

Green Bonds: The Chartbook



3Q16



Credit Research

22 September 2016

Welcome to
UniCredit

Executive summary

THE STATE OF THE MARKET

- **New issuance in 2016 stands at USD 49bn YTD***, marking a record so far. However, a large share of issuance comes from Asia, namely Chinese bank transactions. Consequently, China makes up by far the largest share of new issuance YTD (USD 14.4bn compared to 2015: USD 1.3bn; see [slide 10](#)). If one excludes Chinese transactions, Green Bond issuance this year would be nearly flat yoy.
- **Corporate Green Bond issuance has slowed somewhat in 3Q16 compared to 2Q16.** Spanish utility Iberdrola was the only larger issuer in 3Q16 (see [slide 5](#)). Most notable in 2Q16 was a EUR-benchmark corporate green bond from US utility Southern Power. Other US issuers are likely to follow suit, in our view. We think grid operator Tennet is an interesting issuer: it is using Green Bonds as its major funding source, in particular for its maturity profile beyond seven years.
- **European banks are increasingly using Green Bonds:** ABN Amro has issued two Green Bonds as senior debt; Société Générale plans a 5Y senior-unsecured-positive-impact bond, its second bond already. Dutch lender Rabobank (RABOBK; Aa2/A+/AA-) plans its inaugural green bond, denominated in euro. The bank developed a green and sustainability bond framework for renewable energy projects and small and medium-sized enterprises. Dutch non-financial rating agency Sustainalytics has reviewed the framework and argues that “Rabobank’s green and sustainability framework is robust and credible”. See [slide 22](#) for trading levels.
- **The Green Bond Principles (GBP) were revised and updated:** The International Capital Markets Association (ICMA) updated the Green Bond Principles on 16 June 2016. The GBP are voluntary process guidelines that are applied to Green Bonds and which emphasize disclosure and transparency. This is already the second review of the GBP, which were first published in 2014. The update focuses on four key areas: **1.** environmental categories are expanded; **2.** external assurance is extended to include a rating; **3.** the use of proceeds are broadened to include Social Bonds and **4.** a new resource center has been launched.
- **G20 Green Finance Synthesis Report:** The 20 largest economies (G20) aim to support the market. They published a report outlining their goals after the G20 summit in China on 5 September. The report provides a number of options to support the market such as raising awareness, supporting local Green Bond markets, reducing risk premiums and establishing cost-efficient verification and reporting. The G20 also suggest promoting the development of Green Bond indices, ratings and exchange listings. Additional options included in the report are market responsiveness and product innovation .

*transactions closed as of 21 September 2016, Source: our own analysis based on data from the Climate Bonds Initiative, Environmental Finance and Bloomberg



- I CURRENT MARKET DEVELOPMENTS

- II ASSET CLASSES & CURRENCIES

- III GREEN BOND ISSUERS

- IV TRADING LEVELS

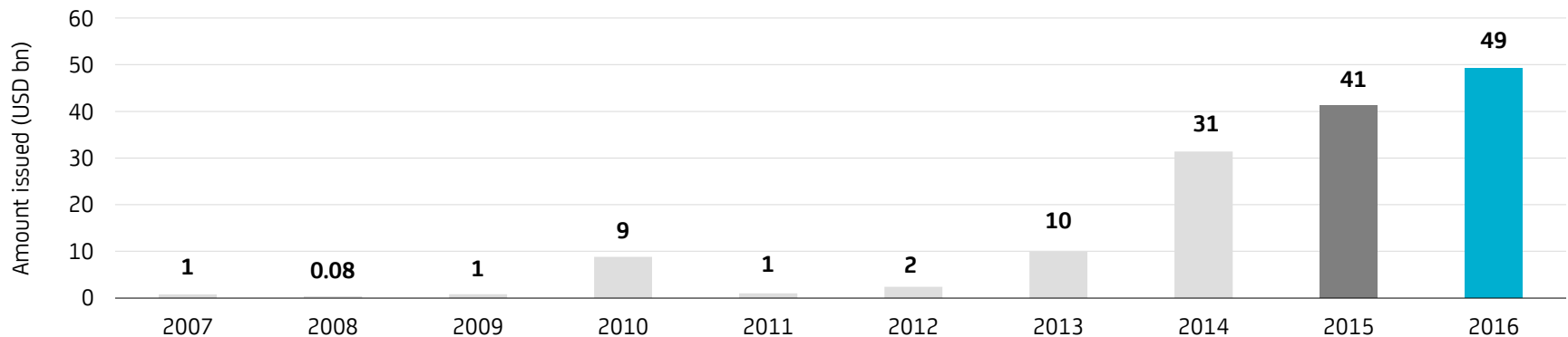


Current market developments

Growing a resilient Green Bond market

- The volume of labeled Green Bonds currently outstanding amounts to USD 136bn (as of 20 September 2016)*
- Green Bonds are part of a USD 694bn climate-aligned bond universe**
- Green Bond issuance reached a record in 2015 (USD 41bn)
- Market continues to grow rapidly with USD 49bn in new issues YTD
- Investor demand for Green Bonds is strong; however, a pricing difference to non-Green Bonds is not existent
- At the G20 meeting in September in China, the twenty leading nations developed plans to scale up the Green Bond market and issued the G20 Finance Synthesis Report

Outstanding Green Bonds by issue year (as of 20 September 2016)*



*All numbers are based on the calculations of UniCredit Research, using public information and data from Climate Bonds Initiative (CBI), Environmental Finance and Bloomberg. Note that we excluded sustainability bonds from our calculations as they are not technically Green Bonds. Green Schuldscheine are included.

** Climate-aligned bonds are themed bonds which also include Green Bonds; Source: Climate Bonds Initiative, July 2016

Source: UniCredit Research



Green-Bond issuance peaked in July

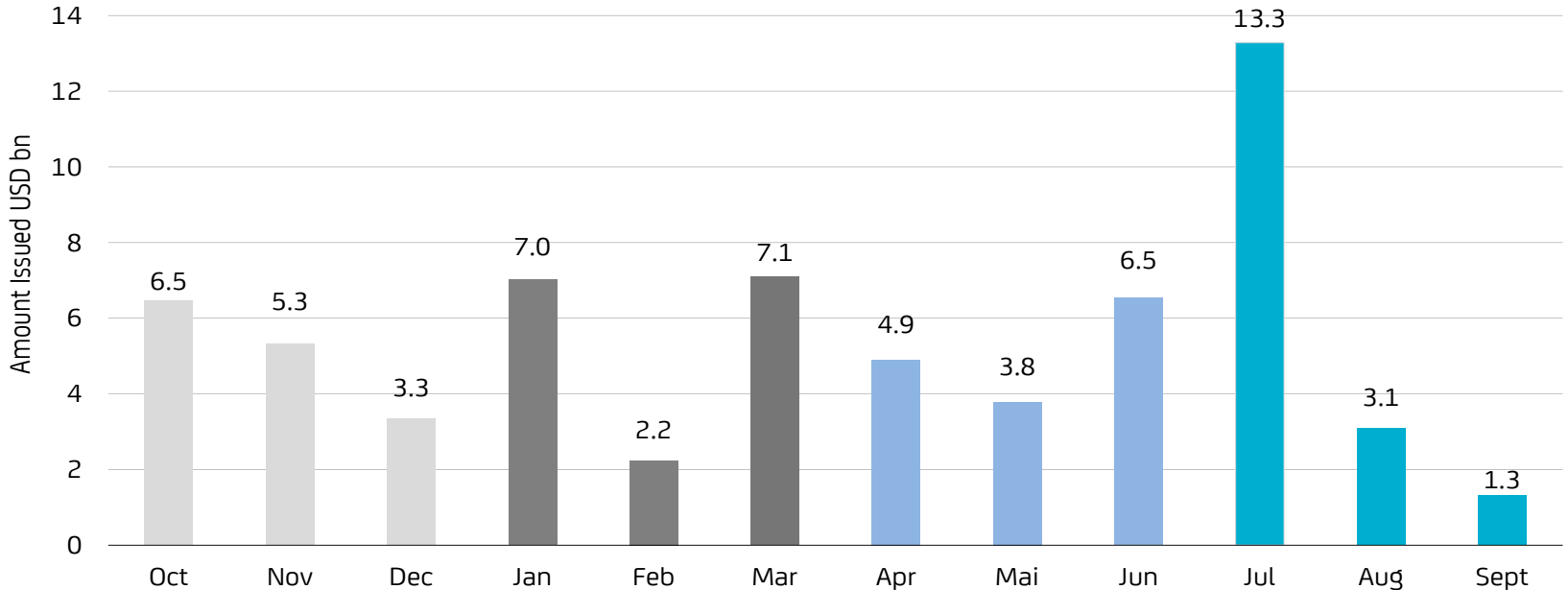
New issuance and large transactions over the past 12 months

4Q15
EDF USD 1.25bn EDF 3.625% 10/25
KfW USD 2.6bn EUR 1.5bn 0.125% 10/20 USD 1bn 1.875% 11/20
ING USD 1.25bn USD 800mn 2% 11/18 EUR 500mn 11/20

1Q16
Shanghai Pudong Bk USD 5.2bn SHANPU CNY 20bn 2.95% 01/19 SHANPU CNY 15bn 3.2% 03/21
Industrial Bank USD 1.5bn INDUBK CNY 10bn 2.95% 01/19
Apple USD 1.5bn AAPL USD 1.5bn 2.85% 02/23
Ned. Waterschapsbank USD 1bn NEDWBK 2.375% 03/26

2Q16
Southern Power EUR 1.1bn SO 1% 6/2022 SO 1.85% 6/2026
Iberdrola EUR 1bn IBESM 1% 4/2026
Tennet EUR 1bn TENNET 1% 6/2026 TENNET 1.875% 6/2036
Deut. Kreditbank EUR 500mn DKRED 0.625% 6/2021

3Q16
Bank of China USD 3bn BCHINA (5 issues in September)
Asian Dev. Bank USD 1.3bn ASIA 1% 8/2019 ASIA 1.75% 8/2026
Iberdrola (Utility) EUR 700mn IBESM 0.375% 9/2025
Greenko USD 500mn GRENKO 4.875% 8/2023



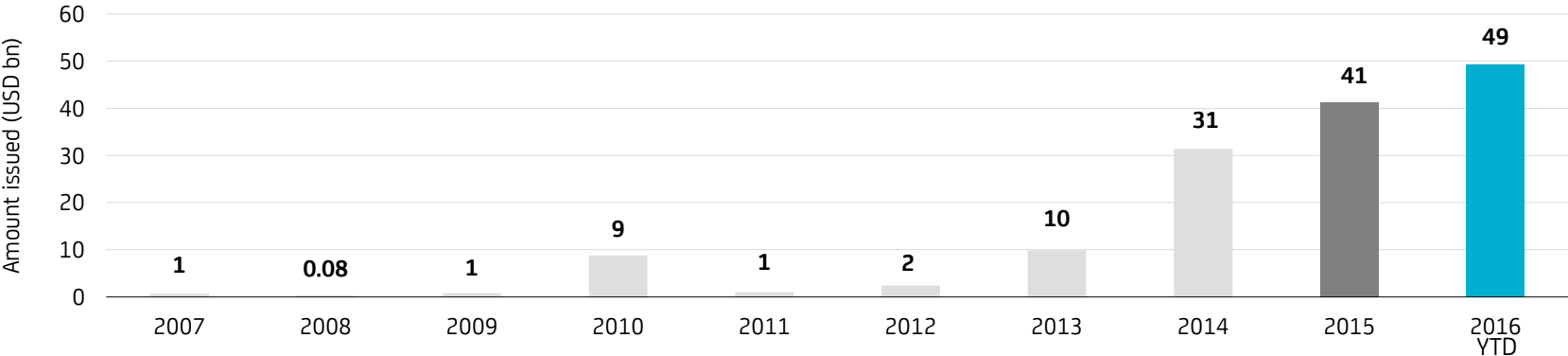
Source: Climate Bonds Initiative, Bloomberg, UniCredit Research



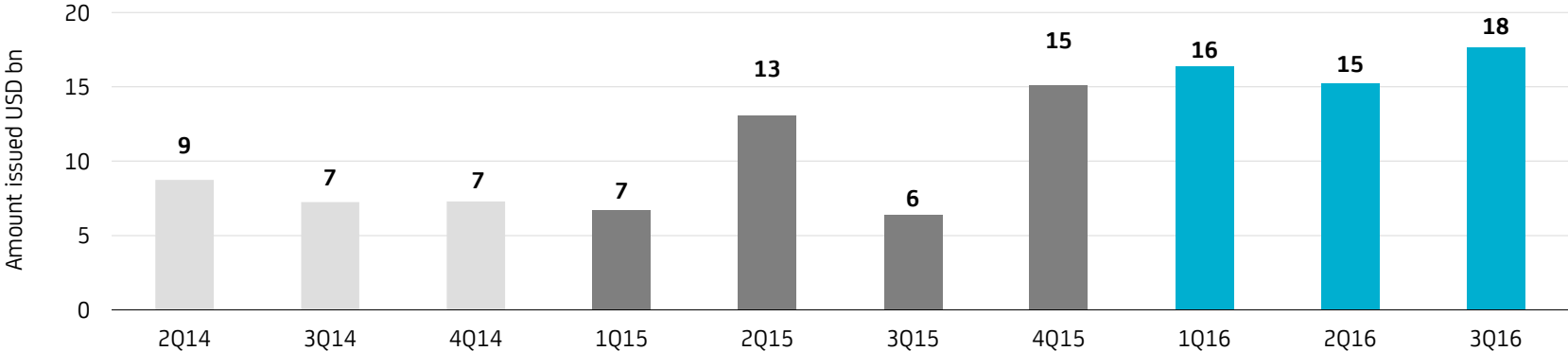
Transactions in 2016 have exceeded our initial estimates

We revise our initial estimates to USD 65bn for 2016 from USD 50bn

New Green-Bond issuance (yearly distribution, in USD bn)



New Green-Bond issuance (quarterly distribution, in USD bn)

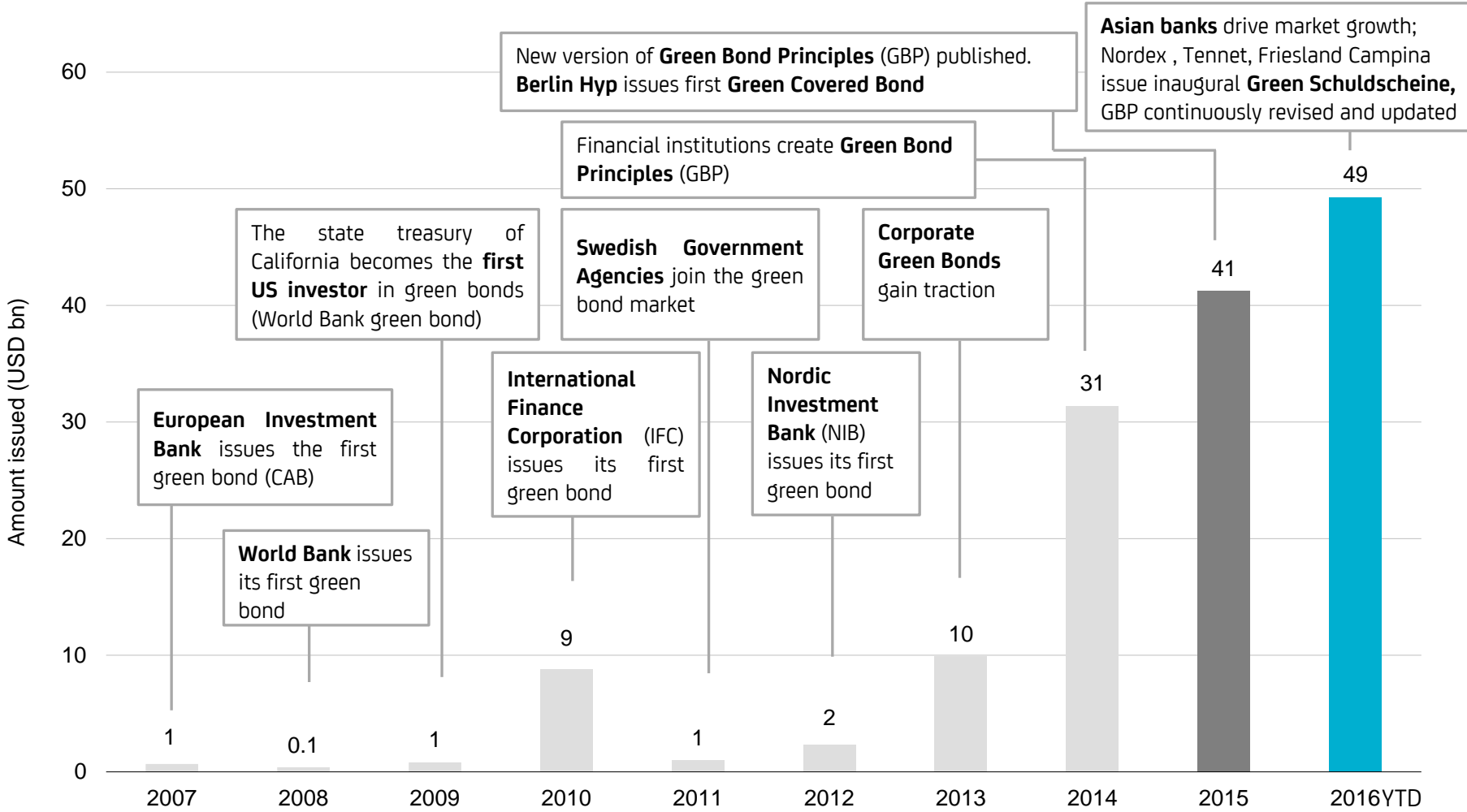


Source: Climate Bonds Initiative, Bloomberg, UniCredit Research



Green Bonds: a timeline

Market development and key events



Source: Climate Bonds Initiative, UniCredit Research



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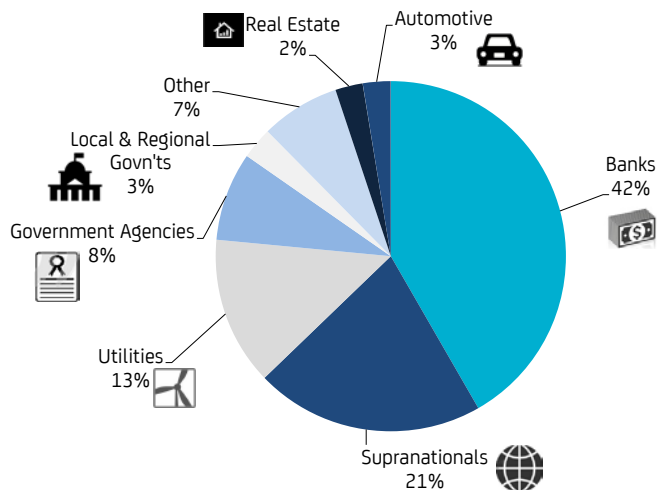


Financial institutions dominate Green-Bond issuance in 2016

The Green Bond market has evolved in 2016

- Banks and supras are the largest issuers this year**

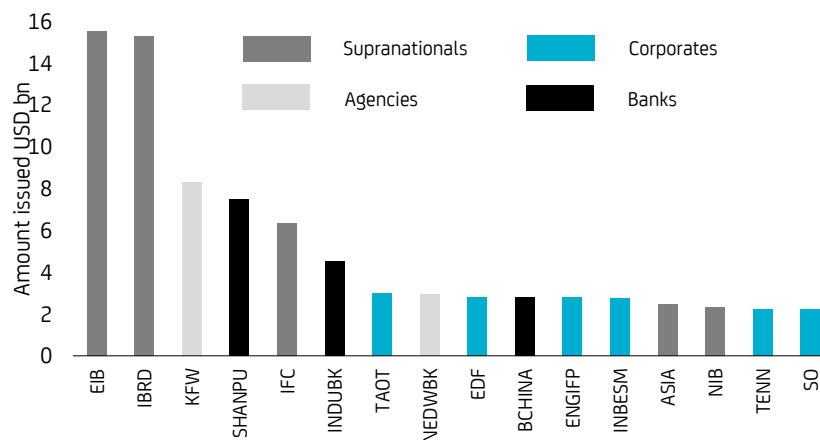
New issuance by sector in 2016 YTD



- Green Bonds are moving from a supra & agency market to a segment driven by financials & utilities
- Banks dominate new issuance in 2016, led by China (Industrial Bank and Shanghai Pudong Development Bank)

- EIB & World Bank are the largest single-name issuers**

Outstanding Green Bonds by issuer



- The World Bank (IBRD), the European Investment Bank (EIB) and German agency KFW are the largest single-name green bond issuers
- The second-largest issuer group are corporates, led by Toyota and the utilities EDF, Engie and Iberdrola

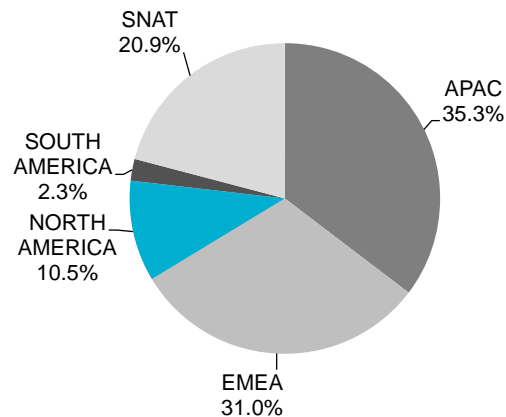


Asia-Pacific is the most important region in 2016

Geographic distribution

- **2016: EMEA ranks No. 3**

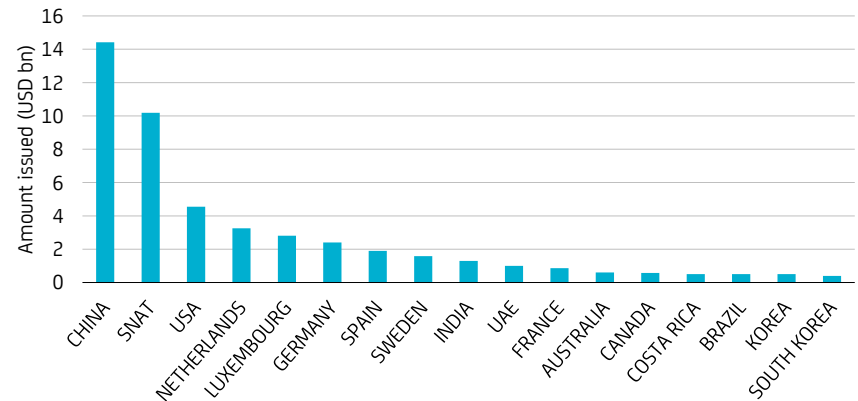
Green Bonds issued by region in 2016 YTD



- Banks dominate new issuance in 2016, led by China (Industrial Bank and Shanghai Pudong Development Bank)
- EMEA issuers make up the second-largest group in 2016 YTD, ahead of the US
- South America is catching up

- **2016: United States rank No. 3**

Green Bonds by nationality issued in 2016 YTD*



- US computer company Apple leads the way for corporate green bonds in 2016
- Dutch issuers rank fourth in 2016 on the back of transactions from grid operator Tennet, agency Nederlandse Waterschapsbank and bank ABN Amro

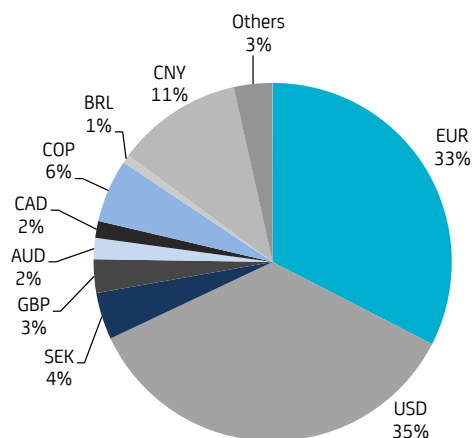


EUR and USD bonds with IG rating dominate the overall market

Suprationals are the foundation – corporates are entering the market

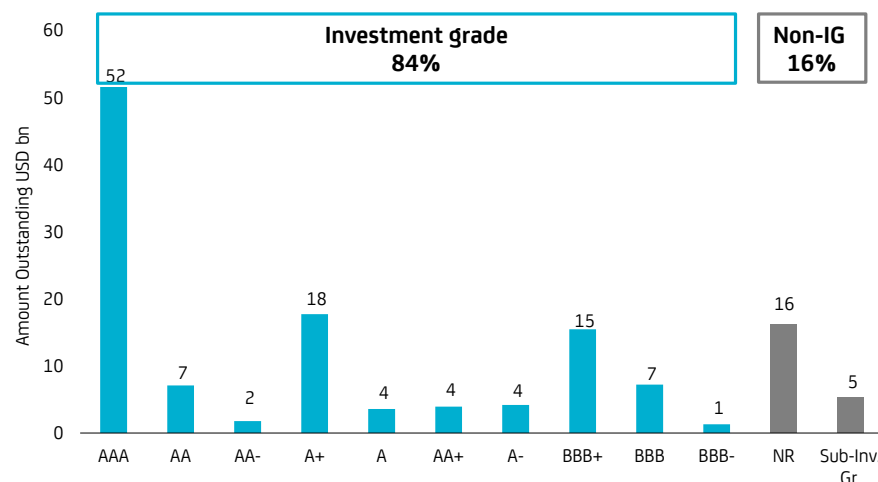
- **The market consists largely of EUR and USD bonds**

Outstanding volume by currency (total outstanding bonds)



- **Green Bonds are an investment grade segment**

Outstanding Green Bonds by credit rating



- Euro and US dollar: issuers from Europe and the US dominate the green bond market; the currency split reflects this
- The Renminbi (CNY) makes up 11%, due to large bank bonds

- Suprationals are the foundation of the Green Bond market; all have an investment grade rating
- Non-IG-rated issuers include US utility Terraform, Brazilian food processor BRF and Banco Nacional de Costa Rica; non-rated issuers include wind turbine makers Nordex and Vestas



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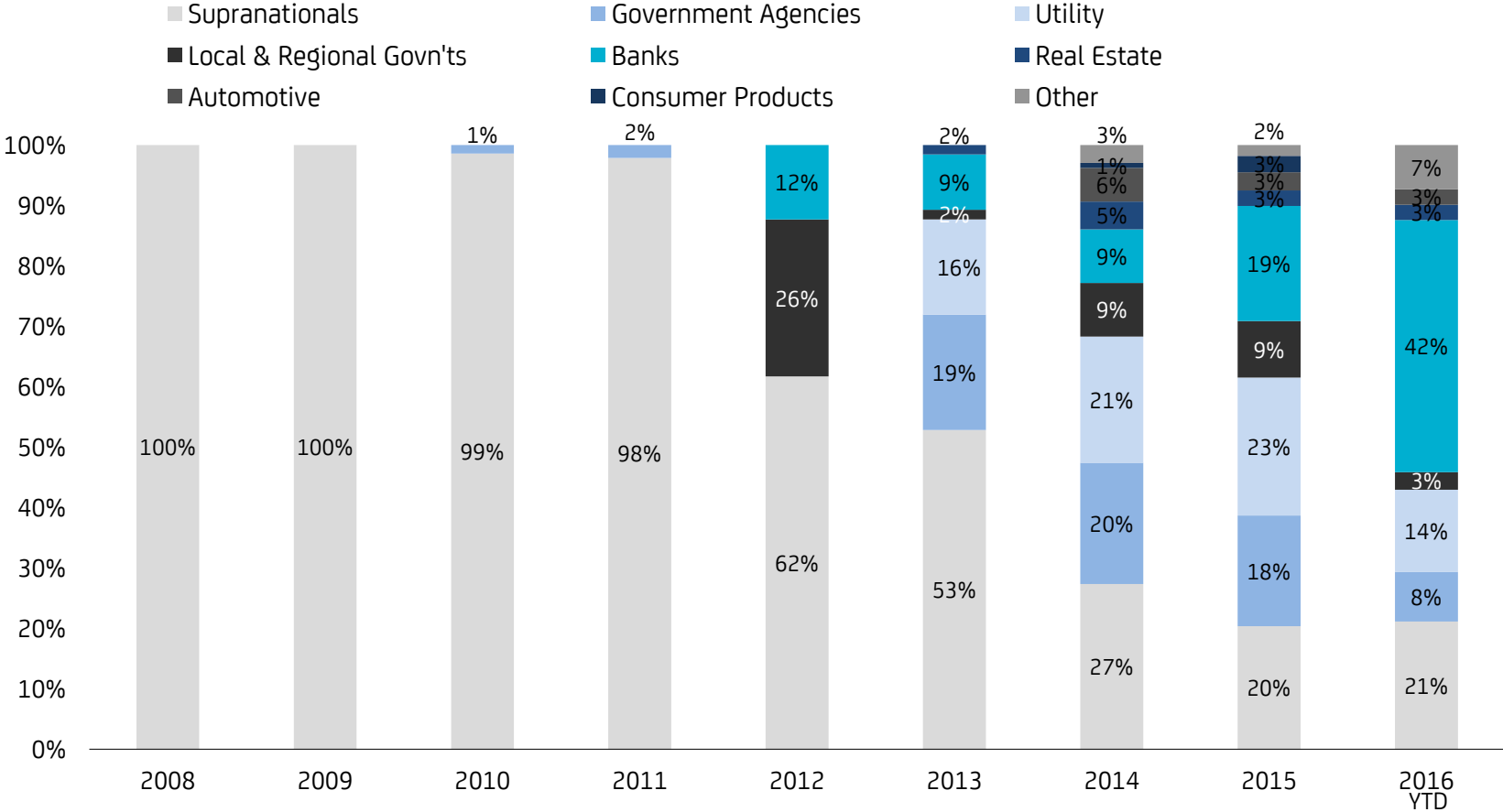
■ III GREEN BOND ISSUERS

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Financial sector issuance increases in 2016

Green Bonds by sector: annual distribution as a percentage



Source: Climate Bonds Initiative, Bloomberg, UniCredit Research



Global issuers in 2016

Transactions at a glance

	Issuer	Latest issue date	Issuer type	Second-party opinion	Cumulated 2016 issues (USD)
SSA	EUROPEAN INVESTMENT BANK	9/16/2016	Supranationals	None	4,139,607,000
	INTL FINANCE CORP	9/2/2016	Supranationals	CICERO	2,442,360,758
	ASIAN DEVELOPMENT BANK	8/16/2016	Supranationals	CICERO	1,300,000,000
	EUROPEAN BK RECON & DEV	7/20/2016	Supranationals	CICERO	706,872,432
	NORDIC INVESTMENT BANK	6/10/2016	Supranationals	CICERO	677,582,000
	INTL BK RECON & DEVELOP	6/29/2016	Supranationals	CICERO	629,389,700
	NEW DEVELOPMENT BANKS BRICS	7/19/2016	Supranationals	EY	449,730,000
	CENTRAL AMERICAN BANK FOR ECONOMIC INTEGRATION	8/18/2016	Supranationals	None	74,128,560
	NEDER WATERSCHAPSBANK	8/10/2016	Government Agencies	CICERO	1,250,000,000
	KFW	5/20/2016	Government Agencies	CICERO	1,238,032,000
	KOMMUNINVEST	3/14/2016	Government Agencies	CICERO	600,000,000
	EXPORT-IMPORT BK KOREA	2/2/2016	Government Agencies	CICERO	400,000,000
	TREASURY CORP OF VICTORIA	7/27/2016	Government Agencies	None	226,770,000
	OVERSEAS PRIVATE INV COR	8/24/2016	Government Agencies	None	116,800,000
	IREDA	1/21/2016	Government Agencies	None	102,500,112
NAFIN	9/2/2016	Government Agencies	Sustainalytics	101,880,000	

Source: Climate Bonds Initiative, Bloomberg, UniCredit Research



Global issuers in 2016

Transactions at a glance

	Issuer	Latest issue date	Issuer type	Second-party opinion	Cumulated 2016 issues (USD)
MUNI	ONTARIO	1/21/2016	Local & Regional Govn'ts	CICERO	568,275,000
	MASSACHUSETTS DEVELOP FIN AGENCY	6/1/2016	Local & Regional Govn'ts	None	188,235,000
	STOCKHOLMS LANS LANDSTIN	5/27/2016	Local & Regional Govn'ts	CICERO	175,698,000
	CITY OF GOTHENBURG	6/15/2016	Local & Regional Govn'ts	Cicero	117,132,000
	SAN DIEGO CA UNIF SCH DIST	1/5/2016	Local & Regional Govn'ts	None	100,000,000
	AMERICAN MUNICIPAL POWER	7/1/2016	Local & Regional Govn'ts	Sustainalytics	80,050,000
	RAMSEY CNTY MN	2/25/2016	Local & Regional Govn'ts	None	17,900,000
	IBERDROLA	9/15/2016	Utility	Vigeo	1,905,530,000
CORP	SOUTHERN POWER CO	6/20/2016	Utility	Deloitte	1,232,990,000
	TENNET HOLDING BV	6/13/2016	Utility	Oekom	1,120,900,000
	NORDEX	3/1/2016	Utility	DNV GL	616,495,000
	GREENKO INVESTMENT CO	8/16/2016	Utility	Sustainalytics	500,000,000
	CHINA ENERGY CONS	8/18/2016	Utility	None	449,730,000
	ALLIANDER	4/22/2016	Utility	Oekom	336,270,000
	NTPC LTD	8/10/2016	Utility	None	298,660,000
	XINJIANG GOLDWIND	9/5/2016	Utility	None	149,984,955
	BJ ENTERPRISES WATER GRP	8/3/2016	Utility	None	104,937,000
	HERO WIND ENERGY PVT LTD	2/15/2016	Utility	KPMG	29,866,000
	SOLARCITY	1/14/2016	Utility	None	5,000,000

Source: Climate Bonds Initiative, Bloomberg, UniCredit Research



Global issuers in 2016

Transactions at a glance

CORP

Issuer	Latest issue date	Issuer type	Second-party opinion	Cumulated 2016 issues (USD)
HYUNDAI CAPITAL SERVICES	3/7/2016	Automotive	None	500,000,000
LTC GB LTD	5/26/2016	Automotive	None	400,000,000
BEIJING AUTOMOBILE	4/22/2016	Automotive	None	374,775,000
SUZANO PAPEL E CELULOSE	7/1/2016	Forest & Paper Products Manufacturing	Sustainalytics	500,000,000
SODRA SKOGSAGARNA	6/7/2016	Forest & Paper Products Manufacturing	None	117,132,000
APPLE INC	2/16/2016	Other	Sustainalytics	1,500,000,000
WESTAR ENERGY INC	6/20/2016	Other	None	350,000,000
FRIESLANDCAMPINA	3/31/2016	Other	Vigeo	336,270,000
GEORGIA POWER	3/8/2016	Other	None	325,000,000
ALPERIA SPA	6/1/2016	Other	None	252,202,500
SVEASKOG AB	3/1/2016	Other	DNV GL	117,132,000
NYA SVENSK FASTIGHETS FI	9/7/2016	Other	None	53,880,720
WALLENSTAM AB	5/30/2016	Other	DNV GL	46,852,800
FONCIERE DES REGIONS	5/20/2016	Real Estate	None	560,450,000
LINK FINANCE CAYMAN 2009 LTD /THE	7/21/2016	Real Estate	None	500,000,000
FABEGE AB	8/25/2016	Real Estate	Sustainalytics	124,159,920
RIKSHEM AB	4/29/2016	Real Estate	CICERO	29,283,000
VASAKRONAN AB	5/26/2016	Real Estate	CICERO	29,283,000

Source: Climate Bonds Initiative, Bloomberg, UniCredit Research



Global issuers in 2016

Transactions at a glance

FIN

Issuer	Latest issue date	Issuer type	Second-party opinion	Cumulated 2016 issues (USD)
SHANGHAI PUDONG DEV BANK	7/18/2016	Banks	None	7,495,500,000
INDUSTRIAL BANK CO LTD	7/18/2016	Banks	None	4,497,300,000
BANK OF CHINA LTD/LUXEMBOURG	7/12/2016	Banks	None	2,810,450,000
AXIS BANK/DUBAI	6/1/2016	Banks	None	1,000,000,000
BANK OF JIANGXI	7/14/2016	Banks	None	749,550,000
BANK OF QINGDAO CO LTD	3/15/2016	Banks	EY	599,640,000
ABN AMRO BANK NV	5/31/2016	Banks	Oekom	560,450,000
DEUTSCHE KREDITBANK	6/8/2016	Banks	Oekom	560,450,000
BANCO NACIONAL DE COSTA RICA	4/25/2016	Banks	None	500,000,000
WESTPAC BANKING CORP	6/3/2016	Banks	EY	377,950,000
AXIS BANK	5/27/2016	Banks	KPMG	362,871,900
TURKIYE SINAI KALKINMA BANKASI AS	5/18/2016	Banks	Sustainalytics	300,000,000
CREDIT AGRICOLE CIB	6/24/2016	Banks	Sustainalytics	300,718,050
SBAB BANK AB	6/23/2016	Banks	None	234,264,000
BANK OF CHINA LTD/ NY	7/12/2016	Banks	None	224,865,000
BAJAJ FINANCE LTD	7/14/2016	Banks	None	1,493,300
CREDIT AGRICOLE SA	6/29/2016	Banks	Sustainalytics	1,008,480

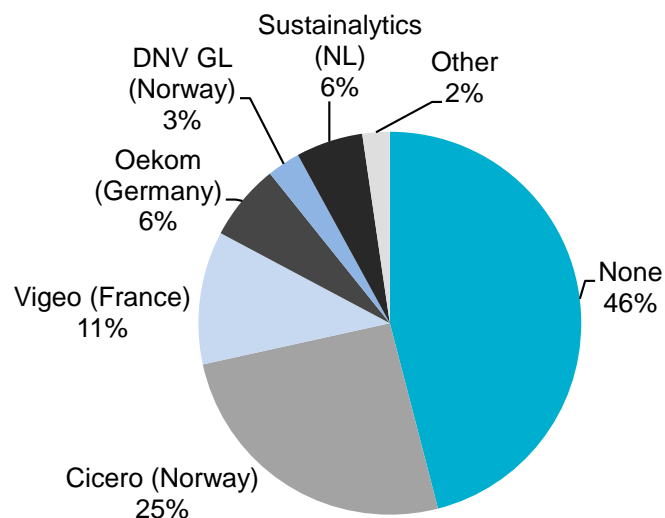
Source: Climate Bonds Initiative, Bloomberg, UniCredit Research



The GBPs recommend an external review to confirm the alignment of Green Bonds with the key features of the GBPs

External review providers used

By outstanding volume*



- **Consultant Review:** An issuer can seek advice from consultants and/or institutions with recognized expertise in environmental sustainability or other aspects of the issuance of a Green Bond, such as the establishment/review of an issuer's Green Bond framework. "Second opinions" may fall into this category.
- **Verification:** An issuer can have its Green Bond, associated Green Bond framework, or underlying assets independently verified by qualified parties, such as auditors. In contrast to certification, verification may focus on alignment with internal standards or claims made by the issuer. Evaluation of the environmentally sustainable features of underlying assets may be termed verification and may reference external criteria.
- **Certification:** An issuer can have its Green Bond or associated Green Bond framework or Use of Proceeds certified against an external green assessment standard. An assessment standard defines criteria, and alignment with such criteria is tested by qualified third parties / certifiers.
- **Rating:** An issuer can have its Green Bond or associated Green Bond framework rated by qualified third parties, such as specialised research providers or rating agencies. Green Bond ratings are separate from an issuer's ESG rating as they typically apply to individual securities or Green Bond frameworks / programmes.

Source: Green Bond Principles; Climate Bonds Initiative, UniCredit Research

*Market share by deal volume in 2014, 2015 and 2016; note that the EIB does not use external reviewers.



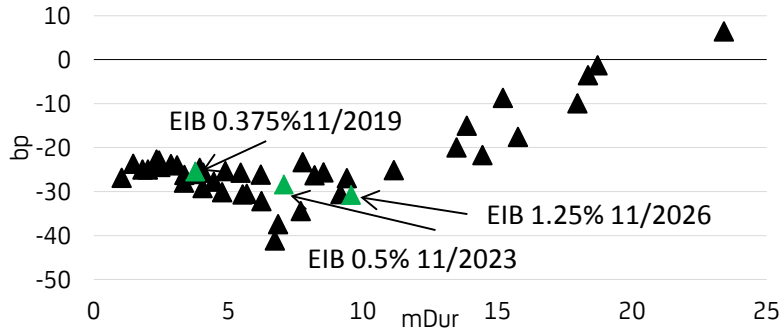
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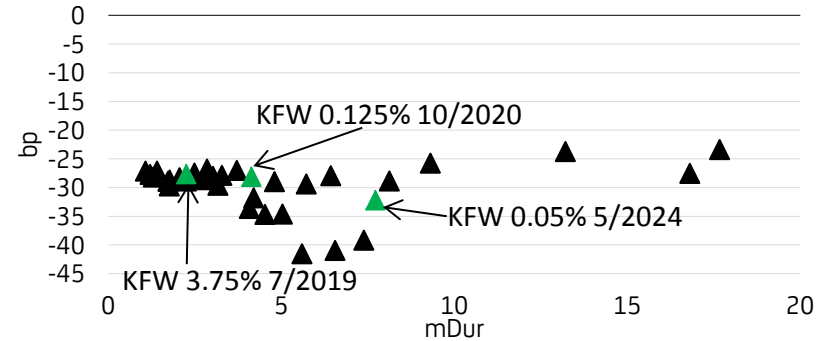
Agencies & supras: yield levels of Green Bonds on the issuer curve

Eurobond ASW spreads of the largest Green-Bond issuers

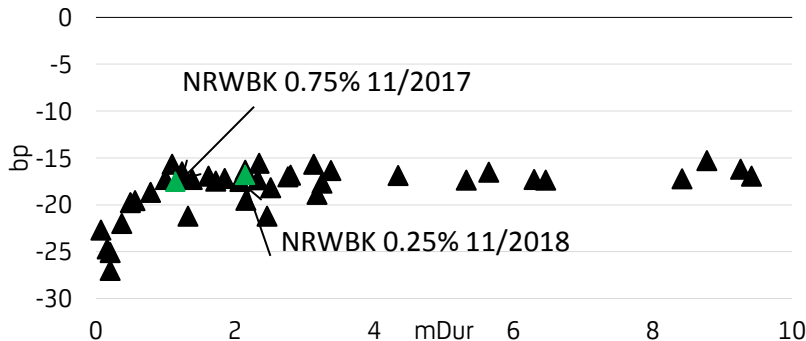
European Investment Bank (EIB; Aaas/AAAs/AAAs)



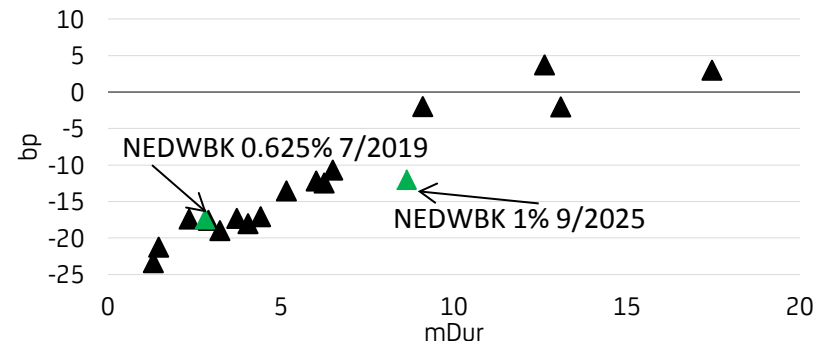
Kreditanstalt für Wiederaufbau (KFW; Aaas/AAAs/AAAs)



NRW.BK (NRWBK; Aa1s/AA-s/AAAs)



Nederlandse Waterschapsbank (NEDWBK; Aaas/AAAs/--)



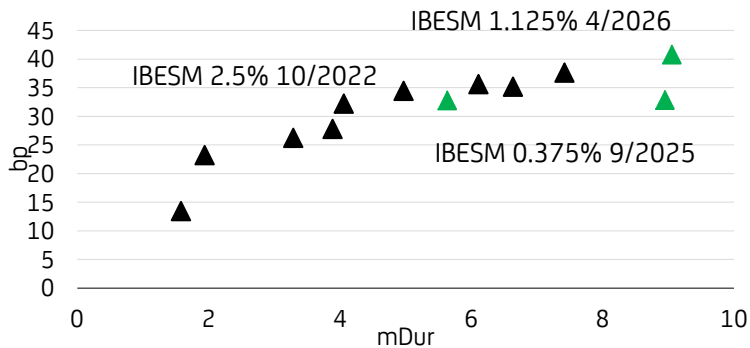
- EIB and KFW are the two largest and most liquid EUR Green Bond issuers
- Both established distinct Green Bond curves, which trade in line with outstanding non-green issues in this tight yield environment
- NRWBK Green Bonds also trade on the issuer's curve
- The outstanding NEDWBK 1% 9/2025 is trading more expensively than non-Green Bonds on the issuer's curve



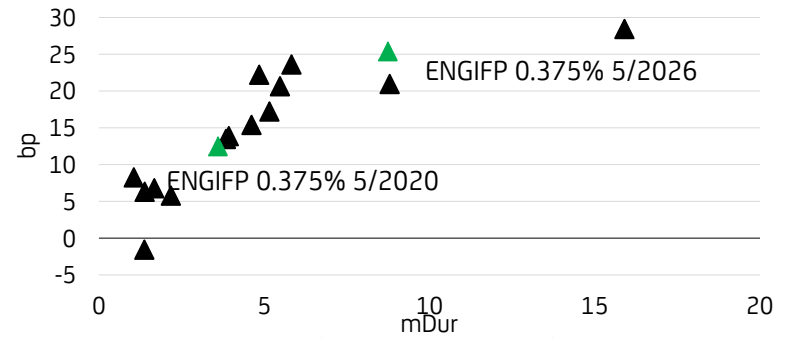
Utilities: yield levels of Green Bonds on the issuer curve

Eurobond ASW spreads of the largest Green-Bond issuers

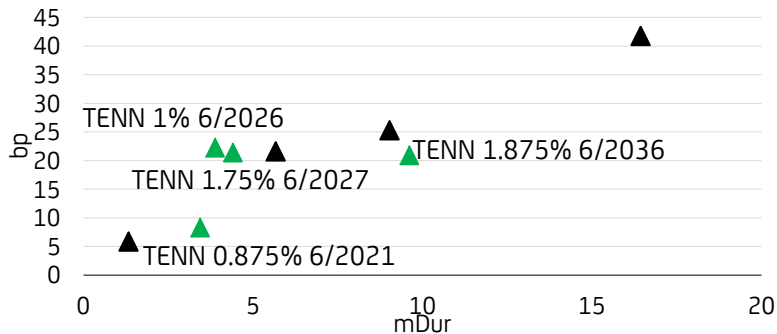
Iberdrola (IBESM; Baa1p/BBB+s/BBB+s)



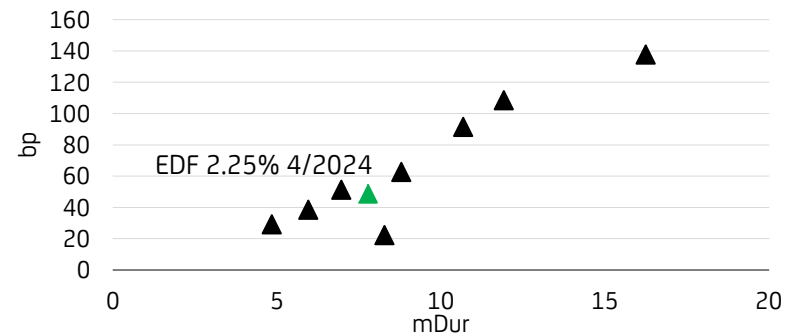
Engie (ENGIFP; A2s/A-n/--)



Tennet (TENN; A3s/A-s/--)



Electricite de France (EDF; A2wn/An/A-s)



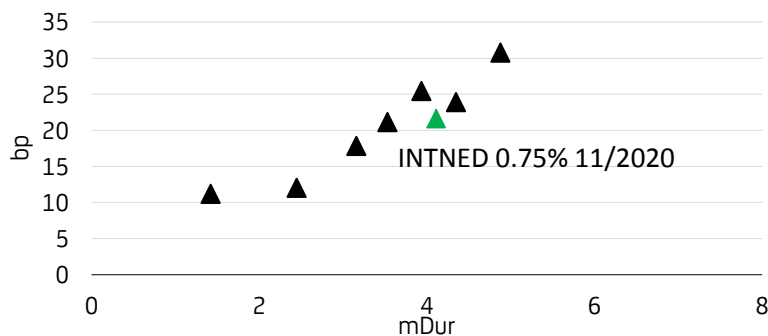
- Utilities Green Bonds are trading in line with the issuer's senior curves
- Interestingly, TENN is using Green Bonds as its major funding source to extend its maturity profile beyond seven years
- EDF issued the first-ever benchmark corporate Green Bond in 2013. Its latest Green Bond, denominated in USD, is mostly intended for the construction of wind projects in the US. With an issue size of USD 1.25bn, it marks the largest USD corporate Green Bond



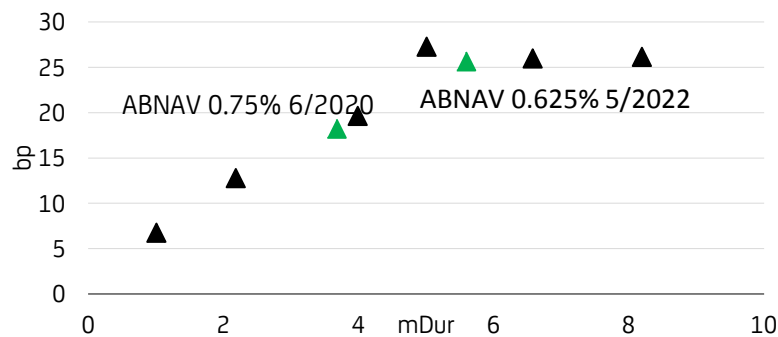
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Eurobond ASW spreads of the largest Green-Bond issuers

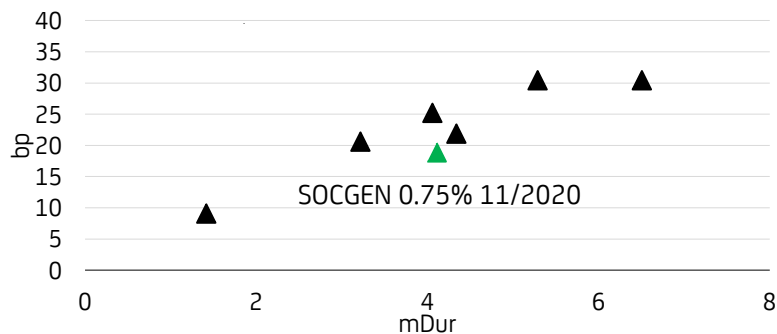
ING (INTNED)



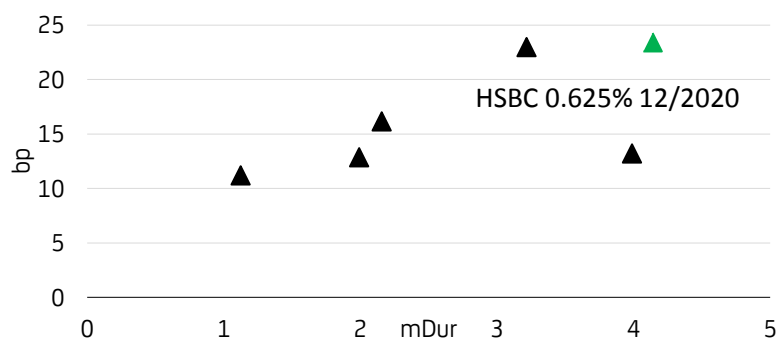
ABN Amro (ABNAV)



Société Générale (SOCGEN)



HSBC (HSBC)



- Several banks in Europe have issued or plan to issue Green Bonds as senior debt, more recently Rabobank and Berlin Hyp
- Financials Green Bonds are trading mostly in line (INTNED; ABNAV) to slightly inside (SOCGEN) the curves of outstanding seniors
- Financials investors prefer Green Bonds due to their additional benefits (i.e. issuers provide a more detailed use of the proceeds)



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Corporate & Investment Banking

UniCredit Bank AG, Munich
as of 22 September 2016



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