

Ecopetrol, S.A.: Mastering the Art of Competency Mapping

Background

- Established in 1948
- In the Top 35 Energy Companies
- Current goal to be positioned in the top 27 companies in the *Petroleum Intelligence Weekly PIW* Ranking by the year 2015



For Ecopetrol, S.A.—one of South America's four biggest energy enterprises—simply maintaining the status quo in terms of the performance of its engineers isn't nearly good enough. That's why the Colombian energy company concluded that to raise engineer performance it needed to better comprehend the competencies that its engineers had to master. The energy firm couldn't get where it wanted to go without thoroughly understanding the terrain its engineers have to negotiate—both routinely and when exceptional circumstances occur.

Consequently, several initiatives were started by Ecopetrol to map the competencies of its engineers at all levels and to certify them in some fashion. These initial approaches to competency mapping were useful but proved to be not rigorous enough.

To help get its competency mapping efforts back on track, Ecopetrol turned to RWD—long-time experts in process-improvement and training in the energy industry and many other sectors. Working together with Ecopetrol personnel, RWD experts applied the RWD Technical Competency Framework tools and methodology, which is a part of RWD's new Competency Attainment Acceleration Program (CAAP™). CAAP is being adopted by Ecopetrol as the corporate standard for developing learning plans for its more than one hundred engineering professionals.

Energy

Defining a learning plan for process engineers

Established in 1948, Ecopetrol, S.A. is Colombia's leading energy exploration, transportation and refining company—in addition to being the country's largest enterprise in any category. It ranks among the world's top 35 energy organizations.

The company has established the goal of being positioned in the top 27 companies in the *Petroleum Intelligence Weekly* PIW Ranking by the year 2015. Currently Ecopetrol ranks at 39. Ecopetrol's President, Javier Genaro Gutiérrez Pemberty, set out an interim target, as well: Having 80 percent of the company's professionals achieving 100 percent of their competency levels by the end of 2011.

The Vice-presidency of Petrochemical and Refining of Ecopetrol S.A (VRP) campaign involving RWD began in late 2007. The RWD team met with the team of engineering coordinators of VRP to begin defining a learning plan for their process engineers. To create such a learning plan, they needed to know the engineers' competency gaps. To know this they needed to have a competency map.

RWD has been involved in developing competency models for operations and maintenance teams in the energy industry and elsewhere for a long time. RWD also has deep and long-term experience in developing all types of training for engineers. However, the Ecopetrol project was the first time that there was a well-defined need to either extend or develop a new competency model for engineers. Dr. Sai Ranade, RWD's Manager of Process and Product Innovation, was charged with developing a competency framework for Ecopetrol's refinery engineers. He decided to drive the development by three simple guiding principles.

The new framework* and tools had to be:

- Visual
- Intuitive
- Simple

Competency gaps matched with training interventions

By March 2008, the initial framework for mapping the competencies of Ecopetrol's engineers was ready. It was decided to use an incremental/iterative approach to implementing it: Start with an engineering discipline, learn while applying the framework to that discipline and then extend it to other engineering disciplines. The RWD team led by Senior Training Engineer Enrique Torres began applying the framework.

The process began with the creation of an outcome/experience (O/E) map for each discipline. The map included all value-creating tasks or outcomes that are accomplished by a person with a unique competency. The O/E map addressed the "What?" question. The second map—the knowledge-capability (K-C) map—defined all the resources needed to complete the tasks in the O/E map in an acceptable fashion. It defined the resources on the vertical axis and the X axis, as derived from Bloom's taxonomy—showing how individuals at different "levels of cognitive abilities" process each resource. The next step was to write the assessment statements (or proof-of-behavior statements) for each virtual asset for all the defined levels. The completed K-C map was then used to develop the curriculum map. The O/E and K-C maps are unique modalities available only through RWD.

The refinery team leaders filled in the two maps to create the To-Be maps—which lay out their targets and goals for engineer performance at all job levels. Armed with the To-Be maps and the completed K-C maps, the teams conducted face-to-face interviews with the engineers to determine and qualify the individual gaps, as well as group-competency gaps. The competency gaps were then easily matched with the specific training interventions in the curriculum map to define a learning plan for the engineers.

* Ranade, S. M., "A Competency Framework for Refinery Process Engineers," *Hydrocarbon Processing*, July 2008.

RWD process to be extended enterprise-wide

In September 2009, the work with process engineers was completed. Unlike the previous attempts, the framework was embraced by the engineers. Many of the findings matched the prior assessments made by the engineering coordinators. And there were some new non-intuitive findings—including the fact that competency gaps existed across all different job levels within the company.

At this juncture, RWD began extending the framework, tools and methodology to other engineering disciplines within Ecopetrol. The learning gaps have now been identified for the fixed and rotating equipment engineers. Interviews are currently under way for electrical and control engineers. Unlike the prior attempts, the RWD framework is visual. Since employees can now see the rationale for their interview questions, the program is no longer perceived as top-down but rather bottom-up. This translates into greater understanding and acceptance.

Recognizing the potential of the RWD approach, Angela Corrales, Ecopetrol's Leader for their Operational Excellence Initiative, requested a few other groups within of the VRP to attend one of the competency map development sessions. The other groups included staff from planning, turn around, safety and HR. In January of 2009, the operational excellence team decided to extend the RWD framework and approach to professionals in planning, quality lab, maintenance, turn around, power coordination and energy-loss coordination.

Since January of 2009, Ranade and the RWD team have now assisted six other groups within Ecopetrol in the use of the RWD framework. Assuming continued progress in competency mapping, it is very likely that by the end of 2009, the RWD competency framework, process and tools will have been utilized by every single professional at Ecopetrol, S.A.

Factors for success

There are several factors that contributed to the success of this effort:

- For two years Ecopetrol has shown unwavering commitment to its competency goals—achieving an improved *Petroleum Intelligence Weekly* Ranking and having 80 percent of engineers achieving 100 percent competency by the end of 2011.
- The openness, knowledge and experience brought to the table by the Ecopetrol professionals has been exceptional.
- The visual/intuitive nature of the framework breaks down the initial barriers to adoption. Since the employees “get it,” they participate enthusiastically in the process.
- The framework is easily extended to other disciplines.

What Our Client Said

“In comparison to other methods, the RWD approach to competency mapping is focused on business outcomes, is directly linked to the career plan of individuals and identifies all the skills necessary for an employee to be competent in his or her job position. It is an orderly and clear methodology that we plan on using to develop training plans for members of my team.”

Liliana Patricia Angulo Jimenez,
Engineer and Production Planner for Ecopetrol, S.A.'s Barrancabermeja Refinery.

“The stages of the model are clearly interrelated and they culminate in identification of unique and different solutions than what we had seen with other models. The visual nature of the methodology helped us learn in simple and clear way the application of concepts such as knowledge, competencies and experience.”

ENG. Germán Alfonso Rodríguez Rodríguez,
Shift Leader, Maintenance, Ecopetrol, S.A., Barrancabermeja Refinery.

“RWD's Competency mapping methodology is more robust and scientific compared with a functional decomposition based method I was familiar with. The Gap Analysis results are more close to reality as a consequence of the robustness and reliability of the methodology.”

Juan Martinez L., Electronics and Electrical Engineering Team Leader, Ecopetrol, S.A.'s Cartagena Refinery.

Energy

- The framework maximizes use of existing information: RWD's framework leverages all the prior work done using other models and it is aligned with the vision and goals of SENA (Servicio Nacional de Aprendizaje), the national training service that promotes technical occupational training in Columbia.
- The domain expertise of the RWD team and RWD's investment in the process provided notable advantages.

By its wholehearted adoption of the RWD approach, Ecopetrol has solidly positioned itself to meet its dual goals of climbing up the *Petroleum Intelligence Weekly* PIW Rankings and meeting its President's competency level targets in the near future.
