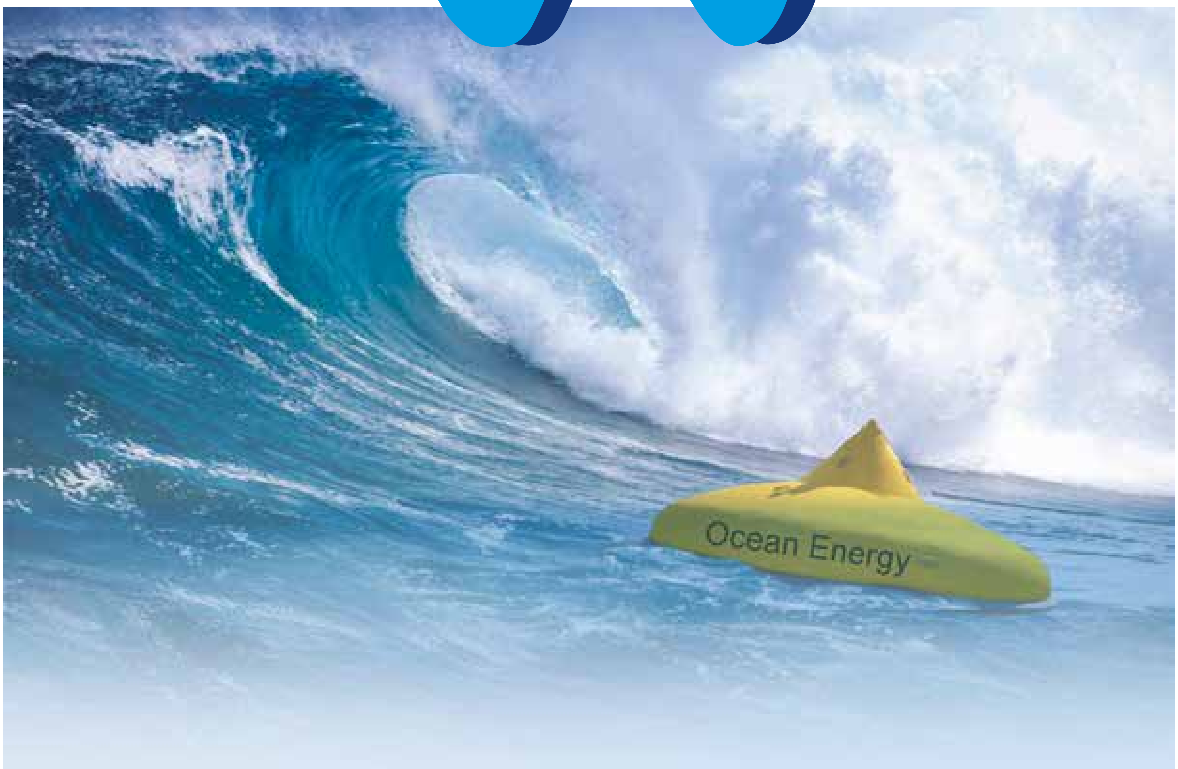
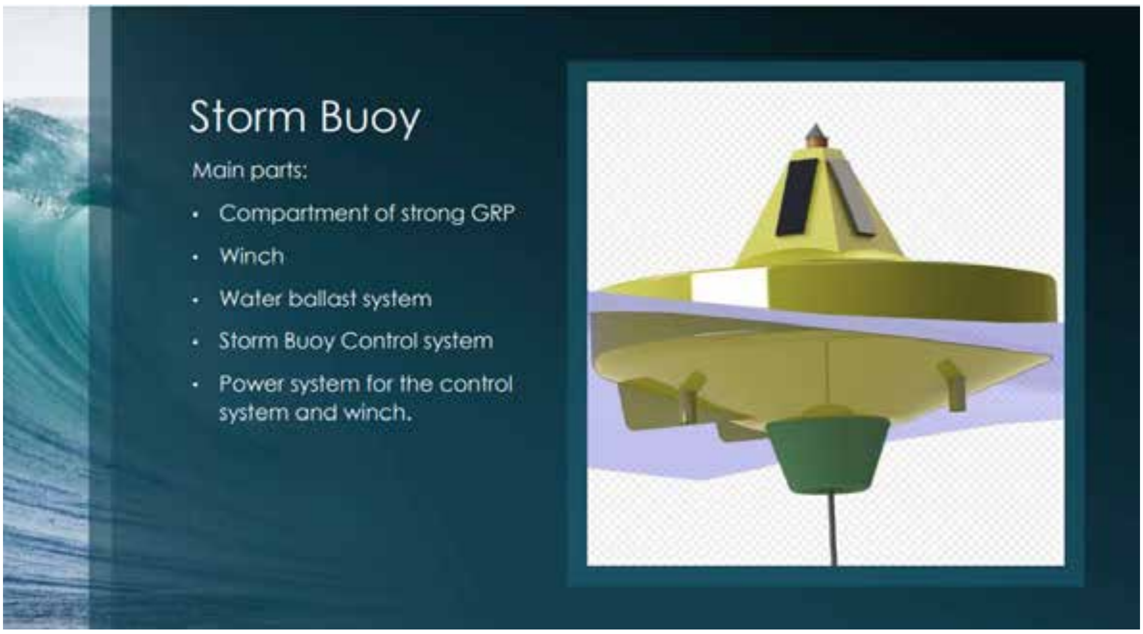
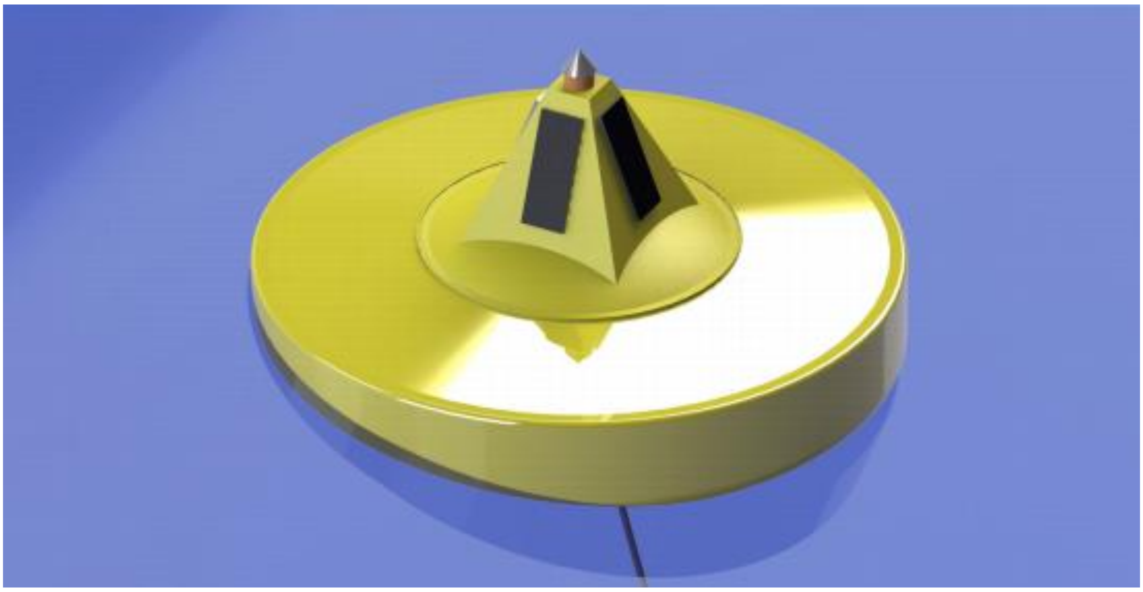


Ocean Energy's submergible and patented floating buoy
THE BALANCED SYSTEM (The Storm Buoy)

OCEAN ENERGY AS
OCEAN ENERGY TECHNOLOGY AS

February 2024





"All truth passes through three stages.
First, it is ridiculed. Second, it is violently opposed.
Third, it is accepted as being self-evident."

Arthur Schopenhauer (1788-1860)

INTRODUCTION

The energy company Ocean Energy AS has during the recent years developed and patented worldwide, a complete solution which has solved the greatest problems for all previous attempts to create wave power plant solutions, which has been wreckage during extreme weather conditions. This in addition to running and dynamics, to be able to handle all types of wave heights in a normal operating situation

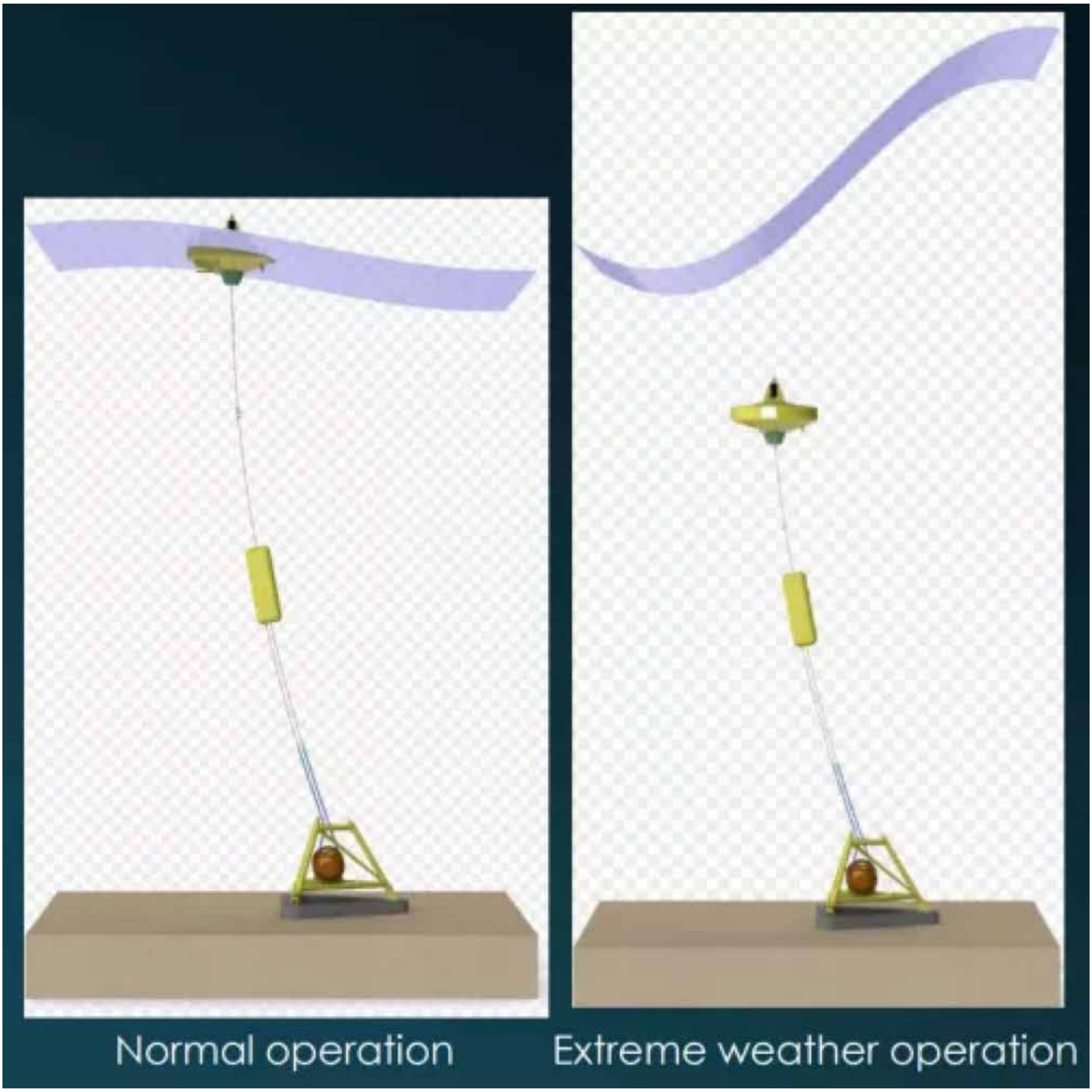
With the invention of the Balanced system, «Storm Buoy», the wave power station will be able to withstand the enormous natural forces which everything offshore is exposed to. This wave power station will survive even the most excessive type of weather because the floating part on the ocean surface will automatically submerge below the surface by extreme weather and by that is able to avoid the «crisis» when the bad weather is raging. The generator itself is placed on the sea bottom and will generate the electric current through a new and innovative solution which is based on a magnet gear (MLS) combined with a conventional el-generator.

The patented principle is a stepless levelling in the Balanced System which makes the system automatically receive and regulate for all normal wave heights which are received and simultaneously adjust for the differences between ebbtide differences. The System will have no limitations for wave heights or stroke length.

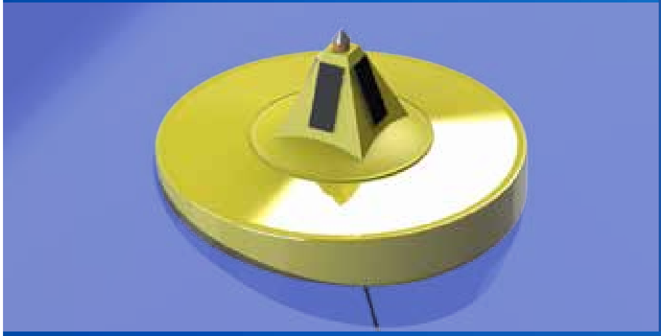
Leading Cooperation Partners
The development and experience collection for the part-components of The Balanced System has been going on together with Scandinavian partners since 2010. The Company has among others cooperated with the Swedish based Uppsala University and the Danish Aalborg University, and today with the SINTEF based departments in the University in Trondheim. All the experiences we have gathered from this development work, allow us to a commercial break through with the complete solution: The Balanced System, and can start the work of the full development together with the University environment in Trondheim.

The new and collective wave power energy plant might mean a revolution within this last and very little developed branch of completely «green» energy on a worldwide basis.

Ocean Energy AS has founded a daugther company OCEAN ENERGY SOLUTION AS, in order to work on the international market.


Normal operation
Extreme weather operation

Storm Buoy



Main parts:

- Compartment of strong GRP
- Water ballast system
- Storm Buoy Control system
- Power system for the control system.

Submerged Buoy

Main parts:

- Standard buoy approx. $3m^3$
- Modified to the concept

Seabed Unit

Main parts:

- Strong steel structure with quick release maintenance system.
- Concrete base foundation aprox. 30 tons.

THE PROJECT

Description of the idea:
The founders behind Ocean Energy AS (OCE) have during a period of approx. 10 years worked out and patented a simple and robust wave power station, based on direct electric induction in a linear generator in combination with robust floating buoys. This solution is today patented world-wide. (PTC Patent)

Based on a demand in the first patent of submergibility of the whole plant in extreme weather conditions, OCE has thereafter patented a general submergible floating Buoy (The Storm Buoy) which automatically is submerged by extreme weather conditions to avoid wreckage when waves are extremely high. This buoy can be combined with the Company's own generator concept or with other wave generators which are available in today's market, or which will, most probably be available in the future – also as a separate product.

Which existing demands and/or challenging solutions will this unique idea produce?
A lot of successful attempts to create wave power stations, both in Norway and internationally for more than 30 years, and a repeating problem has been that they quite fast are wrecked by bad weather and waves during the winter season. Norway's most advanced expert in this field, concluded after several full-scale trials that «It is impossible to create a commercial wave power station because they will be too expensive to build, the dimensions will be so huge that they will not be able to withstand extreme weather conditions – something like oil drilling platforms». He based his ideas on the fact that the solutions would be placed on the ocean surface all the time.

This saying was the basis for the Company's mind-blowing idea; to combine bottom-mounted generators with floating buoys which could be submerged with extreme weather conditions without a very expensive structure. (Compared to U-boats which rather dive a few meters below surface to avoid bad weather).

Furthermore, most of the earlier, unsuccessful wave power stations were mechanically created, often with conventional high rpm- generators mounted with hydraulic pumps and open wire-pull floating on the surface of the ocean – resulting in the solution not giving the wanted degree of efficiency. These constructions demanded a rather high degree of maintenance (if they survived the first winter storm).

These were the basic challenges which have hindered wave power stations to be developed commercially (compared to wind and sun energy stations) which Ocean Energy have solved with the Storm Buoy in combination with sea bottom mounted and hermetically closed linear generators in the complete solution, The Balanced System.

In which way did these ideas solve the needs and challenges?
Ocean Energy's total ideas and patents are based on the subsequent 4 basic specifications for a wave power station had to be solved through the process: The claims were put forward at the project's start some years ago and was defined after a founding analyses of the problem. All these claims and demands are now solved by the Company, together with the partners and involves the following 4 basic demands for a functioning system.

1. Simple wave absorption – «wave to energy conversion» - with optimal efficiency.
I.e. maximum 1 - one- power conversion from a physical ocean wave to electric current into the consumption network. Without the use of mechanical intermediate solutions with hydraulics, mechanical gear boxes or pulley- systems.

Solution: The use of the Company's own developed generator concept which generates the electricity directly in time with the wave's low frequency at the surface of the ocean, for thereafter to inter-connect more generators to produce a totally normal current which can be delivered directly into the network.

This anchored «Seabed unit» will be a steel construction which is anchored to a concrete base, which is easily reached for maintenance. The unit will be joined by means of two «pressure-chambers», each with 25-kVA (kilovolt AMP). The magnet gear (the MLS unit) will be a part of the construction. The complete «Seabed-unit» is filled with nitrogen gas before it is submerged, the gas having the same pressure as the surroundings at the planned depth. This is to prevent leakage and it will protect the unit against corrosion due to the lack of oxygen which will be expelled.

2. Marginal maintenance and renewal requirement
I.e. corrosion free contraptions without superflux and friction creating mechanics for the energy conversion itself.

Solution: The bottom-mounted linear generators are as mentioned above hermetically closed and filled with nitrogen gas in order to avoid any kind of corrosion. The power conversion takes place with a magnet gear (MLS) which will not contract running wear and tear as there are no point of touching between the magnets. The generator is placed safely at the bottom of the ocean in a protected environment and even temperature (2-4 degrees), minimal external influence, and stable cabling which is placed on the bottom of the sea to avoid breakage in the cables during time. Estimated time for this type of installation is about 15 years.

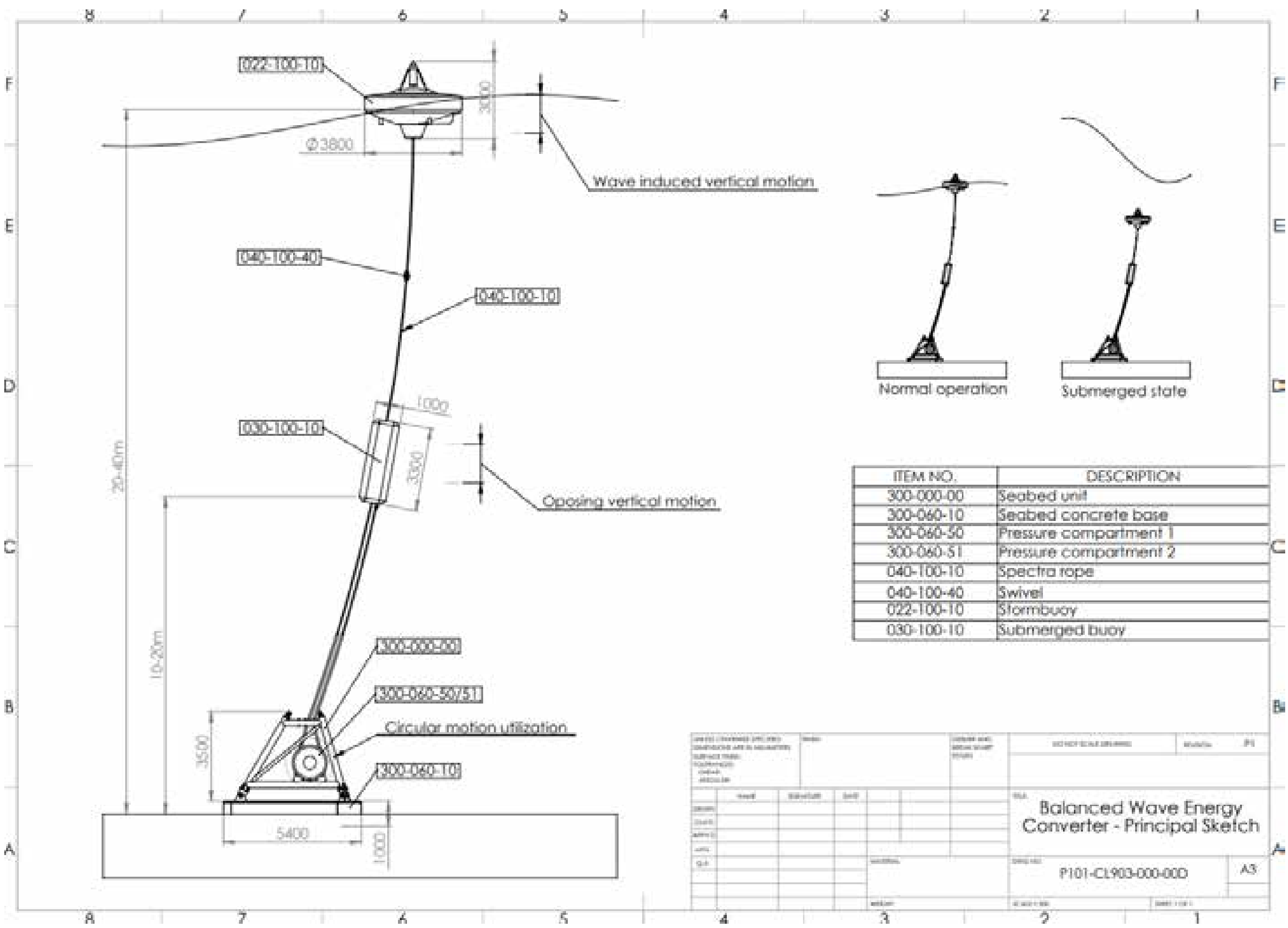
3. Damage-secure equipment
I.e. that the equipment by the few but estimated extreme occurrences of bad weather through the winter season, with simple means must be able to «initial adjust» the equipment in such a practical way that the equipment can endure these stresses for a limited period.

Solution: By extern manual command or automatically by hard and increasing stress, the surface buoy will gradually via compensation by the ballast tanks, the buoy will submerge to an underwater level which will make the buoy able to survive the bad weather at the surface. As soon as the conditions at the surface level is normalized an acoustic signal is given, and the buoy will again ascend to the surface. The ballast tanks will empty, and normal production will resume.

This is the Company's main product which has the name «The Storm Buoy».

4. Simple implementing in a commercial model.
I.e. that the wave power compounds must easily be able to be implemented in a larger concept for the commercial delivery of electricity to the land-based electricity network.

Solution: The System can be built successively and modularly out of 2 generator units to «parks» for up to 150 MW based and several hundred generator units. This will also simplify the investment for smaller units. One can for example start with a small «park» with 1 MWh (such as the plan for our future «test- customer» in Greece) and then successively build this larger when positive cash flow is obtained, and the earning power is good.



THE STORM BUOY - BALANCED SYSTEM TECHNICAL

The Balanced System consists of two buoys where one is placed on the surface where it absorbs energy directly by following the wave movements. In addition, one buoy should be submerged along the anchor line (which connects the two buoys), which again is connected to the generator in the «Seabed Unit» on the bottom. The system is connected by the anchor line being connected to the surface buoy, one side connected to the surface buoy on one side, stretches down to the submerged buoy to the generator wheel and further, stretches upwards and is coupled to the submerged buoy on the other side.

The surface buoy itself will be operated by a ballast system which enables the submerging. This has been tested and verified and will be one part of the complete system.
The system needs to be developed by advanced calculation models which analyses the weather conditions. We will utilize the internationally renowned university milieu in Trondheim to carry out the strengthening calculations on the component level. In the system needs to be able to compare weather conditions with earlier data and consequences through actions carried out.

The system will continuously collect data on produced energy, weather conditions, forecasts etc. will be available – so called «Big Data».
This will be an important element in what it is related to when the buoy submerges and is raised.

We will whenever this is possible, cooperate with the supplier companies who has the competence to lift this to a higher level. In this instance, it will be the company CTM Lyng AS, which will be responsible for the work concerning sensors, etc.

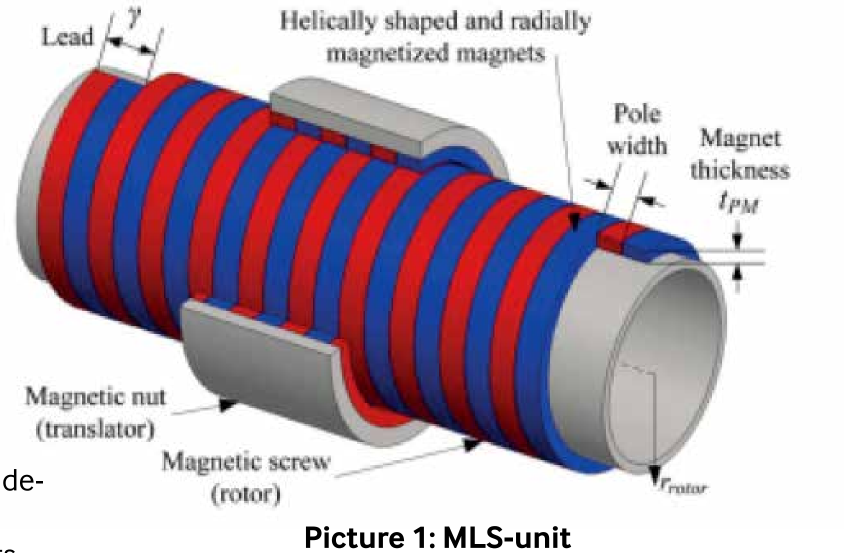
One other important innovation which we think will be decisive for a stabile production of energy is the magnetic screw (Magnetic Lead Screw – MLS). The magnetic shaping of the MLS-unit is based on a Hallbach-matrix on the rotor and a resistance-based transformer. The MLS-unit will be arranged between the generator and the fly wheel. Resulting in the vertical movement giving a rotation of the generator in both directions for every passing wave. This results in an even electric production.

The MLS unit utilizes the benefit of not touching the power transmission parts, and thereby minimizing the friction and increases the effectiveness. In addition, the unit has a power protection which the magnetic poles will jump past a pair of poles when it is subjected to higher power than the unit is designed for. This makes the MLS-unit especially well-suited for wave energy, as large waves will lead to high power load, which the unit is capable to resist, all due to the power protection.

By implementing an MLS in the bottom unit, «Seabed Unit», the movement from the waves is transmitted to the unit which converts slow going, linear movements to quick rotating movements. These quick movements will then be converted to electricity using a generator mounted on the MLS-rotor.

We have earlier together with Ålborg University worked in order to test prototypes of the MLS-unit. We have used considerable means to make the MLS-unit work in a smaller scale.
See the picture for the principle around the magnet screw (MLS).

1 Hallbach-array is a special composition of permanent magnets which increases the magnet field on one side while it reduces the magnet field on the other side.



Picture 1: MLS-unit

The wave technology

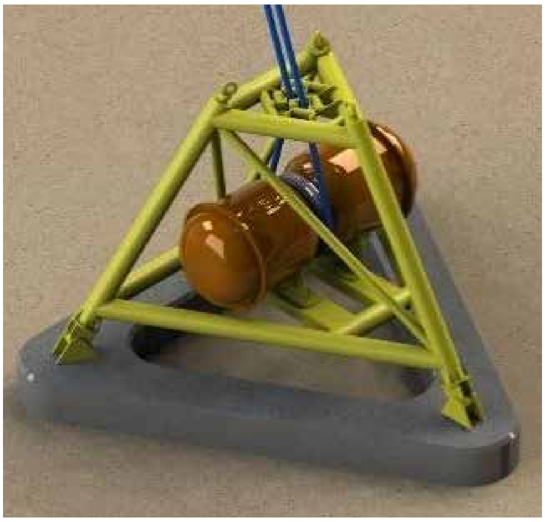
The wave technology consists of a set of components which one by one has been tested in a smaller scale, they have been evaluated, designed or prototyped. The further development will verify that the technology not only alone is functional but that the components are functional in a system.

The Wave Buoy

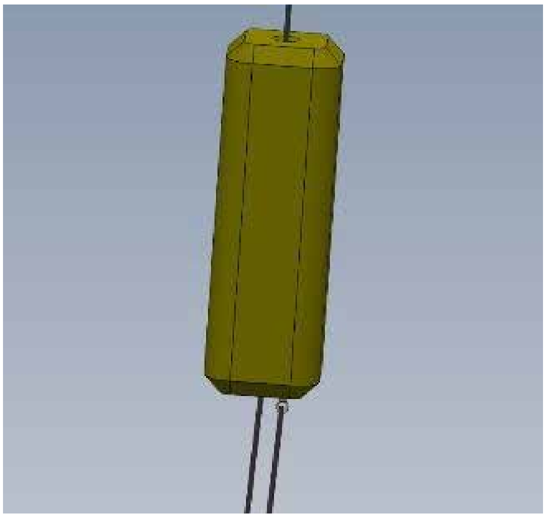
The diameter of the buoy is approx. 6 metres.

«The Storm Buoy» is equipped with a ballast system which will be filled/ or emptied during the submerging or raising of the buoy. The brain in the system will be placed in the buoy, just like a control or steering system which are handling situations at sea. In addition, the buoy will be mounted with a ventilation system which is handling the control and steering.
The anchoring unit, the Seabed Unit, will be a steel construction which is anchored to a concrete base, and which is easily accessible for maintenance. The unit will be coupled to two pressure chambers, each with a 25-kVA (kilovolt AMP) generator. The magnet gear (MLS) unit will be a part of the construction. The whole sealed «Seabed unit» will before it is submerged, be filled with nitrogen with the same pressure as its surroundings at the planned depth. This will prevent leakage and any form of corrosion inside the unit as a result of total lack of oxygen which then is expelled from the unit.

The Anchoring Unit



Submerged Buoy



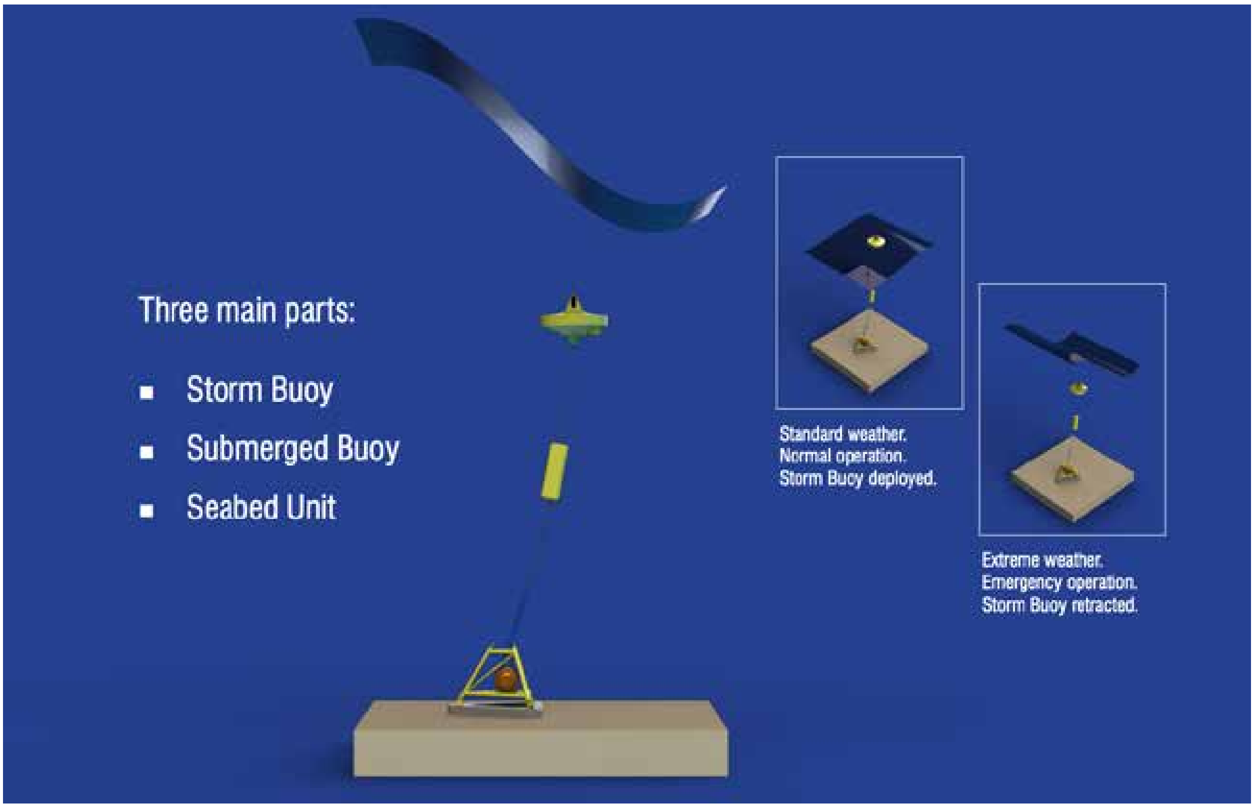
Gearbox

«Gearbox» without superfluous and friction-generating mechanics for the energy conversion itself. The magnet gear also has the unique feature that it also acts as a «shock absorber» at «jerk and snap» from the buoy at the top - because the magnets simply «slip over» at extreme loads and are virtually maintenance-free for long-term operation.

DEGREE OF INNOVATION

Ocean Energy AS is using a gathering of all their patents as basis for this project. The technology master develops further and optimizes s with the wave technology to make it economically competitive compared to other renewable energy sources. One goal is that the technology must be weather independent and be able to endure storms and other mechanical strains, which today's technology does not.

The further goal is to bring forward the balanced wave energy converter system, which is to arrange for the system to handle uneven movements, which normally influences such systems. – which enables handling of all running and normal wave heights (until) critical weather forecasts are announced and the system submerges from the surface of the ocean. This is quite a unique «point absorber»-solution and is the sole concept in the world to tackle this condition. The innovation was, when presented for the first time radical – which it still is. With the development done by Ocean Energy, which happened through time and by gradual innovations, we have now a complete concept, which we want to show is durable through time. With this solution it appears that a wave energy power station (plant), will appear to operate over time without being worn out – as we have seen other solutions struggle with today and which has a limited stroke length.



Ocean Energy Technology AS

THE BALANCED SYSTEM

Collaboration partners/subcontractors:

Bouy	Easyform	Måløy
Bouy	OVUN	Åndalsnes
Lightning	OVUN	Åndalsnes
Seabed Unit	J P Tenfjord	Tennfjord
Magnets	Ningbo Magnetic	Ningbo,China
Generator	Elmotor	Stavanger
Generator covering	Hydronic	Ålesund
Rope	MøreNot	Ålesund
Mecanical technology	Nogva Motorfabrikk	Haram
Design	West Maritime	Fosnavåg
Concrete unit	X- Betong	Ålesund

Ocean Energy AS

Ocean Energy Technology AS

CO2-ACCOUNTING

REQUIREMENTS FOR CO2-ACCOUNTING FOR THE SPECIFIC PROJECT:

In connection with Ocean Energy AS (OCE) and partners' application to the EU system's various funds for support for our renewable projects, it is a requirement for the project and the application that this specific project must meet the EU's own require- ments for CO2 climate footprint. So also for the OCE applications.

This is also ground- breaking work for OCE, which in fact has not previously been able to calculate the CO2-footprint for the very specific project with «THE BALANCED SYSTEM», i.e. wave power parks consisting of a number of units with THE BALANCED SYSTEM, including «THE STORM BUOY» (referred to as DBS).

We emphasize in particular that this is a very basic calculation of the CO2-footprint for this one specific project and NOT a general figure for wave power as such. If we look at other wave power concepts, they may even consist of heavy constructions in steel and other materials, which will give a completely different and higher CO2 footprint.

BASIC CO2-CALCULATION FOR DBS:
The consulting company BlueDay Technology AS in Sandnes has carried out the specific calculation of the CO2-accounts for the specific OCE project The Balanced System.

EU REQUIREMENTS FOR A CO2 ELIGIBLE PROJECT:
REQUIREMENTS: Less than 150 CO2 equivalents per produced MWh

Every application to the EU system is required to be accompanied by a CO2-calculation for the applied project. This is probably a good rule, because this means that applications which do not meet the requirements, will not be submitted.

It is projects which meet EU's CO2-requirements for an environmental project, which will receive EU support.

We can summarize the EU's requirements for an eligible project as follows:
A CO2-account shall be calculated for the specific project, which shall be calculated over a period of 10 years of life, including the production of all physical parts of the project involved, all transport and operation through 10 years, then removal and de- struction or recycling of all the physical parts involved in the project.

The requirement to be eligible is that the project has a CO2-footprint that produces less than 150 CO2 equivalents per produced MWh (MegaWatt hours).

As a comparison of such CO2 equivalents for the different energy carriers, see a separate table below here in the Memorandum.

A short comment on this EU requirement; - This is a pure requirement for calculation of CO2 within a calculated framework of «only» 10 years, and it will probably have a slightly different effect for the individual energy carrier. For example, it becomes very unnatural to envisage both a nuclear power plant and a major hydropower develop- ment, based on the entire project being completed and returned to nature in a per- spective of only 10 years.

OCE's project The Balanced system has a normally estimated service life of 15 years for a specific wave power park.

SURVEY OF OUR NORMAL ENERGY CARRIERS.

In order to get a certain balance in the assessments between the different existing energy carriers we have, we have to link some specific comments to different ones below.

Since the EU system has a very specific mathematical formula for calculating the CO2-footprint for a very specific project, there will also be some factors that are not captured by a one-sided CO2-account.

We can simply state that more than 80% of the total energy we use in the world comes from oil, gas and coal.

For Norway, the fact is completely different, since half of the energy we use comes from hydropower.

COAL POWER:

CO2-equivalent: 1300

Coal has been, is and will be a major energy carrier. The coal reserves in the world are enormous, and they are relatively easy to extract and convert into energy. But coal pollutes and leaves a CO2-imprint.

In Norway, we only have one coal mine still in production, the Mine 7 in Longyear- byen on Svalbard. The goal from our environmental authorities is to close this as soon as it is practically possible. The coal extracted from this mine is mainly used for the operation of the coal power plant in Longyearbyen, and produces electricity and district heating.

It will probably be difficult to replace this «safe» energy carrier, but the replacement will probably come within few years.

GAS POWER:

CO2-equivalent: 566

Both in Norway and in the world, gas accounts for a large part of the use from our energy carriers.

Gas extraction and storage is a relatively simple technology, and the gas reserves are also enormous. Gas can be used for almost any purpose, and it is easy to make products that can be run by gas, from the simple barbecue in the garden to the operation of buses and ships.

But the CO2-footprint is also very high.

DIESEL UNIT:

CO2-equivalent: 240

We use the term «diesel generators» because it is a popular term that it is easy to understand in this context.

Diesel is an oil, which can come from several sources, but mainly from hydrocarbons. Diesel is easy to use for many purposes, but with a high CO2-footprint.

In many places in the world the population and the authorities can only use diesel generators to provide electricity locally. And as such, it is very easy to use such diesel generators.

BIOGAS:
CO_2-equivalent: 176
Biogas is better for the environment than diesel generators and ordinary gas, but still somewhat worse to obtain.

Diesel oil is easy to transport. Biogas needs a pipeline or gas containers to be moved. So biogas will mainly be a product that must be used locally and not for long-term distribution.

SOLAR POWER:
CO_2-equivalent: 20-90
Solar power is a modern «invention» and developed over the last decades. But as the name implies, it requires the sun to rise and charge these solar panels.

The actual transformation of the sun's rays into electricity gives almost no CO_2-foot- print. But these panels, which are now found in millions of square meters towards the sun, are required to be produced somewhere. For those who choose to buy solar panels from China, for example, where these panels are produced with energy from coal power, the CO_2-footprint will also increse drastically.

NUCLEAR POWER:
CO_2-equivalent: 21
Nuclear power is in some circles referred to as «renewable» energy. This can be dis- cussed. But the fact is that nuclear power hardly gives a CO_2-imprint in normal pro- duction.

Nuclear power is «environmentally friendly». But, and here comes the big BUT:

The slightest accident in a nuclear power plant, can create consequences so great that they can hardly be calculated into economic loss.

Even though nuclear power gets a figure for CO_2-equivalent of «only» 21, this does not give a satisfactory picture of reality – with reference to the Chernobyl accident in 1986.

Regardless of the calculation for this disaster, the real number for «environmental destruction» is not measurable in this context.

WIND POWER:
CO_2-equivalent: 20
Wind power also has a relatively low CO_2 equivalent. Wind power has existed for more than 500 years. Imagine the many charming wind turbines in Holland where the local farmer could grind his grain with the help of wind power. Compared to Norway, there were no wind turbines here at that time. Almost every farm had a river and a small waterfall to run its own local mill, i.e. the mill house on the farm. There was as much wind on the Norwegian coast at that time as in Holland, but the need was different.

If we go back approx. 15-20 years, the wind turbines were planned to make up the big and green shift in Norway.

Many companies applied for a license to build, and eventually obtained a license for wind farms on the coast of Norway.

If we look into the current situation, it will hardly be granted more licenses for wind farms on land. Only those who received a license years ago, will continue the develop- ment of these planned wind farms.

And even though wind power has a relatively low CO2-footprint, it is another very important factor that is not included in this calculation.
What is the «reverse» value «visual pollution» in the form of giant wind turbines «in the middle» of nature? No one knows, and such a case has never been brought to trial in a Norwegian court. In addition, we have the direct negative effect of the wind turbines on nature. Eagles in particular are «beheaded» by the rotor blades, and millions of insects also die, hit by the rotor blades. These facts are not included in the accounts for CO2 emissions, but these biodiversity values are important. The wings of an ordinary wind turbine cannot be recycled, but the used and damaged ones are simply buried!

OFFSHORE WIND FARMS:
Offshore wind farms which are bottom-mounted also have their opponents. If these are located close to the coast, in the middle of the fishing grounds and in the areas where the bird population along the coast has its natural grazing and hunting areas.

FLOATING OFFSHORE WIND:
Floating offshore winds are also being planned in several places, but since both the development cost and the electricity price to the buyer / consumer are so uncertain at this time, these are also uncertain economic projects, although it is less controversial to establish such parks far offshore .

However, such parks can also be financially profitable, and without subsidies, if the costs of development and operation go down significantly.

HYDROPOWER:
CO2-equivalent: 3-6
When it comes to CO2-footprint, there is probably no energy carrier that can measure up to hydropower, especially in Norway, where the authorities have largely tried to minimize destruction on nature to what is strictly necessary. However, with several exceptions.

Our waterfalls are there forever, and are also renewable forever?

What is the value of a waterfall that is «gone forever»? The Mardøla campaign in Romsdal approx. 50 years ago is well known and also the Alta action at the same time. Natural values that are gone forever - no matter what.

Although the formal CO2- equivalent figure for hydropower is low, the other important value is not included here - lost nature forever.

THE SOLUTION?

OCE Wave Power from the Balanced System CO2-equivalent: 6
OCE has through many years worked with its innovative technology to arrive at a commercial product that can be sold world wide. We are now close to a breakthrough with THE BALANCED SYSTEM.

The $CO2$-equivalent number is calculated to be below 6 (5.93) depending on where the wave power park is to be placed in the world, Sunnmøre, Gran Canaria, Gambia, the Pacific Islands etc. (The CO2-figure will be directly affected by the transport to and from, for a specific wave power park, but this will only be completely marginal and only a few changes behind the comma).
All the physical parts of an OCE wave power park will be recyclable.
Seabed Unit consisting of concrete and steel is almost completely recyclable.

The buoys of polyester etc. are guaranteed recyclable by the factory from which we plan to have these delivered.

The OCE's wave power project - «THE BALANCED SYSTEM» - will be a very environmentally good project, with a CO2-footprint that almost no other energy carrier can match!

Another aspect that the EU's CO2-formula does not consider, are the saved CO2- emissions by changing the energy carrier from, for example, diesel generators to wave power.
OCE's future strategy is to set up wave power parks in places world wide where today electricity is produced almost exclusively from diesel generators. Our starting sales promotions are to sell and place such parks in, for example, Gran Canaria, Gambia in West Africa and some of the island states in the Pacific Ocean. With the transi- tion from today's diesel generators into OCE wave power, the real CO2-accounts will be much more favorable!

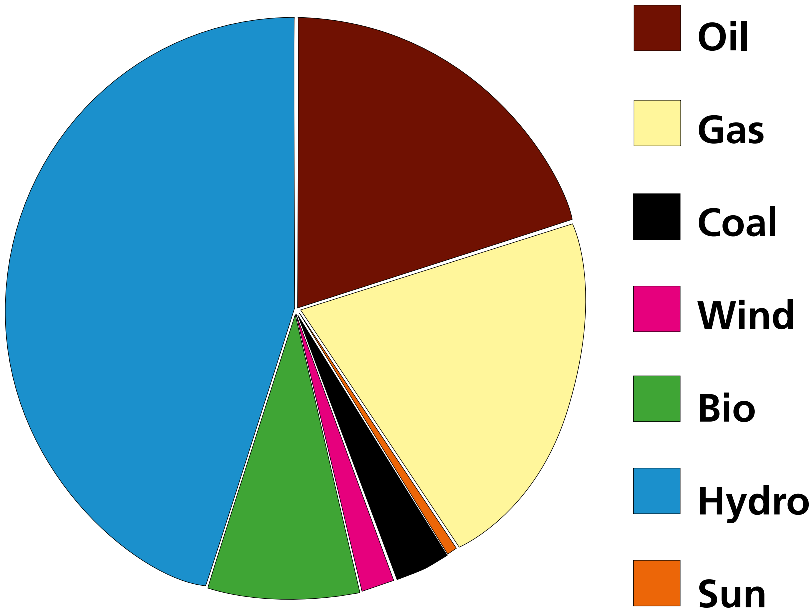
CO^2 ekvivalents pr. produced MWh (Rounded to whole numbers)

Coal power	**1300**	
Gas power	**566**	
Diesel generator	**240**	
Biogas	**176**	
Solarpower	**20-30**	**in sunny areas**
	60-70	**in Norway, due to less sun**
	90	**using panels from China**
Nuclear power	**21**	
Wind power	**20**	
OCE Wave power	**7,5**	
Hydropower in Norway	**3-4**	
Hydropower worldvide	**6**	
Hydropower in Norway (new)	**6**	

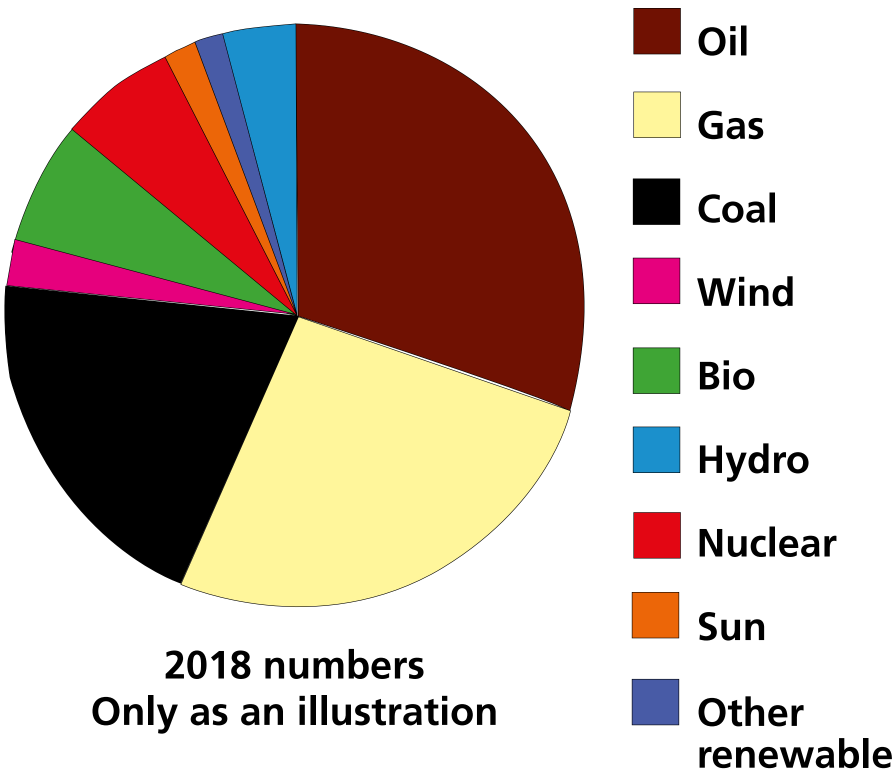
We must make it particularly clear that this is for OCE's facility The Balanced System, quite spe- cifically, and not other wave power projects, where there is, for example, a huge construction in steel and concrete etc., or other large constructions in other materials.

The table here is figures based on experience for these energy carriers, and it may of course happen that a completely specific plant has a different figure for CO^2 emissions.

– Distributed energy in Norway –
divided to energycarriers



– Distributed energy of the World –



2018 numbers
Only as an illustration

BLUEDAY

TECHNOLOGY

REV.	DATE	REASON FOR ISSUE	PREPARED BY	REVIEWED BY	APPROVED BY
03	16.02.21	Re-Issued for Information	RSA	HPH	RSA
02	10.02.21	Issued for Information	RSA	HPH	RSA
01	04.02.21	Issued for Review	RSA	HPH	RSA

PROJECT NO: 100626	PROJECT: Ocean Energy - CO2 regnskap - bølgekraftprosjekt	DISCIPLINE: Engineering General
PACKAGE: BluEco® Power Generation		TAG NO:
CLIENT: Ocean Energy AS		
FACILITY: The Gambia		
CONTRACT / PO NO.:		
OTHER DOCUMENT NO.:		

DOCUMENT TITLE:

CO2 regnskap-Bølgekraftverk

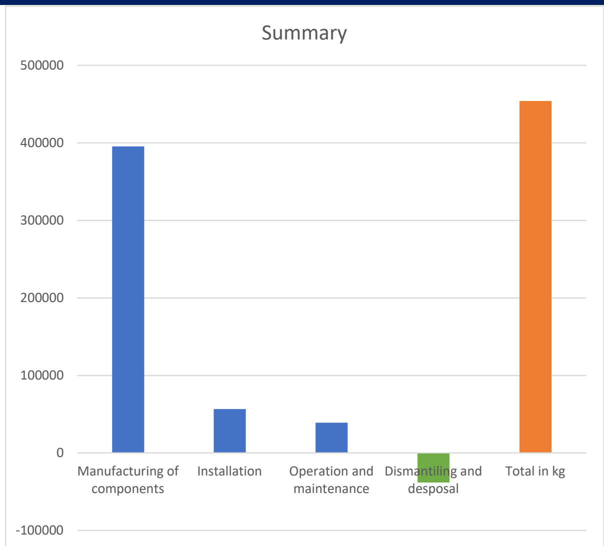
DOC NO:	100626-901-RA-001	PAGE NO: 1 OF 6

CO_2 emissions - 1 unit

LCA	No	Description	Material/ product/ action	Amount	Unit	CO_2- equivalent 1kg produced	Total amount of CO_2- equivalent	Unit
1. Manufacturing of components	1.1	Seabed unit - Foundation	Concret	30000	kg	1,068	32040	kg
	1.1	Seabed unit - Foundation	Steel	300	kg	1,9	570	kg
	1.1	Seabed unit - Generator enclosure	Steel	200	kg	1,9	380	kg
	1.1	Seabed unit - Generator	Steel	100	kg	1,9	190	kg
	1.1	Seabed unit - Generator	Copper	50	kg	6,06	303	kg
	1.1	Seabed unit - Generator	Magnets	20	kg	6,06	121,2	kg
	1.2	Spektra rope	Polyethylene	15	kg	2,4	36	kg
	1.3	Submerged Buoy	Expanded polystyrene	150	kg	3,07	460,5	kg
	1.3	Submerged Buoy	Polyester	200	kg	6,528	1305,6	kg
	1.3	Submerged Buoy	Steel	20	kg	1,9	38	kg
	1.4	Storm Buoy	Expanded polystyrene	450	kg	3,07	1381,5	kg
	1.4	Storm Buoy	Polyester	400	kg	6,528	2611,2	kg
	1.4	Storm Buoy	Steel	50	kg	1,9	95	kg
	1.5	Assembly, bending, welding, painting, packing etc	Not included			-		
2.Installation	2.1	Transportation from manufacturing to power plant	Oslo to Gambia	1655	Kg	-	5640	kg
	2.2	Mounting on seabed	Battery vessel (charging)	0,4	d	-	30,0	kg
	2.3	Cable installation to shore	Not included			-		
	2.4	Onshore substation	Not included			-		
3.Operation and maintenance	3.1	El production	Emission free			-		
	3.2	Maintenance	Battery vessel (charging) - estimated once a week	52	d	-	3900,0	kg
	3.3	Spareparts	Not included			-		
4.Dismantiling ad desposal	4.1	Dismantiling	Battery vessel	0,4	d	-	30,0	kg
	4.2	Transportation from powerplant to waste management	Approx 100km	31955	kg	-	174,8	kg
	4.3	Recykling of products	Recycled steel	670	kg	-1,75	-1172,5	kg
	4.4	Recykling of products	Recycled plastic	1215	kg	-2,3	-2794,5	kg
			Weight each unit	31955	Kg	Pr unit CO_2 in kg	45340	
			Total Weight	319550	Kg	Pr unit CO_2 in ton	45,3	
						Total CO_2 in kg	453400	
						Total CO_2 in ton	453	

Summary

LCA	Total amount of CO_2- equivalent in kg
Manufacturing of components	395320
Installation	56702
Operation and maintenance	39000
Dismantiling and desposal	-37622
Total in kg	453400



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https://www.siemensgamesa.com/-/media/siemensgamesa/downloads/en/sustainability/environment/siemens-gamesa-environmental-product-declaration-epd-sg-8-0-167.pdf

No	Material	Emission factors in kg CO2-equivalent per unit	Uncertainty	Total ink uncertainty	Comment	Link
1	Concret	0,89	20 %	1,068	Cement	www.winnipeg.ca
2	Copper	4,04	50 %	6,06	Copper	vestforsk.no
3	Magnets	6,06		6,06	Estimated = copper	siemensgamesa.com
4	Polyethylene	2,4		2,4	Thermoplastic PE	www.winnipeg.ca
5	Polyester	5,44	20 %	6,528	Thermoplastic PET v	www.winnipeg.ca
6	Expanded polystyrene	3,07		3,07	Hentet fra polystyrene	www.winnipeg.ca
7	Steel	1,9		1,9		Bellona
8		0		0		
9	Recycled steel	-1,75		-1,75		innovasjonnorge
10	Recycled plastic	-2,3		-2,3		innovasjonnorge

Produced energy

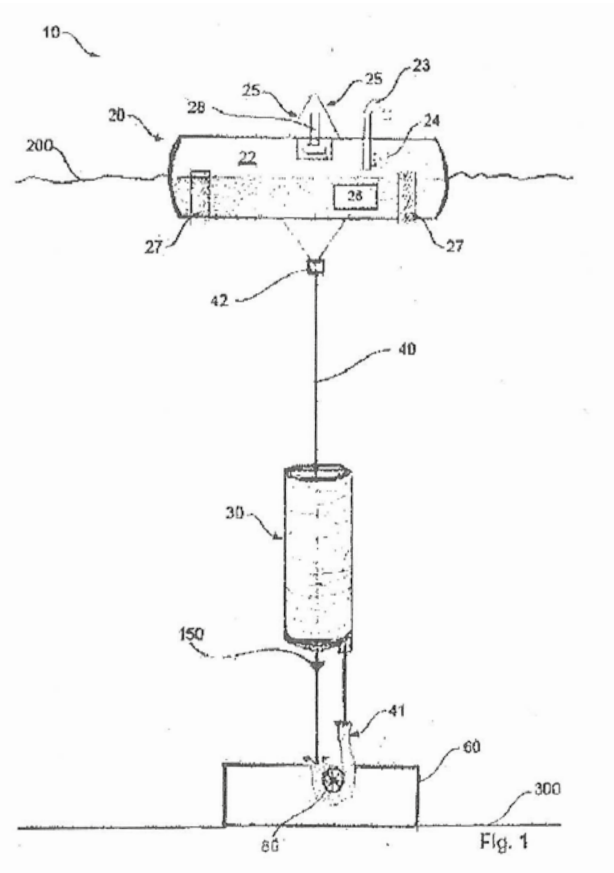
No	Description		
1	Installed effekt 1 unit	100	kW
2	Typical operating hours (hours)	6000	h
3	Yearly production 1 unit	600	MWh
4	Amount of units installed	10	pcs
5	Amount of installed effect	1	MW
6	Total yearly production	6000	MWh
7	10 years of production	60000	MWh
8	Emission CO_2/MWh 1 year	0,07557	tCO_2/MWh
9	Emission CO_2/MWh lifetime (10y)	0,00756	tCO_2/MWh
10	EU mix Emission CO_2/MWh	0,15	tCO_2/MWh

No	Transport	CO2-equivalent [kg/tkm]	CO2-equivalent [kgCO2/MWh]			Link
1	Air traffic - Domestic	1,933				http://www.lipasto
2	Air traffic - Short-haul international flights	1,416				http://www.lipasto
3	Air traffic - Long-haul international flights	0,6				http://www.lipasto
4	Container ship, 1 000 TEU	0,042				http://lipasto
5	Full trailer combination Gross vehicle mass 60t ay load capacity 40t Urban driving, streets	0,055				http://lipasto.vtt.fi/
6	Charging battery vessel approx 500kWh - Charging 50kW 10 hours with 0,15tCo2e/MWh		75			www.kyst.no

No	Distance	Nm	Km	Kg c02e - 1t freight		Link
1	Flight-Oslo-Gambia	3067	5680	3408		airplanemanager.com
2	Trailer- Powerplant to waste management		100	5,47		

Stormbouy
Norwegian patent: NO 331603
US patent: US 9,394,877
EU patent: EP 2504568

The Balanced System
Norwegian patent: NO 340893
EU patent: EP 3464877



This is a patent principle sketch of The Balanced System and must thus never be confused for a designsketch of the product.

Ocean Energy AS

The Waves of the Future