



EDF Green Bond Framework

September 2016

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EDF, a European leader in renewables, has included Green Bonds in its financing toolbox to support its development in wind and solar

- EDF is a leading European renewables generator today
 - **Over 29GW**, of which 26GW in Europe: net installed capacity in hydropower, wind, solar PV and other renewables
 - **~€2 billion / year**: gross operational Capex in renewables (development of new capacity, renovation of existing assets)
- Development of renewables is a core component of EDF's CAP 2030 strategy
 - **More than 50GW in 2030**: the goal the Group has set for net installed renewables capacity (i.e., x2 from 2014)
 - **Renewable Energy Division**: new division created in 2015, gathering all Group renewables activities and directly represented in EDF's Executive Committee, to deliver this strategic ambition
- EDF considers Green Bonds as a key financing instrument to support such efforts
 - **November 2013**: Landmark inaugural issuance and integration of Green Bonds into EDF's financing policy

EDF has issued two Green Bonds so far

Proceeds aimed at financing new wind and PV projects

November 2013

Inaugural EDF Green Bond issuance

- €1.4bn, 7.5 year maturity
- First benchmark corporate Green Bond

October 2015

Second EDF Green Bond issuance

- \$1.25bn, 10 year maturity
- Largest US\$ corporate Green Bond

Benefits for EDF



- Diversify investors' base
 - Strengthen the link with socially-responsible investors and access to a wider pool of bond investors
- Highlight EDF's existing footprint and development strategy in renewable energies
 - Create a funding instrument aligned with EDF strategy of developing renewable energies in a sustainable way
- Further streamline EDF's approach to Corporate Responsibility
 - First joint initiative between Finance, Sustainable Development and EDF Energies Nouvelles

Fund allocation and impact reporting as at 31/12/2015 under the first two EDF Green Bonds

	Funds raised	Funds allocated	Projects having received GB funding	Share funded by the GB	Gross total capacity of GB funded projects (in MW)		Expected output (in TWh/year)		Expected avoided CO ₂ emissions (in Mt/year)	
					Gross ⁽¹⁾	Net ⁽²⁾	Gross ⁽¹⁾	Net ⁽²⁾	Gross ⁽¹⁾	Net ⁽²⁾
Green Bond #1 November 2013	€1.4bn	€1.4bn	13 projects ⁽³⁾	59%	1,755	976	7.0	4.1	3.3	1.8
Green Bond #2 October 2015	\$1.25bn	\$500m	3 projects ⁽³⁾	60%	574	346	2.4	1.5	1.7	1.1

A total of 2.9MtCO₂/year avoided by the allocation of Green Bond proceeds to 15 projects

The detailed list of Green Bund funded projects is available in section 6.9 of the 2015 EDF reference document.



- (1) Sum of the gross impacts of each project funded by the corresponding Green Bond
- (2) Sum of the impacts of each project weighted by the share of total investment funded by the corresponding Green Bond
- (3) Of which one project received funding from both Green Bonds



EDF now extends its Green Bond Framework to its whole renewable business to include investments in hydropower assets modernisation and upgrade

- This new Framework is applicable to potential future Green Bond issuances
- It aims to include investments in the existing hydropower fleet in mainland France into the scope of projects eligible to Green Bond funding, in addition to new wind and solar projects
 - Green Bond funding becomes available to investment activities that will enable those hydropower generation facilities to sustain a high level of generation efficiency and operational safety, to adapt to future changes in climate patterns, to increase their renewable electricity output, and to respond to enhanced flexibility needs to balance the growing share of intermittent renewable generation
- This addition further expands an already strong pipeline of Green Bond eligible investments
 - **~€1bn per year:** eligible investments in new wind and solar projects by EDF Energies Nouvelles
 - **~€300m per year:** eligible investments in hydropower assets managed by EDF's Hydro Division

This Framework builds on the structure developed for EDF's past Green Bond issuances under which EDF committed to, and delivered, high levels of transparency and external scrutiny on all four components of the ICMA Green Bond Principles

EDF Green Bond Framework following best market practices and Green Bond Principles

<p>1 Use of Proceeds</p> <p>Investment in EDF EN and EDF's Hydro Division power generation assets from renewable energy sources:</p> <ul style="list-style-type: none"> • Development of new renewables generation capacity • Renovation and modernisation of existing hydropower generation facilities with a view to increasing efficiency, flexibility and ability to contribute to meeting needs of changing electricity systems as the share of intermittent capacity grows • Adaptation of existing hydropower assets to changing climate patterns <p>Investment activities to comply with specific Environmental and Social criteria</p>	<p>2 Project selection process</p> <p>Dedicated internal organisation to assess and ensure that only Eligible Projects as defined in Use of Proceeds may benefit from Green Bond financing</p> <p>3 Management of Proceeds</p> <p>Net proceeds allocated to a sub portfolio, managed and tracked separately until their allocation to Eligible Projects</p> <p>4 Reporting</p> <p>Quarterly updates : Fund allocation Annual disclosures: Green Bond-funded projects and aggregated impacts (at the level of each Bond issuance)</p>
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<p> External Review </p> <p>Ex-ante Second Opinion – Vigeo Eiris' level of assurance on the sustainability of the Green Bond Framework is “reasonable”</p> <ul style="list-style-type: none"> • Confirms bonds to be issued are Green Bonds and alignment with the GBPs • Considers EDF ESG performance and the new Green Bond Framework as “robust” • Considers reporting commitments showing an overall consistent level of transparency 	<p>Ex-post attestation report – Deloitte to issue an annual assurance report on fund allocations and EDF Green Bonds compliance with EDF Green Bond Framework and the Green Bond Principles</p>
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EDF EN Eligible Projects

Unchanged from EDF's 2013 and 2015 Green Bond issues

New renewable energy projects

- New projects identified and developed by EDF Energies Nouvelles in the field of renewable energies such as wind (off-shore and on-shore), photovoltaic, biogas, marine energy, etc.



- Eligible projects can only consist of new projects (under development or construction)

Fulfilling E&S criteria

- EDF EN Project E&S Criteria cover five Environmental and Social aspects
 - Civil rights and Governance assessment of country location of the projects
 - Management of environmental impacts
 - Protection of workers' health and safety
 - Promotion of responsible supplier relationship
 - Dialogue with local players

EDF mainland France Hydro Eligible Projects

Investments in existing hydropower facilities in mainland France (excluding subsidiaries)

- Renovation and upgrade of hydropower generation facilities
- Modernisation and automation of existing hydropower facilities' maintenance and operation
- Hydropower development projects

Improve hydropower generation efficiency and safety

Improve resilience to climate change

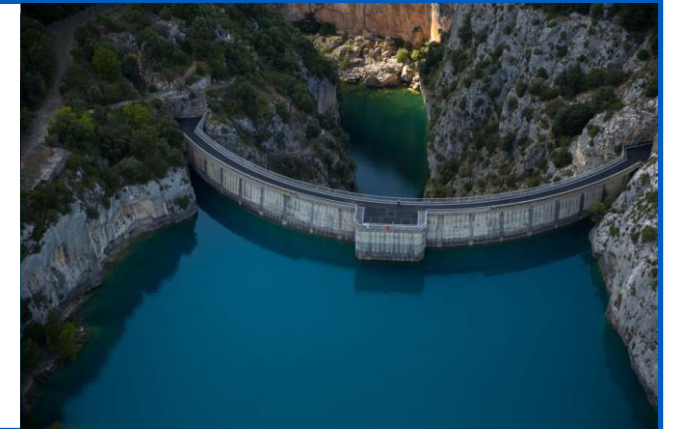
Increase generation flexibility and ability to manage growth in intermittent renewables

Net increase of hydropower output and/or storage capacity (for pumped storage)

Fulfilling E&S criteria

- French Hydro Project E&S criteria cover five E&S aspects
 - Development of sustainable human resources practices and processes
 - Management of environmental impacts
 - Protection of employees and contractors workers' health and safety
 - Promotion of responsible contractors relationship
 - Dialogue with local players

Inspired by the IHA Protocol's philosophy



Project selection, reporting and verification processes

	EDF Energies Nouvelles	EDF mainland France Hydro
Project selection	Based on project assessment provided by the EDF EN teams in charge of project development, procurement and sustainable development.	Based on project assessment by EDF's Hydro Division teams in charge of project development, procurement and sustainable development.
Quarterly Reporting	<ul style="list-style-type: none"> Total amount of proceeds allocated to selected Eligible Projects (+ share vs. total raised and unallocated balance) Distribution of the total allocated amount b/w the different Eligible Projects categories and geographical distribution Number of projects having received Green Bond funding 	
Annual Reporting	<ul style="list-style-type: none"> Description of each project that received Green Bond funding: <ul style="list-style-type: none"> ✓ Technology, location and commissioning timeline ✓ Electricity generation capacity (in MW) For each Green Bond issue, aggregated impacts from all funded projects: <ul style="list-style-type: none"> ✓ Total expected electricity output (in GWh) ✓ Expected avoided CO₂ emissions 	<ul style="list-style-type: none"> Description of most representative projects that received Green Bond funding For each Green Bond issue, aggregated impacts: <ul style="list-style-type: none"> ✓ For development projects: additional generation capacity; expected output, and expected avoided CO₂ emissions ✓ For all other EDF Hydro Division Eligible Projects: generation capacity impacted by investments, expected output, and qualitative description of associated environmental benefits
Annual attestation report from Deloitte	<ul style="list-style-type: none"> Alignment with Green Bond Principles Compliance with EDF Green Bond Framework on the following aspects: <ul style="list-style-type: none"> ✓ Project selection process and eligibility of Green Bond-funded projects ✓ Tracking of the funds raised and reconciliation of amounts of funds allocated ✓ Compliance of avoided CO₂ emissions reported with calculation methodology 	

Deloitte.

EDF's hydropower fleet in mainland France

- EDF's hydropower fleet in mainland France comprised of **433 power plants** with an average age of 71 years
- Around **20GW of installed capacity**
 - Of which 13GW can be dispatched instantly
- **Total output in 2015 = 38.9TWh⁽¹⁾**
 - Excluding Corsica and the French overseas departments, where output was 1.3TWh in 2015
- **Benefits of hydropower**
 - Dispatchable renewable generation
 - Speed, availability and flexibility
 - Contribution to management of supply and demand balance in a context of growing share of intermittent generation
 - Ability to provide ancillary services to the network (frequency and voltage adjustments)
 - Water storage capacity (peak energy, cold source for thermal and nuclear generation)



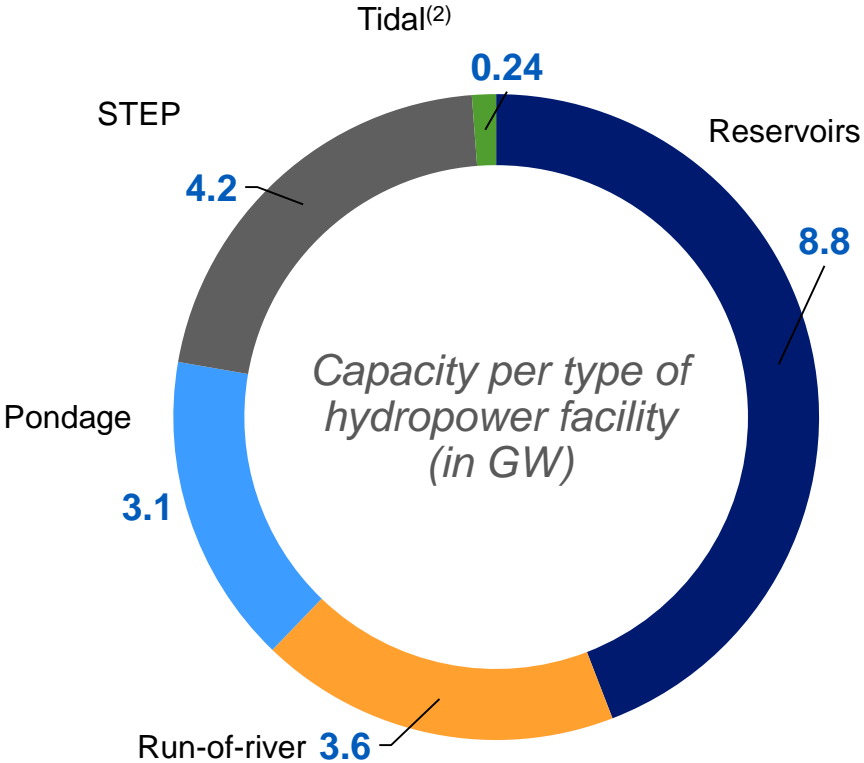
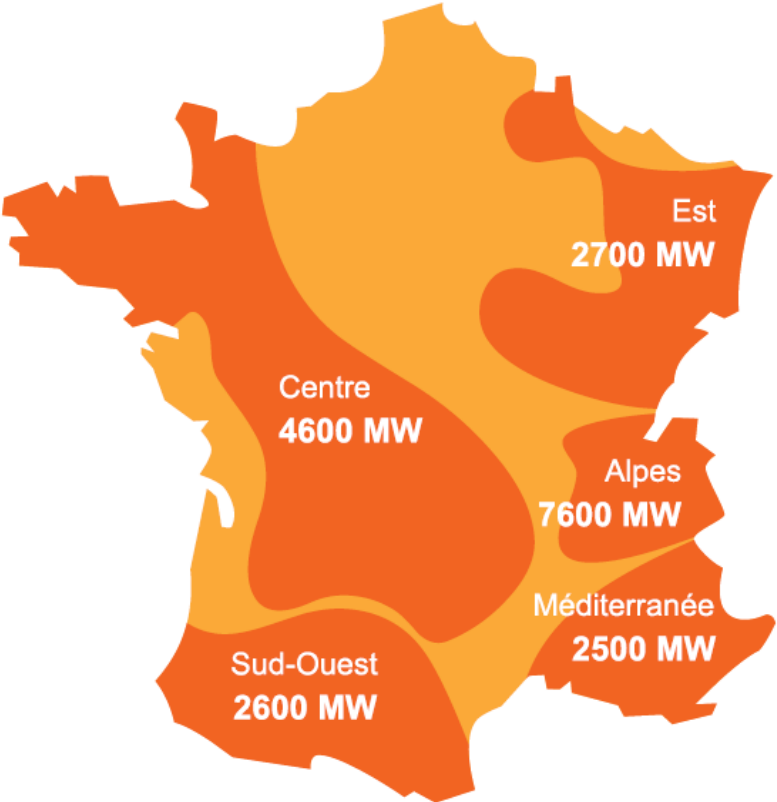
Different types of hydropower facilities

- **Run-of-river**
 - No storage capacity, run-of-river plants are used in order to meet normal day-to-day demand
 - Energy generation depends solely on the current water condition
- **Pondage water**
 - Average sized water reserve,
 - Intended for an occasional use during the week or the day, to cover peaks in demand
- **Reservoirs (lake-supplied)**
 - Large storage capacity
 - Influence on downstream power plants (located in mountain ranges) which calls for a management of valley stations
- **Pumped storage (STEP)**
 - Water is pumped from a downstream reservoir to an upstream one to create a reserve available during off-peak hours
 - Water is then turbined from the upstream reservoir to the downstream one during periods of high demand
- **Tidal power**
 - Plant on the river Rance which, using the up and down movement of the tides, provides a very regular power supply

EDF operates multiple, small-to-large hydropower facilities of different types, able to meet base-load and peak demand, designed to optimise harnessing and use of water resources

EDF's hydropower fleet in mainland France

Total installed capacity ~20GW⁽¹⁾



≈20% of the overall generation capacity in France



(1) Excluding Corsica and overseas departments, equivalent to 440MW

(2) The tidal power plant of the Rance generates electricity by using the up and down movement of the tides

Examples of EDF mainland France Hydro Eligible Projects

Generation efficiency investment - Grand'Maison

EDF is rolling out an industrial project aimed at sustaining the technical and economic performance of its hydro generation fleet with high standards of reliability, flexibility, modularity and availability, blending seamlessly into its surroundings and making a major contribution to the economic life of France mountainous regions

■ Plant description

- Commissioned in 1985, most powerful hydropower plant in France
 - 1,790 MW of capacity that can be dispatched within 2 minutes
- Pumped-storage = only GW-size power storage technology available today
 - During periods of high demand, water in the upper reservoir pumped down to the lower reservoir. When demand power drops, water pumped back up.
 - Two-reservoir system key to flexibility and safety

■ Investment programme

- Replacement of large components
 - Wheels, turbine components, valves
- Modernization to improve the industrial performance of the plant:
 - Connection to the regional “e-operation” center
 - Enhanced instrumentation with close monitoring of the evolution of “metal” temperatures
 - ➔ reduced unplanned outages and better anticipation of maintenance



Examples of EDF mainland France Hydro Eligible Projects

Development project - Upgrade of La Bâthie

Multifaceted by nature, the development of hydropower entails the replacement of existing plants, the construction of new dams or increasing installed capacity

■ Plant description

- La Bâthie consists of thirty hydrants, 45 km of tunnels and three storage tanks, Roselend, Saint-Guérin and Gittaz spread in Beaufortain in the Savoie region.
- 6 turbines delivering an initial installed capacity of 500 MW for a 50 m³/s discharge when it was commissioned in 1961 (upgraded in 1975 by increasing the discharge to 55 m³/s)

■ Investment programme

- Almost €50 million invested over eight years to increase the installation's capacity from 550MW to 600MW by:
 - Increasing each of the 6 existing turbines
 - Replacing voltage regulation system and underground electricity cables.
 - Creation of a new secondary reservoir in order to stock part of the water when turning on the power station, enabling to smooth the river flow variations down the power station.
- Project spread over time as plant critical to the electrical system and cannot be stopped altogether
- ➔ The project will provide 50MW of extra capacity and allow to significantly increase the peaking capacity of the plant by the end of the decade, thereby supporting the development of intermittent renewables while limiting any potential negative impact on the touristic activity in the valleys.

