



ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





**CAN OUR INDUSTRY DELIVER CLEAN ENERGY THAT
IS AFFORDABLE, COMPETITIVE AND INCLUSIVE?**



Ray Thompson

Head of Business Development
Siemens Gamesa





Offshore Wind - Future and Opportunities Edinburgh

March 2018

© Siemens Gamesa Renewable Energy Ltd. 2018

SIEMENS Gamesa
RENEWABLE ENERGY

Unrestricted

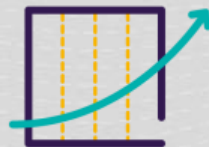
Siemens Gamesa Renewable Energy – Facts & figures



75 GW
Installed
capacity
worldwide



**More than
20,000**
Passionate
employees



**more than
€20 bn**
Order backlog



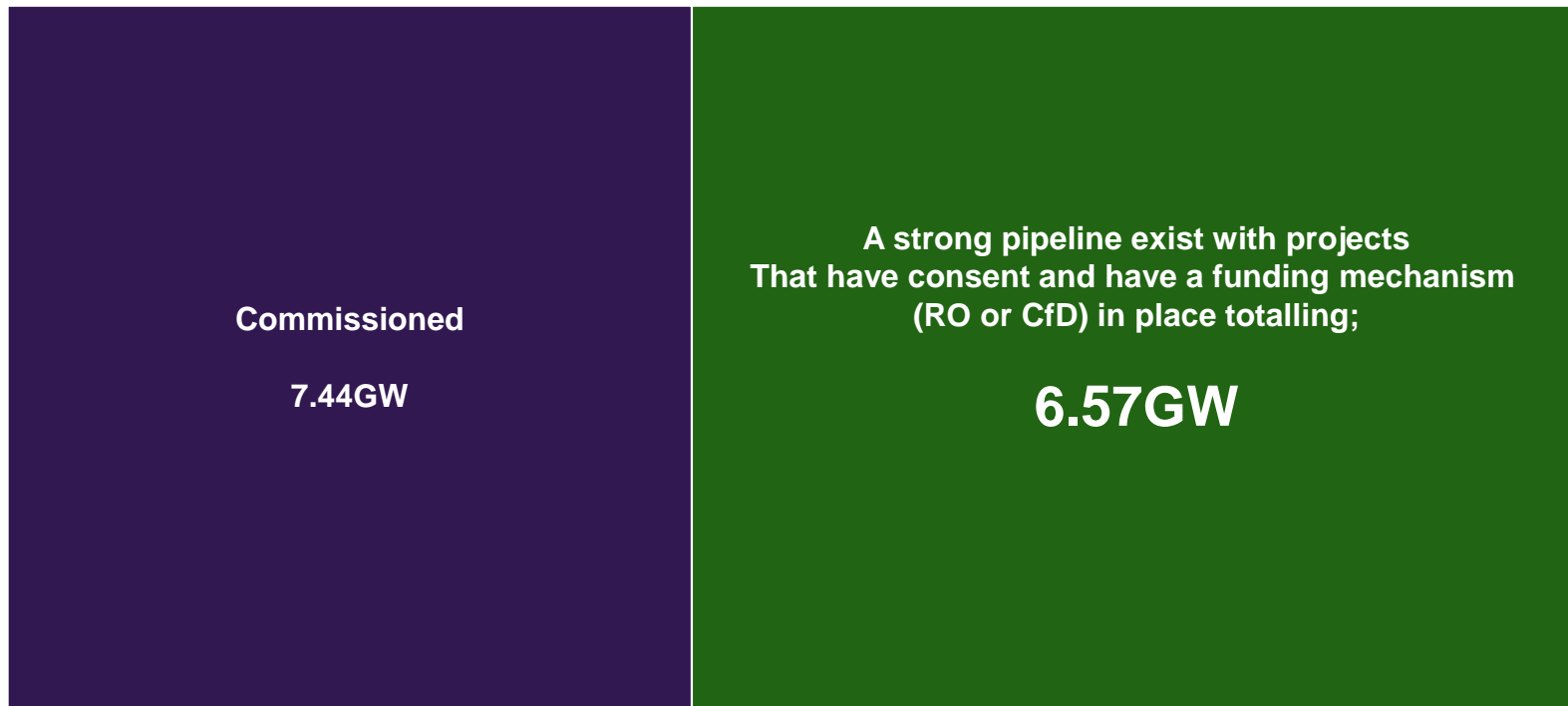
€11 bn
Combined
annual revenue

UK Offshore Wind Farms

**UK is the World's largest Offshore wind market
With Commissioned projects totalling**

7.44GW

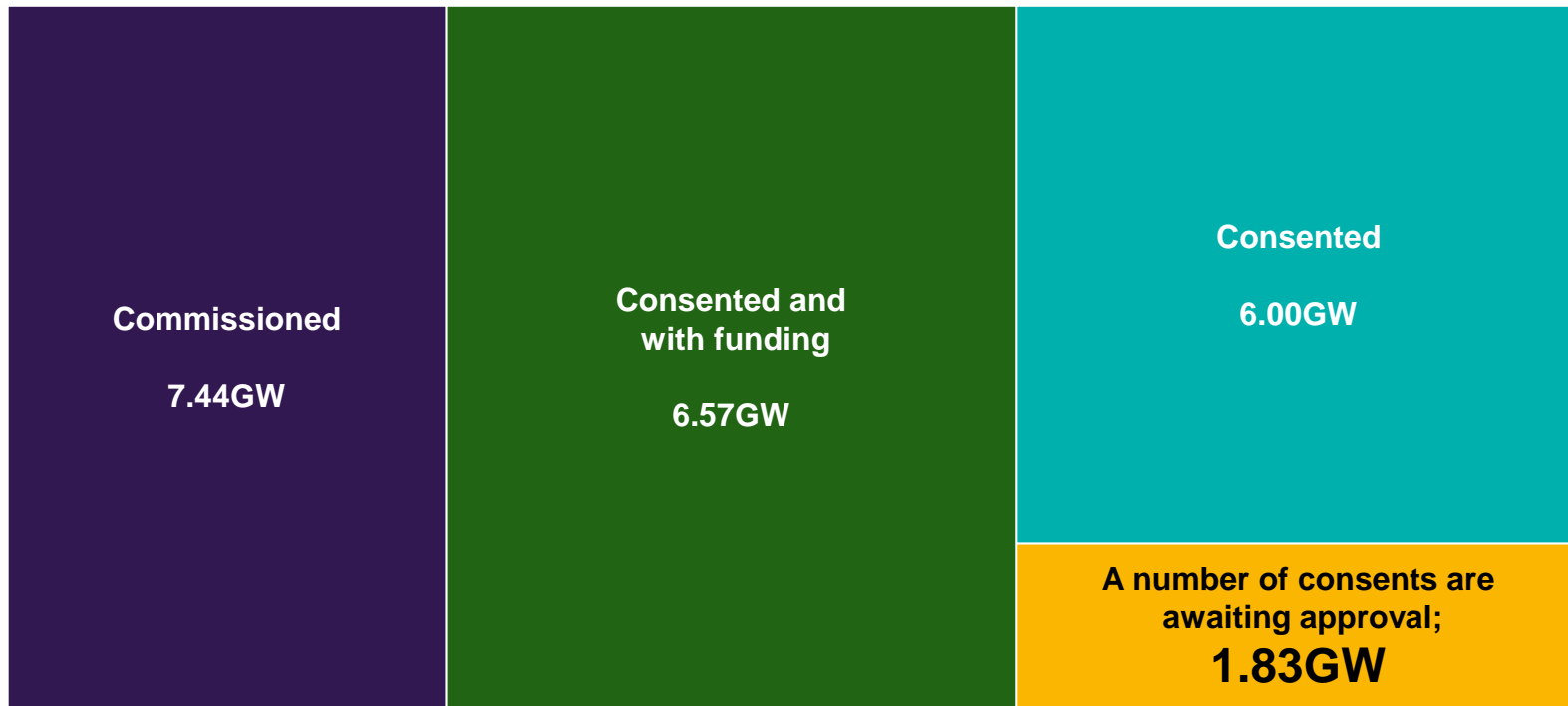
UK Offshore Wind Farms



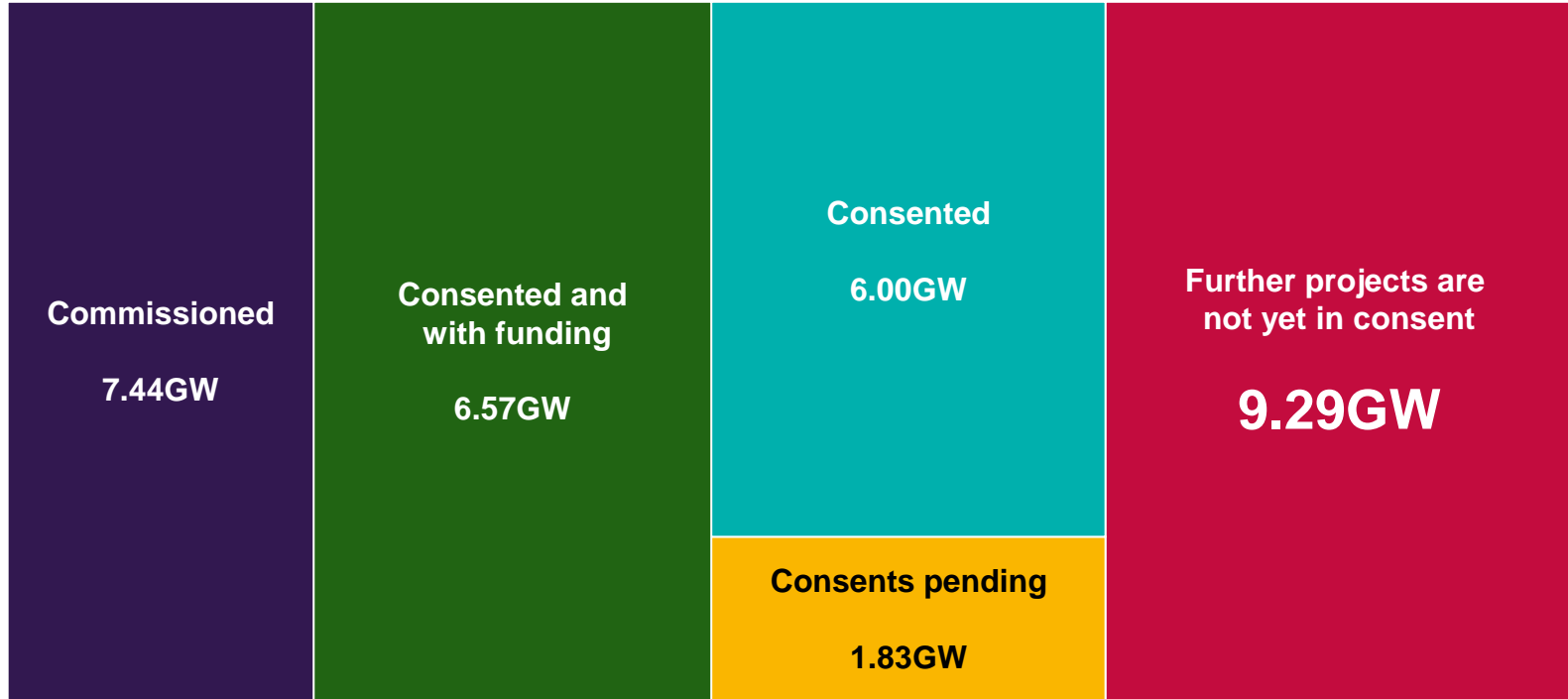
UK Offshore Wind Farms



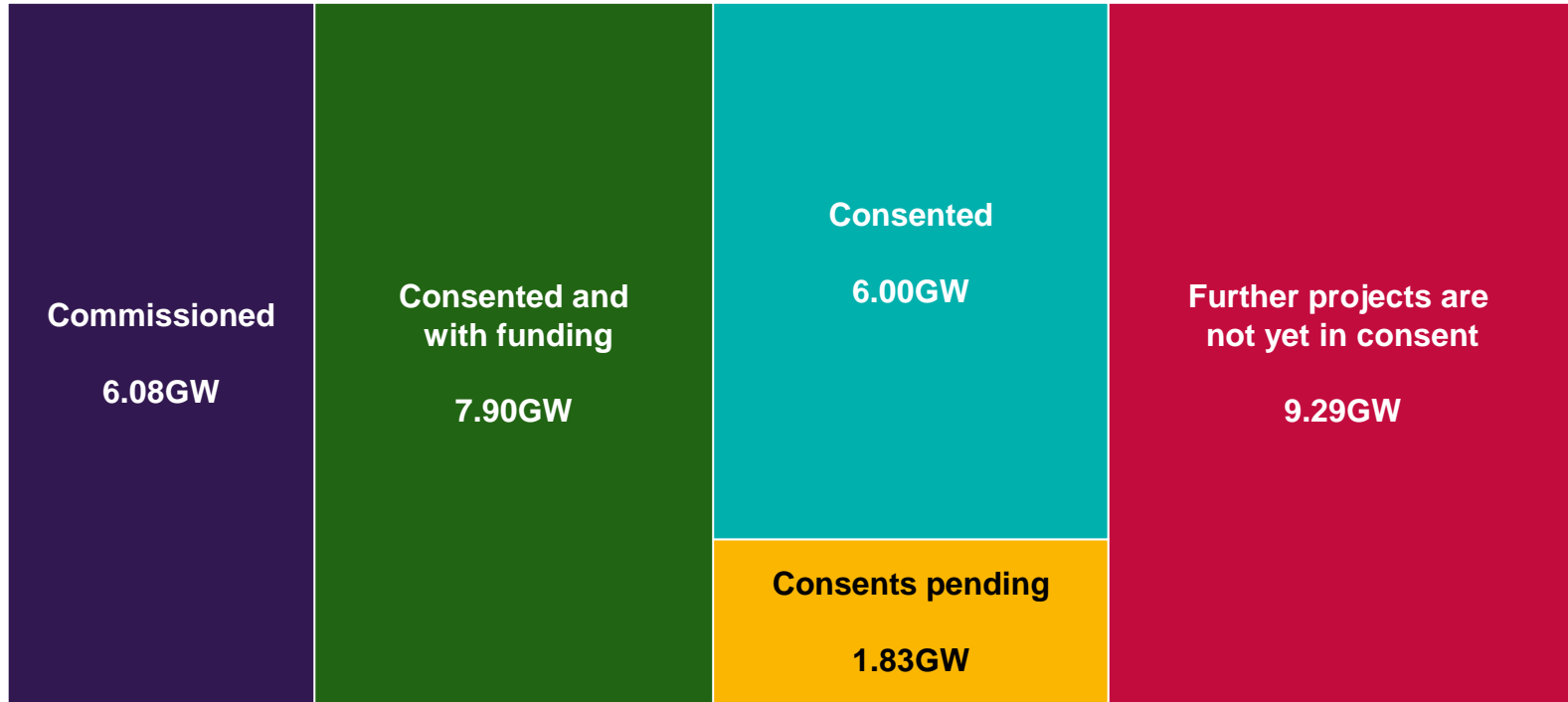
UK Offshore Wind Farms



UK Offshore Wind Farms



UK Offshore Wind Farms - Total potential pipeline of 31GW



Operational

Project name	MW
Barrow	90
Beatrice Demonstration	10
Burbo Bank	90
Gunfleet Sands I	108
Gunfleet Sands II	64.8
Kentish Flats	90
Lynn & Inner Dowsing	194.4
North Hoyle	60
Rhyl Flats	90
Robin Rigg	180
Scroby Sands	60
Thanet	300
Walney I	183.6
Ormonde	150
Walney II	183.6
Greater Gabbard	504
Sheringham Shoal	316.8
London Array I	630
Gunfleet Sands extension	12
Lincs	270
Teesside	62.1
West of Duddon Sands	388.8
Gwynt y Mor	576
Humber Gateway	219
Westermost Rough	210
Kentish Flats Extension	51
Burbo Banks Ext.	258

Operational

Project name	MW
Walney Ext West	330
Dudgeon	402
Hywind	30
Blyth Demonstration	41.5
Rampion	400.2
Galloper	336
Race Bank	546
TOTAL	7437.8

Consented and with Funding

Gov't Support in place	MW
FIDER	
Beatrice	588
Walney Extension East	330
Hornsea (Heron and Njord)	1200
RO	
Aberdeen Demonstration	92.4
CFD	
East Anglia 1	714
Near Na Gaoithe	448
Moray Firth	950
Triton Knoll	860
Hornsea 2	1386
TOTAL	6568.4

Consented

Project name	MW
Dogger Bank Creyke beck A (Statoil/SSE)	1200
Dogger Bank Creyke beck B (Statoil/SSE)	1200
Dogger Bank Teesside A (Statoil/SSE)	1200
Dogger Bank - Sofia (Innogy)	1200
East Anglia 3	1200
TOTAL	6000

Consent Submitted

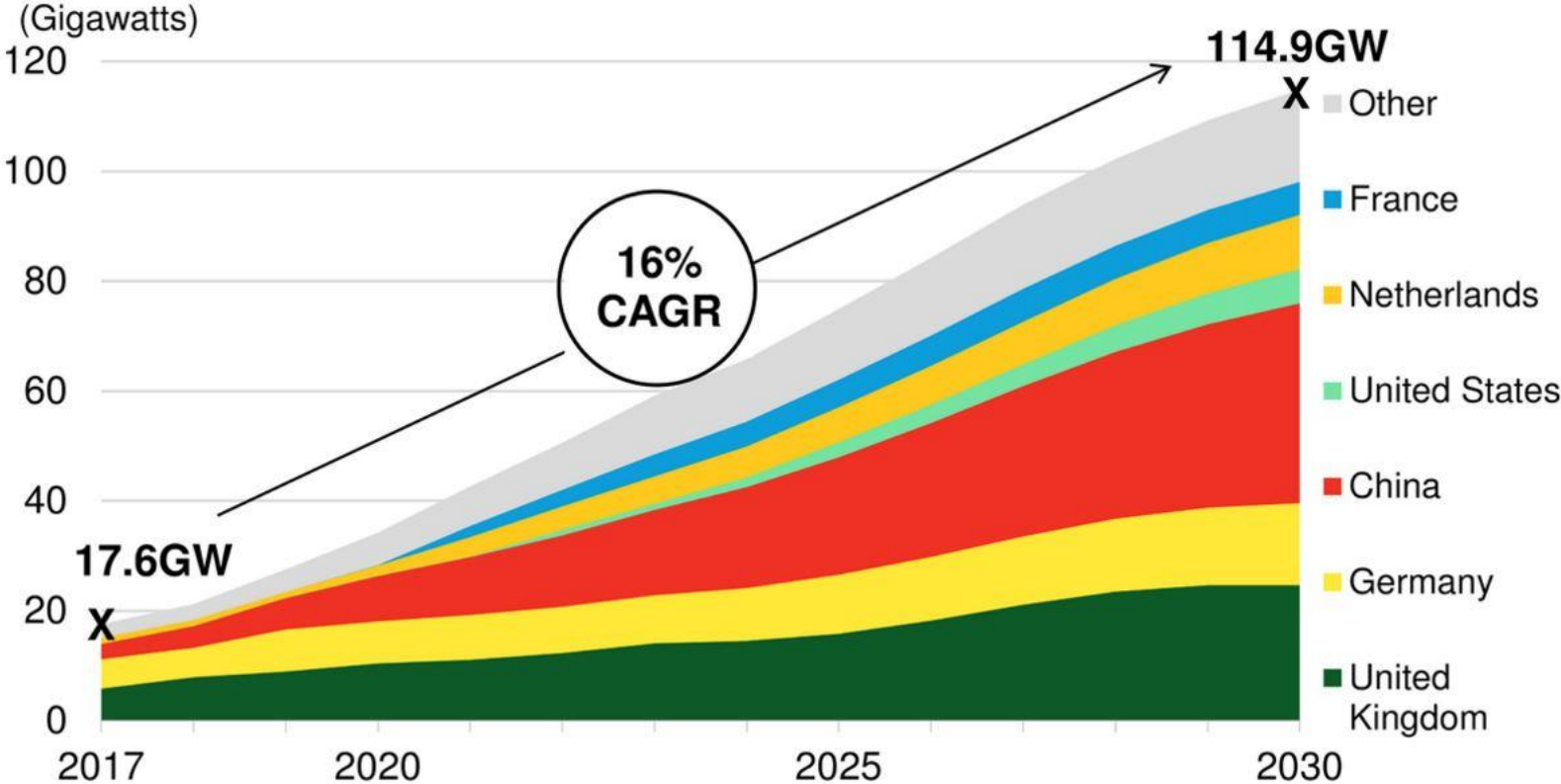
Project name	MW
Inch Cape	784
Firth of Forth	1500
TOTAL	2284

Not yet in consent

Project name	MW
Hornsea 3	2000
Hornsea 4	1000
East Anglia 2	800
East Anglia 1 NORTH	800
Norfolk Vanguard	1800
Norfolk Boreas	1800
Moray Firth 2	750
Thanet 2	340
TOTAL	9290

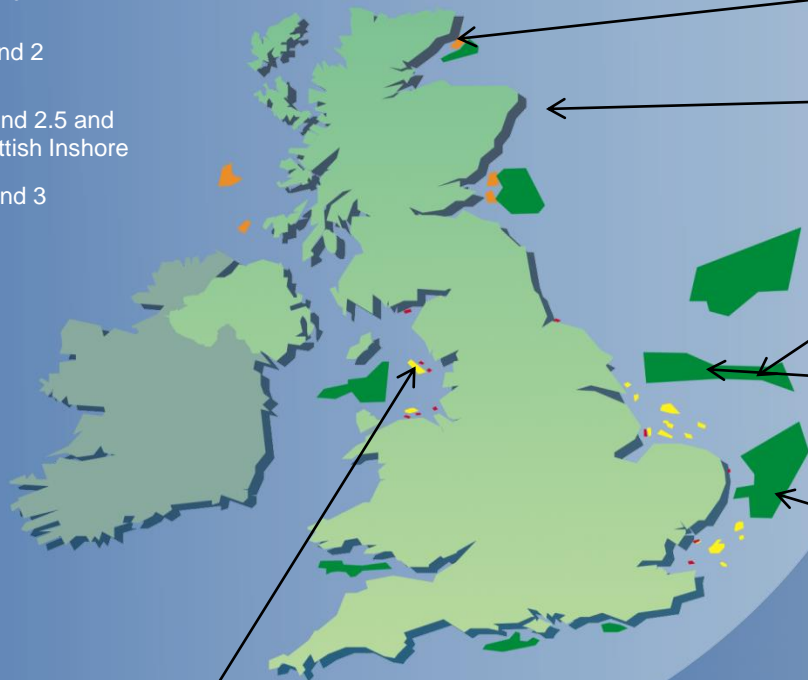
GRAND TOTAL

Bloomberg NEF Offshore Forecast



Siemens Gamesa - Strong Offshore pipeline in place

- Round 1
- Round 2
- Round 2.5 and Scottish Inshore
- Round 3



Beatrice 588 MW

- SSE(50%) SDIC (25%) CIP (25%)
- Execution from Nigg – GEG Energy Park

Hywind 30 MW

- Statoil Floating array project
- Project execution recently completed from deepwater port Norway

Hornsea 1 1200 MW

- Ørsted with CfD approved under FIDER
- Execution from Hull commencing 2019

Hornsea 2 1386 MW

- Ørsted with CfD approved in Second CfD round
- Execution from Hull commencing 2021/22

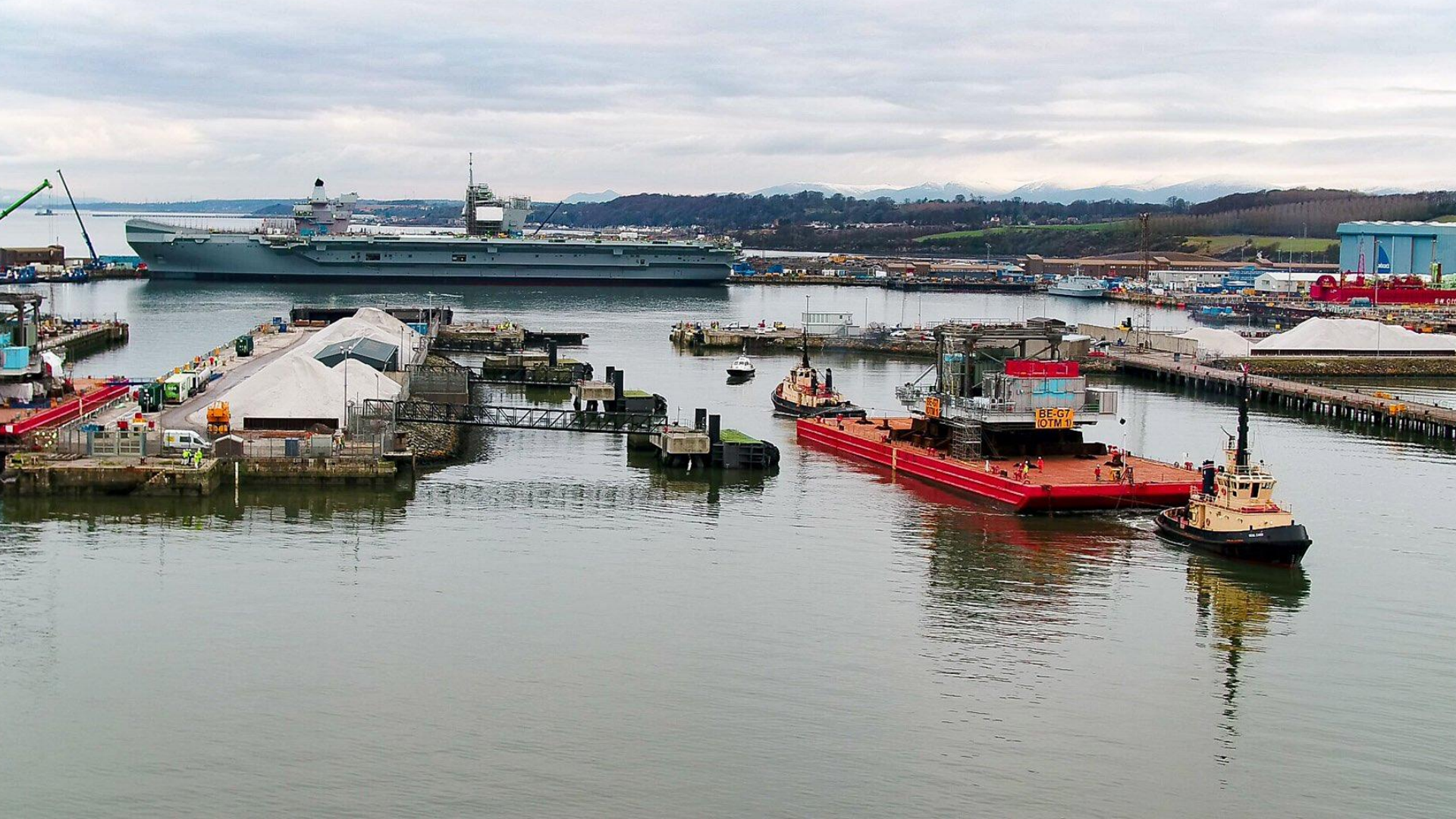
East Anglia1 714MW

- Scottish Power Renewables, First CfD project
- Execution from 2018 – Great Yarmouth

Walney Extension East 330MW

- Ørsted - Early CfD Project
- Order in execution Early 2018 from Belfast

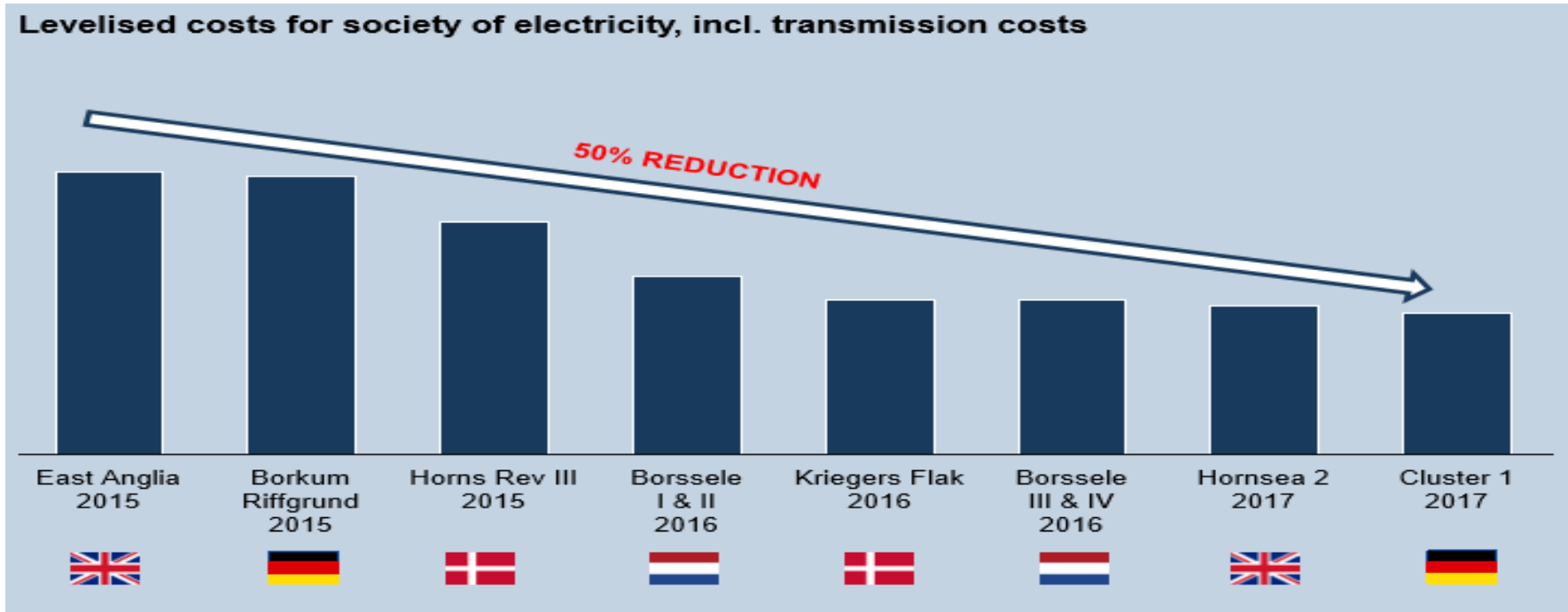




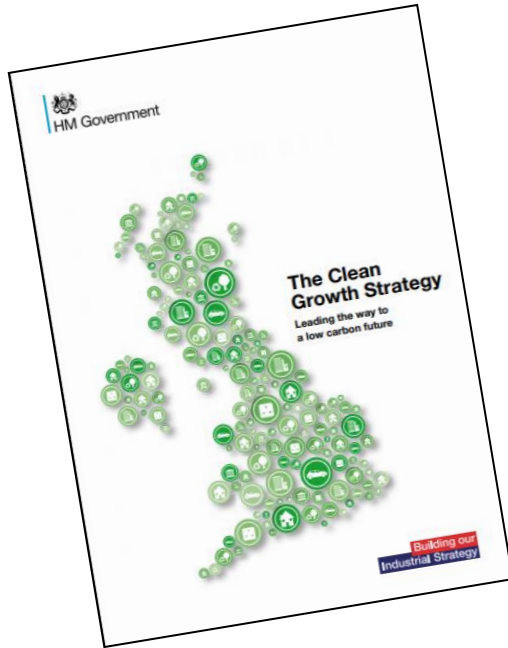




Development of prices over the last few years shows declining need for support schemes



Clean Growth Strategy



Following the great result for offshore wind with all 3 large offshore projects securing capacity in the second CfD auction round,

UK Government published 'Clean Growth Strategy' putting Offshore wind at the heart of future energy policy

Scottish Energy policy very clear on renewable support

Sector invited to propose a 'Sector Deal' as part of Industrial Strategy

And Offshore wind is clearly the cheapest utility scale form of generation.

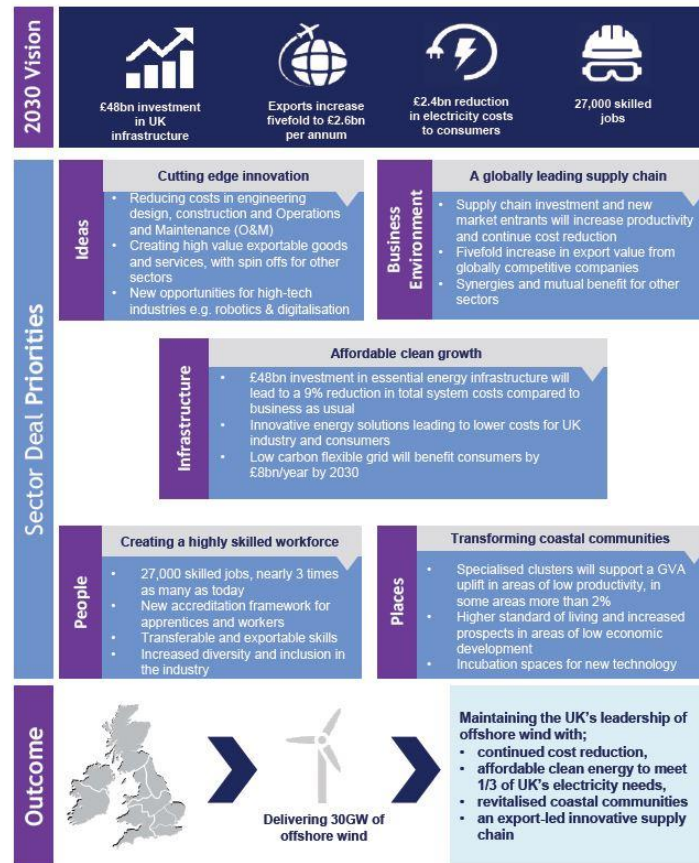
With Lowest cost, no reason why Government shouldn't choose to do more offshore in the future

Sector Deal for Offshore wind

Submitted to Government – negotiations to follow

Some Highlights;

- £48BN in infrastructure investment
- 27,000 Skilled jobs
- Up to 1/3 of UK electricity needs met by offshore wind
- 30GW of clean electricity by 2030



Summary



- We have a strong pipeline of current projects
- With the lowest cost of generation, Offshore wind is at the heart of energy policy, but like all forms of new generation capacity still need Government support.
- Costs will continue to fall
- The continued need to de-carbonise and the rise of electric vehicles and heat will drive increasing demand for renewable electricity in the future



Úna Brosnan

Business and Strategy Development
Manager, Energy, UK & Europe

Atkins





Delivering Affordable, Competitive & Inclusive Clean Energy

Úna Brosnan, Business & Strategic Development Manager, Offshore Wind

27th March 2018



SNC Lavalin - Atkins : Introduction

On July 3 2017, SNC-Lavalin and Atkins joined forces



- › A leading engineering and construction group in the world offering services in oil and gas, mining and metallurgy, infrastructure and power
- › Major player in the ownership of infrastructure
- › One of the world's most respected design, engineering and project management consultancies serving infrastructure, transportation and energy sectors

APPROXIMATELY
50,000
EMPLOYEES

SPEAKS
70
LANGUAGES

WORK FROM
OFFICES IN OVER
50
COUNTRIES

REPRESENTS
SOME
130
NATIONALITIES

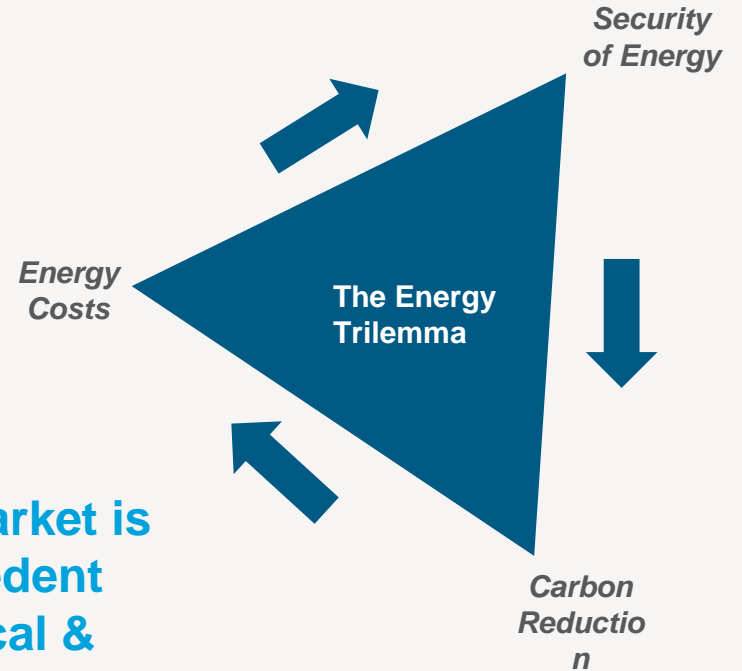


Global Renewable Energy Drivers

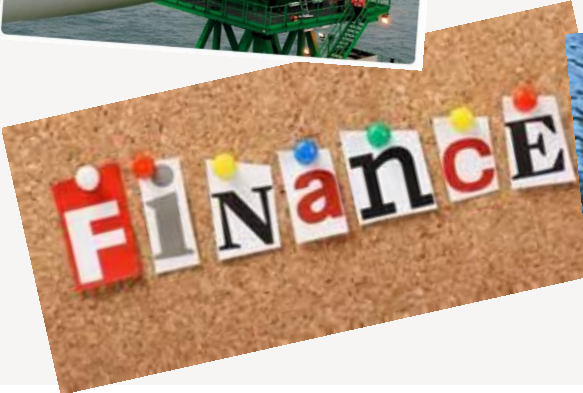
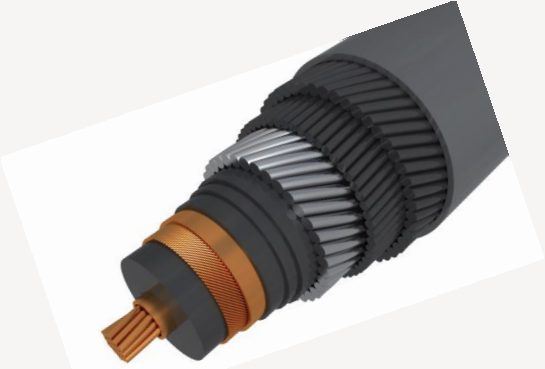


Resilience v
Cost

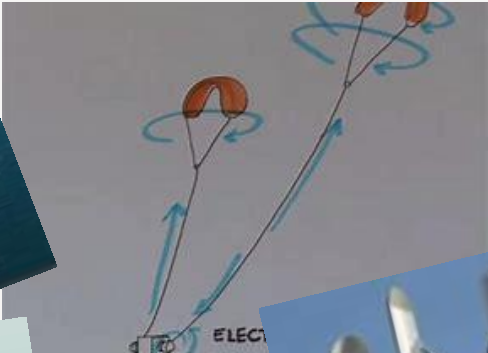
Our Global Energy Market is moving at an unprecedented pace from both political & technical & social perspective.



Offshore Wind – Success to date



The Disruptors of the Future



Floating Wind : The Route to Commercialisation

Build on achievements to date

Developing the Case study for Floating Wind

Policy & Government Support

Energy security & Supply – realising our future targets

Route to market & Clear Pipeline

Innovation & Cost Reduction

Investor Confidence;

Technology readiness level



Thank you

If you'd like to find out more visit:
www.atkinsglobal.com

© Atkins except where stated otherwise
Published by the Atkins Communications team, February 2018



Dr Keith MacLean OBE

Managing Director

Providence Policy



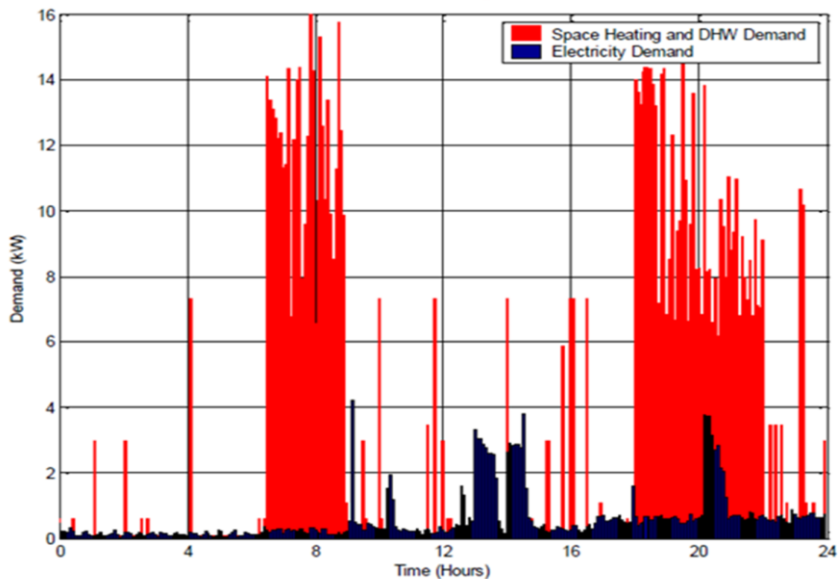
Heat decarbonisation

DR KEITH MACLEAN

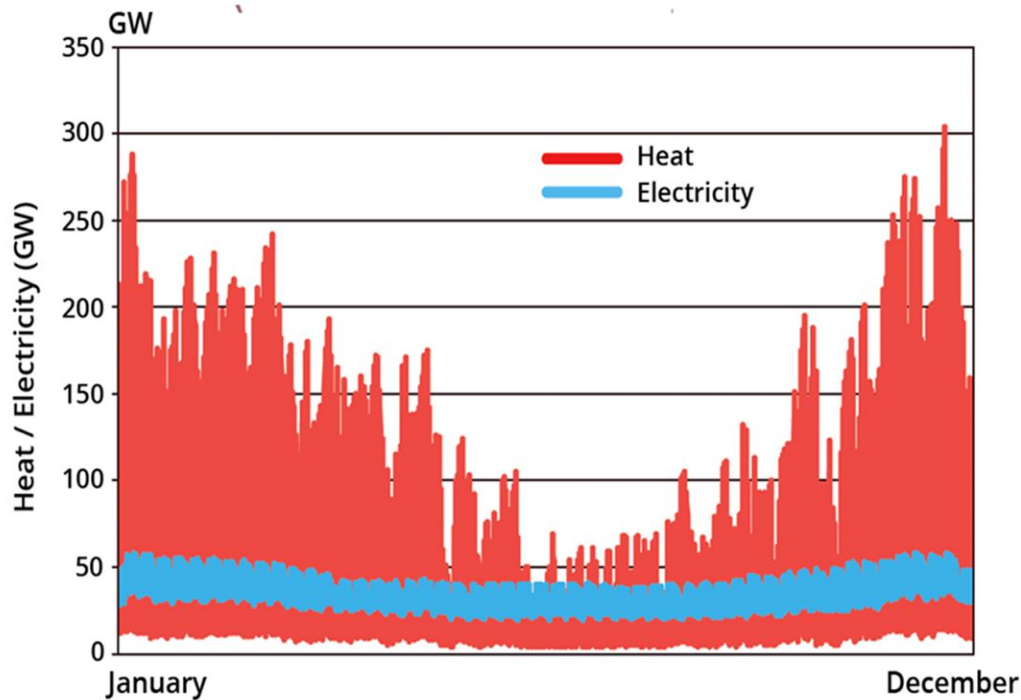
27TH MARCH 2018

How much, and when do we use heat?

Residential heat and power demand



Heat and Power Demand over 1 Day in a Typical UK Dwelling



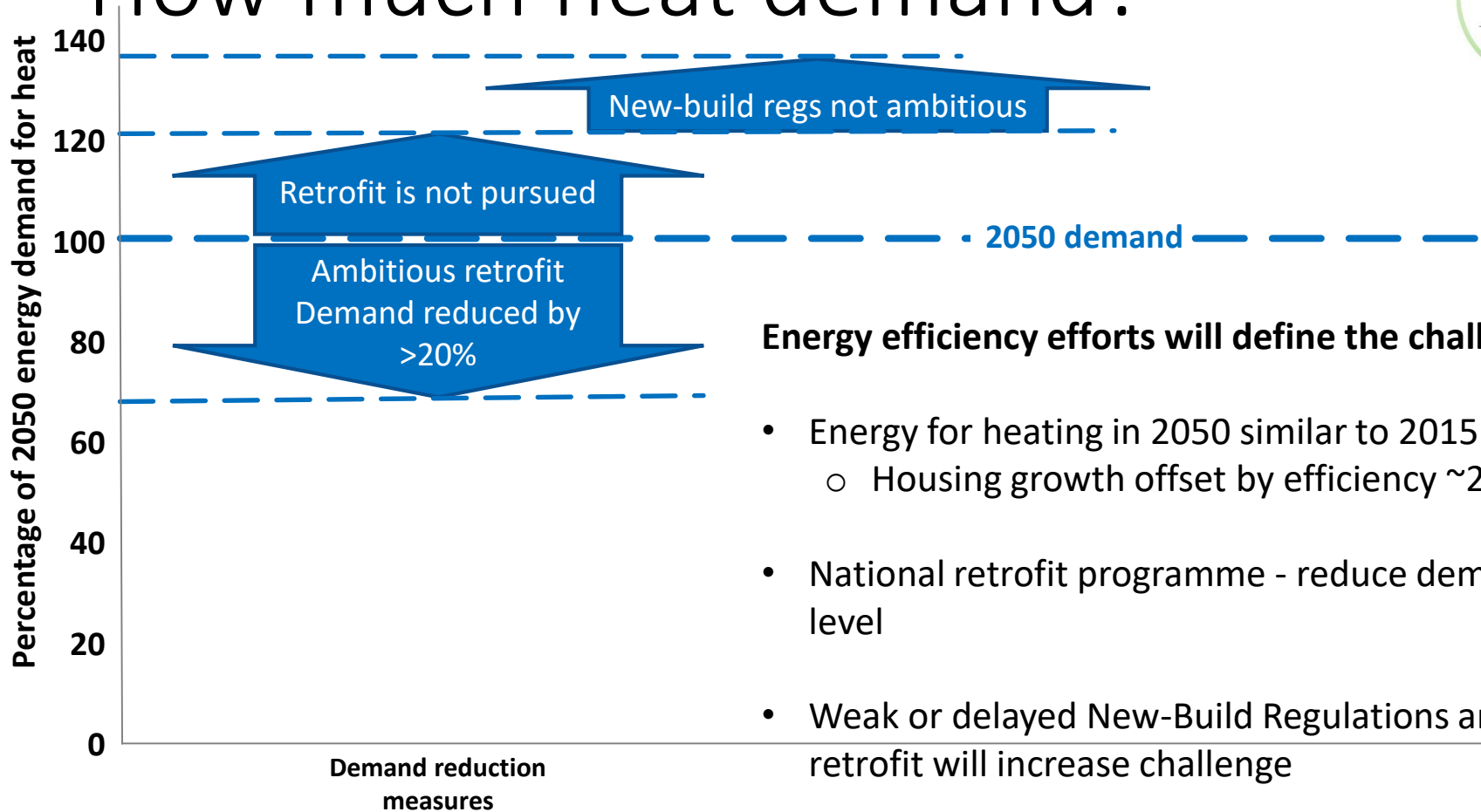
Decarbonising heat – the challenge

- ▶ Twice as much energy as electricity
- ▶ Six times the peak in winter (100 HPCs)
- ▶ Seasonal challenge for resilience/storage
- ▶ Lowest renewable heat in EU
- ▶ Worst housing
- ▶ People are 'happy' with gas
- ▶ Sector is poorly understood, resourced and governed

Carbon reduction solutions

- ▶ Lower consumption through
 - ▶ building and appliance efficiency improvements
 - ▶ operational efficiency, e.g. district heating
- ▶ Decarbonisation of heat generation
 - ▶ repurpose gas grids, e.g. with hydrogen
 - ▶ electrification (as grid carbon intensity reduces)
 - ▶ others? (bio-sources, solar thermal, geo-thermal)
- ▶ Major infrastructure investments

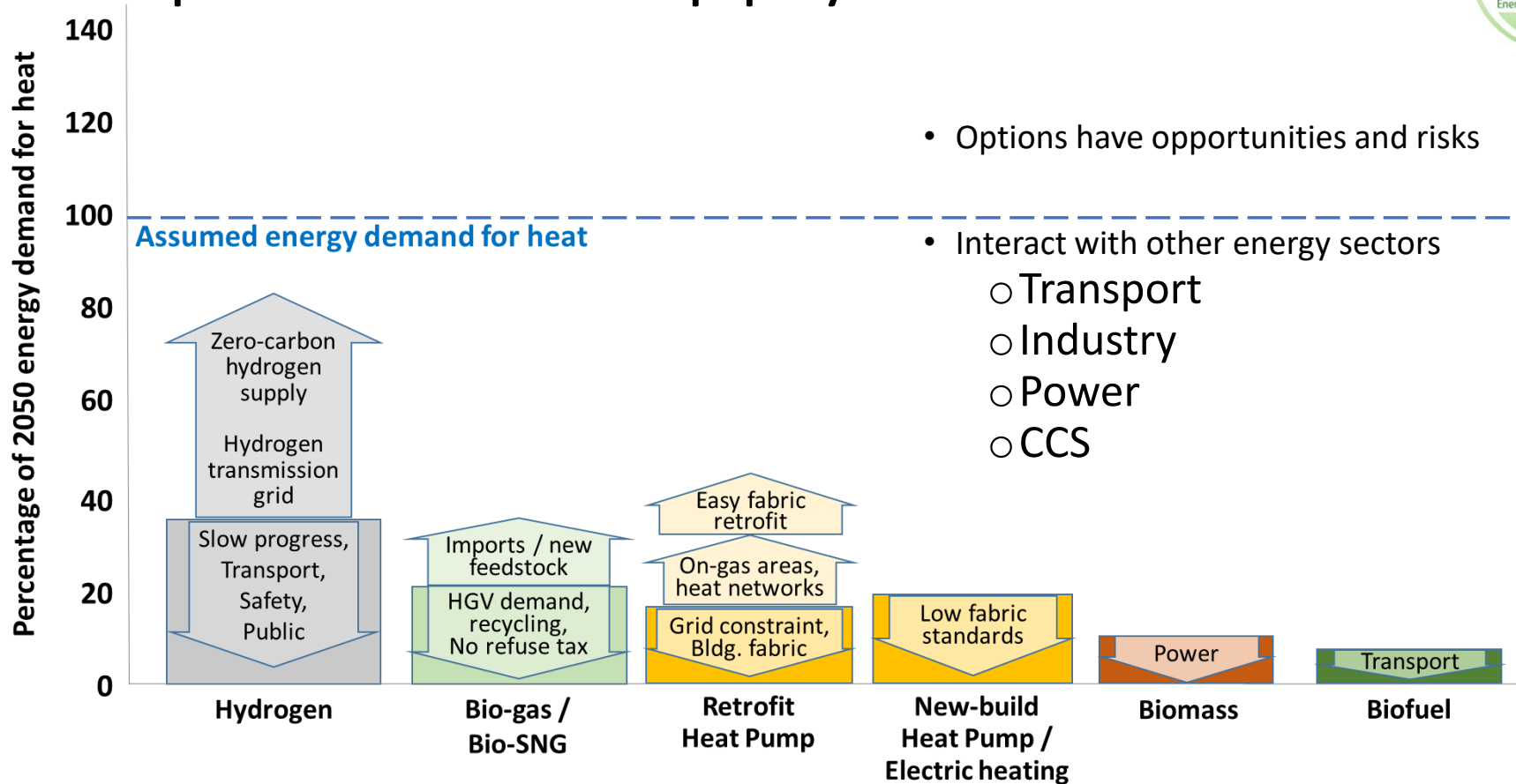
How much heat demand?



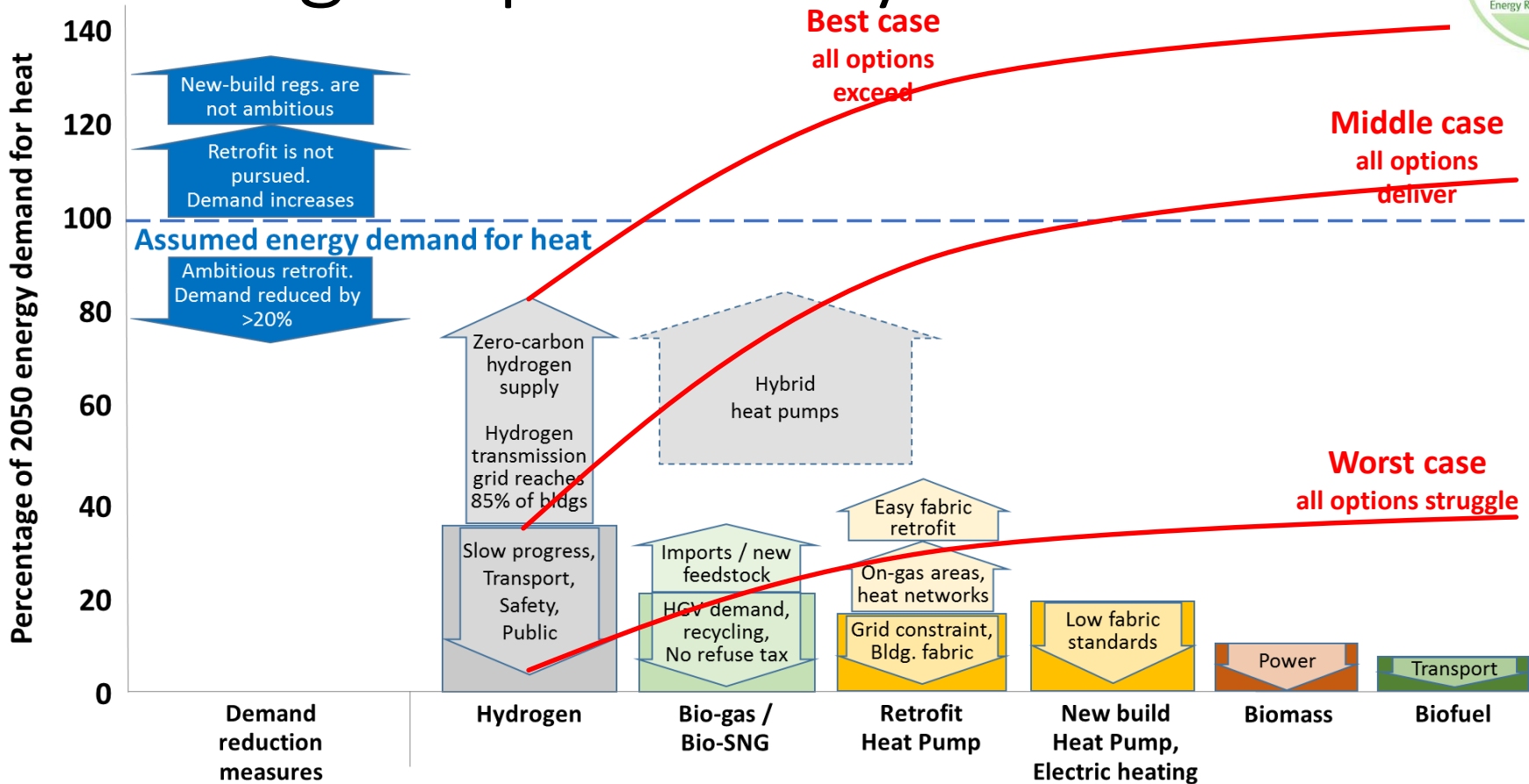
Energy efficiency efforts will define the challenge

- Energy for heating in 2050 similar to 2015
 - Housing growth offset by efficiency ~20%
- National retrofit programme - reduce demand level
- Weak or delayed New-Build Regulations and/or retrofit will increase challenge

Options for supply



A single option may not dominate



Imperial College Analysis

- ▶ Retrofit (UK-wide = 20,000 properties/week over 20-25 years)
- ▶ Cost impact and practicality of
 - ▶ Hydrogen in repurposed gas grid
 - ▶ Electricity
 - ▶ District heating
- ▶ For different housing types
 - ▶ Urban
 - ▶ Suburban
 - ▶ Rural
 - ▶ Flats

Imperial College Results

Urban and suburban properties	Repurposed gas grids (hydrogen)	Electrification (heat pump)	District heating
Cost/impact of decarbonised heat supply	Red	Green	Green
Cost/impact of network activities	Green	Yellow	Red
Cost/impact of activities in customer premises	Green	Red	Green

Network cost and impacts (urban)

	Network type			
	Gas grid		Electricity	District heating
	Natural gas	Hydrogen		Large heat pump
Evaluation criteria		SMR+CCS	Electrolysis	
Network investment cost (£k/home)		0.3	2	9
Homes converted per year (thousand)		1,000	400	100
Trench size (m)		N/A	1	3
Traffic and access disruption				

Household costs and impacts (urban)

Evaluation criteria	Network type				
	Natural gas	Gas grid		Electricity	District heating
		Hydrogen		Heat pumps	Large heat pump
		SMR+CCS	Electrolysis		
Criticality of energy efficiency					
Appliance costs per household (£k)		0 - 1		5 - 15	
Household disruption					
Customer acceptance					
Visual and noise impact					
Regulation issues					

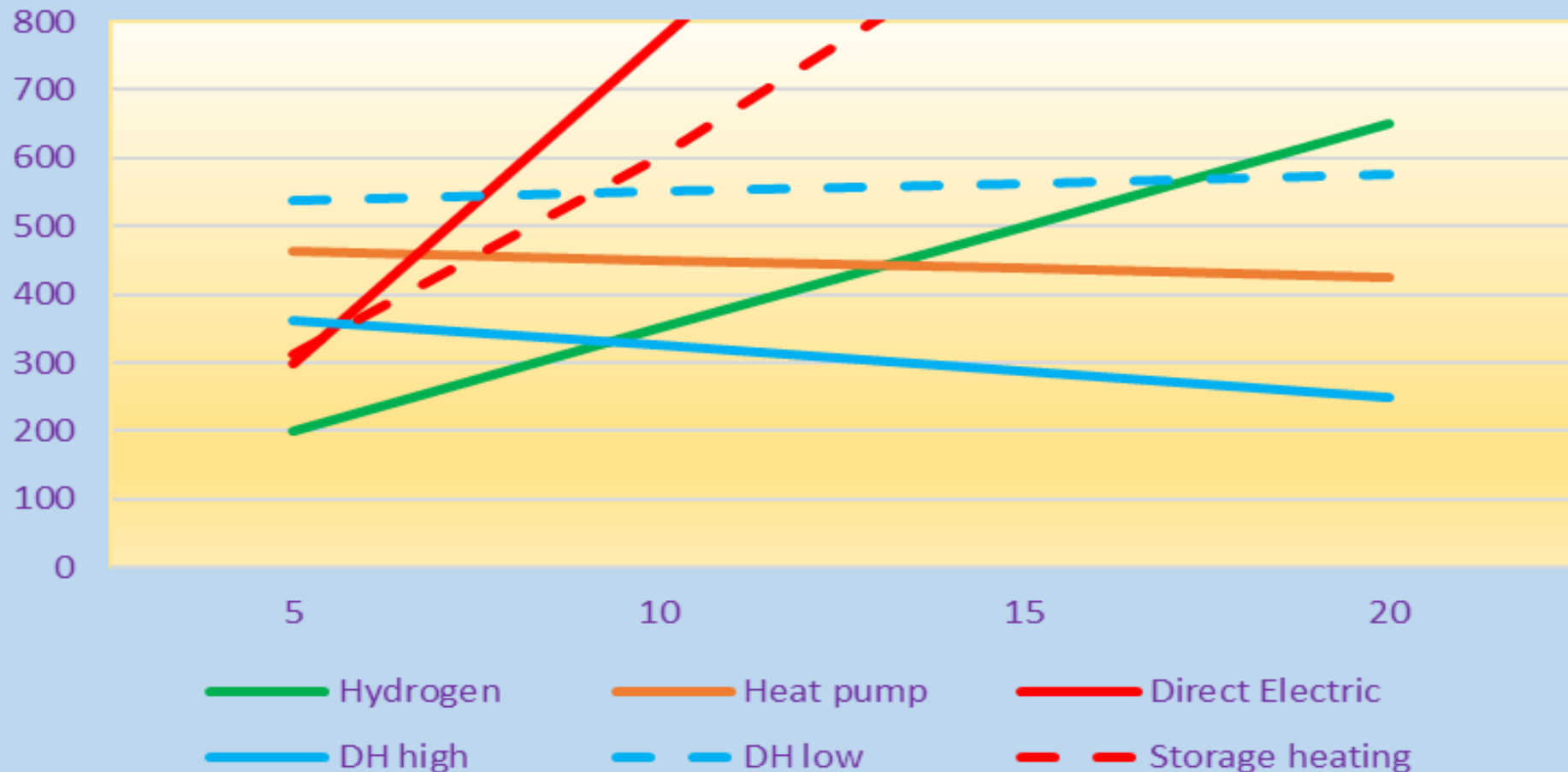
Imperial College Conclusions

- ▶ Each solution can have a role to play, but none is a silver bullet
- ▶ Needs long-term infrastructure investment programmes
- ▶ New governance arrangements should be introduced
 - ▶ strong city and local authority level involvement
- ▶ Choice and/or the rate of deployment depend on
 - ▶ the non-cost impacts, not just simple economics

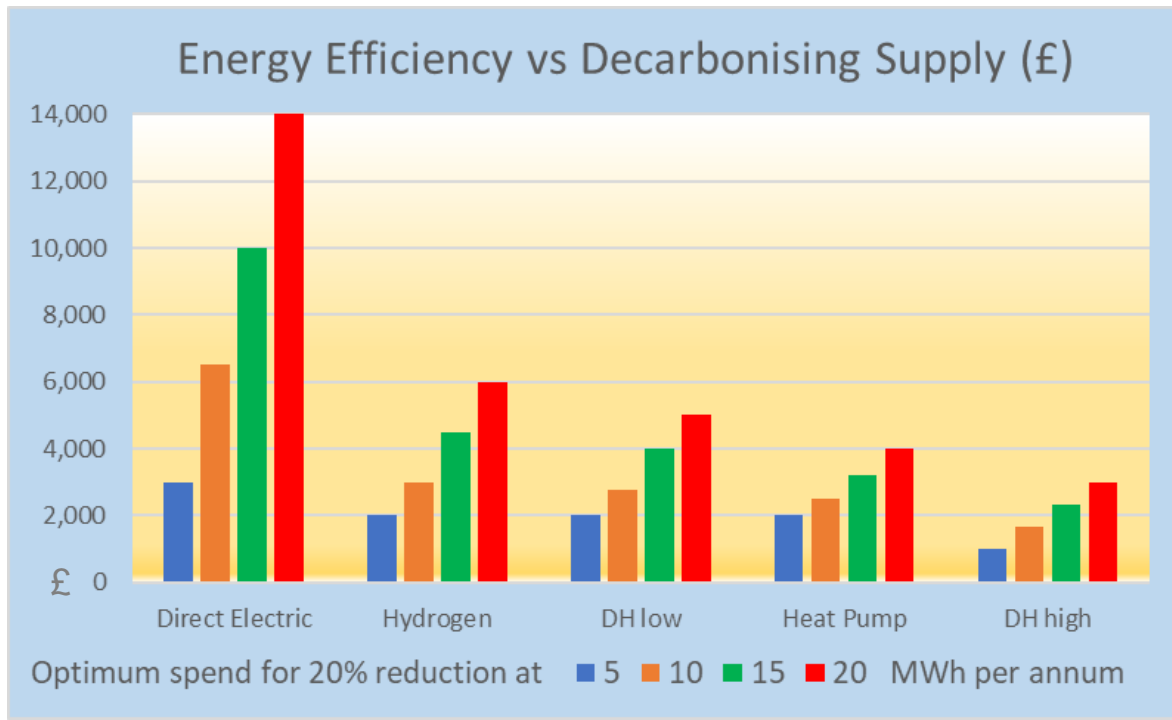
NEA – Social equity and fuel poverty impacts

- ▶ Additional total annual costs could rise by £200 to £800 per household (if costs recovered through bills rather than tax)
- ▶ £4,000 - £16,000 difference between first and last converted
- ▶ £0 to £15,000 in up-front capital required
- ▶ Annual running costs could reduce by £200 or increase by £600
- ▶ Cost increases could create additional 0.6 to 2.6 million fuel poor households across the UK
- ▶ Potential for significant (unintended) distributional impacts

Annual additional costs (£) versus consumption (MWh)



Optimum energy efficiency investment



NEA - Energy efficiency summary

- ▶ Level of investment for fuel poverty is driven by social policy
- ▶ Optimum level of investment for carbon emissions depends on cost structure of decarbonised heat and on consumption levels
- ▶ Residual hot water energy and capacity needs become increasingly important/dominant for low consumption households

Overall Conclusions

- ▶ Transition centres on new, enhanced or modified energy networks, and
 - ▶ Requires long-term infrastructure programmes
 - ▶ Will not happen unaided
 - ▶ Cannot be purely market driven
- ▶ Governance – need for coordinated and planned approach
 - ▶ Energy efficiency and decarbonised heat
 - ▶ National and local actions
- ▶ Important to consider disruption as well as cost
- ▶ Need to deal with distributional impacts

Background Reports

▶ ERP

http://erpuk.org/wp-content/uploads/2017/10/ERP_heat_transition-Oct-2017.pdf

▶ Imperial College

<http://www.imperial.ac.uk/media/imperial-college/research-centres-and-groups/icept/Heat-infrastructure-paper.pdf>

▶ NEA

<http://www.nea.org.uk/wp-content/uploads/2017/09/Heat-Decarbonisation-Report-2017.pdf>

keith.maclean
@provpol.com

FOR ANY QUESTIONS

Jenny Hogan

Deputy Chief Executive
Scottish Renewables

Ray Thompson

Head of Business Development
Siemens Gamesa

Úna Brosnan

Business and Strategy Development Manager, Energy, UK & Europe
Atkins

Dr Keith MacLean OBE

Managing Director
Providence Policy

Dawn Muspratt

Founding Chief Executive
Our Power

Rob Forrest

Chief Executive
GreenPower



ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





THE UK POLICY LANDSCAPE



Vicky Dawe

**Deputy Director, Renewable Electricity
Support Schemes**

**Department for Business, Energy and
Industrial Strategy (BEIS)**



The UK Policy Landscape

Vicky Dawe

Deputy Director, Renewable Electricity Support Schemes
Department for Business, Energy & Industrial Strategy


Department for
Business, Energy
& Industrial Strategy

Scottish Renewables Annual Conference 2018
Edinburgh, 27th March 2018


Department for
Business, Energy
& Industrial Strategy

The Government Context

Industrial Strategy



Clean Growth Strategy



Industrial Strategy – November 2017

We will create an economy that boosts **productivity** and **earning power** throughout the UK



AI & Data Economy

We will put the UK at the forefront of the artificial intelligence and data revolution



Future of Mobility

We will become a world leader in the way people, goods and services move



Clean Growth

We will maximise the advantages for UK industry from the global shift to clean growth



Ageing Society

We will harness the power of innovation to help meet the needs of an ageing society



Clean Growth Strategy – October 2017



Business and industry efficiency

Package of measures to improve business energy efficiency by at least 20% by 2030 – cutting costs and improving productivity.



Low carbon transport

End the sale of new conventional petrol and diesel cars and vans by 2040.

£1 billion to support the take-up of ultra low emission vehicles.



Enhancing our natural resources

Future system of agricultural support to focus on delivering better environmental outcomes, including addressing climate change more directly.



Improving our homes

Households to benefit from lower bills and warmer homes with aspiration for as many homes as possible to be EPC Band C by 2035.



Clean, smart, flexible power

Investing in renewables such as offshore wind, with up to half a billion pounds for further auctions.

Phasing out use of unabated coal to produce electricity by 2025.



Leading in the public sector

Introduce a voluntary public sector target of 30% reduction in carbon emissions by 2021.



The Clean Growth Strategy:

Overarching aims, and specific commitments

Building on successful decarbonisation of the power sector

Includes ambitious proposals to decarbonise the whole economy, including housing, business, transport, the natural environment and green finance. An emphasis on growth across the country.

Focus on actions to deliver multiple benefits

Cleaner air from low emissions vehicles; lower energy bills from improved energy efficiency; reducing waste and using resources efficiently.

Innovation Investment

Invest around £900 million of public funds in innovation, including ~ £265 million in smart systems, ~ £460 million in nuclear, and ~ £177 million to further reduce the cost of renewables, including innovation in offshore wind turbine blade technology and foundations

Continued support for decarbonisation of power sector

Up to a further £557 million for renewable technologies through the future Contracts for Difference.
At least 10 gigawatts of new capacity, provided costs continue to fall, with potential for additional deployment in the 2020s

Clean Growth Grand Challenge

We will maximise the advantages for UK industry from the global shift to clean growth – through leading the world in the development, manufacture and use of low carbon technologies, systems and services that cost less than high carbon alternatives

We will take action to establish & extend UK leadership in priority areas:

- develop **smart systems** for cheap and clean energy across power, heating and transport
- transform **construction** techniques to dramatically improve efficiency
- make our **energy-intensive industries** competitive in the clean economy
- put the UK at the forefront of the global move to high-efficiency **agriculture**
- make the UK the global standard-setter for **finance** that supports clean growth
- develop UK leadership in low carbon **transport** across road, rail, aviation and maritime

We will

- increase our support for innovation so that the costs of clean technologies, systems and services are reduced across all sectors,
- align our policies, regulations, taxes and investments to grow the markets for these new innovations so that they are successfully commercialised in the UK.

Our long-term goals are to make clean technologies cost less than high carbon alternatives, and for UK businesses to take the lead in supplying them to global markets.



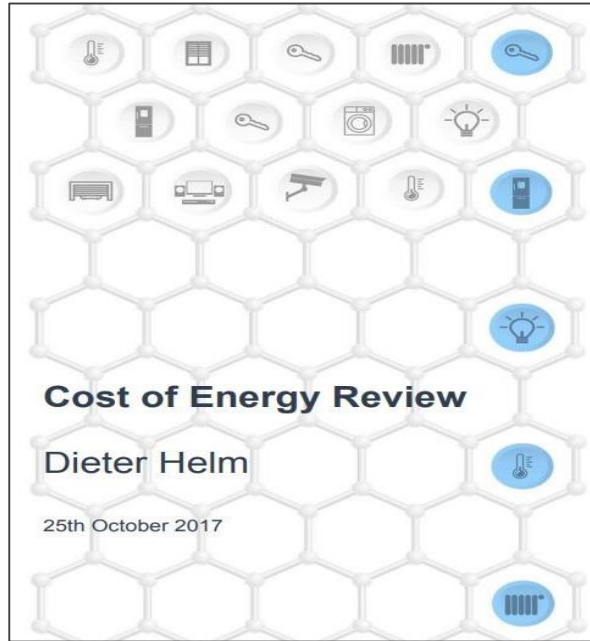
Offshore wind



Onshore wind



The wider renewables context: Dieter Helm's Cost of Energy Review



The wider renewables context: Control for Low Carbon Levies

Levy Control Framework

Has helped control the costs to the consumer of low carbon subsidies in recent years.

However, current framework is no longer the right vehicle to do this.

Control for low carbon levies

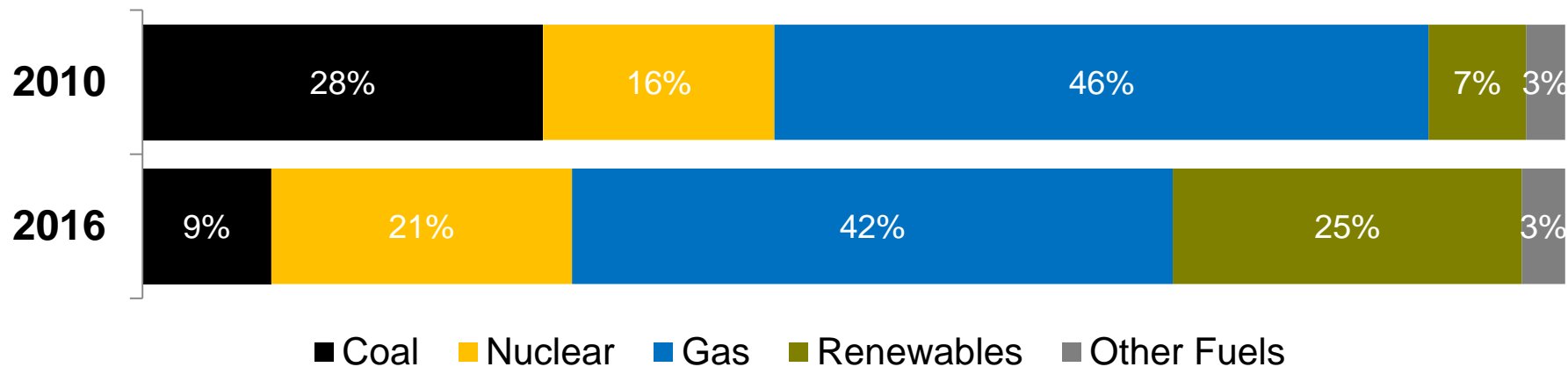
New framework recently announced by Government

Covers all existing and new low carbon levies and will monitor the total cost of these schemes

To protect consumers, no new low carbon levies until costs are falling

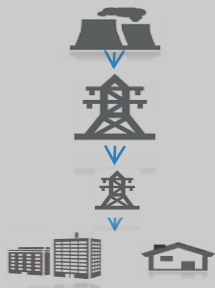
The wider renewables context: Changing energy mix

Government policy has led to significant change in electricity mix over the last 5 years



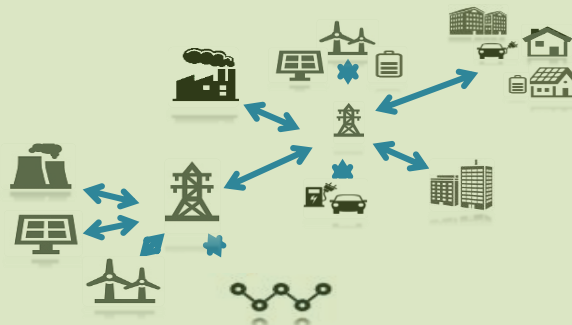
The wider renewables context: Decentralised energy & small scale renewables

Yesterday



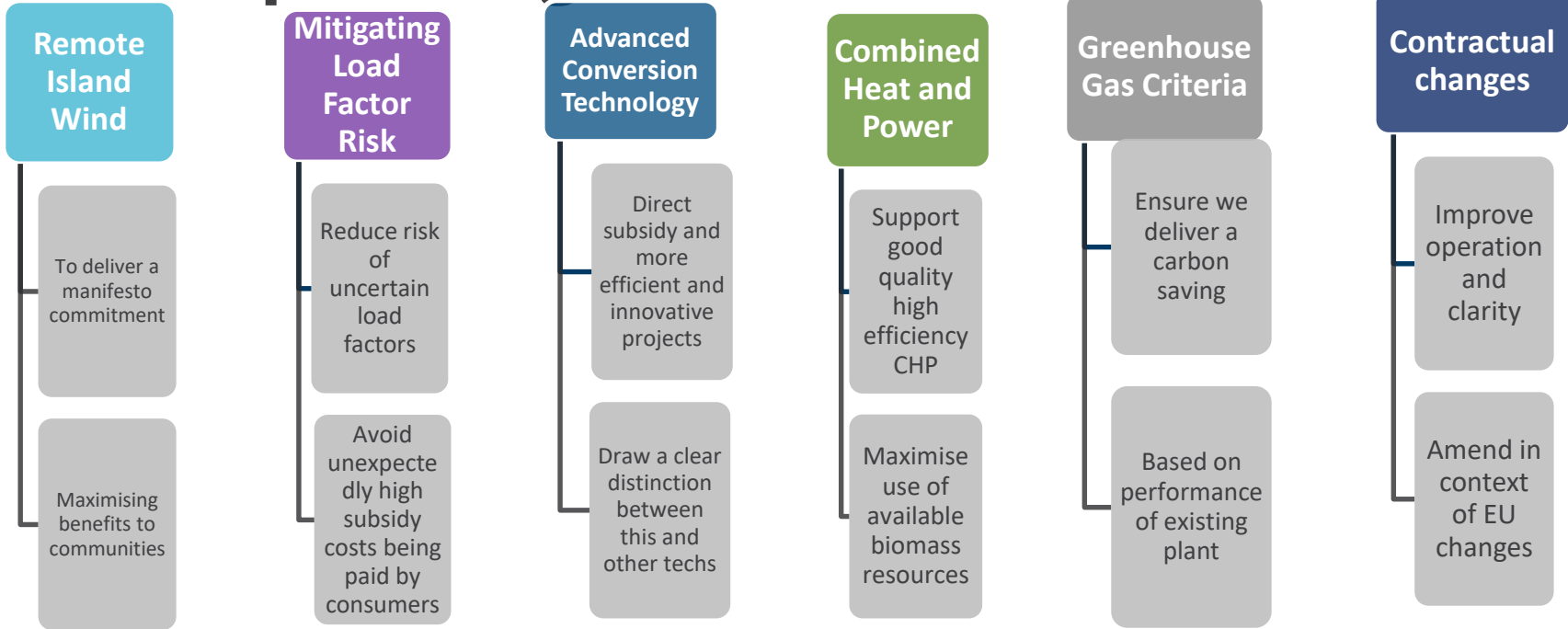
- Carbon intensive
- Centralised generation
- Predictable supplies

Emerging System – increased interactions



- Low carbon
- Interconnectors
- More distributed
- Storage
- Demand-side response
- Electric vehicles/heat
- Smart grids
- A smart system

The wider renewables context: Next steps being considered for the CfD



The UK Policy Landscape

Vicky Dawe

Deputy Director, Renewable Electricity Support Schemes
Department for Business, Energy & Industrial Strategy


Department for
Business, Energy
& Industrial Strategy

Scottish Renewables Annual Conference 2018
Edinburgh, 27th March 2018


Department for
Business, Energy
& Industrial Strategy



Andrew Jamieson
CEO



Offshore Renewable Energy Catapult



Rachel Anderson

Head of External Affairs – UK & Ireland

RES





Andrew Lyle

Director

Locogen





Hannah Smith
Senior Policy Manager
Scottish Renewables

Vicky Dawe
Deputy Director, Renewable Electricity Support Schemes
Department for Business, Energy and Industrial Strategy (BEIS)

Andrew Jamieson
CEO
Offshore Renewable Energy Catapult

Rachel Anderson
Head of External Affairs – UK & Ireland
RES

Andrew Lyle
Director
Locogen





ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





Robert Lewellyn

Actor and Presenter of 'Fully Charged'





Claire Mack
Chief Executive
Scottish Renewables



Robert Llewellyn
Actor and Presenter of 'Fully Charged'



ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





THE SCOTTISH POLICY LANDSCAPE



Paul Wheelhouse MSP

Minister for Business, Innovation and
Energy

Scottish Government





Paul Cooley

**Director of Generation Development
SSE**



Fabrice Leveque
Senior Policy Manager
Scottish Renewables

PAUL WHEELHOUSE MSP
MINISTER FOR BUSINESS, INNOVATION AND ENERGY
SCOTTISH GOVERNMENT

Paul Cooley
Director of Generation Development
SSE

Nicola Mahmood
Project Manager Energy, Innovation and Sustainability, Places and Communities
Engie UK & Ireland

Kenny Hunter
Director
Hunter Hydro Services





Rob Forrest
Chairman
Scottish Renewables



ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





Claire Mack
Chief Executive
Scottish Renewables



Matthieu Hue
Chief Executive Officer
EDF Energy Renewables

**Scottish Renewables
Annual Conference
2018**

Matthieu Hue
CEO



Dorenell wind farm - Moray



Onshore wind is good for the UK

- The UK has yet to secure two-thirds of the low-carbon electricity generation it needs to replace ageing power stations
- Abundant wind and falling prices means onshore wind will save consumers money
- Onshore wind provides economic benefits to the UK including opportunities and jobs in communities up and down the country
- Contracts for Difference (CfD) are the best way to deliver investment in onshore wind and onshore should be included in any future CfD auctions



Burnhead wind farm 26 MW, near Falkirk



The Burnhead wind farm is 26 MW and is in the Falkirk area. It provides low carbon electricity for 142,000 homes.

Every year the community around the wind farm receive £130k from the benefit fund. The money goes to the people of Blackridge, Avon & Standburn and Limerigg & Slamannan.

For the first time, an education and training fund of £26k has been set up as part of this which allows the community to pursue academic and professional qualifications.

Already we have two engineering apprentices who are studying at Forth Valley College (FVC) as a result of this.

**£3.5
MILLION**

**SPENT IN THE LOCAL
ECONOMY DURING
CONSTRUCTION**

Lewis Wind Power

Our new office in Stornoway opened in January 2018 with Council Leader Roddie Mackay, Community Liaison Kerry MacPhee, Stornoway Trust Factor Ian MacIver and LWP Director Mark Vyvyan Robinson all there.





Rt. Hon. Nicola Sturgeon MSP
First Minister of Scotland



Claire Mack
Chief Executive
Scottish Renewables

Matthieu Hue
Chief Executive Officer
EDF Energy Renewables



Rt. Hon. Nicola Sturgeon MSP
First Minister of Scotland



ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





Telling Our Story



Eamonn Ives

Researcher

Bright Blue





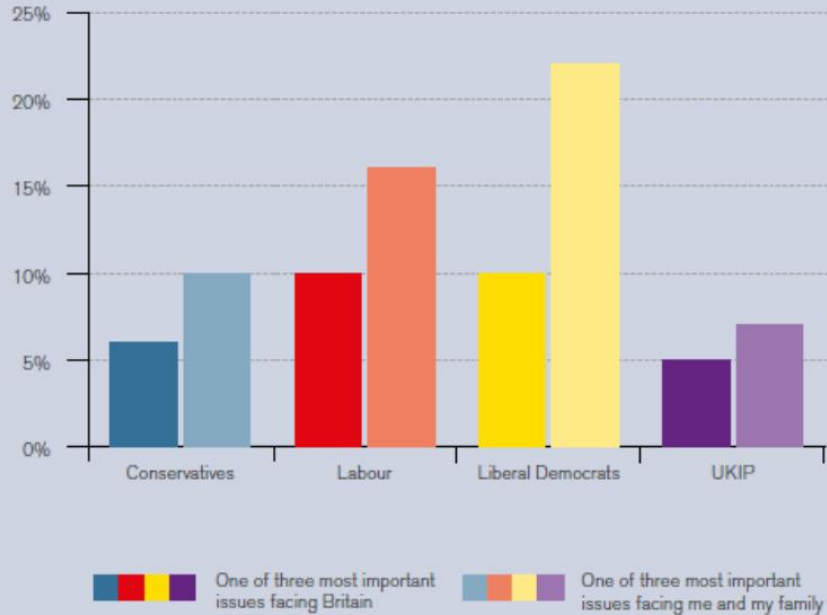
Green conservatives?

Understanding what conservatives think about the environment

Eamonn Ives

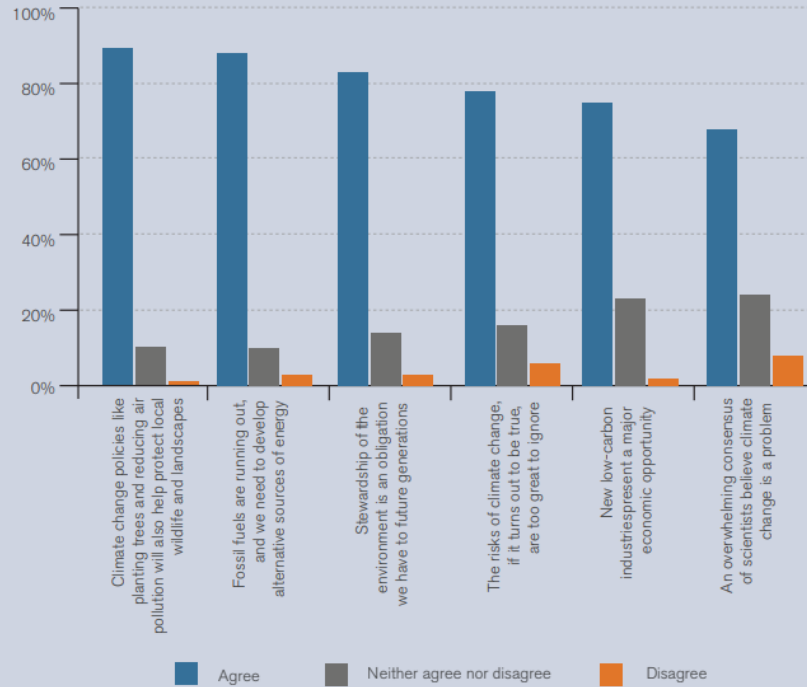
@eamonnives | @wearebrightblue

Chart 3.1. Proportion of voters that put protecting the environment among the top three political issues, by political party



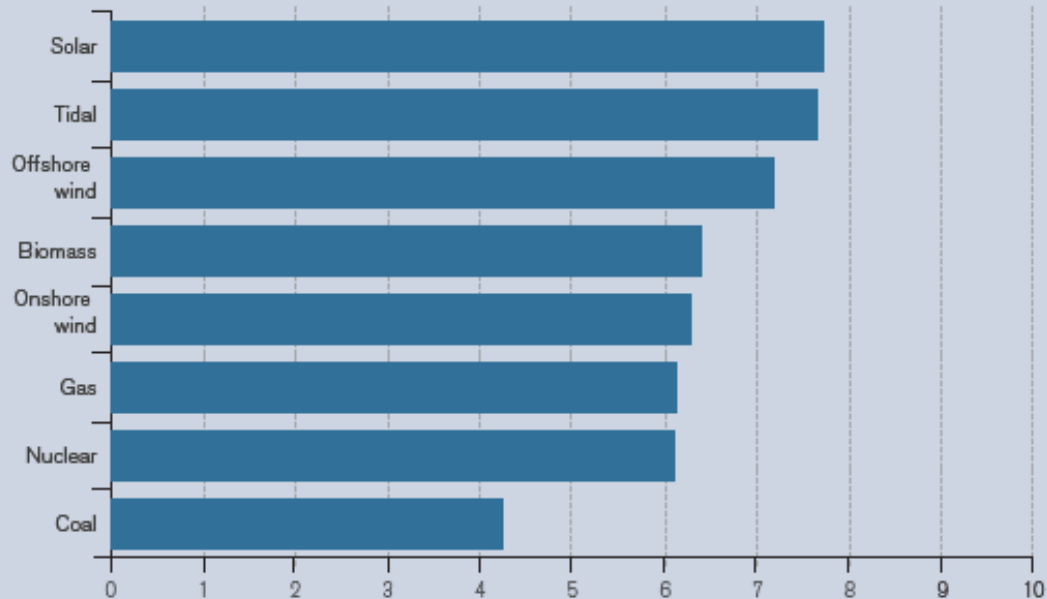
Base: 2,022 Conservative voters, 293 Labour voters, 54 Liberal Democrat voters, 168 UKIP voters

Chart 3.5. Proportion of Conservatives who support different arguments for tackling climate change



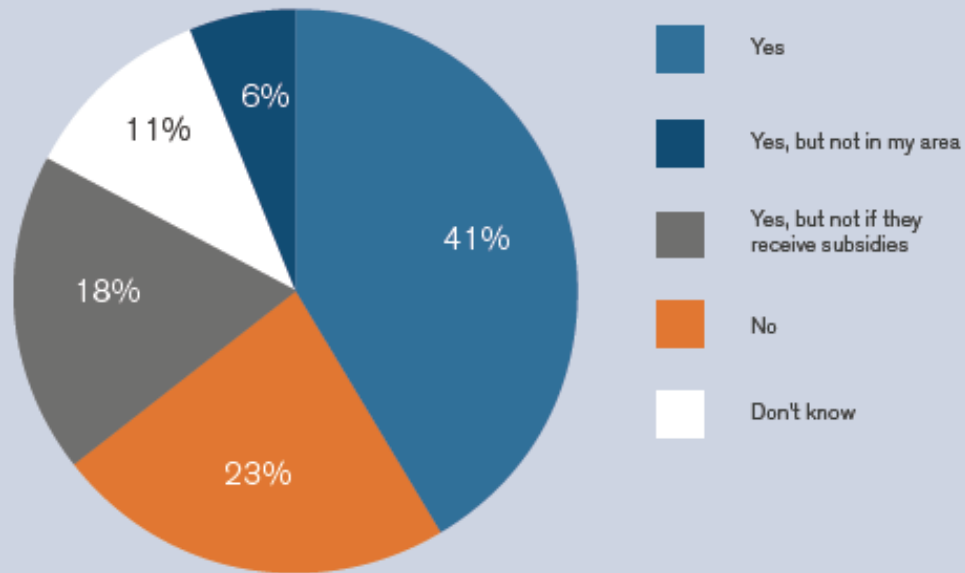
Base: 2,022 Conservative voters

Chart 5.1. Conservatives' views on different energy sources from 0 (most unfavourable) to 10 (most favourable)



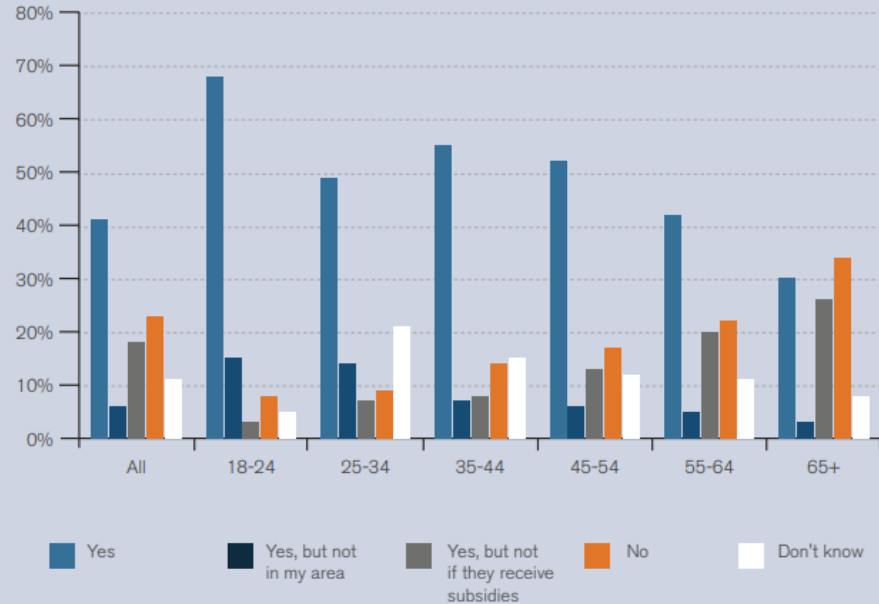
Base: 2,022 Conservative voters

Chart 5.3. Conservative support for further development of onshore wind farms



Base: 2,022 Conservative voters

Chart 5.4. Conservative support for further development of onshore wind farms, by age



Base: 2,022 Conservative voters

GREEN & RESPONSIBLE CONSERVATISM

Embedding sustainability and long-termism within the UK economy

BEN CALDECOTT

bright blue

KEEPING THE LIGHTS ON

Security of supply after coal

BEN CALDECOTT

bright blue

BETTER HOMES

INCENTIVISING HOME ENERGY IMPROVEMENTS

Sam Hall and Ben Caldecott

bright blue

bright blue

Green conservatives?

UNDERSTANDING WHAT CONSERVATIVES THINK ABOUT THE ENVIRONMENT

SAM HALL

A GREENER, MORE PLEASANT LAND

A new market-based commissioning scheme for rural payments

Ben Caldecott, Sam Hall, and Eamonn Níves

bright blue



Peter Duncan

Director of Message Matters and
Chairman of the Association of
Professional Political Consultants
Scotland





Telling your story

A Message Matters Presentation
for Scottish Renewables



The national policy environment



Opportunity from change





Opportunity: Changing policy



Daily Mail
WEDNESDAY 5, 2017 www.dailymail.co.uk NEWSPAPER OF THE YEAR 65p

Is 'ribcage bragging' the most worrying celebrity trend yet?
SEE PAGES 24-25



Theresa pledges cap on tariff paid by 70% of families

£100 OFF YOUR ENERGY BILL



**“Get your story straight,
time it perfectly, and
tell it relentlessly.”**



Talk the right language

- *Appeal to a new generation*
 - *Innovate on funding solutions*
 - *Own the balanced energy mix*
 - *Sell the economic potential*
 - *Talk global*
-



Appreciate inter-relationships





**Key message:
Get ahead of
this curve**



Nick Sharpe
Director of Communications
Scottish Renewables

Eamonn Ives
Researcher
Bright Blue



Peter Duncan
Director of Message Matters and Chairman of the
Association of Professional Political Consultants
Scotland





ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





Decarbonising Industry: The Global Challenge



Ole Høy Jakobsen

Corporate Actions Engagement
Manager

The Climate Group



RE100 and EP100
– How companies
are leading the
clean energy
transition

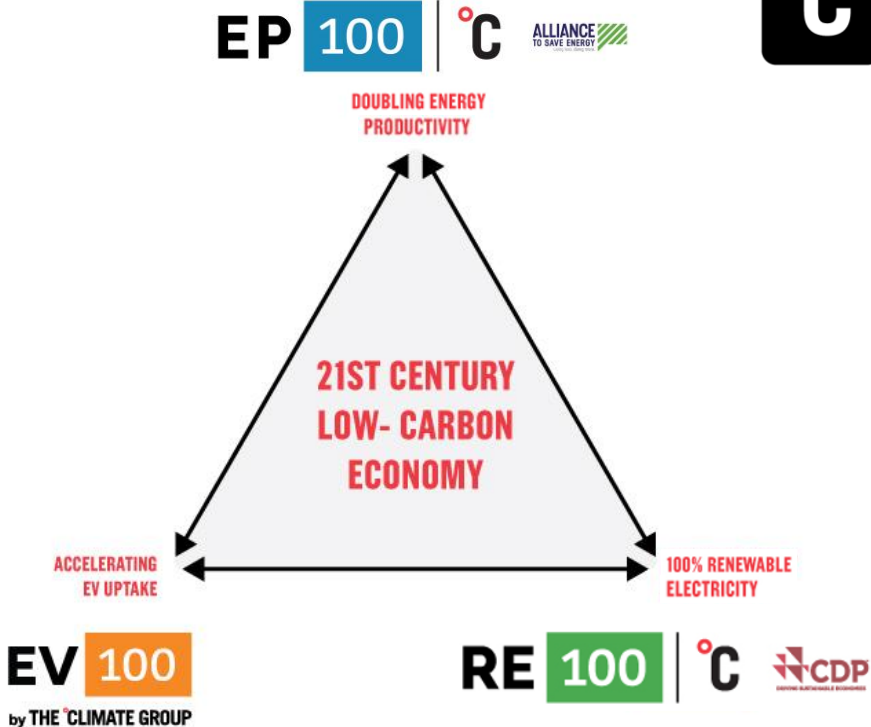




The Climate Group's activities



Subnational Global Climate Leadership Memorandum of Understanding



EP100: The case

To stay below 2°C of warming, energy productivity is critical and will be **the largest contributor (49%)** to GHG emissions reductions by 2030. ([IEA, 2015](#))

Energy productivity is critical component of climate strategy, with **2.5% - 3% annual improvement** in EP needed globally to enable continued economic growth and limit warming to 2 °C . ([ETC, 2017](#))

Corporates are hugely important:
Industry and commercial buildings account for around half of final energy consumption, ([IEA, 2017](#)). By doubling their energy productivity, companies can do what it takes to meet global climate goals.



Dalmia Cement was the first cement company in India to join EP100 and also RE100

Baseline

Metric – Revenue (INR)/J of energy use

2010-11

Saved \$46.6 million and avoided approximately **311,000 metric tons of GHG emissions** in costs due to EE improvements since 2010.

Membership with EP100

Joined EP100 in Sep'16 during Climate Week NYC

2016-17

Global Outreach

Speaker at **Business and Climate Summit 2016** in London, UK and at COPs in Marrakech and Bonn

Target year for doubling EP

2030



Swiss Re

EQUINIX

HSBC

Kingspan

AstraZeneca

rackspace
the #1 managed cloud company

TD

salesforce

Bankia

AVIVA

AUTODESK

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.

RELX Group

ASKUL

helvetia

VOYA
FINANCIAL

JPMORGAN CHASE & Co.

GM

LA POSTE

Carlsberg
Group

T

Goldman Sachs

M&S
EST. 1884

Integrated Essence Design
TCI Co., Ltd.

workday

PHILIPS

Walmart

Bloomberg

TESCO

CLIF

ORGANIC VALLEY

British Land

Infosys

sky

proximus

Nordea

Walmart

Unilever

YOOX
NET-A-PORTER
GROUP

P&G

Google

YOUR LONDON AIRPORT
Gatwick

IKEA

hp

AkzoNobel

DBS

facebook



SWISS POST

BMW GROUP

Danske Bank

Steelcase

RICOH

SEKISUI HOUSE

CANARY WHARF
GROUP PLC

citi



Interface

UBS

VAIL RESORTS
EXPERIENCE OF A LIFETIME

ELION
亿利资源

Microsoft

RE 100

CANARY WHARF
GROUP PLC

citi

SAP

GROUPE
L'OCCITANE

Vestas



ELION
亿利资源

LEGO



PHILIPS Lighting

Kellogg's

MARS

WELLS FARGO

ABInBev

vf

IHS Markit

H&M

HEALTH · HYGIENE · HOME

rb



Morgan Stanley

DANONE
ONE PLANET. ONE HEALTH

Nestlé

IFF

ESTÉE LAUDER
COMPANIES

ebay

HAP

Bank of America

PEARSON

Telefonica

COLRUYT
GROUP

Biogen

Schroders

BT

AXA



ebay

SAE
GRUPPO SAE

vmware

Landsec



COMMERZBANK

Dalmia
Bharat Cement

CaixaBank

Adobe

BURBERRY
London, England

Corbion

BROAD GROUP
远大集团

dentsu AEGIS
network



DIAGEO

DNB

Johnson & Johnson
FAMILY OF COMPANIES

CRÉDIT AGRICOLE



Givaudan

SGS

ING

Heathrow

amalgamated
bank

VAISALA

JUPITER
Asset Management

Hewlett Packard
Enterprise

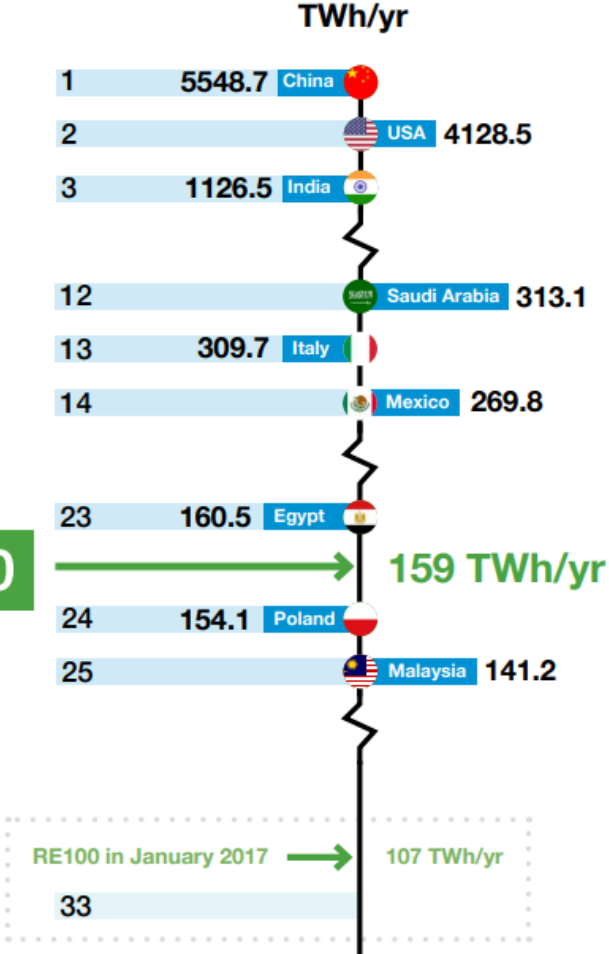
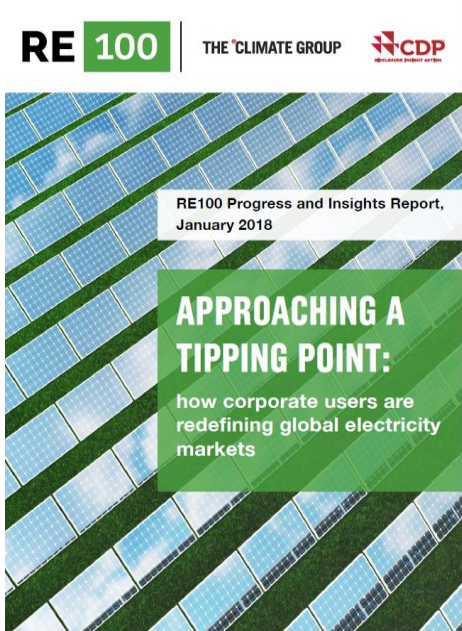
J. SAFRA SARASIN
Sustainable Swiss Private Banking since 1841

alstria
First German REIT

TATA MOTORS

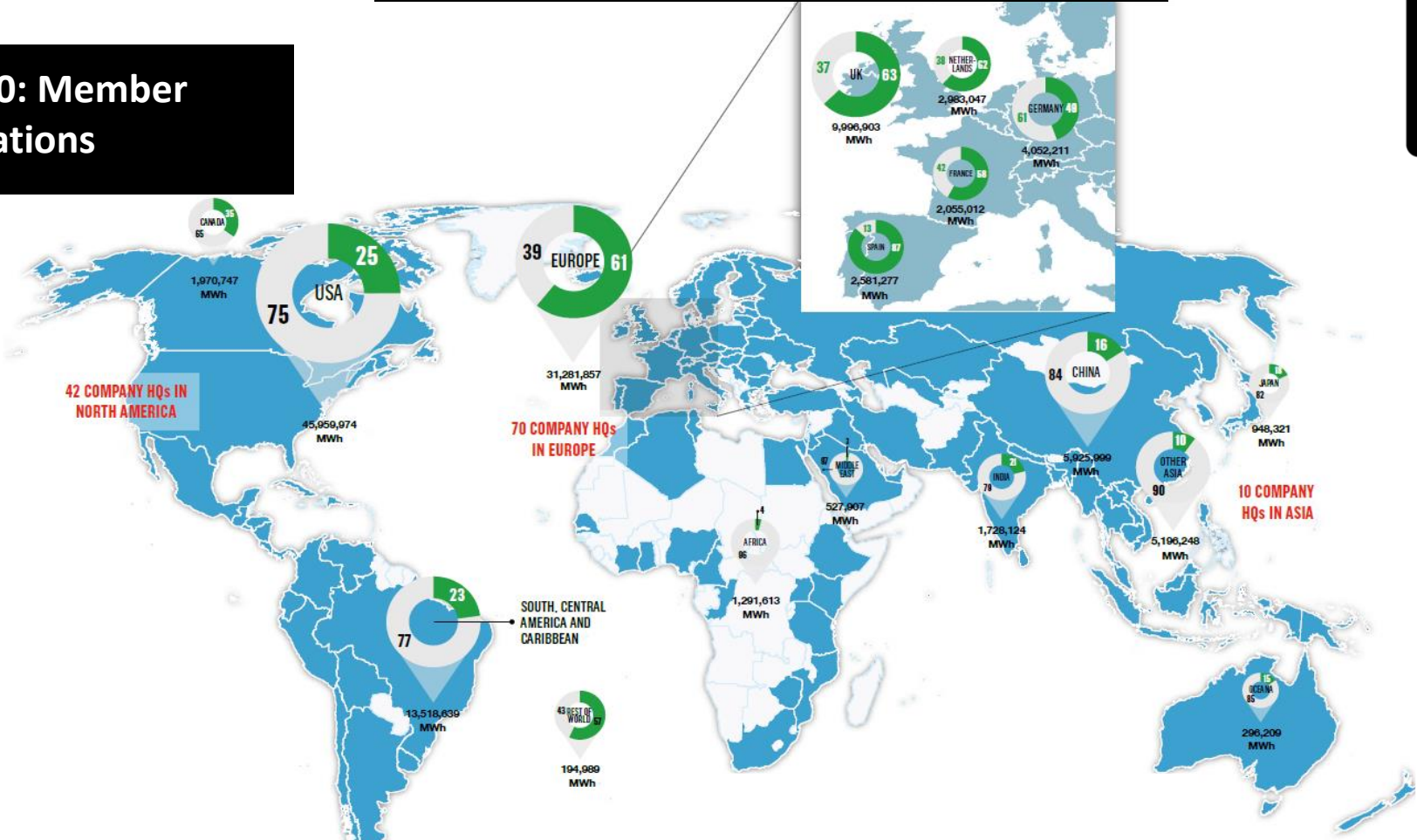


RE100: Progress



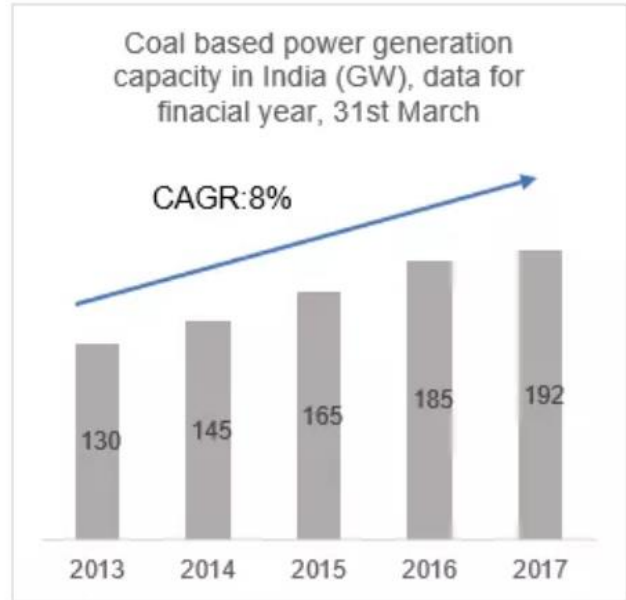
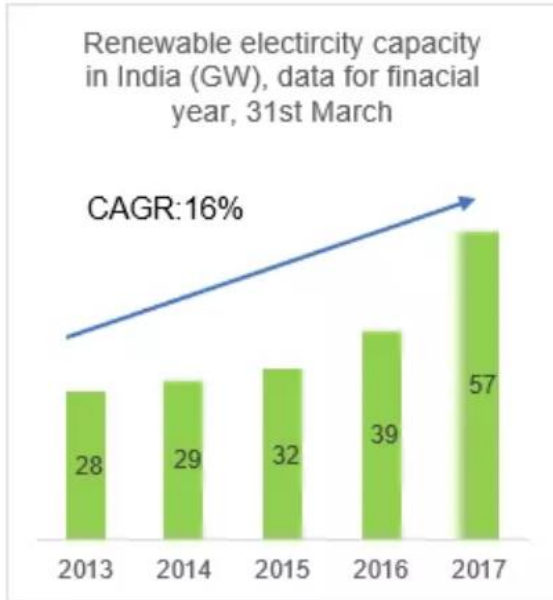


RE100: Member operations





RE100: Procurement of RE in India



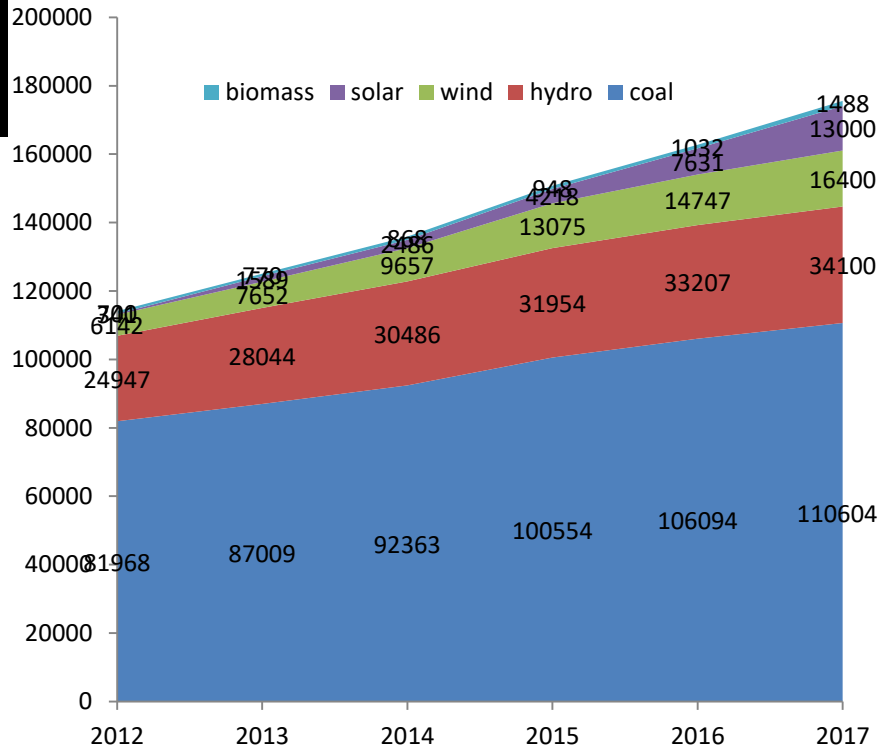
Significant growth of RE installations in India

RE100: Procurement of RE100 companies in India

Sourcing strategies	2016 (MWh)	2016 (%)	2015 (%)
Unbundled energy attribute certificate purchase	114,707	31	0
Contract with suppliers (green electricity products)	108,194	30	0
Generation from installations owned by the company	49,270	13	31
Direct procurement from offsite grid-connected generators	46,123	13	69
Other options	39,804	11	0
Purchase from on-site installations owned by a supplier	5,692	2	0
Total	363,790	100%	100%



RE100 – Installed power capacity in China by 2017



Installed capacity target	By 2020 (x10 ⁴ KW)
Coal	<110,000
Hydro	34,000
Wind	21,000
Solar	11,000
Biomass	1,500

RE100: Procurement of RE100 companies in China

Sourcing strategies	2016 (MWh)	2016 (%)	2015 (%)
Unbundled energy attribute certificate purchase	854,331	89	87
Other options	56,571	6	9
Contract with suppliers (green electricity products)	35,066	4	0
Generation from installations owned by the company	8,808	1	<1
Purchase from on-site installations owned by a supplier	448	<1	0
Direct procurement from offsite grid-connected generators	0	0	3
Total	955,224	100%	100%

Back to EU and Scotland



RE-Source Platform

The European platform for corporate renewable energy sourcing

Brought to you by:



Thank you.

For more information please contact:

Ole Høy Jakobsen, Corporate Actions
Engagement Manager at The Climate
Group: ojakobsen@theclimategroup.org





John MacArthur
Vice President of Group CO2
Shell



Scottish Renewables Annual Conference 26 & 27 March 2018, Edinburgh

Plenary session: “Decarbonising Industry: The Global Challenge”

John MacArthur
Vice President, Group Carbon

Definitions and cautionary note

This presentation contains data from Shell's New Lens Scenarios. The New Lens Scenarios are a part of an ongoing process used in Shell for 40 years to challenge executives' perspectives on the future business environment. We base them on plausible assumptions and quantifications, and they are designed to stretch management to consider even events that may only be remotely possible. Scenarios, therefore, are not intended to be predictions of likely future events or outcomes and investors should not rely on them when making an investment decision with regard to Royal Dutch Shell plc securities.

It is important to note that Shell's existing portfolio has been decades in development. While we believe our portfolio is resilient under a wide range of outlooks, including the IEA's 450 scenario, it includes assets across a spectrum of energy intensities including some with above-average intensity. While we seek to enhance our operations' average energy intensity through both the development of new projects and divestments, we have no immediate plans to move to a net-zero emissions portfolio over our investment horizon of 10-20 years.

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate legal entities. In this presentation "Shell", "Shell group" and "Royal Dutch Shell" are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general. Likewise, the words "we", "us" and "our" are also used to refer to subsidiaries in general or to those who work for them. These expressions are also used where no useful purpose is served by identifying the particular company or companies. "Subsidiaries", "Shell subsidiaries" and "Shell companies" as used in this presentation refer to companies over which Royal Dutch Shell plc either directly or indirectly has control. Entities and unincorporated arrangements over which Shell has joint control are generally referred to as "joint ventures" and "joint operations" respectively. Entities over which Shell has significant influence but neither control nor joint control are referred to as "associates". The term "Shell interest" is used for convenience to indicate the direct and/or indirect ownership interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest.

This presentation contains forward-looking statements concerning the financial condition, results of operations and businesses of Royal Dutch Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management's current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Royal Dutch Shell to market risks and statements expressing management's expectations, beliefs, estimates, forecasts, projections and assumptions. These forward-looking statements are identified by their use of terms and phrases such as "anticipate", "believe", "could", "estimate", "expect", "goals", "intend", "may", "objectives", "outlook", "plan", "probably", "project", "risks", "schedule", "seek", "should", "target", "will" and similar terms and phrases. There are a number of factors that could affect the future operations of Royal Dutch Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this presentation, including (without limitation): (a) price fluctuations in crude oil and natural gas; (b) changes in demand for Shell's products; (c) currency fluctuations; (d) drilling and production results; (e) reserves estimates; (f) loss of market share and industry competition; (g) environmental and physical risks; (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions; (i) the risk of doing business in developing countries and countries subject to international sanctions; (j) legislative, fiscal and regulatory developments including regulatory measures addressing climate change; (k) economic and financial market conditions in various countries and regions; (l) political risks, including the risks of expropriation and renegotiation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs; and (m) changes in trading conditions. No assurance is provided that future dividend payments will match or exceed previous dividend payments. All forward-looking statements contained in this presentation are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. Readers should not place undue reliance on forward-looking statements. Additional risk factors that may affect future results are contained in Royal Dutch Shell's Form 20-F for the year ended December 31, 2016 (available at www.shell.com/investor and www.sec.gov). These risk factors also expressly qualify all forward-looking statements contained in this presentation and should be considered by the reader. Each forward-looking statement speaks only as of the date of this presentation, 26 March 2018. Neither Royal Dutch Shell plc nor any of its subsidiaries undertake any obligation to publicly update or revise any forward-looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward-looking statements contained in this presentation.

We may have used certain terms, such as resources, in this presentation that United States Securities and Exchange Commission (SEC) strictly prohibits us from including in our filings with the SEC. U.S. investors are urged to consider closely the disclosure in our Form 20-F, File No 1-32575, available on the SEC website www.sec.gov. You can also obtain this form from the SEC by calling 1-800-SEC-0330.

Tilley



© TREL

Shell Scenarios: Sky

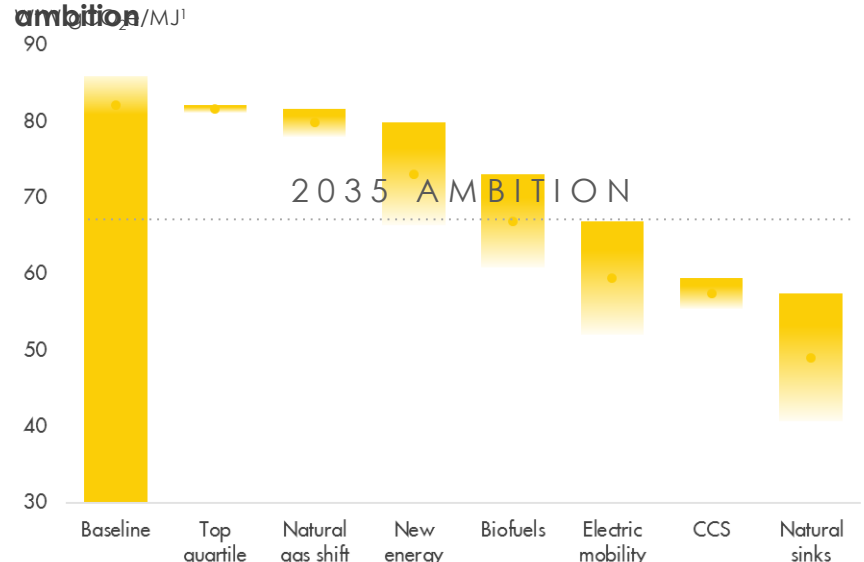


Thrive in the energy transition

Ambition – Net Carbon Footprint

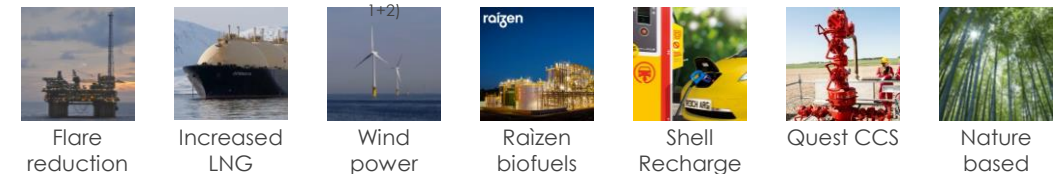
- Flexibility and mix of options to achieve ambition
 - Allows for oil and gas production growth offset by evolving product mix
- Changing product mix gives greatest opportunity
- Top-quartile scope 1 + 2 emissions has limited overall impact

Potential tools to achieve our 2035 Net Carbon Footprint¹



Shell is active in each of these areas

Existing examples:



¹: Net Carbon Footprint measured on an aggregate "well to wheel" or "well to wire" basis, from production through to consumption, on grams of CO₂ equivalent per megajoule of energy products consumed; chemical products are excluded. Carbon Footprint of the energy system is modelled using Shell methodology aggregating lifecycle emissions of energy products on a fossil-equivalence basis. The methodology will be further reviewed and validated in collaboration with external experts.

New Energies



- Build integrated value chains
- Exploit adjacencies to existing businesses
- Discipline and commerciality
- Not equipment manufacturing

Emerging Opportunities

New Fuels



Focus areas:

- Biofuels
- Hydrogen

Power



Focus areas:

- Trading, marketing and customer access
- Low-carbon generation and storage (solar, wind, gas)





Tracy Black
Director
CBI Scotland

Ole Høy Jakobsen
Corporate Actions Engagement Manager
The Climate Group



John MacArthur
Vice President of Group CO2
Shell



ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR





The Technology Revolution: People, Services and Disruption



Chris Yiu

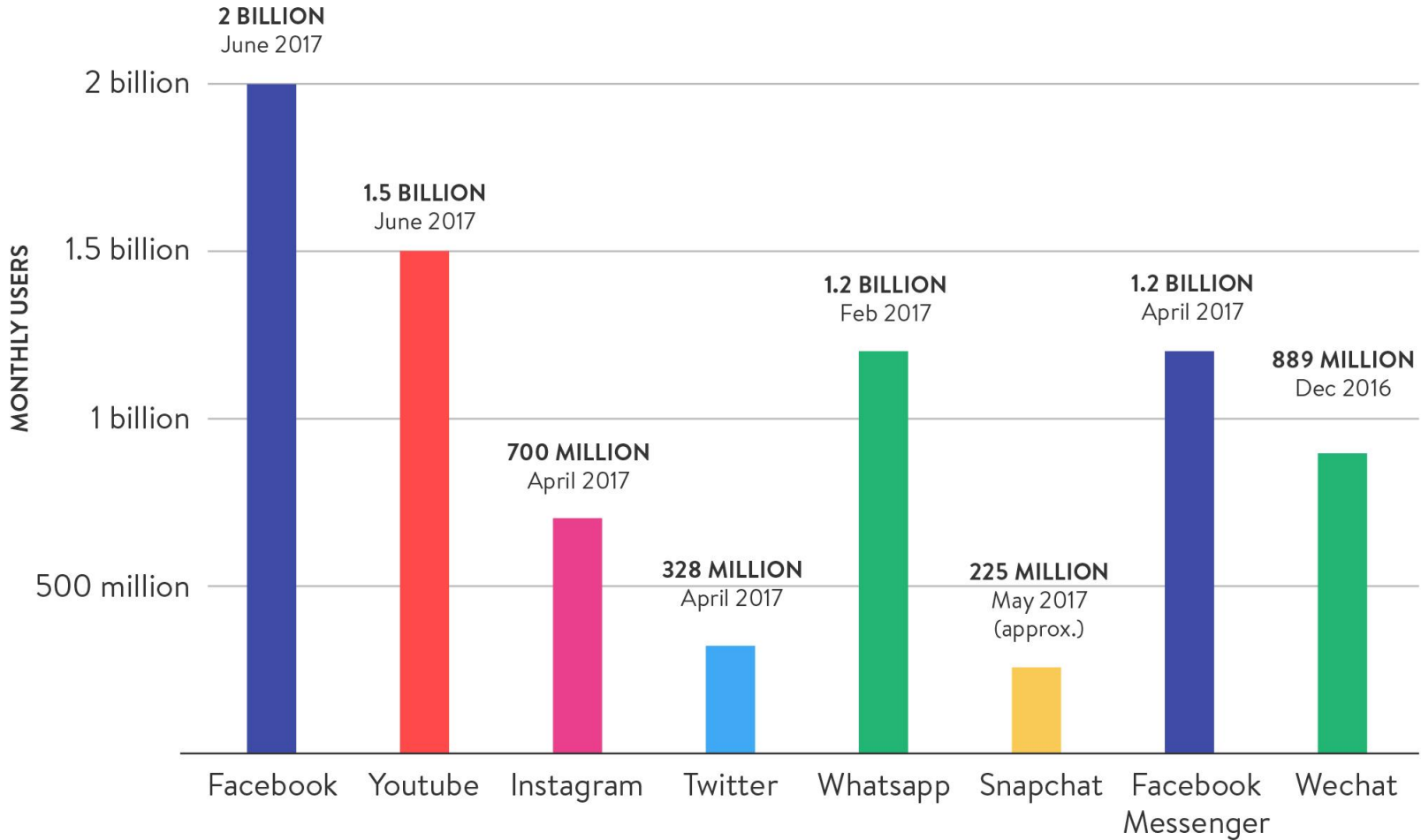
Senior Policy Fellow for Technology
Tony Blair Institute for Global Change

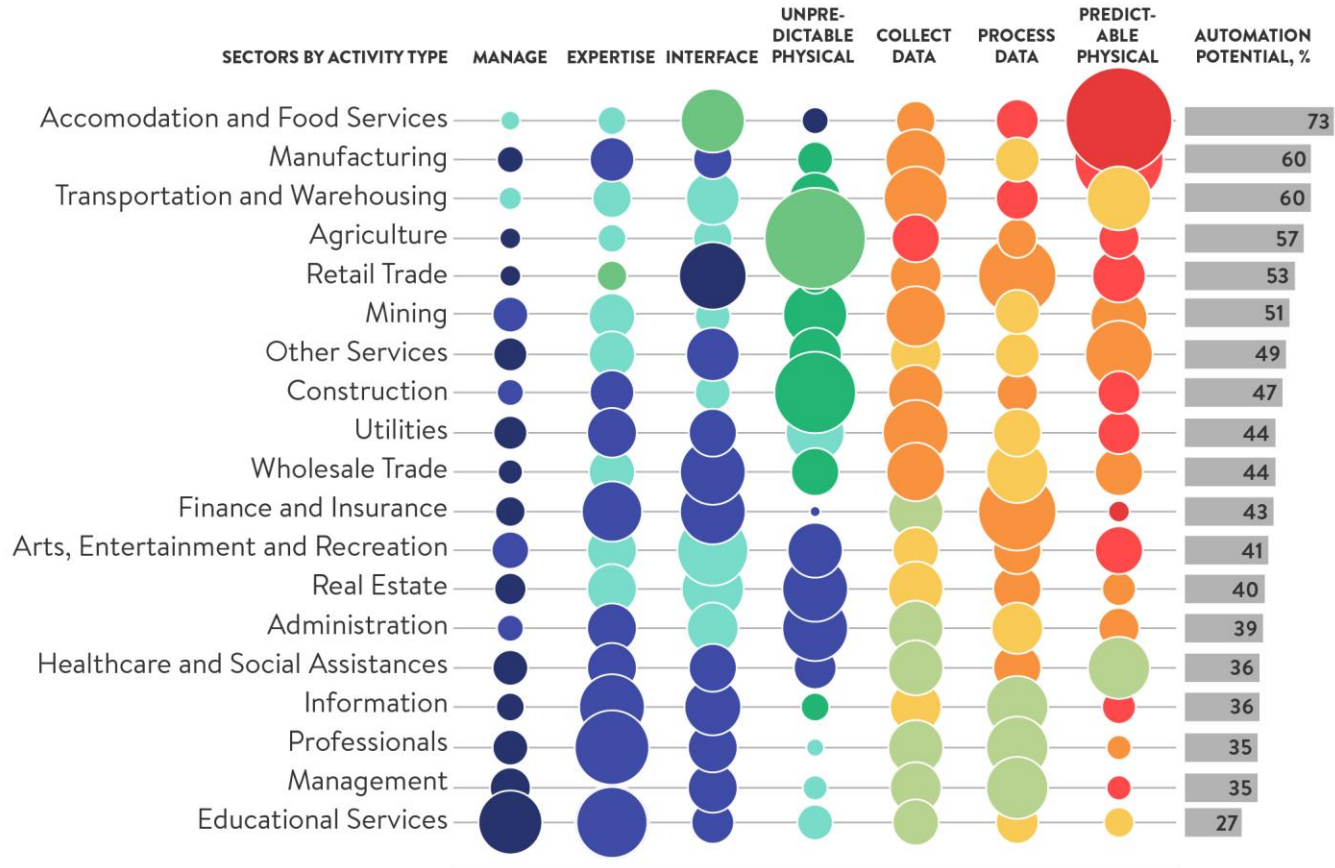




TONY BLAIR
INSTITUTE
FOR GLOBAL
CHANGE

RENEWING
THE CENTRE





Ability to automate, %

Size of bubble indicates % of time spent in US occupations

Source: US Bureau of Labor Statistics; McKinsey Global Institute analysis



TONY BLAIR
INSTITUTE
FOR GLOBAL
CHANGE

RENEWING
THE CENTRE



Andrew Kerr

Executive Director
Edinburgh Centre for Carbon
Innovation (ECCI)





Claire Mack
Chief Executive
Scottish Renewables

Chris Yiu
Senior Policy Fellow for Technology
Tony Blair Institute for Global Change

Andrew Kerr
Executive Director
Edinburgh Centre for Carbon Innovation (ECCI)





ANNUAL CONFERENCE

26 & 27 MARCH 2018 EDINBURGH

HEADLINE SPONSOR

