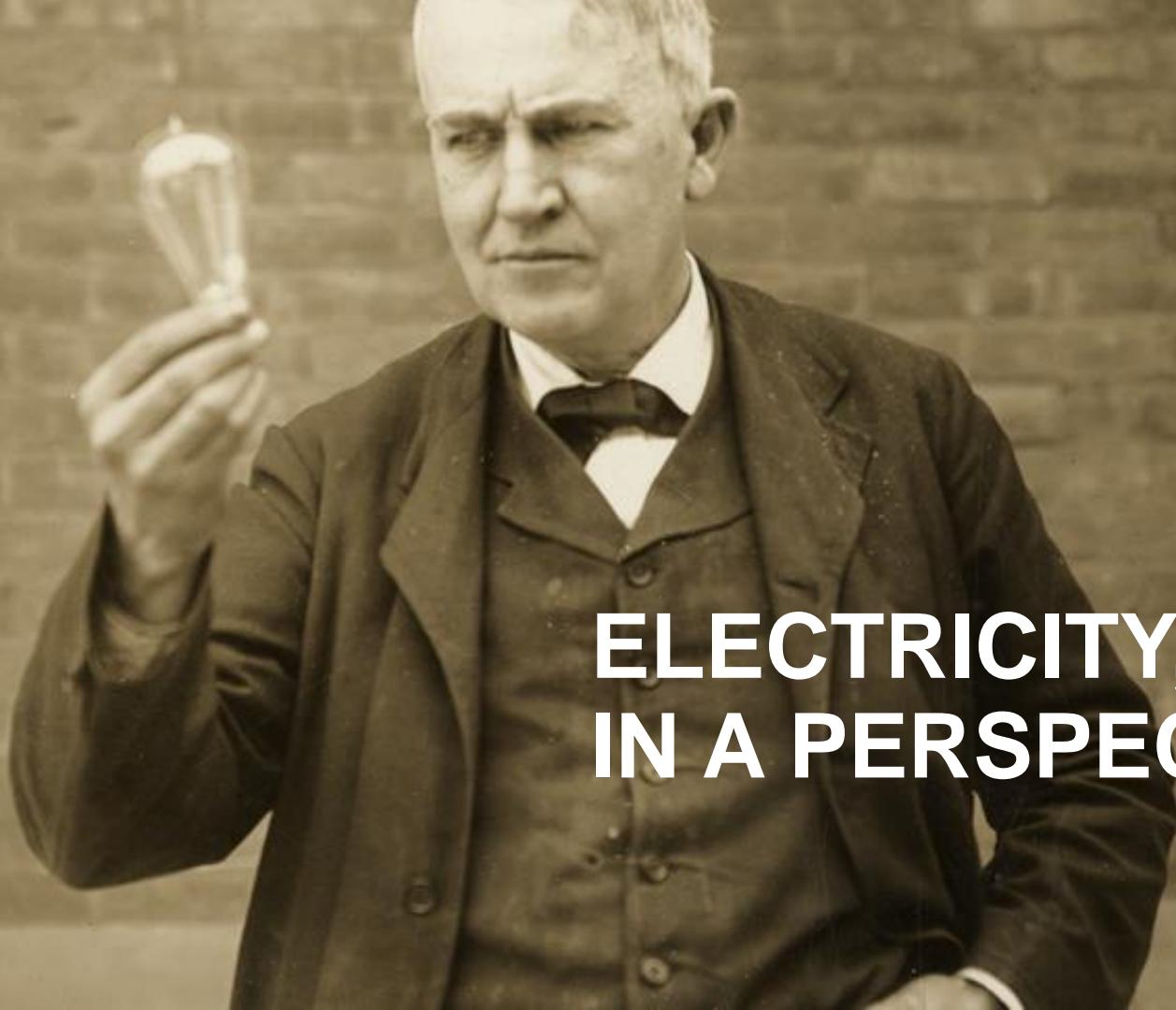




Porto Design Centre

A mudança do paradigma energético



ELECTRICITY,
IN A PERSPECTIVE

2016

\$0.2tr

Renewable

\$0.14tr

Fossil fuels & nuclear

2040

\$7.8tr

Renewable

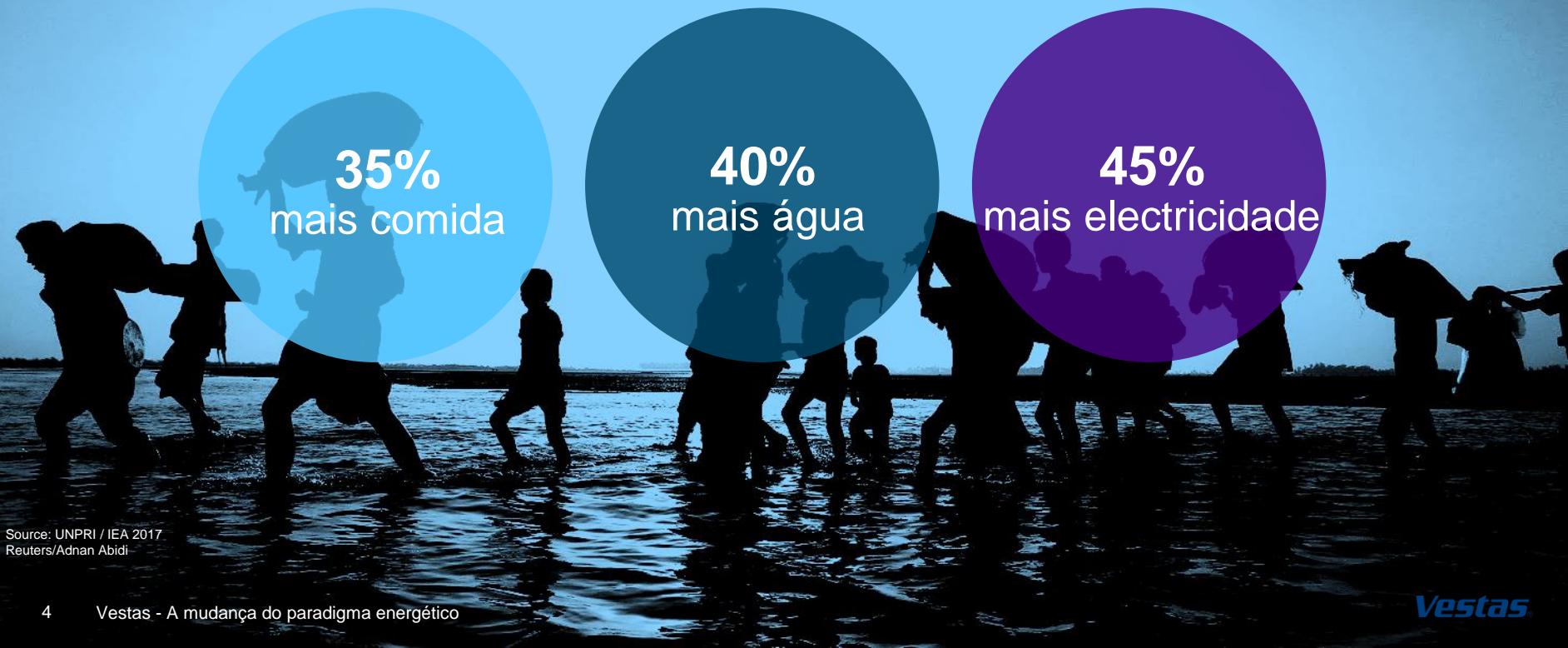
\$3.2tr

Fossil fuels & nuclear

Total investment in power generation
Source: bnef

O desafio global

Em 2030, o mundo vai necessitar de...



Source: UNPRI / IEA 2017
Reuters/Adnan Abidi



O nosso objectivo

Previsão das emissões globais de CO₂

200
150
100

2000

2018

2035

Caminho
actual

Onde
temos de
estar

Source: IEA World Energy Outlook 2017

Respondendo ao desafio do clima global...

- Emissões globais de CO₂ estão destinadas a aumentar se os países continuarem no caminho actual
- Esta tendência tem de ser invertida para ter impacto no clima global e no bem-estar do nosso planeta
- Isto leva a uma imensa necessidade e oportunidade de crescimento para as energias limpas

Vestas em resumo

A única empresa de energia eólica global



+ 23,300

Empregamos mais de 23,300 pessoas em todo o mundo e temos mais de 35 anos de experiência com energia eólica



+38,892

Temos um total de 38,892 turbinas combinadas em serviço, ou cerca de 76 GW



+ 63,500

Temos mais de 63,500 turbinas ou 90 GW de capacidade instalada em 77 países cobrindo seis continentes



€ 9,953m

A receita da Vestas em 2017

Vestas Portugal

Factos e Números



20 Anos de presença em Portugal

- ✓ Primeiro Parque Eólico instalado em 1996 (2 x V29)
- ✓ Abertura Escritório de Lisboa em 2004



Forte presença no **Norte, Centro e Ilhas Cabo verde** sob Supervisão de Portugal



700 MW Capacidade Instalada

916 MW Em Manutenção (Multi-brand)



Compromisso a longo prazo no mercado Portugês



Excelente performance dos geradores eólicos:
98,5% de Taxa de Disponibilidade

Açores



Madeira



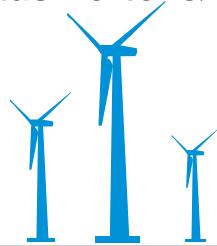
Cabo Verde



O novo Hub de I&D

Factos e Números

Vestas Porto I&D



Áreas:

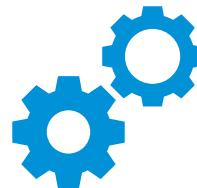
- ✓ Mecânica
- ✓ Electro
- ✓ Software e Control
- ✓ Gestão de Projectos
- ✓ Data Analytics

Investimento até 2020



- ✓ Centenas de Engenheiros até 2020

Cooperação



Relação próxima com:

- ✓ Universidades
- ✓ Indústria local
- ✓ Vestas global

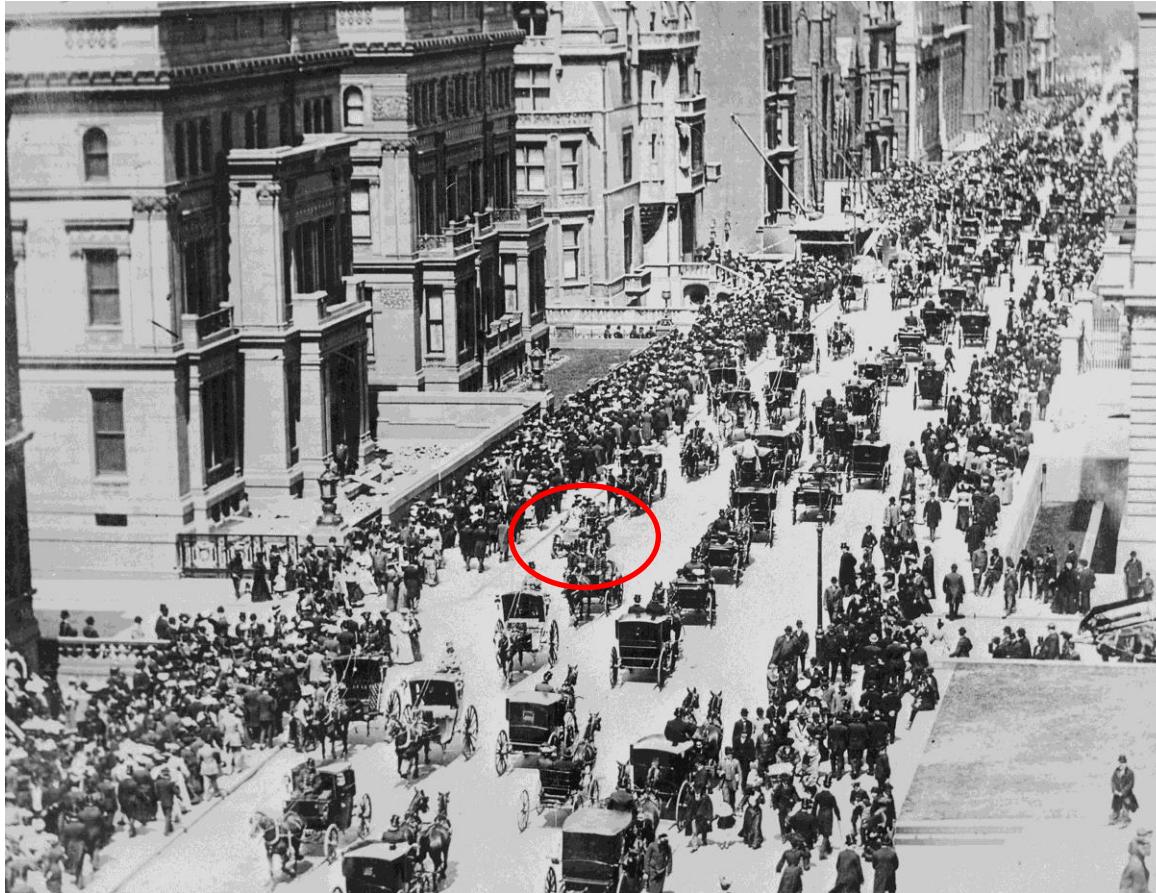
O mais importante



- ✓ Compromisso a longo prazo
- ✓ Desenvolvimento contínuo

5th Avenue, New York City, Easter parade, 1900

Where is the car?



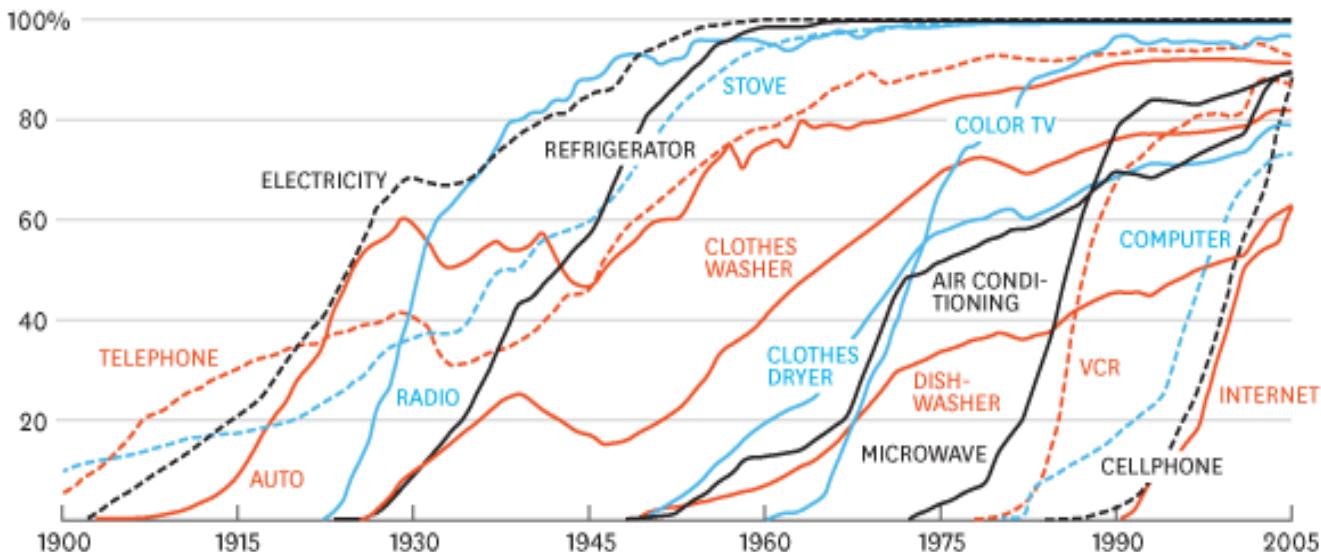
5th Avenue, New York City, Easter parade, 1913

Where is the horse?



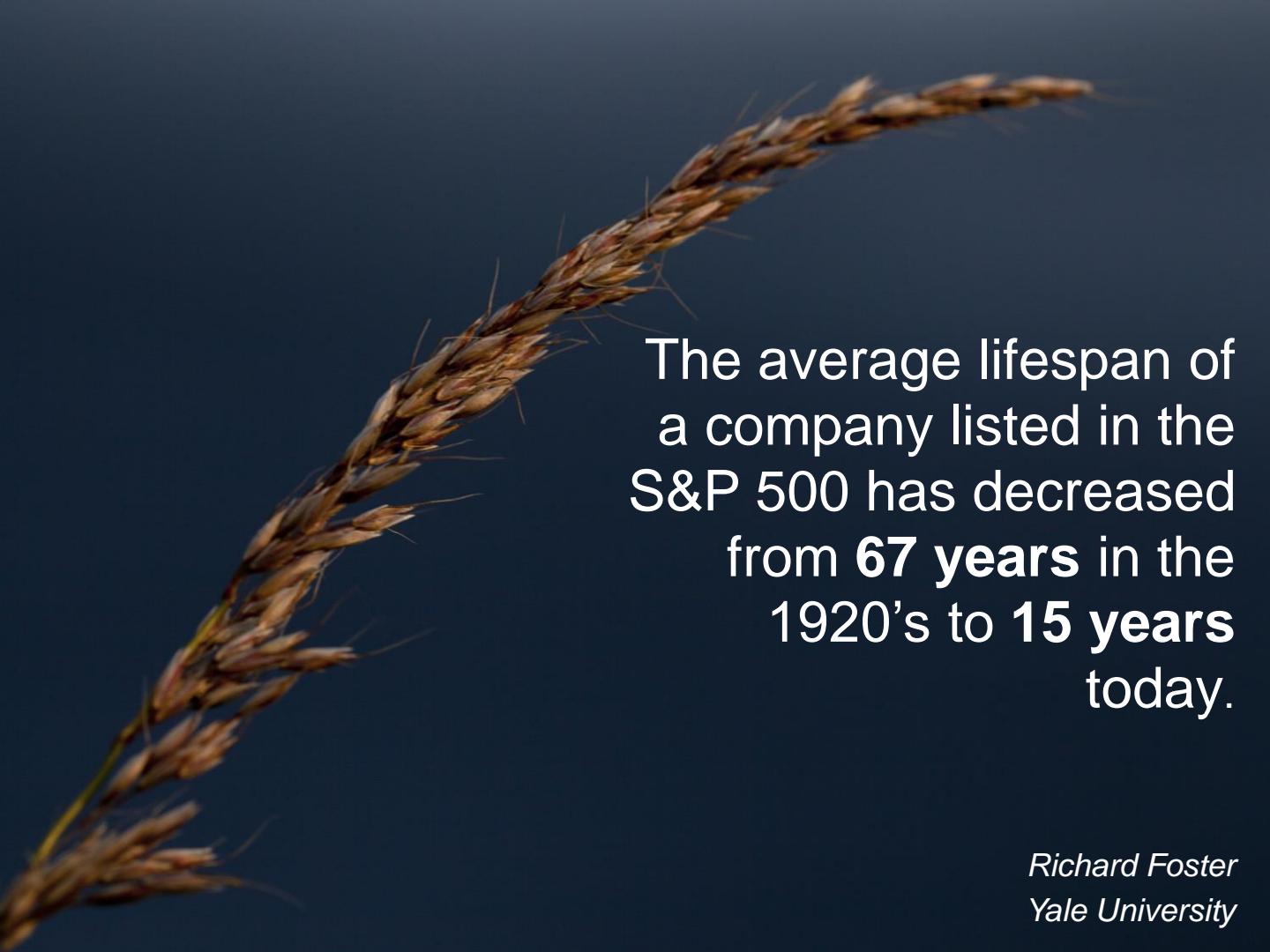
CONSUMPTION SPREADS FASTER TODAY

PERCENT OF U.S. HOUSEHOLDS



SOURCE MICHAEL FELTON, THE NEW YORK TIMES

HBR.ORG



The average lifespan of
a company listed in the
S&P 500 has decreased
from 67 years in the
1920's to **15 years**
today.

*Richard Foster
Yale University*

the world to us.™



In 10 years, over
40% of FORTUNE
500 companies will no
longer be here

Source: Babson Olin School of Business Advertisement, Fast Company April 2011, page 121.

is the world to us.™

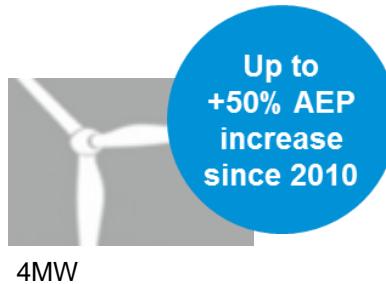
Remaining competitive: relentless focus to lower LCOE

Evolution of proven technology

Global platforms



2MW

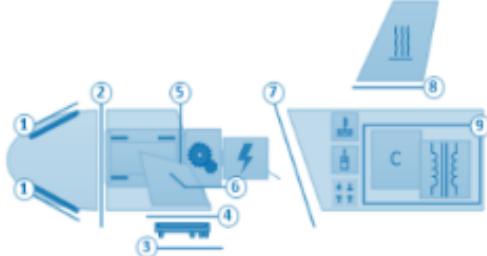


4MW

Product flexibility



Standardisation & modularisation



Enablers





is the world to us.™

New technologies with significant potential to reduce LCOE

Innovation

Much lighter and more effective turbines

Additive Manufacturing, Advanced/Functional/Digital Materials, Design technologies/topology optimization, Real-time control, sensing and actuation

Streamlined value chain

Additive Manufacturing, Value chain technology, Robotics and drones, Digitalization/Industry 4.0

A fully digitalized energy business

Internet of Things, Interconnectivity Smart Data, Cloud computing, Advanced modelling and simulation, Real-time plant level control

Flexible, multi-mix, distributed energy solutions

Short and long term storage technology, Power to fuel/wind to value, Power chain simplification, Energy Management System, Real-time control and communication, DC coupled PV and battery

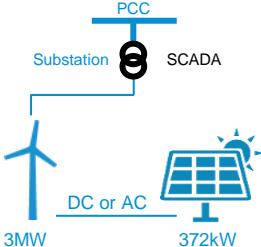


Vestas Hybrid Power Plant Solutions

Small plants

Low solar/wind ratio

WTG-coupled



Wind and PV

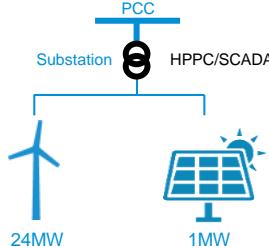


Demonstrator in Spain

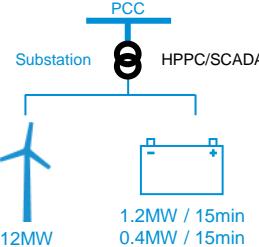
Large plants

Hybrid Power Plant Controller (HPPC)

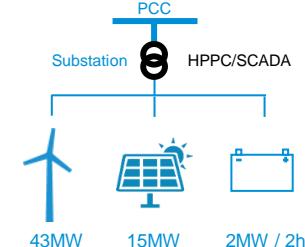
Co-located & sharing substation and infrastructure



Wind and PV



Wind and storage



Wind, PV and storage



Kennedy, Australia

Vestas scope of work: **Full EPC & Service**

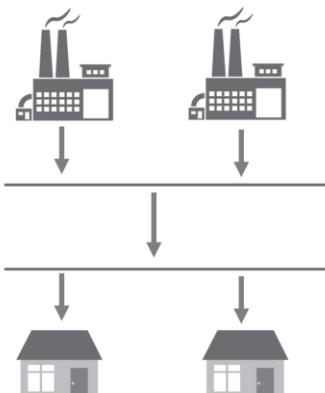
Remaining relevant: from one technology to system thinking

System thinking and digitalization necessary to enable high penetration of renewables

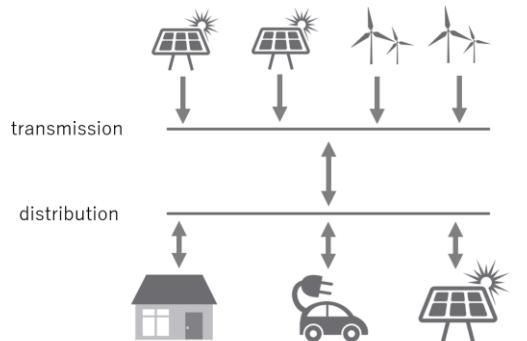
Moving from centralised to distributed generation
poses new challenges...

...but also opportunities!

THE OLD

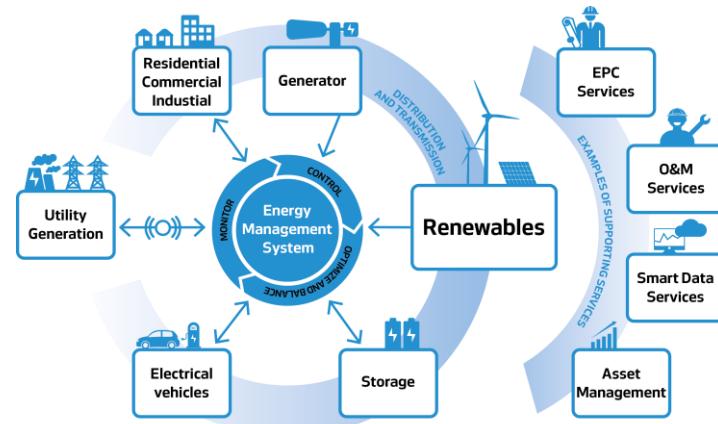


THE NEW



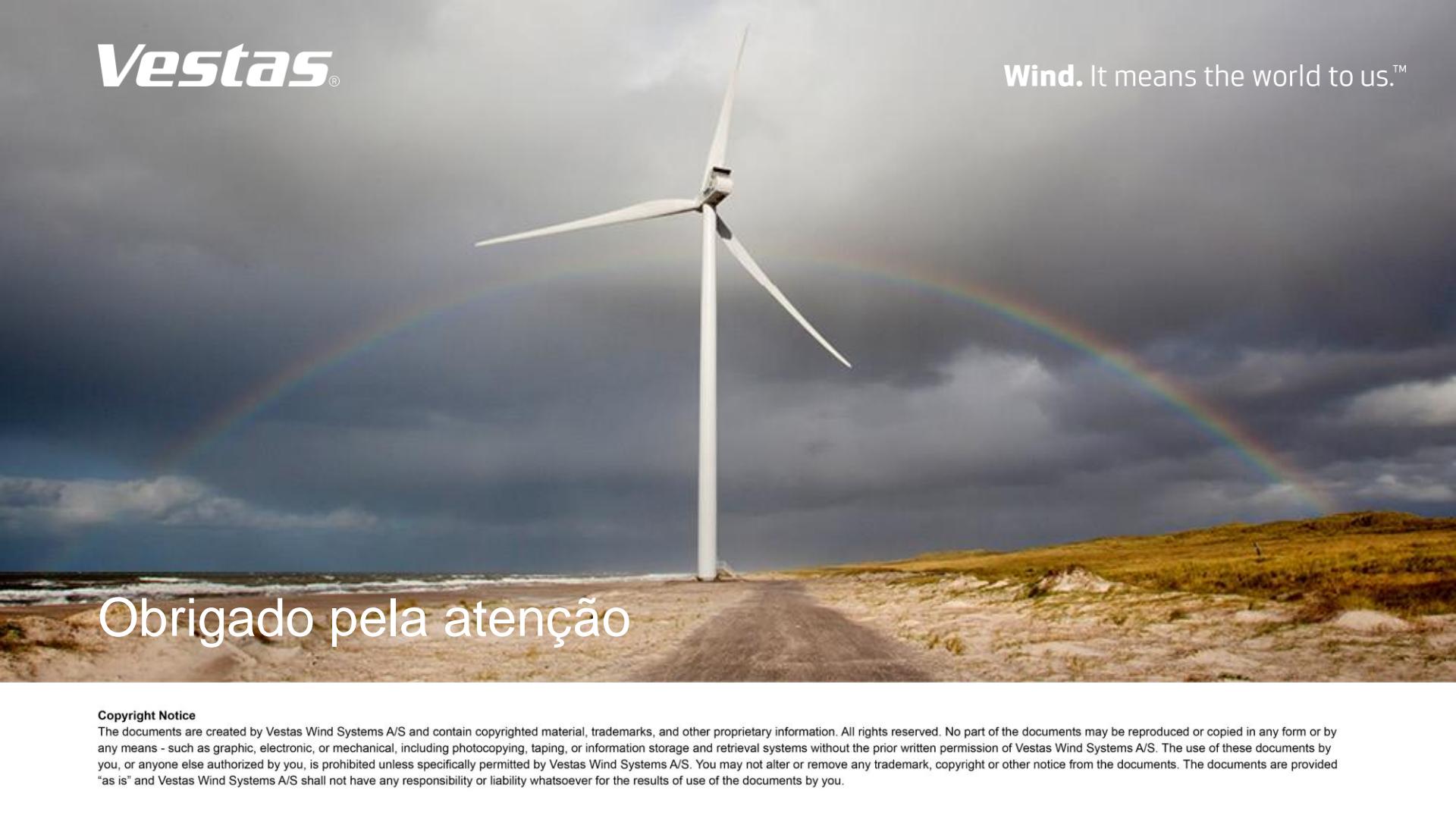
dispatchable, centralized and large-scale

intermittent, distributed and small scale





Wind. It means the world to us.™

A photograph of a white wind turbine standing on a grassy, sandy hill. The sky is filled with dark, heavy clouds, and a vibrant double rainbow arches across the horizon. The ocean is visible in the background to the left. The overall scene conveys a sense of clean energy and natural beauty.

Obrigado pela atenção

Copyright Notice

The documents are created by Vestas Wind Systems A/S and contain copyrighted material, trademarks, and other proprietary information. All rights reserved. No part of the documents may be reproduced or copied in any form or by any means - such as graphic, electronic, or mechanical, including photocopying, taping, or information storage and retrieval systems without the prior written permission of Vestas Wind Systems A/S. The use of these documents by you, or anyone else authorized by you, is prohibited unless specifically permitted by Vestas Wind Systems A/S. You may not alter or remove any trademark, copyright or other notice from the documents. The documents are provided "as is" and Vestas Wind Systems A/S shall not have any responsibility or liability whatsoever for the results of use of the documents by you.