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International Center
for Numerical Methods in Engineering



_ Thinking outside the box _



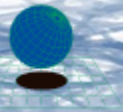
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OBJECTIVES_

NATURA

Our times' biggest challenges to mankind evolution are posed by increasing scarcity of **energy** and **water** worldwide. *Nature* department tries to address these fundamental issues by developing knowledge and breakthrough technology in an environmentally friendly frame, in order to develop strategic and sustainable solutions.



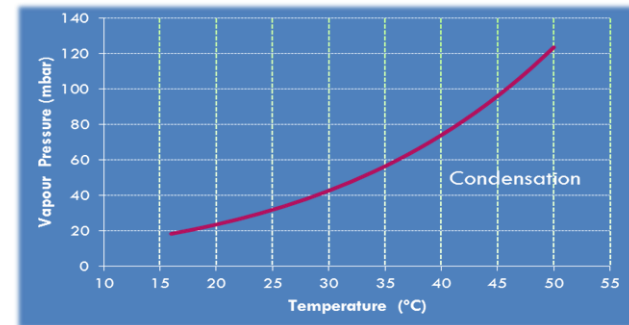
RTD ACTIVITIES_

Main research approaches are:

- Energy Storage
- **Water Desalination**
- Climate Adaptation
- Technological Convergence

- Waste water treatment
- Heat exchange industrial integration
- Green energy production optimization
- Avoiding reversal osmosis facilities complexity

Cool Steam!



Dependence of water steam pressure on temperature in the range of interest

- Use of heat stored in oceans
- Boiling at ambient temperature at low pressures
- Condensation at low pressure in the cold spot
- Profit residual heat
- Low energy consumption



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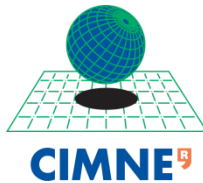
ON-GOING RTD PROJECT_

RETOS 2015:

From proof of concept to
pre-industrial installation in
operational emplacement



iPido



UNIÓN EUROPEA

FONDO EUROPEO DE
DESARROLLO REGIONAL

UNA MANERA DE HACER EUROPA



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ON-GOING RTD PROJECT_

TECHNOLOGICAL INNOVATIONS:

- Atmospheric pressure -vacuum heat exchange stationary process
- Surface nan-coatings
- Vacuum flux regulation
- Modular and scalable distillation method

PUBLICATIONS:

- System and Method for Desalinating Seawater (European Patent, EP 2535096 A1).
- System and Method for Desalinating Seawater (International Patent, WO 2012/171986 A1)

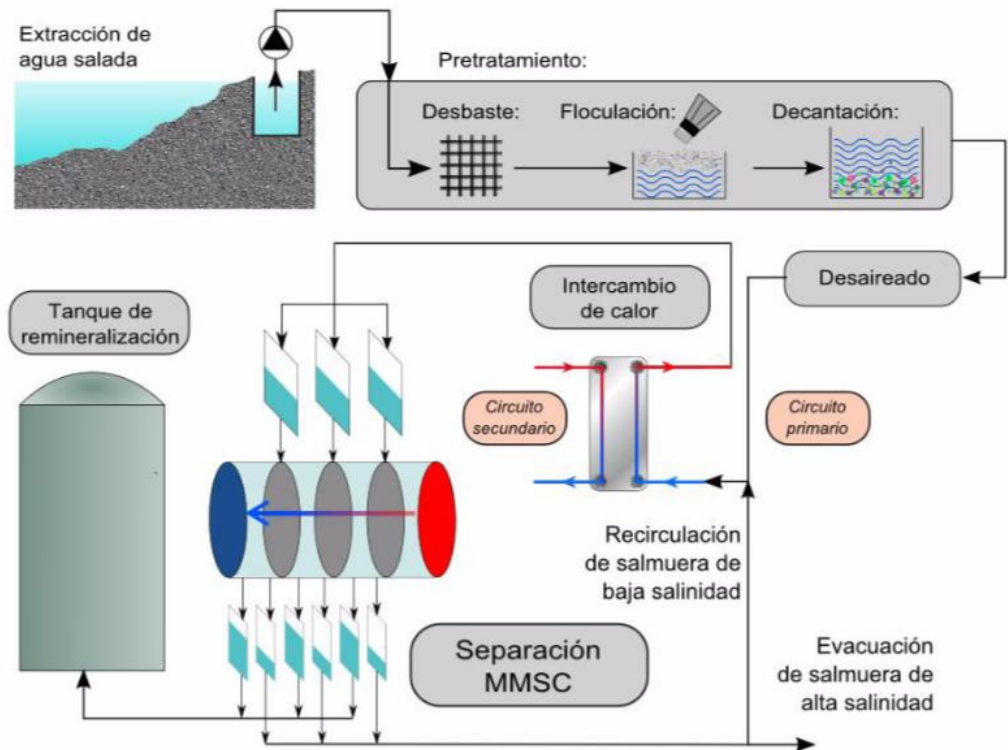
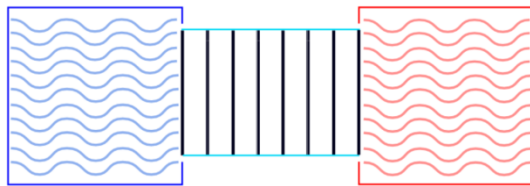




ON-GOING RTD PROJECT_

MAIN DESALINATION SCHEME:

- Integration of Cool Steam in standard processes
- Thermal gradient main energy source
- Distillation process working as a heat exchanger

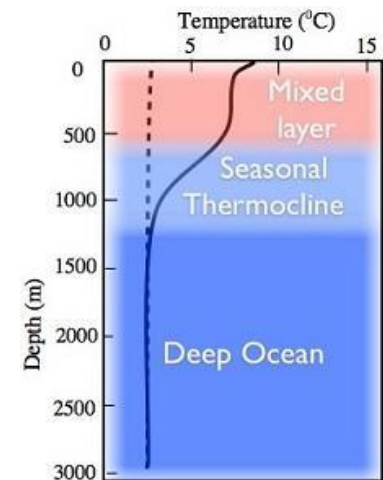
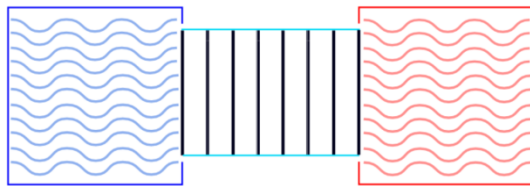




ON-GOING RTD PROJECT_

OTHER APLICATIONS:

- Solar panels overheat cooling
- Thermal gradients in layers under sea, for offshore facilities
- Recirculation of refrigerating water, using its residual heat, and distilling it
- ...





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— Oceans of fresh water, drop by drop —