ROYAUME DU MAROC
Ministère de l'Aménagement du territoire ,
de l 'Eau et de l'Environnement

Secrétariat d 'Etat chargé de l 'Environnement

HRS Project -OCP

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The Project of Heat Recovery enhancement at the Jorf Lasfar Phosphoric Acid Production Plant OCP

The considered project is under the category of energy efficiency improvement

The additional heat recovered will lead to a reduction of the global primary energy consumption for power generation

The Jorf Lasfar plant (OCP)

The phosphoric acid processing plant (OCP): Technical description of the project activity

+ The Maroc Phosphore Plant uses phosphates extracted from Khouribga mine to produce acid phosphoric and fertilizers

+ **The sulfuric acid processing Facility includes six units using THE** MONSANTO ENVIRO-CHEM process, which is an exothermic process which generate heat

Heat

The Jorf Lasfar plant (OCP)

Technical description of the project activity

Heat released from this process is divided into

+ 70% of the heat released by the process is recoverd to produce steam for the process and electricity.

+ 28% is evacuated in the cooling water pumped from and rejected back to the atlantic ocean

+ 2% is lost by radiation

Recovered
The new installation

The Jorf Lasfar plant (OCP)

Technical description of the project activity

Recovered heat released by the exothermic absorption process

+ 28% is evacuated in the cooling water pumped from and rejected back to the atlantic ocean

The project will replace the existing absorption towers by HRS systems will result in a significant increase of the heat recovery ratio. This is allow to generate an additional amont of steam leading to a greater power generation on the site (about 16MW)

Production de l'Électricité

The Jorf Lasfar plant (OCP)

Positive impacts of the Project

+ Reduce Morocco's coal importation,
+ Reduce atmospheric pollutants;
+ Decrease the temperature of water rejected to the sea, and then the themal pollution of the marine ecosystem

+Technological handling of the process that will improve the competitiveness of Maroc Phosphore plant

+ Decrease of the fossil fuel comsumption

+ Emissions reduced are 889 000 tons of CO2eq over 10 years of crediting period [2005-2014]

The Jorf Lasfar plant (OCP)

Calculation of GHG emissions by sources:

The additional power generated by the project is obtained using the heat recovered from an exotermic process

Net emissions by project activity : 0 tons of CO2 per year

Description of formulae:

Ratio between the steam expanded in the turbines and the power generated, in the existing situation:

$r = M_{steam}$ (steam mass-flow expanded) / E (power generated MW)

Additional power generation: $E_{HRS} = M_{steamHRS} \times 1/r$

$M_{steamHRS}$: additional steam generated by the HRS system (t)

r: ratio

E_{HRS}: additional power generated due to the introduction of the HRS systems (MW)

The Jorf Lasfar plant (OCP)

CO2 emissions of the BASELINE tCO2: The additional power generated will displace power imported from the grid

$CO2 = \Sigma CEF_i \times T_i \times E_{HRS,i}$

i: year

CEF: average grid CO2 emissions factor tCO2/MWh

E_{HRS}: additional electricity generated due to the introduction of the HRS systems MW

T: operating time (h)

CO2 emissions reduction of the project activities:

$CO2 = \text{Baseline emissions} - \text{Project emissions}$

$= \Sigma (CEF_i \times T_i \times E_{HRSi})$

889 000 tons of CO2eq over 10 years

Calculation of net emission réductions

year	Weighted emissions factor in tCO2 / Mwh)	Electricity Displaced (MWh)	Emission reductions of th project in tCO2
2005	0.853	48240	41127
2006	0.805	100828	81190
2007	0.809	126361	102188
2008	0.798	126361	100841
2009	0.729	126361	92169
2010	0.729	126361	92169
2011	0.738	126361	93214
2012	0.746	126361	94260
2013	0.754	126361	95305
2014	0.763	126361	96350
TOTAL OF 10 YEARS			**888 813**

The Jorf Lasfar plant (OCP)

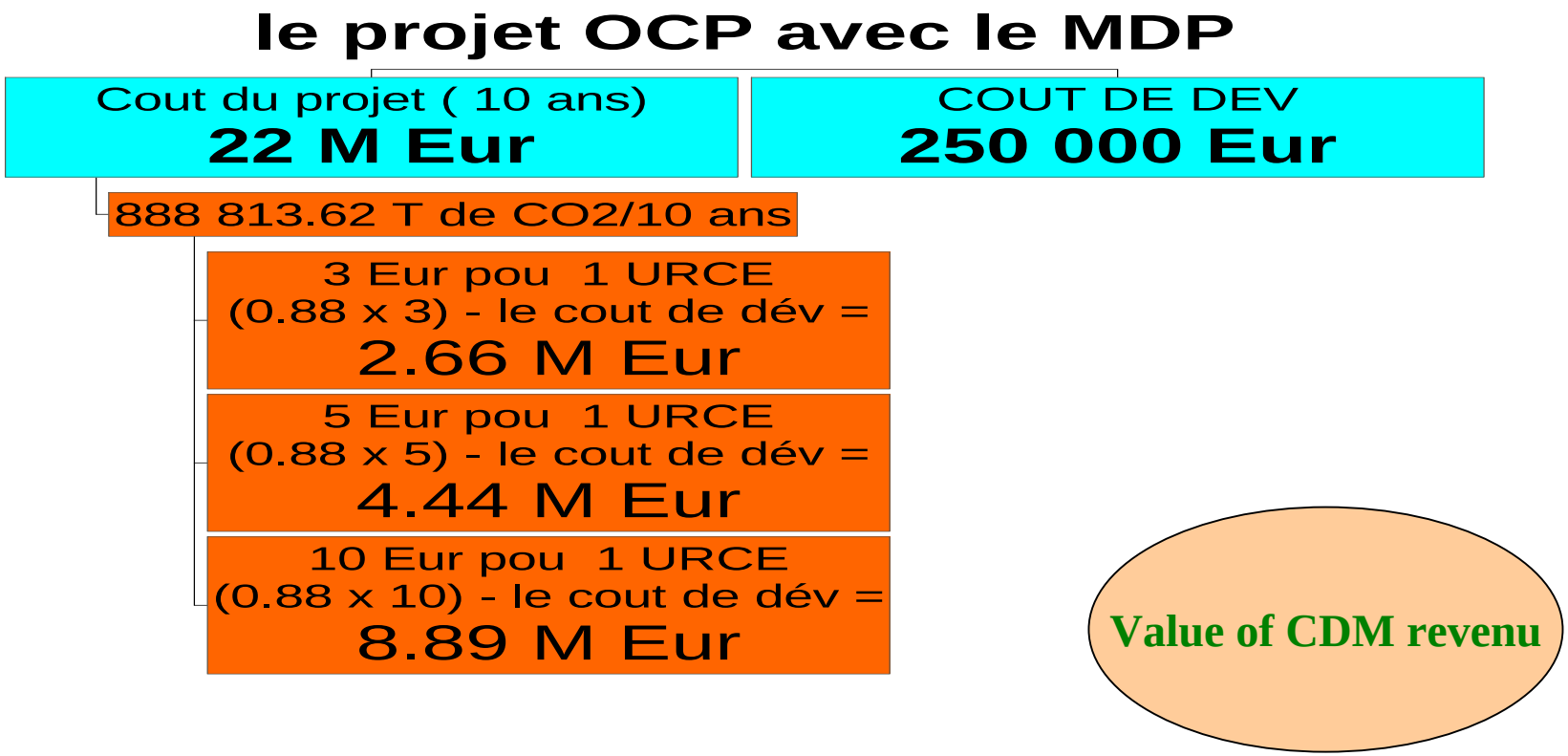
Le financement de projet

+ Coût du projet : 16 M Eur

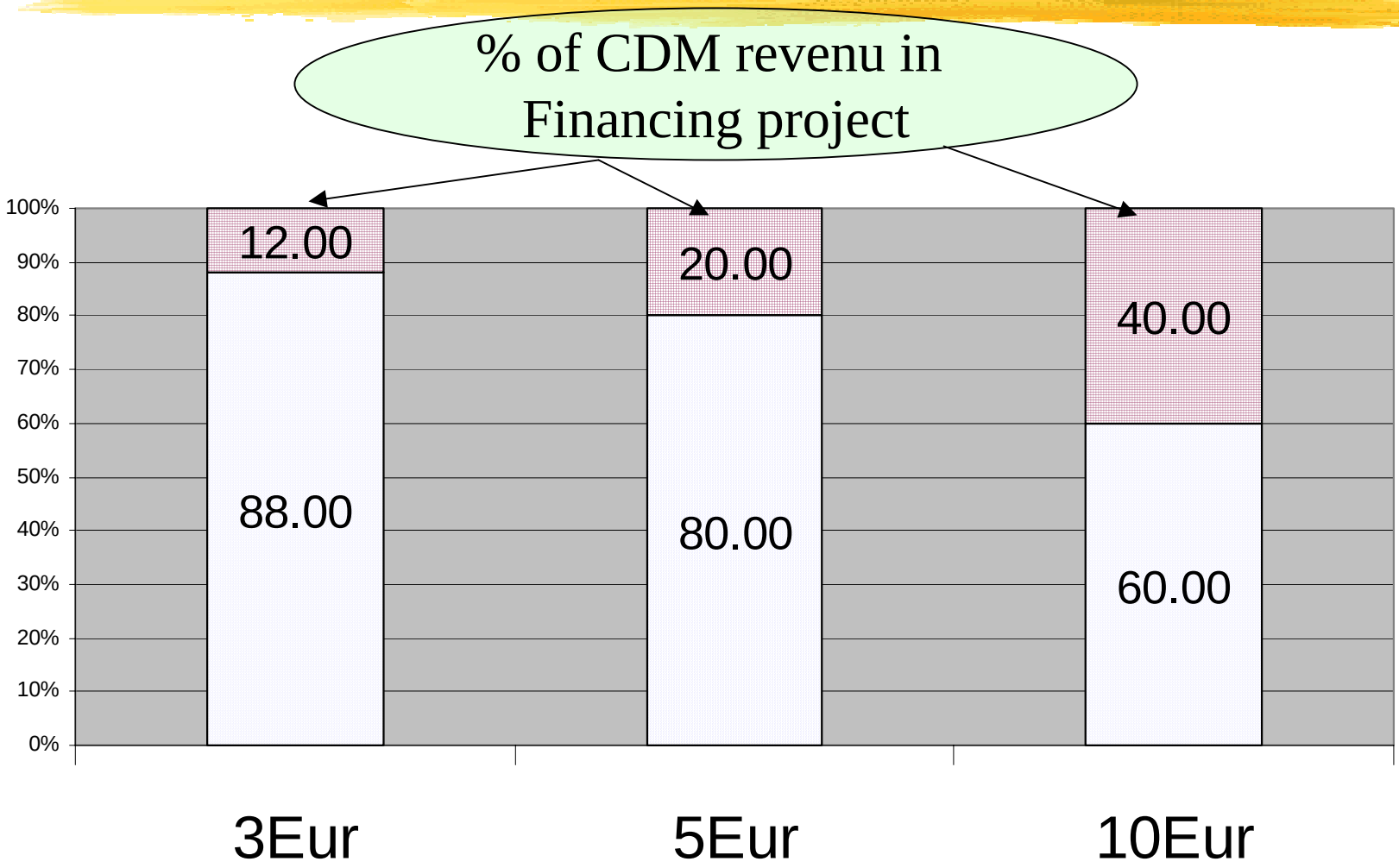
+ Coût annuel de fonctionnement : 0.6 M Eur

+ projet autofinancé à 100% PAR l'OCP

The Jorf Lasfar plant (OCP)



The Jorf Lasfar plant (OCP)



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