



**RESEARCH &
INNOVATION**
THE CREATION OF
OUR FUTURE MOBILITY



TotalEnergies

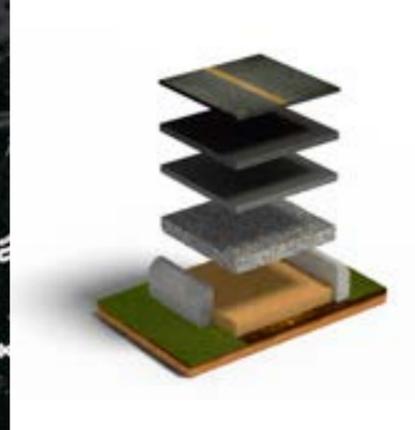
DESIGN THE FUTURE OF MOBILITY

The Research and Development teams are engaged in formulating and designing innovative products and processes to meet our clients' needs. They are in line with technical, economic, regulatory, environmental and safety requirements..

BITUMEN SUSTAINABLE DEVELOPMENT APPROACH

Sustainable development is one of the factors driving innovation at TotalEnergies. We are constantly focused on reducing the environmental impact of our products, and evidence of this can be seen in our initiatives:

- Lowering the temperature.**
 Our products for roads (STYRELF ECO²) and for roofing (ALTEK ECO²B) reduce the site application and process temperatures without compromising on mechanical performance. The result is that you can gain energy savings and observe improved working conditions
- Increasing the service life of our highways.**
 With greater than 40 years of experience with our innovative polymer modified bitumen (STYRELF). TotalEnergies has an unrivalled knowledge base, aiding the development of extremely high-performance products that enhance the durability of the asphalt pavement
- Preserving resources by recycling.**
 We have a range of solutions designed to enable optimum asphalt recycling for paving grade bitumen's (with the REGENIS range) and asphalts incorporating polymer modified binders (with the STYRELF RC range)
- Reducing waste.**
 Products such as bitumen in drums, generates an unwanted waste stream, when discarded or sent to landfill. AZALT InBlock, is TotalEnergies' packaged bitumen solution, that reduces this waste, and our subsequent impact on the



PROTECTING THE ENVIRONMENT

Develop technologies to improve our energy efficiency and optimise the usage of natural resources.
Reducing the application temperatures of asphalts with the STYRELF ECO² range and creating the RC range, for recycling.

DEVELOP INNOVATIVE LOGISTIC PROCESSES

Use more effective resources and logistical processes that generate less pollution to support our clients and help them develop their markets.
AZALT INBLOCK, our block bitumen.

IMAGINE THE ROADS OF THE FUTURE

The research teams focus on designing bitumen solutions for the roads of the future. **TotalEnergies is part of the consortium for the I-Street project, which won the "Roads of the Future" call for projects coordinated by the French Environmental Agency (ADEME).**

Ecosolutions label by TotalEnergies contributes in helping customers through reducing their environmental footprint

The program Ecosolutions by TotalEnergies offers eco-efficient solutions to our clients, throughout their life cycle compared to a market reference. The environmental and health performance can be related to a reduction of carbon emissions, energy consumption, water or toxicity (and its impact on health). This cross-functional program involves several business lines and expertise within the Group (Research & Development, innovation, sustainable development, etc.).

PROVIDING THE MEANS TO SUCCEED

TotalEnergies launches many new bitumen solutions onto the market, using a network of advanced manufacturing facilities to provide the most exhaustive product range in Europe. Our aim is to deliver each of our client's specific requirements as effectively as possible.



3 RESEARCH AND DEVELOPMENT CENTERS

-  **Solaize Research Center (CRES):** a leading centre and symbol of excellence; CRES is at the very heart of TotalEnergies' product innovation. It is where many of our current products and processes originated. The home of the crosslinking process for polymer-modified bitumen, now in use all over the world under the STYRELF brand. The location of industry leading developments including patent creation in recycling, reduced emissions, warm-mix asphalts and logistics.
-  **Preston Technical Center (UK):** The Preston Technical Center supported the spectacular take-up of STYRELF in the UK. The Preston site also has an emulsion production plant. Preston has naturally established itself as an expert in emulsion formulation and modified bitumen production.
-  **Brunsbüttel Technical Center (Germany):** Adjoining the Brunsbüttel refinery where bitumen is refined, this center uses the plant's facilities for developing new formulas adapted for roads and the industrial sectors. They have developed a significant product range, more than 120 products, including 80 STYRELF grades!



MOBILISING SPECIALIST BITUMEN TEAMS

The bitumen expertise also comes in the form of a network of specialist engineers in products, processes and production. These experts located globally, are available to give support and guidance for our clients in their operational challenges and development projects.



INNOVATING WITH LEADING PARTNERS

As far as innovation is concerned, TotalEnergies is engaged with leading universities and enjoys strong partnerships with various stakeholders in the supply industry, SME and national clients, contractors, general councils and motorway operating companies. This partnership innovation means that we are better able to meet clients' requirements and speed up time-to-market.

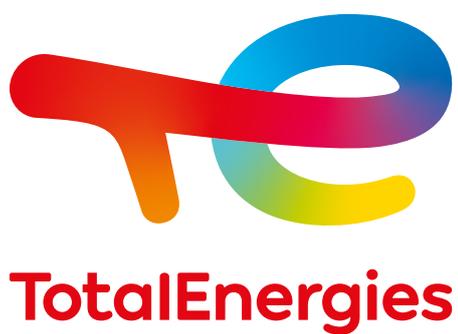


PATENTING BITUMEN INNOVATIONS

TotalEnergies has more bitumen patents than any other bitumen supplier in Europe. It currently holds more than 50 families of active patents.



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