integration enhancement and whether the production is subsidized.

5.3 Development stages

The fl. system connects smart contracts based trading and investment capabilities to local wave energy plant construction, energy retail and flexible markets. The roadmap to realizing these features is divided into 3 general stages of expanding complexity. All three phases completed will form the technology stack for a next generation world wide green energy company, one that encompasses all technological and process capabilities of a traditionally integrated utility but is purpose-built for the emerging decentralized, democratized and decarbonized energy market.

5.3.1. Stage 1. investment, trade, consumption of energy & smart contracts

The objective is to integrate the fl. token with global trading platforms connected to regional energy retail markets with the capability to sell renewable energy. It is concluded when a user can invest in certified wave energy and consume or cash out whatever he or she desires. To invest in wave energy, the high level flow is as follows. When a plant is first planned, an estimate of its energy production pattern and estimate the future-generated power is made. This is converted into smart contracts called fl. that are offered for sale. Tools to view and evaluate wave energy projects under development to find suitable investment opportunities will be promoted on world wide platforms by our team. Internal trading features will be developed first, other market integrations will be added later. Each market will vary slightly with its rules, so at this stage the user will have to choose the target market. To make the trading operations across this complex landscape easy and usable, a wallet system will be developed, allowing for easy fl. transferring and redemption.

5.3.2. Stage 2. enabling high penetration of wave energy

As more plants and consumers get connected, additional optimization capabilities are developed for local power grids in order to fit more green renewable energy into the grid and onto the platform. Since this deals with power grid integrations, it is also the most complex phase. A basic understanding of wave energy impact on the physical grid layer is required to understand what kind of optimization is needed. The impact of wave energy on electricity grids and electricity use can vary dramatically on short and medium time frames, depending on the time of the year, people movement, weather patterns and other difficult to predict events. Electricity generation is adjusted to changing waves and power demand by dispatching more or less power based on demand, ability to scale up and down and price. Optimization of energy generation in order to satisfy energy demand at each moment of time is the classic role of the transmission system operator (TSO). The supply of that energy to each and every consumer is the role of the distribution system operator (DSO). Current electricity grids are designed around centralized large generation units that are using steam, heated by various fuels, to spin large rotating turbines at a stable speed of 50Hz. Wave energy by its nature is not centrally connected to the grid at a single point, but represent distributed electricity generation that has varying, not stable, energy supply profiles. The Slow Mill has some storage capacity to even out irregular waves thus it can also temporarily crank up or down production using the same storage. But many innovative schemes like storing energy in cooling cells, the municipal water supplies, electric cars and houses, steam, etc, are to be implemented before a fully sustainable society can be accomplished. Since this deals with power grid integrations, it is however the most complex phase.

5.3.3. Stage 3. Grid of today challenges

Electricity grids are not designed, planned or operated to take full advantage of distributed green energy resources. The impact of varying loads on the energy infrastructure planning and operations carries a significant cost for society that is paid by all consumers as a regulated grid fee component. The fl. gets a prediction function and markets will always know where the energy comes from and when to expect which amount. In order to coordinate distributed wave energy production into a wholesale market-capable offer, aggregation capabilities are integrated and tested, according to the requirement on wholesale markets to offer bundled energy. Congestion management and frequency regulation services, supported by Slow Mill storage technology, will be sold on the flexibility markets - both “slow” and “quick” activation will be supported; “Slow” load activation (max within 15 minutes); “Quick” load activation (max within 5 seconds). “Quick” load activation will be used for business use-cases where the grid requirements assume a near-real-time reaction time (e.g. for the primary frequency reserve). Congestion management refers to avoiding or relieving congestion and the Slow Mill can serve this market as well. It will need functions that allow a TSO to instantly increase or lower wave energy production. The fl. will eventually integrate the congestion market, creating additional use and income by trading between wave farms and users to adapt production and consumption to guarantee grid stability.