

# Application of the npS<sup>®</sup> methodology to green engineering project management

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**1. Introduction** – Green Engineering (GI) may be assumed as an extension of Green Chemistry but within a wider scope, as it spreads from design and marketing to use and withdrawal, both of processes and products, when they have been studied and designed to minimize environmental costs. In order to efficiently do that a good risk analysis must be carried out both in the design and closing stages [1]. Norm UNE-ISO 21500 provides guidelines for project direction and management, so that five processes should be considered in every project: starting, planning, implementation, control and closing. They cover several areas such as that of risk analysis. Therefore it may be assumed as a reference tool for green energy project management.



Image 1. npS<sup>®</sup> methodology

On the other hand, the npS<sup>®</sup> methodology, because of its foundations clearly aligned with those of project management, allows simplifying management of green engineering projects by systematizing, through a series of phases, actions to be carried out from the beginning to the end of the project in order to facilitate the succeed of the green engineering to be developed.

**2. Experimental** – In this work the npS<sup>®</sup> methodology has been applied to the management of a green engineering project: transforming a building into a nZEB (*nearly zero energy building*) [2] by defining ten specific stages that may be used for this kind of buildings.

This methodology has been also developed and applied in the Master “Integral Project Management” [3], where that transformation was the students’ aim. They worked to integrate Energy Management Systems (EMG) which were defined and applied both to existing and new buildings. So the performance of this methodology was measured in educational environments.

**3. Results and Discussion** – The methodology used has enabled a significant simplification of the working time and management of a green energy project, providing a higher than 21 % reduction of the planning and control times along with an improvement of 3.2 out of 4 points in the management of risks associated with the project.

Its application to simulated buildings has allowed the definition of a Decalogue of stages to be applied to the management of this kind of projects, in line with the five processes stated in UNE-ISO 21500.

**4. Conclusions** – The npS<sup>®</sup> methodology may decrease the times usually consumed in the management projects following the norm UNE-ISO 21500 by simplifying many of the actions to be carried out. It has also shown a strong educational potential when applied to teaching efficient risk management in green engineering by enhancing competencies such as decision making in risk management.

## 5. References

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