ENERGY CLUSTER

ENTERING A NEW ERA

2015 ACTIVITY REPORT & OUTLOOK FOR 2016 AND BEYOND
TENERRDIS ATTENDED THE COP21 CONFERENCE ALONGSIDE A NUMBER OF THE CLUSTER’S INDUSTRIAL AND INSTITUTIONAL MEMBERS, PARTICIPATING IN THE COP21 SOLUTIONS EXPO AT THE GRAND PALAIS IN PARIS.
WE WERE THERE

A number of Tenerrdis members and partners exhibited at COP21.

Live
Tenerrdis' Catherine Candela and McPhy Energy's Pascal Mauberger on the Néo-Planète radio show on hydrogen energy.

In pictures
A film showcasing the first ten solutions to have earned the “Energized by Tenerrdis” seal was broadcast at the Greater Grenoble Intermunicipal Authority booth.

Together
A number of Tenerrdis members and partners exhibited at COP21.
The year 2015 was a major one for the energy transition in France. First, the Energy Transition for Green Growth Act was enacted. This legislation establishes a framework for energy savings and the development of renewables; it contains 50 measures—targeting citizens, businesses, and local governments—that will come into force immediately.

The second major event was the COP21 global climate change conference, which resulted in the signing of the Paris Agreement by 195 countries. Despite some unresolved concerns, the Agreement is considered by the majority of stakeholders to be “unprecedented.”

And the timing couldn’t have been better for Tenerrdis—the cluster for the energy transition—as these events coincided with our tenth anniversary. The dominant worldview is shifting away from climate-change denial and entering an exciting new era.

ENTERING A NEW ERA

Tenerrdis’ long-standing positioning, qualified and effective coordination team, growing network, and expanding know-how have resulted in hundreds of R&D projects carried through to fruition in the form of innovative new products. Our past performance can only do one thing—encourage us to pursue and accelerate our strategy. We have painted a vibrant picture of tomorrow’s energy landscape. We must now build it while planning ahead for future transformations in technology, the economy, and society. This virtuous circle will spur growth and create jobs. And together—Tenerrdis and our partners, whether they are small- to mid-sized businesses, major corporations, research organizations, universities, training centers, or local governments—we will shape the future.

LET’S KEEP MOVING FORWARD TOGETHER!
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BUILDING BRIDGES

**TENERRDIS COORDINATES A VERY DYNAMIC REGIONAL ECOSYSTEM EVIDENCED BY OUR GROWING MEMBERSHIP, R&D PROJECTS AND DEMONSTRATOR SYSTEMS REPRESENTING A TOTAL BUDGET OF €1.7 BILLION, AND, FOR OUR COMPLETED R&D PROJECTS, CONCRETE RESULTS.**

**THE CLUSTER CELEBRATED ITS TENTH ANNIVERSARY ON OCTOBER 1, 2015 MARKING A DECADE OF ACHIEVEMENTS.**

**The Tenerrdis ecosystem**
- **192** members
- **48,000** manufacturing jobs across the region
- **1,900** attendees at 41 Tenerrdis events run in 2015

**Membership 2007–2015**

- **2007**: 13
- **2008**: 23
- **2009**: 40
- **2010**: 59
- **2011**: 74
- **2012**: 92
- **2013**: 103
- **2014**: 105
- **2015**: 110

**Focus**
- **29 FUI-funded projects completed:**
  - 125 direct jobs created
  - 33 patents
  - 38 new products

**Communications**
- **45,000** visitors per year to the Tenerrdis website
- **4,175** newsletter subscribers
- **1,400+** followers on Twitter
- **200+** subscribers to the Tenerrdis LinkedIn page

**Strategic partnerships**

**Celebrating ten years**

Tenerrdis celebrated its tenth anniversary on October 1, 2015 at an event in Lyon attended by nearly 200 representatives of the Rhône-Alpes region’s new energy technology ecosystem. The evening’s highlights included presentations of ten years of innovation for the energy transition, the Vision 2020 strategy plan, and the new “Energized by Tenerrdis” seal.

**From R&D projects to marketable products (2005–2015)**

- **265** projects and demonstrator systems certified by Tenerrdis received **€527 million** in government funding. These projects represent total R&D spending of **€1.7 billion**.

- **487** different organizations were involved in the projects that received funding:
  - 18% corporate partners
  - 45% small- to mid-sized businesses
  - 37% research organizations

**Breakdown of projects financed by source of funds**

- **Private-sector funds in millions of €**
- **Government funds in millions of €**

**Capital-raising campaigns**

- **13** rounds of fundraising completed by Tenerrdis members since 2013 for a total of **€85 million**
The Rhône-Alpes region gets a smart grid campus
The Smart Grid Campus en Rhône-Alpes program, backed by Teneridis and Minalogic, was selected by the French government’s Smart Grid plan under the national industrial renewal strategy for its capacity to shape the emerging smart grid industry. This far-reaching project is led by Grenoble-Alpes University and ERDF, France’s main electric utility infrastructure provider, in conjunction with the French Alternative Energies and Atomic Energy Commission (CEA), the French Solar Energy Institute (INES), smart grid company RTE France, and the Grenoble School Department, with the support of the Greater Grenoble Intermunicipal Authority and the Auvergne-Rhône-Alpes regional government.

Cultivating an ecosystem for the sustainable building industry
One of the highlights of 2015 was a meeting on June 17 in Lyon with Marcel Torrents, Chairman of the Executive Board of Delta Dore and head of the Industrie du Futur Sustainable Cities program. Mr. Torrents met with regional sustainable building industry stakeholders from the Teneridis community to discuss aftermarket heat-efficiency upgrades for existing buildings, which will also be the topic of the 2016 Sustainable Building Forum.

Hydrogen energy a hot topic for European and international networks
A smart specialization workshop on hydrogen energy was held in Lyon in April 2015. The event—the first of its kind in Europe—brought together experts from regions that are leading the way in hydrogen energy across Europe.

The International Partnership for Hydrogen and Fuel Cells Colloquium was held in Grenoble in December 2015, providing a world tour of hydrogen energy, with the latest news from the United States, Japan, China, the Netherlands, Germany, and South Africa.

Challenges in biomass-to-energy
The biomass-to-energy industry is facing a number of hurdles when it comes to transforming biomass into gases suitable for producing energy. Teneridis and Axelera co-organized a technical conference on biomass-based gases in September 2015. The conference was followed by tours of plants in Lyon and Grenoble.

Smart Energy Port
Teneridis led two brainstorming sessions, in September and December 2015, on energy-related innovations in ports and industrial-port complexes, which are strategic for a number of reasons: multimodal transportation, renewable energy production, and new electric mobility technologies like batteries and hydrogen.

Local energy management
In 2015 Teneridis held its second annual event for government stakeholders dealing with local energy management—a topic with broad appeal. The event was attended by representatives of government and industry, and included highlights like a presentation of local government challenges (energy-plus communities, energy master plans) and a focus on small- and mid-sized businesses commercializing solutions developed by Teneridis member companies to government clients.

Pitch Your Business: Energy
In 2015 Teneridis partnered with regional innovation organization ARDI Rhône-Alpes; clusters Rhône-Alpes Eco-Energies, Cluster Lumière, and Innovation Constructive and French government investment bank Bpifrance to create the Pitch Your Business: Energy program to introduce the region’s small- and mid-sized energy businesses to private investors (both general and specific to the energy industry). A total of fifteen applications were reviewed and eight companies pitched their idea to 30 investors; half of the participating companies raised a total of €2.2 million.

LENDING A HAND

TENERRDIS SUPPORTED ITS MEMBERS IN A MULTITUDE OF WAYS IN 2015, WITH PROGRAMS FOCUSING ON HIGH-LEVEL KNOW-HOW IN OUR FLAGSHIP INDUSTRIES, NEW SOURCES OF INNOVATION, AND DRIVING THE GROWTH OF SMALL- TO MID-SIZED BUSINESSES.
INNOVATING

TENERRDIS IS KNOWN FOR PROJECTS SPANNING THE ENTIRE INNOVATION VALUE CHAIN FROM LAB TO MARKET, PLUS GROUNDBREAKING EXPERIMENTS LIKE THE HYWAY HYDROGEN-POWERED VEHICLE ROLLOUT. OUR PROJECTS ARE FUNDED THROUGH FRENCH AND EU PROGRAMS AND COVER THE ENTIRE ENERGY MIX.

In 2015 we went a step further, with three new initiatives: a call for expressions of interest to accelerate the maturation of our collaborative R&D projects, a MOOC on renewable energy, and a new seal of approval to support our “product factory” strategy.

**BRESILAR**
Call for projects: French National Research Agency (ANR)

**A sustainable silicon purification process**
The Bresilar project was set up to develop a sustainable, environmentally-friendly silicon production process for the photovoltaic industry. The purification of metallurgical-grade silicon presents a substantial hurdle—cost—that this project must overcome. The main focus will be the extraction of boron, which is currently the costliest part of the process. The results could also lead to cheaper extraction of phosphorous, which is also financially costly and energy intensive.

The project will give equipment manufacturer ECM Greentech, which currently makes crystallization furnaces used to produce PV-grade silicon ingots, a new technology for the purification of metallurgical-grade silicon.

*Lead:* SIMAP  
*Partners:* CEA, ECM Greentech, SolarPure

**AÉROLIFTER**
Call for projects: French Single Interministerial Fund (FUI)

**Logging balloons: an innovative, competitively-priced solution**
Accessing resources (especially in mountainous areas) and protecting ecosystems are just two of the challenges the forestry industry is facing.

The Aérolifter project will develop a hybrid dirigible that is motorized for site access and setup and wire-guided for logging on steep terrain. The dirigible will be capable of transporting stacks of wood of up to two tons.

Commercial release is planned for 2019 and the market is global (Europe, New Zealand, Japan, the United States). The results of the project could also be used to develop new solutions for the hoisting and construction industries.

*Lead:* Airstar  
*Partners:* EchoForest, FCBA, ONERA, Solution F

**SOOGREEN**
Call for projects: Celtic Plus (Eurêka)

**A backup electric power system for the telecoms market**
The Soogreen project focuses on energy-efficient service delivery for mobile networks amid exponentially-increasing data volumes and strong future growth in the number of connected objects.

One of the project objectives, which will be spearheaded by Tenerrdis member Atawey, will be to bring tomorrow’s telecoms equipment a hydrogen-based main or backup energy solution produced locally using electrolysis. The result will be an alternative to generators or generator-battery couplings.

Commercial release is planned for 2019 and the market is global (Europe, New Zealand, Japan, the United States). The results of the project could also be used to develop new solutions for the hoisting and construction industries.

*Lead:* Orange  
*French partners:* Arelis, Atawey  
*Foreign partners:* Finland, Turkey, Singapore

New Energy Technologies MOOC
Tenerrdis and Grenoble Ecole de Management teamed up in 2015 to develop a MOOC (Massive Open Online Course) on renewable energy. Air Liquide, CNR, General Electric, Grenoble Institute of Technology’s Ense3 school, and Think Smart Grids also participated in creating the course. The project is also backed by IRT Nanoelec.

The MOOC is a prime example of the unique approach to collaborative innovation Tenerrdis has been promoting for a decade. This innovative initiative mobilized key stakeholders—from manufacturing, academia, and scientific research—in the cluster’s six flagship industries. A total of 32 experts worked for eighteen months to create high-quality course content. The course, in English with French subtitles, is free of charge and the first six-week session launched on March 14, 2016.

On top of that, we have a new seal of approval to support our “product factory” strategy.
Tenerdis 2015 Call for Expressions of Interest

Another Tenerdis innovation in 2015 was the Call for Expressions of Interest (CEI) to accelerate the maturation of collaborative R&D projects addressing “Sustainable energy: new technologies, markets, and uses.”

The CEI will also give Tenerdis members and their partners opportunities to get involved in the emerging challenges of the energy transition, whether in France or worldwide. Some of these challenges have already been identified, such as those in France's new Energy Transition Act. However, Tenerdis would also like to explore other issues that present opportunities to innovate. These include network convergence, pilot manufacturing line design leveraging the Horizon 2020 program's Key Enabling Technologies, energy management and integration for specific applications like ports and campuses, and energy and digital innovation.

A new seal for innovative products and services resulting from Tenerdis-certified R&D projects

The cluster’s new 3.0 roadmap and Vision 2020 strategy plan solidly established the “product factory” as the latest incarnation of Tenerdis’ efforts over the past decade. The objective is clear: to nurture innovative ideas into marketable products.

In 2015, Tenerdis created the “ENERGIZED BY TENERRDIS” seal of approval to inventory and promote Tenerdis members' innovative products and services for the energy transition.

A total of ten solutions carried the seal in 2015; three of them were selected for a national cluster expo in March 2016.

Zero emissions: the time is now

The HyWay project, coordinated by Tenerdis, rolled out a fleet of 50 hydrogen-powered electric utility vehicles and built two hydrogen filling stations (in Grenoble in Lyon).

This project kicked off in 2014 and entered its operational phase in 2015. Effective promotion by Tenerdis and its partners resulted in substantial interest from government and the media.

March: Initial fleet of vehicles rolled out in Lyon.

June: Fleet of 21 additional vehicles (Europe’s largest fleet) delivered in Grenoble and three temporary filling stations opened for service.

July: French President François Hollande toured Lyon’s CNR river port, home to Lyon’s hydrogen filling station.

September: HyWay pavilion at Sustainable Mobility Day in Grenoble.

REACHING OUT

EXPANSION WAS A MAJOR THEME IN 2015, AS TENERRDIS BROUGHT IN NEW MEMBERS, BUILT BRIDGES BETWEEN CORPORATIONS AND SMBs, AND HELPED ITS MEMBERS MOVE BEYOND BORDERS. BECAUSE AT TENERRDIS WE FEEL STRONGLY THAT KNOWLEDGE SHARING AND COOPERATION FORM THE FOUNDATIONS OF INNOVATION. IN 2015 THE CLUSTER OFFERED NEW PROGRAMS TO FACILITATE COLLABORATIVE R&D BETWEEN PARTNERS IN FRANCE AND BEYOND.

A growing, changing ecosystem
Tenerrdis’ membership grew in 2015, with 37 new members, 65% of which were small- to mid-sized businesses located across the Rhône-Alpes region. And our high member renewal rate is evidence of the cluster’s power of attraction as we begin a crucial new chapter marked by concrete responses to the challenges of the energy transition.

Two new government agencies joined Tenerrdis in 2015: the Greater Lyon Intermunicipal Authority and the Valence-Romans Sud Rhône-Alpes Intermunicipal Authority. Their presence will help Tenerrdis leverage the resources these areas have to offer to generate new projects and partnerships.

Open innovation
In October 2015 Tenerrdis partnered with Imaginove and Clust’R Numérique to run an open innovation workshop to help Alstom Hydro (GE Power) source the know-how required to develop innovative products and services. The workshop was attended by around 80 people and included 40 B2B meetings between SMBs and Alstom Hydro (GE Power) and ten pitches by SMBs from across the Rhône-Alpes region.

Passport to the world
As an active member of the International Cleantech Network (ICN), a partnership of the world’s top eleven energy and cleantech clusters, Tenerrdis kicked off an innovative new initiative in 2015: the ICN Passport. The purpose is to help members of ICN clusters take full advantage of each other’s networks and services.

In other ICN-related news in 2015, a November trip to Austria provided two key opportunities for Tenerrdis: a meeting with representatives of ICN in Graz (EcoWorld Styria) and a stop at the European Utility Week (EUW) 2015 trade show in Vienna. These initiatives were supported by Tenerrdis’ International Development Plan funded by the Auvergne-Rhône-Alpes regional government.

Tenerrdis leads the way in EU projects
Tenerrdis got involved in EU programs in two capacities in 2015. First, the cluster engineered two ALCOTRA (an interregional cooperation program between France and Italy) projects and analyzed calls for projects in the field of energy for Tenerrdis members. On December 17 Tenerrdis partnered with ARDI, PCN énergie, CCIR, ARC4-énergies, and KIC InnoEnergy to run a workshop on the upcoming EU Horizon 2020 calls for projects on smart grids and energy efficiency.
LOOKING AHEAD

Vision 2020: building our future

As Europe’s leading source of know-how on the EnerNet (the Internet of Energy), Tenerrdis is driving the rollout of innovative solutions and new uses for technology in the field of energy. Tenerrdis is setting new trends and helping position France as the global energy-industry leader. Our role is to serve as the premier point of contact for all energy initiatives and stakeholders, from academia and science to manufacturing and government.

What it means

Tenerrdis is already on the fast track to 2020. As a key stakeholder in energy and innovation, the cluster is constantly on the lookout for the trends that will shape our future: the one-to-many shift from centralized to local energy production and use; energy storage; an increasingly digital energy system; and the growth of energy-plus communities.

And we are gearing up for these transformations. In early 2015 we unveiled our Vision 2020 strategy plan. The plan leverages our core activities—collaborative R&D projects, innovation, and business development support for SMBs—to make advances in four key areas:

The enernet, with the goal of accelerating the rollout of innovative solutions and new uses for technology to build smart energy systems.

Outreach to local governments to create sustainable value by tying local economic development to local implementation of the energy transition.

International expansion to boost our capacity to create value and promote Tenerrdis and our members worldwide.

Strategic alliances to generate synergies between our initiatives and those of other innovation and energy stakeholders.

What’s next

Our strategy is clear and will guide our initiatives and events throughout the current year, already well underway. Our role is to position our flagship industries to support the energy transition. The quest for excellence shapes everything we—from our in-house staff to the outside scientific researchers and manufacturing professionals with whom we work—do. Our approach encompasses the entire value chain, from renewable energy production, conversion, and storage to new ways of using energy that ensure economy of means, efficiency, and flexibility. This approach puts us in an even stronger position to support local energy policies in both rural and urban areas and spanning issues from green mobility to the factory of the future.

We have come a long way in just ten years. Our membership is growing in number and diversity. Our collaborative innovation projects continue to gain traction, with the new “Energized by Tenerrdis” seal of approval for innovative products and services. Our Vision 2020 strategy plan is giving new meaning to our activities. And our scope is broadening, with a foothold in the Auvergne region in our very near future. Tenerrdis is entering this new decade with more energy than ever!