A WORD ABOUT WIND

MAY 2017

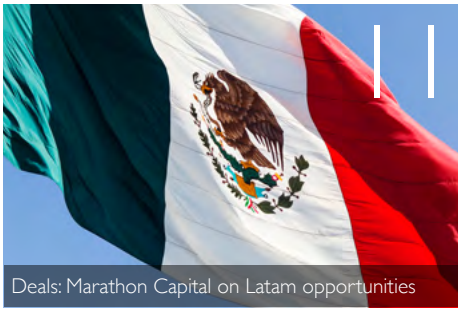
EMERGING MARKETS

In association with MARATHON CAPITAL

Including insights from Mario and Lucas Araripe from Casa dos Ventos

CONTENTS

Data: Analysing wind in 20 developing economies



Deals: Marathon Capital on Latam opportunities

Q&A: Anette Eberhard on EKF's approach to risk

Interview: Mario Araripe discusses Brazil's recession

Opinion: K2's Per Melgaard talks Taiwanese offshore

Interview: Mainstream's Andy Kinsella on Vietnam

© A Word About Wind, 2017

EDITORIAL

by Richard Heap,
editor at A Word About Wind

"It can be tough for firms with little on-the-ground experience to know which countries are the best prospects."

Political risk is not only an issue for developing economies. We have been shown this repeatedly since our last Emerging Markets report, in March 2016: Brexit, Trump, Macron vs Le Pen.

It is, however, still a huge factor for wind investors deciding where to do their next deals, along with GDP, population growth, the legal system, supply chain, availability of finance, and so on. It can be tough for firms with little on-the-ground experience to know which countries are the best prospects.

In this report, published in association with independent investment bank and financial advisor Marathon Capital, we are helping with that. If you turn to page 4, you will find our first Emerging Markets Attractiveness Index, where Ilaria Valtimora looks at the key economic trends that are affecting the wind market in 20 developing countries in Africa, Asia and Latin America.

There is no shortage of governments proclaiming their love for renewables, but this enables us to get beyond the nice words to find out which of these markets are strongest. We also have insights from weather measurement specialist Vaisala about the wind resources in the key countries in these regions, from page 8. Check that out now.

After that, Marathon Capital has given us its insights into the potential for off-grid generation in Latin America (page 11). These can offer compelling investment propositions in markets where transmission grids can prove unreliable.

We also have in-depth information on some of these markets and the prospects for investors in a series of interviews with industry leaders.

In Brazil, for example, the wind market has been hit hard in the last two years by the country's worst-ever recession. We have spoken to Mario and Lucas Araripe from leading Brazilian developer Casa dos Ventos about the impact of the recession on their firm and how it is re-shaping the market (page 16).

We have also interviewed Andy Kinsella from Mainstream Renewable Power about the challenges and opportunities for the company doing business in Vietnam, South Africa and beyond (page 24); and Anette Eberhard from Danish export credit agency EKF about how it seeks to support wind businesses going global (page 13).

And last but not least, K2 Management's Per Melgaard gives us some great insights into the prospects for one of the world's hottest new offshore wind markets: Taiwan (page 21).

Each deal contains a degree of political risk – but we expect the analysis and insights in here to help you negotiate it more effectively. ■

Rich

A Word About Wind
www.awordaboutwind.com
editorial@awordaboutwind.com
T: +44 (0)20 7100 1616

2nd Floor,
167-169 Great Portland Street,
London, W1W 5PF

Editor: Richard Heap
Analyst: Ilaria Valtimora
Designer: Lee Washington
Sales: Joe Gulliver
Client Services: Matt Rollason
Publisher: Adam Barber

Cover image: Casa dos Ventos Energias Renovaveis

Not a member? Sign up today!

If you like Emerging Markets and want to access all of our reports and newsletters throughout the year, check out our membership options at www.awordaboutwind.com/subscribe

Silver Membership
1 user, 12 months
£595

Gold Membership
5 users, 12 months
£1,195

Platinum Membership
unlimited users, 12 months
£4,500

© A Word About Wind, 2017

MARATHON CAPITAL

Investment Bankers for
Global Energy and Infrastructure Markets

Marathon Capital is a leading financial advisory and investment banking firm focused on providing financial advice in the areas of M&A, capital raising of debt and equity, project finance, tax equity, financial restructuring, recapitalization, bankruptcy and workout situations in the energy sector. Marathon Capital is a three-time recipient of the *"Best Renewable Asset M&A Advisor"* Award (2013, 2014, 2016), as well as the *"Renewable Generating Project Finance Deal of the Year"* Award (2016) in Power Finance & Risk's Annual Power Finance Deals and Firms Awards.

S·POWER
SUSTAINABLE POWER GROUP
$1,577,000,000
Sale of
Company including 1.3 GW Operating Portfolio and 10 GW Pipeline
to
AES · AIMCo

IGS SOLAR
THE BRIGHT FUTURE OF ENERGY
Capital Commitments
Provided by
ORIX · IGS ENERGY

empower energies
Distributed Generation Fund
Provided by
WGL Energy · Undisclosed Investor

Soltage
RENEWABLE ENERGY PROVIDER
Equity Capital Partnership
BASALT INFRASTRUCTURE PARTNERS

FLS ENERGY
Sale of
Company and Development Pipeline
to
CYPRESS CREEK RENEWABLES

PRC WIND
Sale of
Development Wind Assets
to
TENASKA

Falvez ENERGY
Tax Equity Capital Raise and Construction Debt Financing
163.2 MW Astra Wind Project
Provided by
GE Energy Financial Services · BNP PARIBAS

groSolar
Sale of
Company
to
EDF renewable energy

México POWER GROUP
Equity Capital Raise and Construction Project Financing
La Bufa 1 Wind Farm
to
Offtaker · Investor: FIRST RESERVE · Lenders: SMBC, KDB Bank

Three-Time Recipient
"Best Renewable Asset M&A Advisor"
Power Finance & Risk

2013 DEALS & FIRMS OF THE YEAR AWARDS
2014 DEALS & FIRMS OF THE YEAR AWARDS
2016 DEALS & FIRMS OF THE YEAR AWARDS

MARATHON CAPITAL

Chicago • New York • San Francisco • Canada

200 W. Madison Street, Suite 3650, Chicago, IL 60606

www.marathon-cap.com 312-989-1350

THE MOST ATTRACTIVE EMERGING MARKETS

Our Emerging Markets Attractiveness Index ranks 20 countries on their attractiveness for wind investors. Ilaria Valtimora reports

China continues to exert huge influence on wind energy investment worldwide. For example, its slowdown was a key factor as global investment in clean energy fell by 23% in 2016 to $241.6bn, according to the United Nations in a recent report.

Therefore, the better-than-expected performance of the Chinese economy in 2017 could lead to renewed optimism for investors in emerging markets. A strong China means increased demand for commodities, which boosts the financial performance of other countries' economies and creates the conditions needed for investment.

But this may not last long. GDP growth projections show that China is not expected to grow as quickly in the next five years as it has in the last five (see graph 1, left). Even so, we are seeing financial indicators that should give us hope for emerging markets.

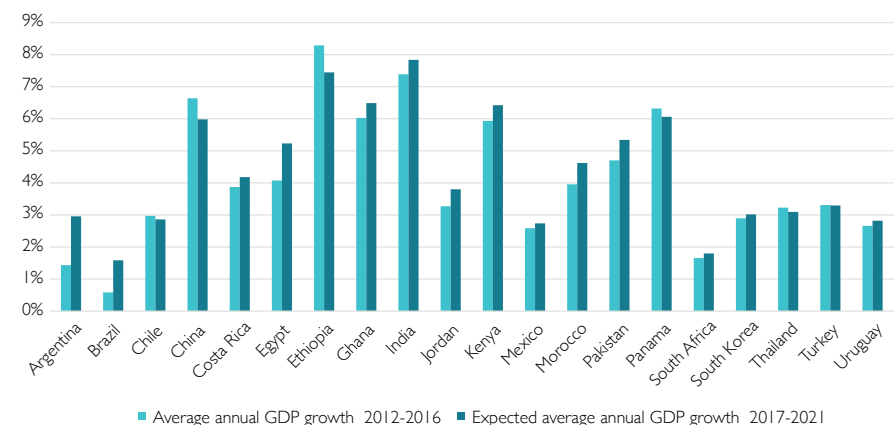
The Institute for International Finance said China drove GDP growth in emerging markets to 6.4% in January – which is its fastest monthly rise since June 2011. This is a change from six years of slowing growth to 2016, identified by the International Monetary Fund, and could start a virtuous cycle that creates the conditions for further growth. This would mean more demand for electricity, including from wind farms.

The size of the market also explains why China has topped our Emerging Markets Attractiveness Index (page 7). In this index, we have analysed 20 key economies in Africa, Asia and Latin America based on factors that affect the attractiveness of their wind markets to investors: business stability, country growth prospects and wind potential.

We also have insights on wind resources from weather specialist Vaisala (page 8).

China is in a strong position, of course. Over 23GW of wind farms were installed in the country in 2016, following the stellar 30GW in 2015. It is no surprise that firms

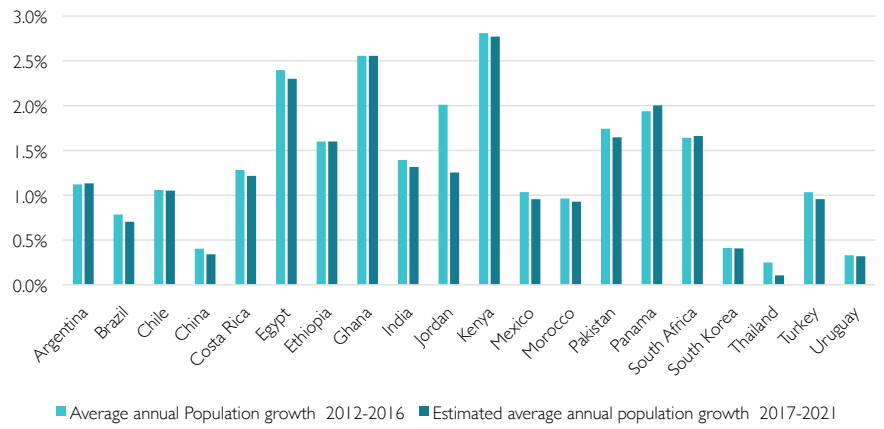
1) GDP growth figures and projections 2012-2021



Source: International Monetary Fund; A Word About Wind

© A Word About Wind, 2017

2) Population growth and projections 2012-2021



Source: International Monetary Fund; A Word About Wind

3) Renewable energy polices in our 20 markets

Country	Targets for renewable energy generation
Argentina	8% of energy mix by 2017 and 20% by 2025
Brazil	24GW of installed wind capacity by 2024
Chile	60% of energy mix by 2035 and 70% by 2050
China	Annual additions of about 15GW of wind until 2021
Costa Rica	Becoming carbon neutral by 2021
Egypt	20% of energy from renewables by 2022, of which 12% is wind
Ethiopia	17GW of renewables by 2020, of which 5.2GW of wind
Ghana	10% of energy mix by 2020
India	175GW of installed renewables by 2022
Jordan	19GW of renewables by 2035, of which 3GW of wind
Kenya	1GW of wind by 2020 and 3GW of wind by 2030
Mexico	25% of non-hydro renewables by 2018, 30% by 2021, and 35% by 2025
Morocco	42% of energy mix by 2020, including 2GW of wind, and 52% by 2030
Pakistan	5% of energy mix by 2030
Panama	15% of energy mix by 2030 and 30% by 2050
South Africa	1.5GW of wind by 2020 and 8.4GW of wind by 2030
South Korea	13GW of installed renewables by 2020
Thailand	19GW of installed renewables by 2035, of which 3GW of wind
Turkey	16GW of wind by 2030
Uruguay	100% of energy mix by 2021

Source: A Word About Wind

in the wind sector want to get into China, although doing so is not easy. But our ranking shows the diversity of opportunities in emerging markets worldwide, with a top five made up of Chile, India, Mexico and Ethiopia. Wind truly is a global sector.

For more details on how we analysed these markets, turn to pages 6 and 7. Here is our region-by-region rundown:

ASIA: CHINA, INDIA… AND WHO ELSE?

One point demonstrated clearly by this index is that emerging markets in Asia run at two different speeds.

On one side, China and India have topped our ranking on the basis of their strong business policies, and good prospects for economic growth and wind policies – although sluggish population growth (see graph 2, left) affects the Chinese market.

Economic growth in China is picking up and the government is pushing to achieve 60% urbanisation by 2020. This would need major investments in infrastructures, and in the electricity network.

On the other side, some of Asia's most interesting emerging markets are also small. South Korea has an ambitious target (see table 3, left) to achieve a combined wind and solar capacity of 13GW by 2020, but its current 1GW of installed wind capacity let us think that that target might be too ambitious to achieve in just three years.

Meanwhile, Turkey has seen fast growth in its wind industry, but its current political turmoil threatens its potential and attractiveness as an investment location.

AFRICA: HIGH RISKS, HIGH REWARDS

Ethiopia is in our top five, (see final index, page 7) driven by strong economic and population projections. The government is underpinning this with ambitious renewables development plans and aims to achieve 5.2GW of wind farms within four years.

Those in the south and the north of the continent also get a look in.

With its massive Renewable Energy Independent Power Producer Procurement, South Africa is always an interesting choice for investment in the wind sector and ranked eighth overall. However, investors need to keep an eye on slow growth and unresolved issues with local utility Eskom.

© A Word About Wind, 2017

4) Rankings for country stability

Country	S&P Credit Rating	World Bank Ease of Doing Business	OECD Country Risk	Stability rating
Argentina	1.6	7.5	2.3	11.4
Brazil	3.6	7.9	3.6	15.0
Chile	9.4	4.0	7.4	20.8
China	9.4	5.3	7.4	22.1
Costa Rica	2.9	4.3	6.1	13.4
Egypt	1.0	7.8	2.3	11.1
Ethiopia	1.6	10.0	1.0	12.6
Ghana	1.0	7.0	2.3	10.3
India	4.9	8.3	6.1	19.3
Jordan	2.9	7.6	3.6	14.1
Kenya	2.3	6.1	2.3	10.7
Mexico	10.0	1.0	10.0	21.0
Morocco	6.8	3.5	6.1	16.4
Pakistan	4.9	4.7	6.1	15.7
Panama	1.6	9.1	1.0	11.8
South Africa	4.9	2.8	6.1	13.8
South Korea	4.2	5.0	4.9	14.1
Thailand	6.8	3.4	6.1	16.3
Turkey	3.6	4.7	4.9	13.2
Uruguay	5.5	6.0	6.1	17.6

Source: Various, A Word About Wind

How we analysed stability

We assessed the risks of investing in the 20 emerging markets by looking at three respected indices:

- Standard & Poor's Sovereign Credit Rating analysis, which gives an indication of the level of risk associated with investing in a specific country.
- The World Bank's Ease of Doing Business analysis, which ranks economies based on how well their regulations support businesses.
- The Organisation for Economic Cooperation & Development Country Risk Classification analysis, which measures country credit risk and the likelihood that a country will service its external debt.

We took the findings from each study and turned it into a score out of ten. In our analysis, ten represents the country that performed best of these 20 nations in that study; and one is the worst.

We then added these scores together. This means the highest stability rating a country could score is 30. On that basis, China and Mexico came out on top.

Morocco also enjoys some of the most supportive policies in Africa, as well as its prospects for decent economic and population growth; and its strategic location in the European grid with its connections to Spain and through to the rest of Europe.

However, there are still significant risks in some markets in north and sub-Saharan Africa: Kenya, Ghana and Egypt. Fundamentally, they are still attractive markets, but their policies and risks for investors (see table 4, above) require improvement.

LATIN AMERICA: SLOW GROWTH WEIGHS DOWN MARKET

Countries in Latin America are split by fundamentals and wind policies.

Mexico and Chile are among the region's most compelling markets (see final index, page 7), due to their encouraging business environment and wind energy policies. Despite slow economic growth recorded from 2012 to 2016, the International Monetary Fund has forecast a sustained pick-up in GDP growth in both countries over the next five years, and this helped both countries to feature in our top five.

Uruguay made it into sixth position based on its performance in recent years: it installed the most wind capacity per capita of any country in this index between 2014 and 2015. However, it is a small country and so the market could quickly reach saturation; and its wind policies also suggest that some improvement is needed.

We also looked at some other markets that might be unfamiliar for investors. With strong fundamentals and specific incentives for new wind capacity, Panama is a promising wind investment location. Its 300MW of installed wind capacity also suggests that it has not yet exploited its potential. Meanwhile, Costa Rica has bold renewables investment targets, but it is concentrating more on hydro than wind.

Finally, despite encouraging population growth projections and wind policies, the heavy economic recession that has affected Argentina and Brazil in the last couple of years, has weighed on their final scores. The International Monetary Fund forecast a stable GDP recovery in the next five years, so both could rise next year. ■

For our final rankings, see the next page...

© A Word About Wind, 2017

5) The full Emerging Markets Attractiveness Index

				Country growth		Wind potential		
Ranking	Country	Region	Stability rating	GDP GROWTH	Population growth	Wind growth rate	Supportive policies	Final score
1	China	Asia	22.1	8.1	1.5	8.0	7.0	46.7
2	Chile	Latin America	20.8	3.8	3.8	7.5	8.0	44.0
3	India	Asia	19.3	8.9	5.0	2.4	8.0	43.7
4	Mexico	Latin America	21.0	3.3	3.8	5.9	9.0	43.0
5	Ethiopia	Africa	12.6	10.0	5.7	1.2	7.0	36.6
6	Uruguay	Latin America	17.6	3.4	1.3	9.0	4.0	35.3
7	Turkey	Asia	13.2	4.2	3.8	7.0	7.0	35.1
8	South Africa	Africa	13.8	2.3	5.9	6.6	6.0	34.6
9	Morocco	Africa	16.4	4.9	3.5	1.3	7.0	33.1
10	Pakistan	Asia	15.7	5.8	6.2	2.3	3.0	33.1
11	Kenya	Africa	10.7	7.2	10.0	0*	5.0	32.9
12	Panama	Latin America	11.8	7.7	6.9	1.0	5.0	32.4
13	Jordan	Asia	14.1	4.1	7.2	1.8	4.0	31.3
14	Ghana	Africa	10.3	7.4	9.1	0*	4.0	30.8
15	Egypt	Africa	11.1	5.1	8.5	1.5	4.0	30.3
16	Brazil	Latin America	15.0	1.0	2.9	4.8	6.0	29.7
17	Costa Rica	Latin America	13.4	4.8	4.6	4.7	2.0	29.5
18	Thailand	Asia	16.3	4.1	1.0	1.1	6.0	28.5
19	South Korea	Asia	14.1	3.7	1.6	2.4	5.0	26.8
20	Argentina	Latin America	11.4	2.0	4.1	1.3	5.0	23.8

*For Ghana and Kenya this value is zero because of lack of historical data on installed wind capacity

Source: Various, A Word About Wind

How we did it

We came up with the rankings for these 20 markets by combining our country stability score (see page 6) with four indices in two categories:

Country growth: We analysed potential growth in electricity demand by looking at the potential rate of growth in the economy and in the population.

This gives us an indication of how much growth investors are likely to see in electricity demand from businesses and individuals. This data came from the International Monetary Fund.

This involved comparing the rate of growth over the last five years (2012-2016) with projections for growth over the next five years (2017-2021). We then rated each of these factors out of ten, with ten being the fastest-growing and one the slowest.

Wind potential: We analysed potential growth in wind by looking at two factors.

First, we looked at the rate of growth in wind capacity over the last seven years, and weighted it using the total population of each country. This gives us an indication of the markets that have seen the fastest growth in wind per capita thus far. We gave each market a score between one and ten, with ten being the fastest-growing. This data came from the Global Wind Energy Council and International Monetary Fund.

Second, we analysed the policies in each country to get a sense of how supportive each is of growth in wind, and assigned a score between one and ten based on those findings. Ten signifies the most supportive policies and one the least.

Overall: We added up the overall scores in these three categories – out of 30 for country stability, out of 20 for country growth, and out of 20 for wind potential – to come up with an overall score out of 70. On this basis, China is the most attractive market that wind investors should be targeting followed by Chile and India.

At the other end, Argentina is ranked as the least attractive because it is a recent convert to renewables and a history as an unstable business location, followed by South Korea and Thailand.

© A Word About Wind, 2017

WIND DATA: AFRICA

Weather specialist Vaisala has analysed the wind resources in our 20 key emerging markets in Africa, Asia and Latin America

Morocco

Strength of overall resource: Strong
Windiest regions: Strait of Gibraltar and along Atlas Mountains

Analysis:
Strong resources (average annual wind speeds up to 8.5m/s at 80m hub heights) can be found along the Strait of Gibraltar from Tangier to Ceuta.

Marginal to strong resources (6.5-8m/s) throughout the southernmost Tan-Tan province and its southwest coastline.

Egypt

Strength of overall resource: Moderate
Windiest regions: Coastal areas around the Gulfs of Suez and Aqaba

Analysis:
Mediterranean air funneled through gaps created by the Gulfs of Suez and Aqaba create excellent resources (average annual wind speeds of 8-10m/s at 80m hub heights) along the coast of these bodies.

Marginal to moderate resources (6-7.5 m/s) in the north, south and central Egypt.

Ethiopia

Strength of overall resource: Strong
Windiest region: Southeast

Analysis:
Largest area of strong resources (average annual wind speeds of 7-9m/s at 80m hub heights) is in the southeast, across the Somali Plateau and Ogaden Desert.

Similar resources can also be found along the southern border with Kenya and along portions of the mountainous Great Rift Valley in the centre of the country.

Kenya

Strength of overall resource: Excellent
Windiest region: Lake Turkana

Analysis:
Excellent resources (average annual wind speeds of 8.5-11m/s at 80m hub heights) in the east and south of Lake Turkana in Kenya's northwest corner.

Marginal to strong resources (6-8m/s) can be found throughout much of north-eastern Kenya and along its Indian Ocean coastline, particularly to the north.

Ghana

Strength of overall resource: Low
Windiest region: Southwest of Lake Volta

Analysis:
Marginal resources (average annual wind speeds of 5.5-6m/s at 80m hub heights) along the Kwahu Plateau southwest of Lake Volta's southern shoreline.

Similar resources along the south coast from Accra to Lomé, Togo, which are significantly higher (6-7m/s on average) during the northern hemisphere summer.

South Africa

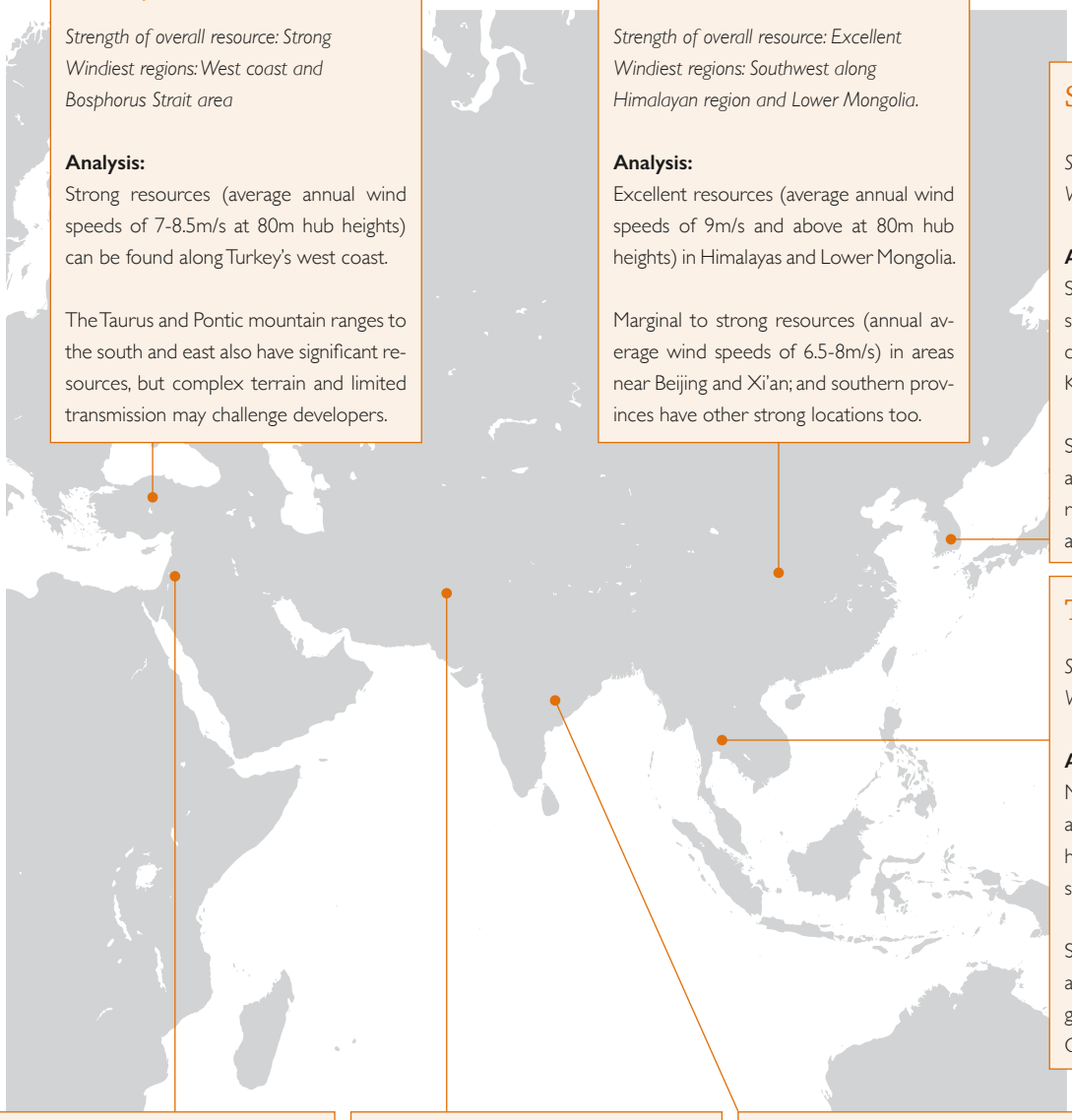
Strength of overall resource: Excellent
Windiest region: Great Karoo

Analysis:
Strongest resources (average annual wind speeds up to 8-9m/s at 80m hub heights) along the Great Karoo region, but has a challenging topography for developers.

Marginal to excellent resources (average wind speeds 6-9m/s) can be found all along South Africa's wind rich coasts, particularly around Cape Town.

© A Word About Wind, 2017

WIND DATA: ASIA



Turkey

Strength of overall resource: Strong
Windiest regions: West coast and Bosphorus Strait area

Analysis:
Strong resources (average annual wind speeds of 7-8.5m/s at 80m hub heights) can be found along Turkey's west coast.

The Taurus and Pontic mountain ranges to the south and east also have significant resources, but complex terrain and limited transmission may challenge developers.

China

Strength of overall resource: Excellent
Windiest regions: Southwest along Himalayan region and Lower Mongolia.

Analysis:
Excellent resources (average annual wind speeds of 9m/s and above at 80m hub heights) in Himalayas and Lower Mongolia.

Marginal to strong resources (annual average wind speeds of 6.5-8m/s) in areas near Beijing and Xi'an; and southern provinces have other strong locations too.

South Korea

Strength of overall resource: Excellent
Windiest regions: East and south coast

Analysis:
Strong resources (average annual wind speeds of 7-9m/s at 80m hub heights) can be found on large portions of South Korea's coasts.

Similar wind resources can be found along the Sobaek and Jiri Massif mountain ranges in the central and south-central areas of the country.

Thailand

Strength of overall wind resource: Moderate
Windiest region: Southwest border

Analysis:
Marginal to strong resources (average annual wind speeds of 6-7.5m/s at 80m hub heights) along portions of Thailand's southwestern border with Myanmar

Similar wind resources can be found along the southern Dawna Range, Dangrek Range and the foothills leading into Cambodia's Cardomom mountains.

Jordan

Strength of overall resource: Low
Windiest region: Southwest

Analysis:
Marginal to strong resources (average annual wind speeds of 6-7.5m/s at 80m hub heights) along portions of the highlands of the Wadi Araba, which borders Israel. Similar resources can be found in the central northern region and along the southern borders near the Red Sea.

Complex wind regimes in mountainous terrain and wilderness protections may challenge developers.

Pakistan

Strength of overall resource: Strong
Windiest regions: Sindh and highlands of Balochistan

Analysis:
Strong resources (average annual wind speeds up to 7-9m/s at 80m hub heights) along parts of the rugged Balochistan Plateau that runs southwest to northeast along Pakistan's western border

Similar resources (average wind speeds 7-8.5m/s) in the area surrounding Karachi, which houses approximately one-third of the country's population.

India

Strength of overall resource: Moderate
Windiest region: Southern tip

Analysis:
Marginal to strong resources (average annual wind speeds of 6-8m/s at 80m hub heights) along selected areas of India's southern Tamil Nadu and Kerala states

Wind speeds of 6-7.5m/s can be found in some coastal areas of Gujarat and Maharashtra states, as well as in the Western Ghat mountains. In most of India, the strongest winds are during the southwest monsoon season from May to September.

© A Word About Wind, 2017

WIND DATA: LATIN AMERICA

Costa Rica

Strength of overall resource: Strong
Windiest regions: Along the Guancaste, Central, and Talamanca mountain ranges

Analysis:
Wind flows in from an easterly direction, off the Caribbean Sea. Excellent resources (average annual wind speeds of 8-11m/s at 80m hub heights) available in the north-west along the coast and Guancaste range.

Moderate to strong resources (7-9m/s) in the Central Mountains near San Jose.

Panama

Strength of overall resource: Strong
Windiest region: Cordillera Central mountains

Analysis:
Excellent wind resources (average annual speeds up to 7-10m/s at 80m hub heights) can be found along the Cordillera Central mountain range.

Strong resources (average wind speeds 7-8m/s) are available in the strip of land between Chepo and La Palma from winds off the Caribbean Sea to the northeast.

Mexico

Strength of overall resource: Strong
Windiest regions: Oaxaca and Puebla states

Analysis:
Excellent resources (average annual wind speeds of 8-10.5m/s at 80m hub heights) along Oaxaca's Isthmus of Tehuantepec.

Strong resources in the mountains of the nearby state of Puebla and along parts of the Sierra Madres. Marginal to strong resources along some shorelines of the Baja California Peninsula and the northern coast of the Gulf of Mexico.

Brazil

Strength of overall resource: Strong
Windiest regions: Northeast states and southern states

Analysis:
Strongest resources (average annual wind speeds of 7-9m/s at 80m hub heights) on coasts and ridges in the eastern states.

Marginal to strong resources (annual average wind speeds of 6.5-7.5m/s) are also available in some areas of Santa Catarina and Rio Grando do Sul southern states.

Chile

Strength of overall resource: Excellent
Windiest regions: Patagonia and Andean region along eastern border

Analysis:
Excellent resources (average annual wind speeds of 9m/s and above at 80m hub heights) in large parts of Chile due to the mid-latitude storm track over Patagonia.

Marginal to strong resources (annual average wind speeds of 6.5-8m/s) along pockets of Chile's western coast.

Uruguay

Strength of overall resource: Moderate
Windiest region: Southeast coast

Analysis:
Marginal to strong resources (average annual wind speeds of 6-7.5m/s at 80m hub heights) are available along Uruguay's southern and eastern coasts.

Similar resources can be found in parts of the Cuchilla Grande range to the southeast and the Cuchilla de Haedo range in the northwest.

Argentina

Strength of overall resource: Excellent
Windiest regions: Patagonia and northwest Andean region

Analysis:
Excellent resources (average annual wind speeds of 9m/s and above at 80m hub heights) in large portions of the country due to the mid-latitude storm track over Patagonia. However, these are largely in remote and challenging regions without substantial access to existing transmission.

© A Word About Wind, 2017

THE NEXT OPPORTUNITY IN LATAM: DISTRIBUTED GENERATION

Growing energy demand and grid conditions are opening up new investment opportunities for distributed renewables in Latin America, says Marathon Capital's Thiago Alfaia

As utility-scale renewables have become more widely accepted in Latin America and record low auction prices make headlines, we see more stakeholders focusing on the nascent opportunities in distributed generation (DG).

DG is primarily used by solar developers – but can be used in wind too – and focuses on small projects (<1MW) that are often for self-supply purposes in a behind-the-meter arrangement. This includes commercial & industrial and residential customers.

So why is this of interest to renewable energy investors? In short, the market fundamentals in Latin America are very attractive for DG schemes, and policy initiatives are forming that will promote the deployment of distributed energy.

It remains to be seen if such initiatives will enable development of portfolios of DG assets at the necessary scale to attract long-term institutional capital.

From a macro perspective, we see increasing electricity demand fuelled by factors such as a growing middle class, and this creates opportunities for both utility-scale schemes and distributed generation. However, the strained transmission and distribution systems that often poses challenges to utility-scale development in these countries can make DG a very attractive proposition in Latin America.

> Mexico's successful energy reform programme has led to mass deployment of renewables, which is bringing down the cost of electricity.

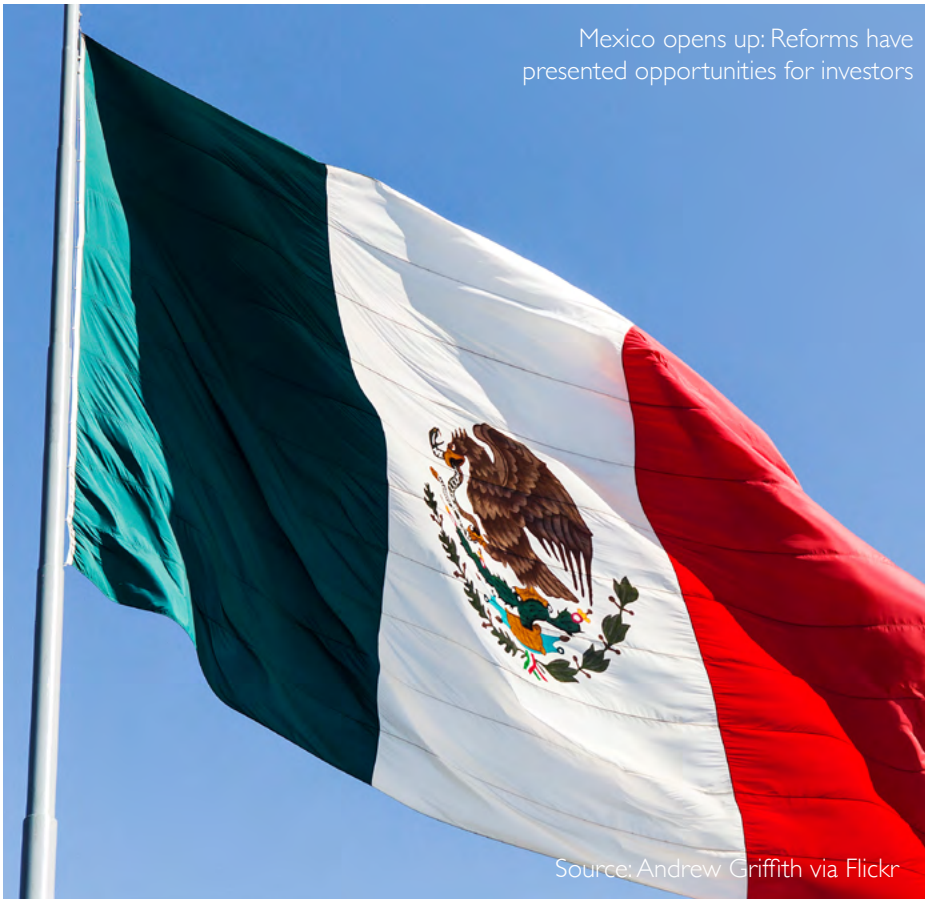
In Mexico, which has experienced 2.4% GDP growth and projected demand growth of 2% for 2017, the successful energy reform programme has led to mass deployment of renewables, which is bringing down the cost of electricity.

Even so, the cost at the retail level is high enough that residential solar systems can produce savings of up to 20%.

The government has also been looking to increase the price of electricity for energy-intensive consumers by 25% under its Domestic High Consumer Rate. As part of the reforms, Mexico's energy secretariat introduced new regulations in January 2017 to encourage the use of DG by allowing producers to sell any excess energy created.

As a result, solar distributed generation projects totalling 220MW were installed in 2016, with a further 240MW estimated for this year. It is a growth sector.

© A Word About Wind, 2017



Mexico opens up: Reforms have presented opportunities for investors

Source: Andrew Griffith via Flickr

Another example of successful renewables penetration is Chile, which has the highest sovereign credit rating in Latin America and projected GDP growth of 1.1%. Similar to Mexico, its auctions have produced record-setting low prices.

However, Chile is a victim of its own success as over-supply of solar in the Atacama Desert region has led to congestion on the grid, pushing spot prices in daytime hours to near zero. The infamous duck curve once reserved for California has reared its ugly head in Chile, showing the imbalance between solar production and demand during the day.

The Comisión Nacional de Energía's Pequeños Medios de Generación Distribuidos (PMGD) programme, which was established in 2005 to promote distributed generation projects of up to 9MW, is a compelling alternative for renewable developers seeking new opportunities that aren't hamstrung by current transmission and low prices.

The PMGD programme allows projects to self-dispatch on the distribution network and avoid transmission congestion. PMGD projects may select a "stabilised price" based on the current round the clock short term marginal cost calculated by CNE and the average price reflected in all of the PPAs currently in effect, both in the regulated and unregulated markets.. The "stabilised price" is pegged to current around the clock pricing as calculated by CNE. The programme is capped at 5% of total generation – around 1GW – and the opportunity may be short-lived, but it is a good near-term solution.

In Brazil, despite a tumultuous couple of years, the Ministry of Mines & Energy forecasts 23.5GW of distributed generation installations, mostly solar, by 2030. Currently this is around 1.2GW and we will see if this plays out – but, if successful, 2.7million consumers could have DG at their residence or place of business.

We have noticed substantial interest from institutional capital providers.

Argentina also plans to introduce a DG policy in 2018. International investors are regaining interest following a successful renewables auction and a more stable government that is promoting clean energy, with a target that renewables should be 20% of the energy mix by 2025.

There is potential for distributed generation in all of these countries, but a key concern is whether these projects can be aggregated to provide scale for institutional investors. We think they can, but progress will be fragmented in different markets.

There are lessons from the United States, where the strategy for financing commercial and industrial solar projects has evolved rapidly.

Historically, sponsors arranged construction and permanent financing for small portfolios of projects that had reached notice-to-proceed. This financing structure enabled sponsors to secure the lowest cost of capital from infrastructure investors who typically avoid development risk. However, it imposed a substantial burden on the sponsor in the form of increased transaction costs and significant working capital drag.

Since the extension of the investment tax credit by US Congress in December 2015, we have noticed a trend towards high-quality sponsors raising dedicated funds. These funds are used to finance the deployment of large portfolios of yet-to-be-determined distributed solar projects over an extended period of up to three years.

Marathon Capital is proud to be accelerating this trend and, in the past six months, we have successfully raised over $700m in capital commitments for IGS Solar, Soltage and Empower Energies to deploy C&I solar in the US.

We believe the benefits to the sponsor are substantial and include:

- Gaining a known cost of equity capital
- Reducing transaction costs by working with just one investor
- Accelerating the cash conversion cycle and reducing working capital drag

We have also noticed substantial interest from institutional capital providers in these transactions. They offer the ability for investors to deploy a large volume of capital, over a known period of time, at a pre-established hurdle rate, in high-quality projects with credit-worthy off-takers without taking undue development risk.

We believe this financing strategy for deploying solar projects in Latin America will gradually and closely mirror the evolving US financing landscape we are observing.

As utility-scale power purchase agreement prices and project returns decline, and demand continues to grow, we see this as a compelling risk-adjusted investment proposition. ■

© A Word About Wind, 2017

Q&A: ANETTE EBERHARD, CEO, EKF

Richard Heap talks to Anette Eberhard from Denmark's export credit agency EKF about the organisation's investment strategy for emerging and established markets

How long have you been at EKF?

I've been here for 17 years, and it is still a pretty small company, with only 130 people. EKF was established in 1922 as the third export credit agency and, last year, we issued new loans and guarantees of 13.2bn DKK (€2bn), in about 200 deals.

I am CEO and head of the credit committee, so I look at all of the larger transactions before they are introduced to our board, which makes the final decisions on the very large ones.

Were you in the commercial sector before that?

Yes, I was in Danske Bank before that. What makes it very interesting to work in the export credit agency business is that your market is literally global. We have transactions in the UK, in Norway, in Mongolia, in Armenia, in Bangladesh, everywhere – not all of them with wind turbines yet. That challenges your competencies all the time, because we have to know very much about doing business all over the world.

> "Vestas, MHI Vestas and Siemens Wind Power are our largest customers; and wind amounts to about 60% of our exposure."

What is your strategy?

EKF and other export credit agencies are financed by governments, so our goal is to support the Danish exporters in their globalisation. We do this by issuing loans and guarantees; and we can also issue working capital for SMEs. Then they pay the interest or a premium.

Our business is very much driven by demand from Danish companies. We can try to inspire Danish companies to move like this or that, but our business is driven by them: Vestas, MHI Vestas and Siemens Wind Power are our largest customers; and the wind industry amounts to about 60% of our exposure. This is because those three global companies are Danish, and because the transactions are very large. We also support all of their sub-suppliers as well.

I should also say we are not directly subsidised by the government. We have to run the business on a sound commercial basis.

So European offshore wind farms are your largest deals?

Yes. Many of our transactions in the past ten years have been offshore wind farms in the North Sea: Dutch, Belgian, UK.

But we have also done onshore in Norway, at Fosen; we've been doing quite a lot in Australia and New Zealand; and Lake Turkana (310MW) in Kenya.

© A Word About Wind, 2017

Which are your biggest recent deals?

The Beatrice offshore wind farm (588MW) is one of them, and we're involved in re-financing the 600MW Gemini. We are also backing Borusan and EnBW's 1GW Wind Bundle project in Turkey; and then Lake Turkana. Most of the transactions in the past three years have been offshore, in Europe. I hope we'll be going to Taiwan soon. We have two active transactions.

What are the key risks you look at in emerging markets?

In Africa, we always have to look at political risks. Most projects in Europe's OECD countries are backed by PPAs guaranteed by governments, and projects in Africa will also be backed by governments, but governments in Africa are another risk than those in most of Europe.

One interesting thing to take care of in Africa is to find out who owns the land. It has been one of the problems at Lake Turkana. It's very hard to find out who owns the land, or who might come to the land once a year as nomads. And then there are the risks that you don't expect: with Lake Turkana, it has 428km of transmission lines and the sub-stations, and they need two guards at each sub-station at all times, as otherwise the cables will be stolen.

> "[In Africa] it is very hard to find out who owns the land, or who might come to the land once a year as nomads.

How is your activity split between emerging and established markets?

In the past two years, we have issued about 20% of our guarantees in what we would call country category 5 and 6 in the Organization for Economic Co-operation & Development risk definition. Country category 0 would be high-income OECD countries, like Singapore.

So 5 and 6 are two of the lowest country categories in the OECD classification, and there is country classification 7 where you should not be, but we do sometimes. We will be issuing our first guarantee on Argentina this year, which is in category 6.

Are there any places you won't go?

A few: Venezuela and Ukraine, for example. But that's so obvious that it doesn't mean anything. Otherwise, we try to find a solution with our regional partners. They tend to know how to mitigate risks, so we use them as reinsurers in many ways.

How much will Brexit affect the attractiveness of investing in the UK?

Like all other decisions of the same character, Brexit imposes a certain level of uncertainty on the market. I think, for a time period until things are settled, most investors and lenders would look carefully so it should, theoretically, increase the risk premium for investors in the UK. But after a certain period, when things are settled, that would graduate out again.

It's a natural market reaction. Most investors didn't foresee Brexit; and the same with the election of Donald Trump. Markets are a little out of balance. ■

Avoid your next major failure today

FULL COMPLIANCE AND INSPECTION TRACKING FOR RENEWABLE ENERGY

A gearbox failure. A crack on a blade. These events can cost you millions. And can often be avoided through better inspection regimes and speedy access to information. But keeping track of every inspection of every component in your environment is hard when you're using a spreadsheet.

Move to Papertrail, a simple yet powerful inspection-tracking platform that makes equipment inspections a blessing, not a headache.

Call **+44 (0)1248 719270**
or email **renewables@papertrail.io**
to find out just how Papertrail can transform your operations.

papertrail
Record keeping made simple

© A Word About Wind, 2017

Join us for a free introductory media and messaging workshop.

Email advice@tamarindocomms.com to arrange a meeting.

+44 (0) 20 7193 6013 www.tamarindocomms.com

TAMARINDO
strategic communications advisory

BUFFETED IN BRAZIL

Casa dos Ventos founder Mario Araripe and director Lucas Araripe, his son, discuss the prospects for wind in the precarious Brazilian market

Wide experience: Mario Araripe worked in a range of sectors before entering wind a decade ago

Brazil has spent the last two years in its worst-ever recession. Over that time, the economy has contracted by 8% and demand for electricity has fallen.

This has brought an end to a wind energy boom that lasted from 2009 to 2015, and saw installed capacity grow from 341MW at the start of 2009 to 8.7GW by the end of 2016. Last year was the first since 2009 that the South American nation did not hold a tender for new wind capacity, and those across the supply chain are suffering.

But Mario Araripe, president and founder of Brazilian developer Casa dos Ventos, is confident about the fundamental strengths of the country's wind sector; and say that the economy is "coming to a turning point and starting to recover" too. But is that just wishful thinking for a firm that has 15GW of projects in its development pipeline?

We spoke to Araripe and his son Lucas, business and project development director, about the 20GW of developments that the firm has worked on since it was founded in 2007.

They also discuss how Brazil's recession is re-shaping its wind market; how this affects investors; and the country's long-standing problems with transmission.

MOVING INTO WIND

For Mario, the move into wind ten years ago was a departure from his background in automotive, construction and textiles – and it owes a great deal to two factors: the sale of jeep manufacturer Troller, and his lifelong friend Odilon Camargo.

Source: Casa dos Ventos

Family business: Casa dos Ventos director Lucas Araripe

Source: Casa dos Ventos

"This first-mover advantage back in 2007 and our willingness to really invest have made us a very large portfolio."

Araripe graduated from Sao Paulo's engineering university Instituto Tecnologico de Aeronautica in 1977, and went to work at his father-in-law's textiles business Textil Bezerra de Menezes. In 1981, he set up a construction business that specialised in building beachfront properties in northeast Brazil. He sold this firm in 1994 to buy a pair of textiles firms; and, in 1997, bought troubled off-road vehicle maker Troller.

Troller was founded two years before the acquisition and, under the leadership of Araripe senior, commercialised its utility vehicles and then started mass production in 1999 before expanding overseas. In January 2007, he sold Troller to Ford for an estimated $280m, which gave him a war chest to invest in other sectors.

It was around this time he spoke to Odilon Camargo, a college classmate and long-time friend who had established himself as an early expert in Brazil's wind sector.

"At that time, there were no government auctions and you had to truly believe wind energy would be a reality in our country to make this kind of investment," he says, but adds that he was confident in the potential for wind power in Brazil. He also had experience of running hydro projects with his other firms and, while hydro was Brazil's main power sector, he was not convinced in its long-term prospects.

Camargo convinced Araripe to invest in wind, and he formed Casa dos Ventos in 2007. In those early days, it worked closely with Camargo's wind measurement consultancy Camargo Schubert to find the most promising wind sites in Brazil. His son Lucas, a business graduate, joined the business in its early days in 2008.

Lucas takes up the story. He says the firm's first priority was to set up a factory to produce met masts – 700 in total – and assess wind resources across a wide area.

"We came up with many areas where the wind wasn't so good, and we focused on some other areas, mainly in the northeast of Brazil. This first-mover advantage back in 2007 and our willingness to really invest have made us a very large portfolio," he says. Understanding the wind resource data enabled Casa dos Ventos to secure a portfolio of sites with project with a total headline capacity of around 20GW.

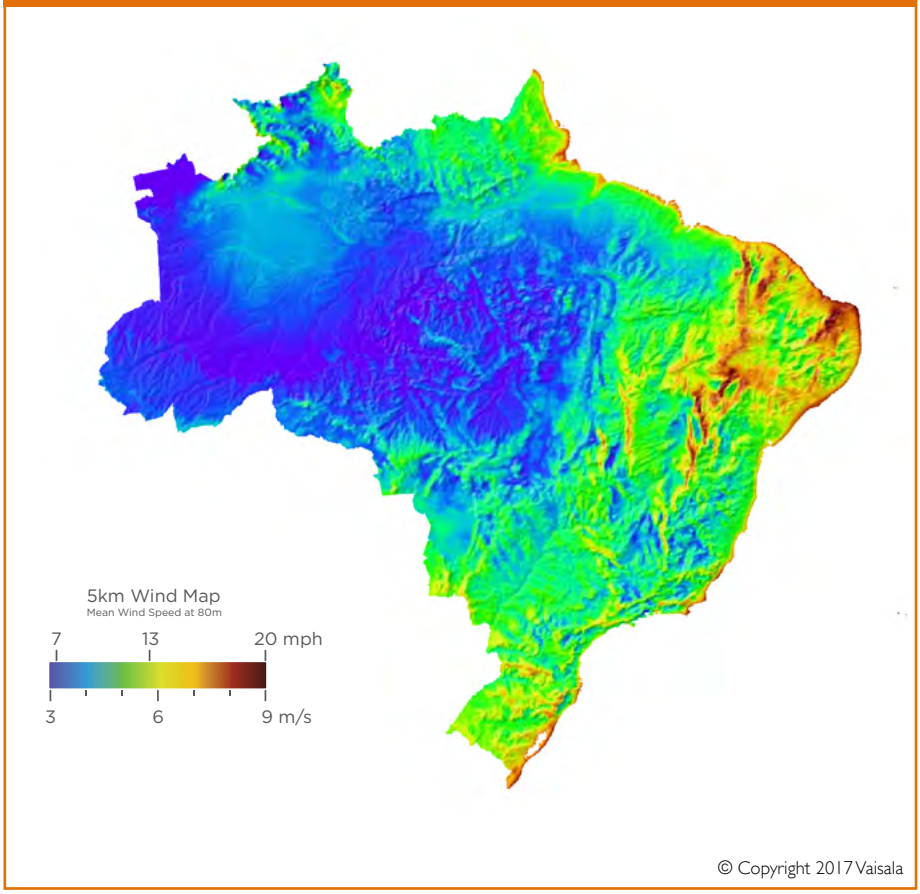
So far, around 5GW of these have been developed. Casa dos Ventos has developed around 1GW of these, of which it still owns 705MW, and has sold 4GW. This means that, of the 18GW of wind projects in operation or under construction in Brazil, Casa dos Ventos has developed more than one quarter – or 27% -- of them.

The company started construction on its debut projects in 2013, and completed the first two – the 210MW Ventos de Araripe I in Piaui state and the 182MW Ventos de Santa Brigida in Pernambuco state – in 2015. It sold the completed projects to the London-based investor Cubico in January 2016 for just under $500m.

The firm followed this by bringing its 126-turbine 216MW Sao Clemente complex in Pernambuco into operation last June; and its 77-turbine 130MW Tiangua complex in Ceara in September. Finally, it is commissioning the 156-turbine 360MW Ventos de Araripe III complex on the border between Piaui and Pernambuco, which started on the first turbines in November and is due to complete on the final turbines this month.

© A Word About Wind, 2017

Brazil annual average wind speed map



© Copyright 2017 Vaisala

"There is a fear that, if we start having two years of contraction, there is going to be a big hit on the supply chain."

It has sold other projects to overseas players including European utilities such as EDF, EDP and Enel Green Power; US developer Contour Global; and both state- and private Brazilian firms, including CPFL. It tends to keep a minority stake.

This means the company has shifted from a pure developer until 2009; to being a developer and minority-stake investor between 2010 and 2013; and now develops schemes itself alongside those other activities. The business is looking to continue with a strategy of selling some projects, or stakes in them, and developing others.

The sales enable Casa dos Ventos to recycle capital and invest in building projects that can grow the size of its portfolio of operating assets: "Our idea is to have Casa dos Ventos as a utility itself, generating and producing energy, and not only being a developer and selling projects," he says. But utilities in Brazil have had tough time.

DEEPEST RECESSION

The recession in Brazil is partly the result of China's financial slowdown, which has cut demand for Brazilian commodities. Falling confidence from overseas investors; political uncertainty; and rising unemployment have also helped to curtail electricity demand. This forced the nation to scrap its auction for new wind capacity in 2016.

Sergio Brandao, a Sao Paulo-based director at Actis, says 2016 was a "disaster" that followed on from a "very depressive" 2015, and he expects 2017 to be "very weak". He said there may be a potential upturn in 2018. The tough economic situation has highlighted schemes that are no longer feasible and is threatening manufacturers.

Lucas Araripe calls the lack of projects a major threat to Brazil's established supply chain: "There is a fear that, if we start having two years of contraction, there is going to be a big hit on the supply chain," he says. Brazil's leaders want to stop the supply chain collapsing and are taking steps to get new projects moving again.

In July, the government is planning an auction where developers can terminate any contracts awarded in previous auctions where the scheme is no longer viable, and re-tender the capacity in an auction in September. Araripe says this could lead to more orders and protect Brazil's manufacturing base: "It is not wise to not have contracts and eventually lose all of those factories, because of one year," he says.

This could also push smaller developers

Source: Casa dos Ventos

out of the market, though this is a process that has been happening anyway as overseas utilities have moved in. Araripe adds that smaller developers have also found it tough to finance schemes because of difficulties securing credit, which again favours the big-budget overseas players.

Casa dos Ventos has, to an extent, been insulated from this. While holding a 15GW project pipeline comes with costs, it also gives the firm the flexibility to sell some of its projects when it needs to raise money. These include the $500m sale to Cubico.

He says: "We're family-owned, we're not in the stock exchange, so we have a limited investment capability. Eventually, it makes sense for us to sell a project so we can build one that is larger, and to really start growing with the recycling of capital. We sell some projects, but we don't sell to get out of the market."

On its own construction projects, Casa dos Ventos is sole equity investor and has to then raise debt from development bank BNDES. This is a feature for all developers in the Brazilian market because the power purchase agreements are priced in reais and so companies avoid currency risk by securing financial support from BNDES.

Casa dos Ventos also complements its equity and BNDES debt with 12-year project bonds. However, Araripe says its wind sector could be more competitive if part of the PPA was denominated in dollars, as it would enable developers to raise money from overseas investors. If it did not need to secure BNDES funding then this would enable developers to avoid local content rules, and thus reduce the cost of energy.

But this would be politically-sensitive in a country where the government is already battling to protect a wind supply chain that is at risk of collapse, and where the rate of unemployment is now over 13%. Araripe is forthright about the benefits.

"You would have much more financing options, much lower costs on financing, on capex, and you would be more efficient and more competitive," he says, but also concedes it would be unpopular among many people, including nationalists, who want to "protect the players that are already here" by restricting imports.

His father agrees. Mario Araripe says that "access to credit in a global scale would bring substantial benefits to the dynamism and growth of our wind industry". This is unlikely to be a priority for Brazil's leaders

"Access to credit in a global scale would bring substantial benefits to the dynamism and growth of our wind industry."

© A Word About Wind, 2017

as they exit the nation's worst recession.

TRANSMISSION TRAUMAS

Brazil's other long-standing problem is about grid connections. The government has not conducted enough auctions for transmission schemes to match demand in busy years.

When it has, the projects have been won by state-run Brazilian firms that have not developed them in a timely manner; or have been won by Spanish firms, such as Abengoa and Isolux, that have faced other problems caused by Spain's downturn.

Mario Araripe says that delays to construction on new transmission infrastructure as created "a bottleneck… that restricts many wind projects". The government is continuing to award licenses: it did so in two auctions last year, and a further one last month.

Araripe senior adds the plan was investment in Brazil's grid on an "unprecedented" scale to "re-establish the reliability of our transmission system". The whole sector, not just his own company, will hope that he is correct.

This is a major challenge for developers, and is a key factor that Casa dos Ventos takes into account when choosing which project to develop. After completing the commissioning of the 360MW Ventos de Araripe III, which is due to happen this month, the company will choose which projects to submit for future auctions.

Araripe says that securing and developing the best sites is an important lesson that he learnt from working in the property sector, but it is not the only one.

"From the textile business, the relation is the need for state-of-the-art technology to achieve high productivity levels," he says, "[and] an analogy to car manufacturing would be the necessity to use robust components that will operate in a reliable way during several years of operation."

Regardless of problems with transmission this knowledge can be used to benefit Brazil's electricity system. He says: "We have a one-of-a-kind wind resource that provides reliability to our supply, and this has to be exploited."

As Brazil recovers, it is a resource that the Araripes will look to keep exploiting. ■

"We have a one-of-a-kind wind resource that provides reliability to our supply, and this has to be exploited."

© A Word About Wind, 2017

TAIWAN: THE HOTTEST NEW OFFSHORE MARKET?

Per Melgaard, co-founder and partner at K2 Management

www.k2management.com

Why firms like Dong Energy, Macquarie and Northland Power are entering Taiwan's nascent offshore wind market

The world is waking up to the potential of Taiwan's offshore wind market. But, with no commissioned schemes and only demonstration projects underway, is it too early to bang the drum about Taiwan?

I don't think so. Taiwan has a lot of key elements in its favour to attract companies, and the foundations being set for offshore wind send a strong signal to the market that Taiwan means business. For example, the government has fast-tracked an ambitious renewables target including 4GW of wind farms by 2030, of which 3GW is offshore.

> "The foundations being set for offshore wind send a strong signal to the market that Taiwan means business."

Government support has been essential in driving progress so far. As far back as 2012, it initiated a grant scheme for offshore wind, and the country also has a fixed feed-in tariff of 6.0437 TWD/kWh (€0.19/kWh) set for 20 years (or 7.40 TWD/kWh (€0.23/kWh) for the first ten years and 3.59 TWD/kWh (€0.11/kWh) for the latter 10 years). These make project development attractive to key players.

PROMOTING PROJECTS

By 2020, Taiwan is planning to have installed capacity of 520MW, including three demonstration offshore wind farms and other projects to reach the government's target. The first demonstration project, Formosa 1, installed its two test turbines in 2016.

Taiwan's set-up also bears similarities to the UK system. The government selects large development zones for offshore wind farms before the competition for contracts commences. Its strategic plan details making up to 36 zones available – though some might be cancelled – and local and international developers have initiated schemes. Sites applications to date have totalled more than 10GW.

Companies are showing a keen interest in this emerging market. These include domestic developers such as state-owned utility Taiwan Power Company; Swancor; TGC; China Steel Corporations; Far Eastern Group; Infravest (owned by Wpd);

© A Word About Wind, 2017

"Developers have to take care of 'local public relations' with groups such as fishermen's associations... to obtain their consents."

Taiwan Green Power; and YuShan Energy. There is also strong interest from large international players including Dong Energy, Macquarie and Northland Power.

The permitting process, although complex and as yet untested, is set out fairly clearly despite the infancy of the industry.

In addition to fulfilling the permitting and approval process, developers have to take care of 'local public relations' with groups such as fishermen's associations, local environmental protection organisations, and offer job opportunities for local residents, in order to obtain their consents, which are key for the environmental impact assessment and project approval process.

SUPPLY CHAIN

Of course, one of the big challenges is with the supply chain, which is virtually non-existent, and lack of domestic experience.

It is likely that we will see collaborations between local stakeholders and foreign professional teams to deliver successful projects and provide a learning platform for the local supply chain.

This, together with a lack of offshore construction experience and lack of suitable vessels and cable-laying equipment, is a great opportunity for foreign contractors.

The lack of infrastructure, such as harbours, vessels, sub-sea cables and offshore substations, means many hurdles may have to be overcome at once.

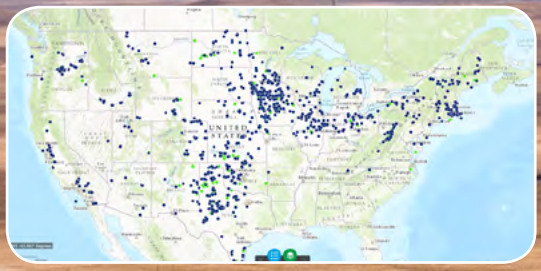
The hefty and ambitious 3GW target set by the government is a world away from the current installed capacity of 8MW. Unless strategic measures are implemented to tackle some of the key issues that the industry is facing, existing and planned projects could face delays.

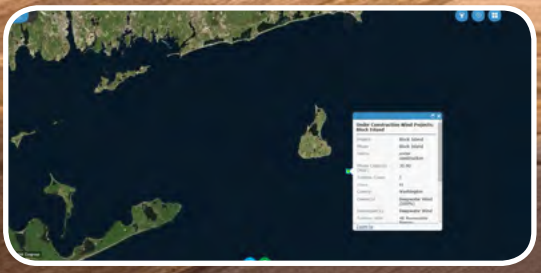
Although the risks are understood, there is little being done to mitigate them, so there is still a way to go. But with fundamentals such as incentives, good wind resource, a clear permitting process in place and a supportive government driving progress, Taiwan's burgeoning offshore wind market has a lot of appeal.

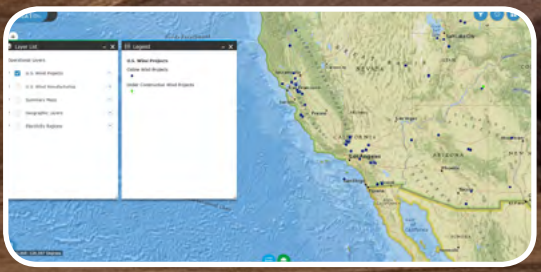
Investors, developers and supply chain should take notice of what is set to be a success story in Asian offshore wind. ■

© A Word About Wind, 2017

Get Proactive with new mapping features.







AWEA AMERICAN WIND ENERGY ASSOCIATION

AWEA
Market Database Pro
An All-Inclusive Wind Energy Project & Manufacturing Resource

AWEA Market Database Pro is a comprehensive, interactive online database that provides downloadable data on all operational, under construction, and advanced development wind projects and wind-related manufacturing facilities in the United States, along with NEW interactive mapping features ... *available only to AWEA members.*

www.awea.org/database

VIETNAM'S MAINSTREAM APPEAL

Richard Heap talks to Mainstream Renewable Power's Andy Kinsella about growing globally, exiting the offshore sector and its new investment arm

Under a statue of the late Vietnamese revolutionary leader Ho Chi Minh, a deal was signed in November that could mark the start of a revolution in Vietnam's electricity grid.

In the Presidential Palace in Hanoi, the presidents of Vietnam and the Republic of Ireland – Tran Dai Quang and Michael Higgins – oversaw the signing of a contract between Mainstream Renewable Power and local developer Phu Cuong Group, to collaborate on an 800MW nearshore wind project. The firms have agreed to work together on the $2bn scheme, with third partner GE Energy Financial Services.

Vietnam veteran: Mainstream COO Andy Kinsella has over 20 years' experience in the Asian nation

Source: Mainstream Renewable Power

Andy Kinsella, chief operating officer at Mainstream, was one of the four men around the ceremonial table: "The Irish president was on a state visit, and we signed a joint development agreement in the presence of the Irish president and President Quang of Vietnam… It was quite striking I have to say."

This may have been a new experience for Kinsella, but doing deals in Vietnam was not: "I have a long history of working in Vietnam," he says. "It goes back over 20 years. It was just an accident of history and I just happen to be very well-connected."

In this interview, we talk to Kinsella about Mainstream's growth plans in Chile, South Africa, Vietnam and elsewhere; why the £2bn 448MW Neart na Gaoithe offshore wind farm in Scottish waters is its final foray in offshore wind; and why the company launched financing arm Mainstream Renewable Capital.

SHIFTING PRIORITIES

Mainstream now focuses almost entirely on emerging markets, but it did not always. Eddie O'Connor and Fintan Whelan founded the Irish developer in 2008 af-

© A Word About Wind, 2017

Energy revolution: Mainstream and Vietnam's Phu Cuong sign 800MW development deal

Source: Mainstream Renewable Power

ter the sale of Airtricity, also founded by O'Connor, for €2bn to Scottish & Southern Energy (SSE) and E.On. Mainstream's core focus is developing, financing, building and operating large renewables projects, mainly wind and solar. It is 25% owned by Japan's Marubeni, which bought the stake for €100m in 2013.

Kinsella joined as an executive director when the company was founded, as well as holding a position on its board of directors. He was chief executive of its offshore business before becoming chief operating officer in 2014. Previously, he worked for the Electricity Supply Board, the Irish state-owned energy company, most recently as head of strategy and sustainability in its ESB Power Generation arm.

Mainstream was set up to focus on three areas: North America, European offshore wind, and developments in emerging markets. In the ten years since, it has moved out of the first of these and is moving out of the second, to focus on the third.

The plan for Mainstream to focus on the US followed on from work done by Airtricity, which build up US arm Airtricity North America before selling it to E.On for $1.4bn in 2007. Kinsella says that Mainstream had "a level of success" in North America as it built a 106MW wind farm in US state Illinois and a 45MW project in Alberta in Canada, but it exited the market three years ago because of ongoing political uncertainty.

"With the uncertainty over the PTCs (production tax credits) and ITCs (investment tax credits) – they'd just been extended on a yearly basis – and the low power prices for PPAs (power purchase agreements), it wasn't what we hoped it to be," he says.

"With the uncertainty over the PTCs and ITCs, and the low power prices for PPAs, [the US] wasn't what we hoped it to be."

Its activity in offshore wind, which Kinsella headed until 2014, was more fruitful. The company developed the 1.2GW Hornsea 1 and 1.8GW Hornsea 2 projects, which it has since sold to Dong Energy.

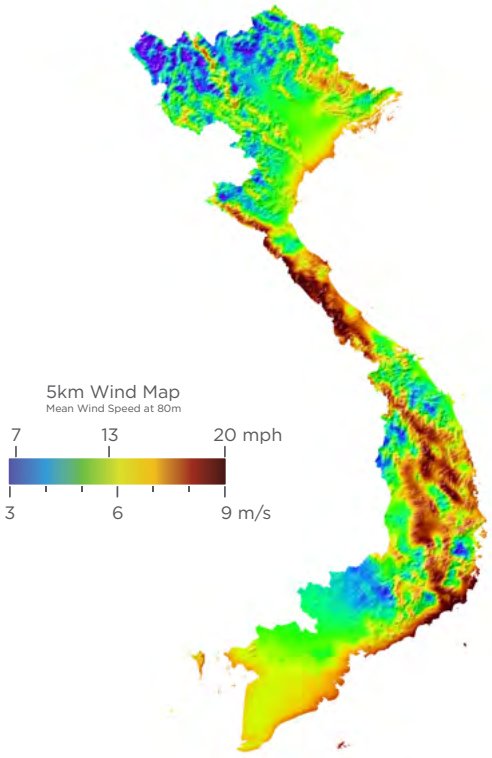
Kinsella says Mainstream plans to see its other major offshore project, the 448MW Neart na Gaoithe in the waters off Scotland, through to completion. The project won planning consent in 2014 and support in the UK's first CfD auction in 2015 at a strike price of £114.39/MWh. It was then one of four in Scottish waters that were subject to a court challenge due to their potential impact on birds and, as a result, had its CfD withdrawn in March 2016 because it had not reached financial close.

However, the company won a judicial review in March 2017, which means its CfD is now reinstated: "We have a very valuable Contract for Difference and the arbitration is binding so… we look to take that back to the market and bring it to financial close towards the back end of 2018, and start construction in 2019," he says.

Mainstream was also planning a 1.2GW offshore project, Horizont, in the waters

© A Word About Wind, 2017

Vietnam annual average wind speed map



© Copyright 2017 Vaisala

"In Germany and the UK, where there was room for an independent [offshore wind] developer... there's just no work to do."

off the coast of Germany, but the German government has since decided that projects that far from shore are now surplus to requirements. Mainstream is talking to the government about compensation, and is not planning more offshore schemes.

"There's just no development work for someone like us to do in Europe," he says. "Other authorities are doing the planning and permitting of the space at sea and, in Germany and the UK, where there was room for an independent developer to develop a greenfield site at sea, there's just no work to do there."

Mainstream closed its offshore office in London in 2015, and has kept its Glasgow office open to support Neart na Gaoithe.

VIETNAMESE VEHICLE

Growing in Vietnam is one of Mainstream's priorities, and the deal in the Presidential Palace is not its only major transaction in the country in the last 12 months. It came after the deal between Mainstream and GE last September to work on 1GW of wind farms in Vietnam, of which the 800MW scheme with Phu Cuong is a huge part.

Not only is it Vietnam's biggest wind project, but it also dwarfs the nation's 159MW of installed capacity. In addition to the Phu Cuong deal, Mainstream is working with local firm Pacific Corporation on two projects in the southern province in Binh Thuan, with a total of 138MW that is set to require $200m of investment. The first phase of these projects is likely to reach financial close in 2018.

Kinsella says that its 92million population; its annual GDP growth rate of around 5%-6%; and the fact that 99% of its inhabitants are connected to the electricity grid means that it has strong energy demand and solid fundamentals. Its wind resources are strongest in the centre and southeast of the country (see map, left).

The government has signed up to the climate change principles that were set in the Paris agreement of December 2015, and has a target to add 6GW of wind and solar capacity to its electricity mix by 2030.

However, the market is being held back by low tariffs for state-backed support for onshore and offshore wind projects, which were due to be increased in November but that has not been confirmed. The regulatory and policy environment has so far been insufficient to enable enough firms to bring projects to practical completion.

But Kinsella's experience in Vietnam should, to an extent, help negotiating these issues. He gained this knowledge during his time at ESB, which started running an international arm around 25 years ago. As part of this, ESB International brought hundreds of workers from Vietnam to the Republic of Ireland, in order to train them and develop their skills in the energy market.

"We put six people through MBA programmes here in Ireland, who I've known for nearly 20 years, and three of them are ministers," he says. "One of the MBAs we put through here in Ireland was Hoang Trung Hai. A year ago he was deputy prime minister in charge of the economy… and now he's a member of the politburo."

Mainstream's vehicle in Vietnam continues that relationship between the countries.

AFRICA AND THE AMERICAS

The firm also targets developing more than 1GW of projects in each of its vehicles in Africa and Chile. These firms, Lekela Power and Aela Energia, are joint ventures with emerging markets investor Actis. Away from Lekela, Mainstream has been developing its own projects in Africa and plans to set up another 1GW platform.

Lekela has nine projects totalling 1.3GW in

© A Word About Wind, 2017

Source: Mainstream Renewable Power

operation, construction and development in four nations: Egypt, Ghana, Senegal and South Africa. These include the 225MW Ayitepa in Ghana, which is due to reach financial close in September; the 158MW Taiba Ndiaye in Senegal, which is due to reach financial close in the next month; and 300MW in two projects in Egypt.

"It's very frustrating for all the players [in South Africa]... It's just an Eskom signature that's holding up the whole industry there."

Mainstream's largest market in Africa is South Africa, where it is working on 850MW of wind and solar farms, of which 610MW are in Lekela. Mainstream is now waiting on financial close for projects totalling 250MW, and expects to win the right to build a "few hundred megawatts" of schemes in an auction this summer.

However, like others, it is being held up by state utility Eskom's refusal to sign power purchase agreements with renewables operators. The projects should have reached financial close in October but, despite the intervention of President Jacob Zuma, the utility has still failed to sign the deals. This is a clear source of frustration.

"In not signing, they are breaking the law in South Africa. That's not my opinion or Mainstream's opinion. That's the department of energy's view, but there's a lot of politics within South Africa that is affecting the energy sector," says Kinsella.

He continues: "It's very frustrating for all the players there. We have our construction contracts, our suppliers are ready to go, we've got our debt and equity lined up, and it's just an Eskom signature that's holding up the whole industry at the moment."

There are fewer frustrations in Chile, where Mainstream has been active for eight years and has run Aela Energia with Actis since 2013. Mainstream has worked on wind and solar projects totalling over 2GW in Chile since 2009, and is currently in development on schemes totalling 1.3GW, of which it is bringing 300MW to financial close through Aela. It is also seeking to bid in forthcoming capacity auctions.

FINANCING ARM

Its other notable vehicle is financing arm Mainstream Renewable Capital, which it set up in November to build wind and solar portfolios in emerging markets. MRC is due to set up an investment platform in South America this year, and in Africa in late 2017 or early 2018.

The idea is the Mainstream Renewable Power will develop projects to a stage where they have been fully consented and permitted, with a grid connection and power purchase agreement in place. It will then sell the assets to MRC, which will bring them to financial close and hold onto them. Mainstream will stay involved as equity investor, and MRC will bring in debt from players including institutions.

It is similar to a yieldco structure, except MRC is acquiring an asset when it is yet to reach financial close rather than an asset that has reached practical completion. It is a label – 'yieldco' – that Kinsella seems slightly wary to attach to the structure.

"Over the last couple of years, the phrase itself has maybe got some bad publicity… It's very simple: as a developer, we take the high risk in developing projects, and when we flip a project into Mainstream Renewable Capital, we take a premium for taking that risk but, at the same time, we are taking projects to financial close and are leaving very attractive equity IRRs (internal rates of return) within the project."

He says that will be attracted to IRRs that are typically in the mid-teens to the low twenties, but that these returns will be dependent on the risk profiles of the different markets: "Chile is a more mature market, in an OECD country, whereas somewhere like Egypt or Vietnam is a very different risk profile," he says.

They are risks with which he and Mainstream are all too familiar. ■

© A Word About Wind, 2017

offshore WIND ENERGY 2017

LONDON 6-8 JUNE

JOIN THE WORLD'S LARGEST OFFSHORE WIND ENERGY GATHERING

EXHIBITION

CONFERENCE

NETWORKING

- **Over 10,000 professionals**
- **More than 400 exhibitors**

REGISTER NOW

Contact us:
info@offshorewind2017.com

Click here to find out more:
offshorewind2017.com

Co-organised by:

WindEurope

renewableUK

Event ambassadors:

DONG energy

MHI VESTAS OFFSHORE WIND

SCOTTISHPOWER RENEWABLES

SIEMENS Gamesa RENEWABLE ENERGY

KEY DATES

Top decision-makers in wind energy finance trust A Word About Wind to deliver news, analysis and new business connections

You can take advantage of our membership and subscription services, and join over 2,500 other senior industry executives, by signing up for the service today. To register for a free 30-day newsletter trial visit: www.awordaboutwind.com

Our rapidly-expanding membership base benefits from a range of intelligence, insight and networking services. In addition to the newsletter, published three times every week, we also publish special reports and run events. You can see key dates for our forthcoming programme of reports and events below:

Events

15th June	Quarterly Drinks Q2
7th September	Quarterly Drinks Q3
October	Annual Conference
16th November	Quarterly Drinks Q4

Reports

11th July	Finance Quarterly Q3
10th October	Finance Quarterly Q4
7th November	Top 100 Power People
9th January 2018	Finance Quarterly Q1

"Membership helps me stay connected to the leading industry participants and to keep updated on the weekly news impacting the sector."

Nicola Riley, Head of Wind Energy UK, Fichtner

Vital market insight at A Word About Wind annual conference in October 2016

© A Word About Wind, 2017

WHY JOIN?

If you are serious about doing business in wind, sign up today

Key benefits include:

- 150 intelligence briefings a year
- 750+ of the biggest news stories
- 100+ insightful market commentaries
- Access to 2,500+ professionals in our community
- Five members-only reports every year, including…
- Our annual Top 100 Power People
- Exclusive access to our members-only networking evenings
- Exclusive access to our members-only annual conference
- On-demand access to our experts (Platinum only)
- Our free-to-access blogs and sponsored reports

You can sign up your whole team for less than £20 a week, or as an individual member for under £10 a week. For price plans visit: www.awordaboutwind.com

It is a small price to pay to become a member of a community that includes Actis Investments, Allianz Capital Partners, BlackRock, Enel Green Power, E.On, Green Giraffe, K2 Management, Macquarie, Marathon Capital, Nordex, PensionDanmark, Siemens Financial Services, Swiss Re, Scottish Power, and many more.

Our members-only reports include...

Published in January 2017, this is our look at the year ahead for the wind sector.

Published each November, this is our annual look at wind's top power-brokers.

Published in September 2016, this is our rundown of wind's top recent deals.

Published in March 2017, to tie in with International Women's Day.

Call us on: +44 (0)20 7100 1616

www.awordaboutwind.com

A WORD ABOUT WIND