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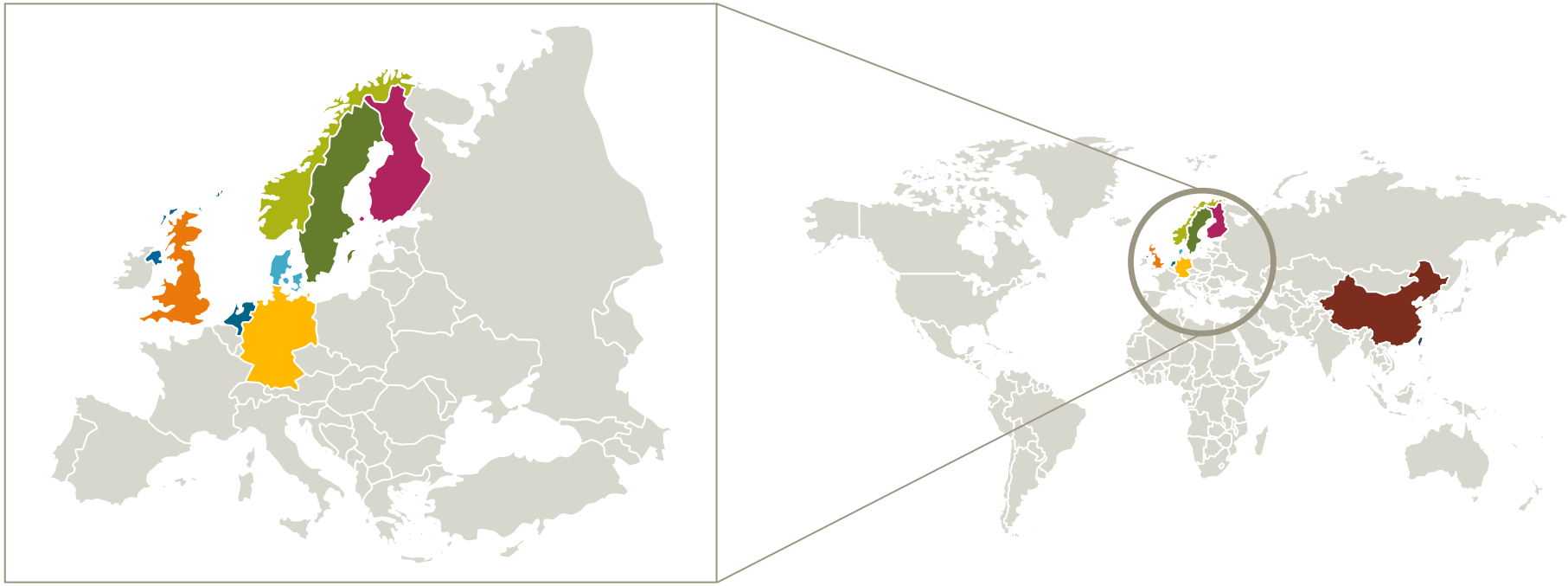
Ingenuity for life

Offshore Wind Industry LCoE development

California Offshore Wind Symposium

Siemens has installed over 8.3GW offshore as of January 2017[1)]



UK
Germany
Denmark
NL
SE
NO
FL
CH
TW

1) Commissioned by January 2017

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Siemens contributes throughout the entire Value Chain

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Finance

Help finance certain stages of the project to improve IRR or reduce funding costs for customers

Turbine/BOP

Strong focus on reducing LCoE

Extending scope to BOP elements where requested

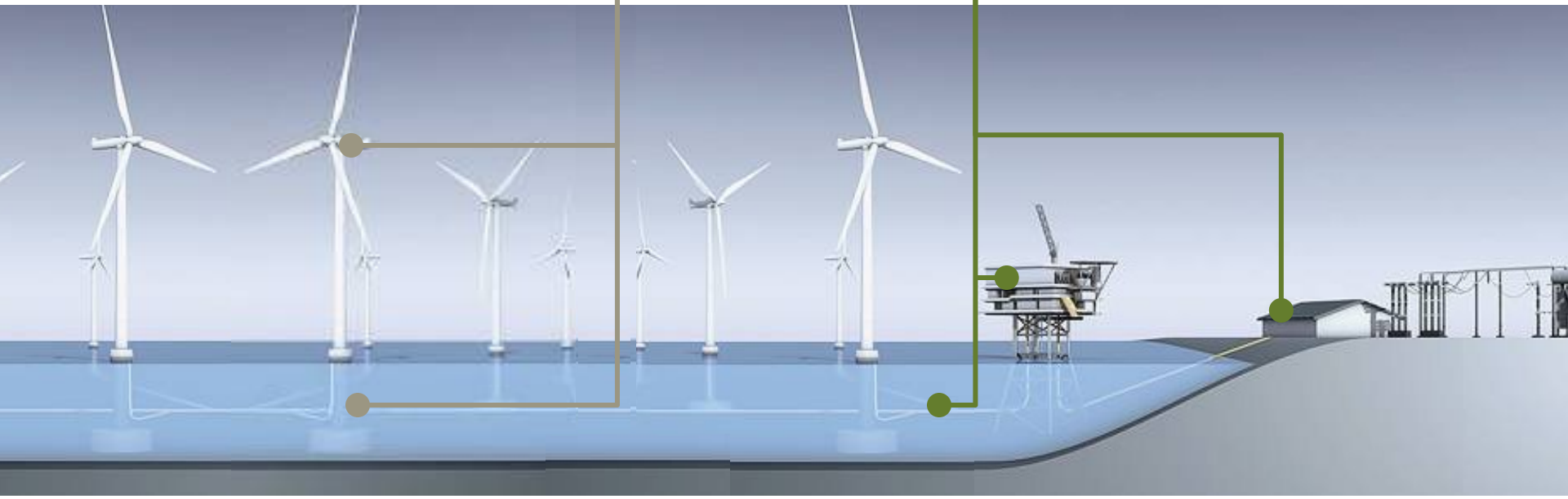
Grid

Standardization initiative

Working with OFTOs and wind developers on grid connections

Service

Customized O&M strategies to optimize service at all levels



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The World's First Floating Wind Turbine

Hywind

- Cooperation on technology with Statoil Hydro ASA to develop the World's first floating offshore installation
- In 2009, Siemens installed the first wind turbine in Norway at a water depth of about 220 meters
- Floating offshore wind turbines could be installed at sites with greater water depths
- Reduced visual impact and increased power production due to strong and stable wind conditions

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An amazing thing happened….Recent auctions indicate LCOE reduction of 72% over the past 8 years

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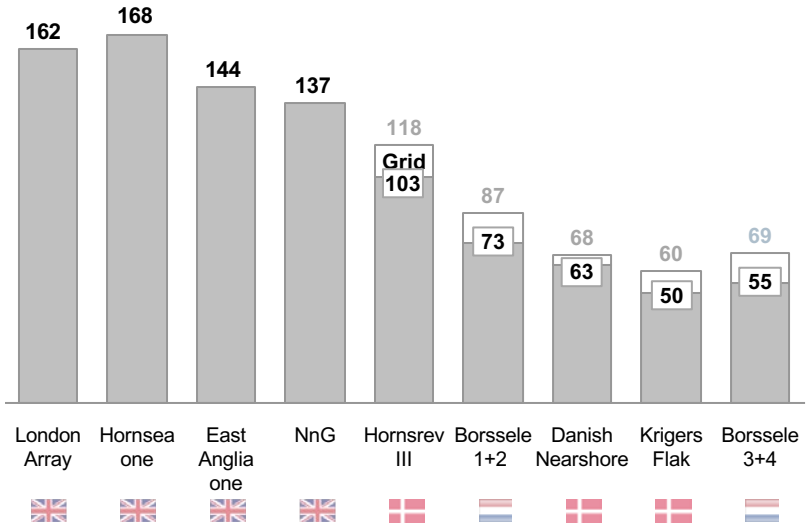
Auctioned / awarded power price (in EUR/MWh)

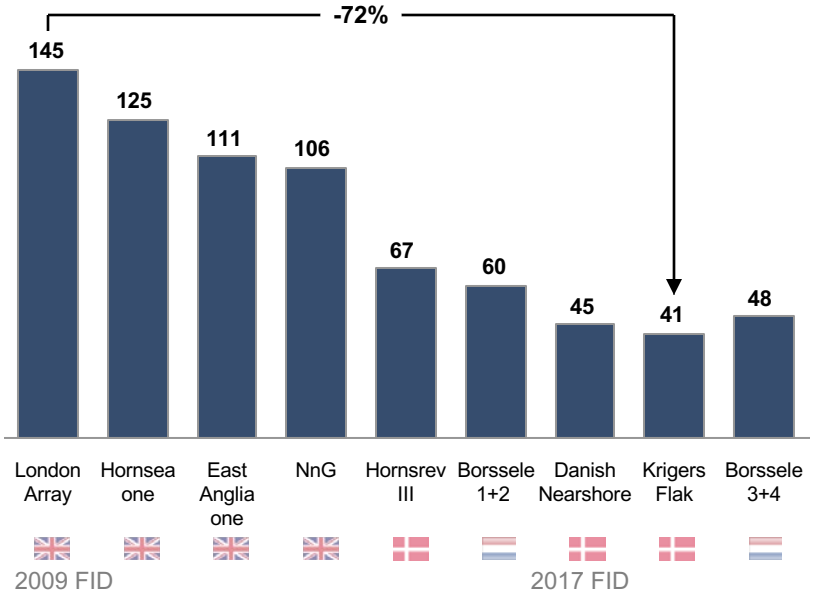


| GBP/EUR exchange rate is constant at 1.2

| UK projects reflect real 2012 price in GBP

| Subsidy for transmission asset added to non-UK projects

Lifecycle cost in real 2014 EUR/MWh (LCOE)



| UK ROC with 20 years of subsidy support, UK CfD, NL with 15 years of subsidy support, DK with 12 years of subsidy support

| Subsidy payments for UK are inflated with 2% p.a. from 2012 onwards

| Subsidy payments for DK and NL projects are not inflated over the lifetime

| Post-subsidy power prices are forecasted (IHS Energy 2015)

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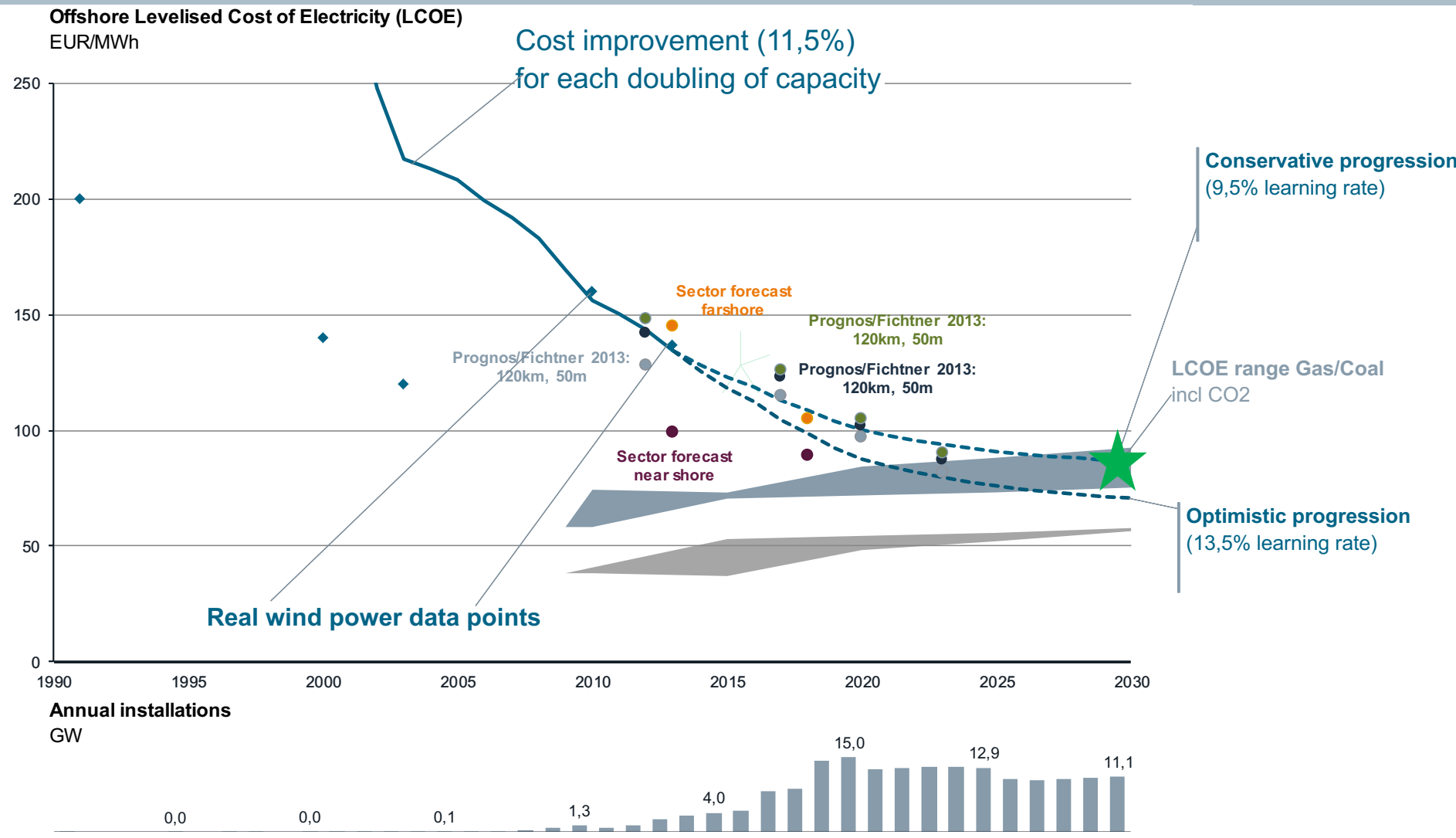
What drives down cost offshore?



Industrialization drives down cost and represents opportunity

Nacelle production site

(Offshore DD platform)

- Investment of **€ 200 million**
- Up to **1,000 jobs**
- Allows loading via a Ro/Ro ramp directly onto a transport vessel
- Start of production in 2017

Blade factory

(B75)

- Investment of **€ 190 million**
- Up to **1,000 jobs**
- Allows loading via a Ro/Ro ramp directly onto a transport vessel.
- Start of production end of 2016

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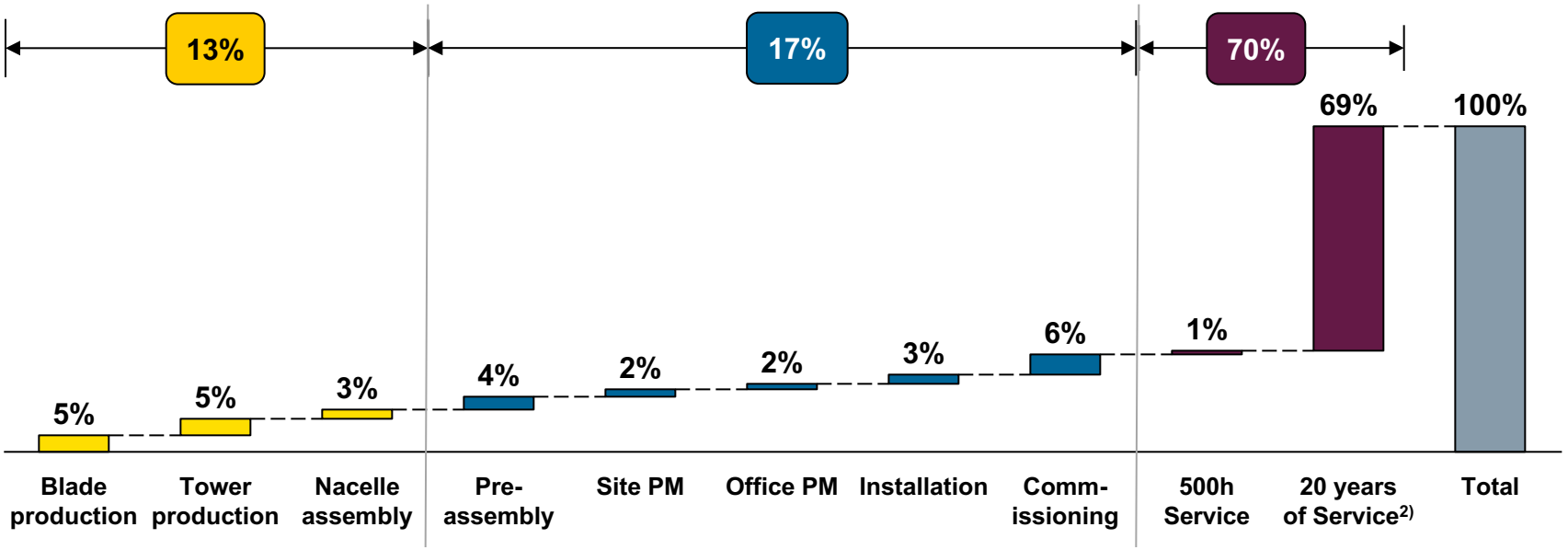
Most work is local – OSW creates jobs

Breakdown of man hours within WTG scope (Based on a 3.6MW turbine, 20 years service)



Source: SWP A/S internal study (2009)

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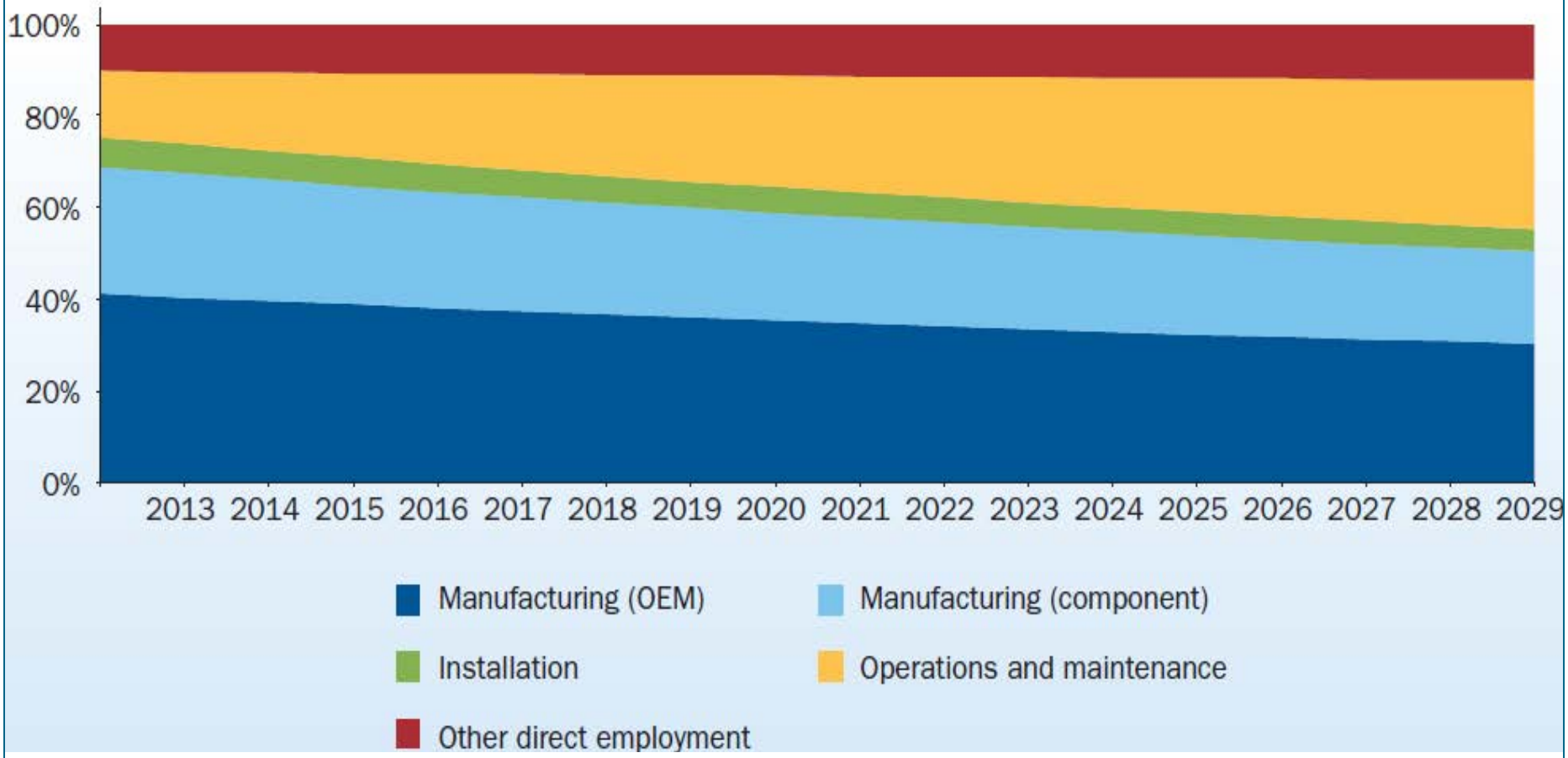
Further operation & maintenance (O&M) jobs will be in demand as more wind farms become operational

Development of employment breakdown by sub-sector



*Source: EWEA, 2013, "Workers wanted"

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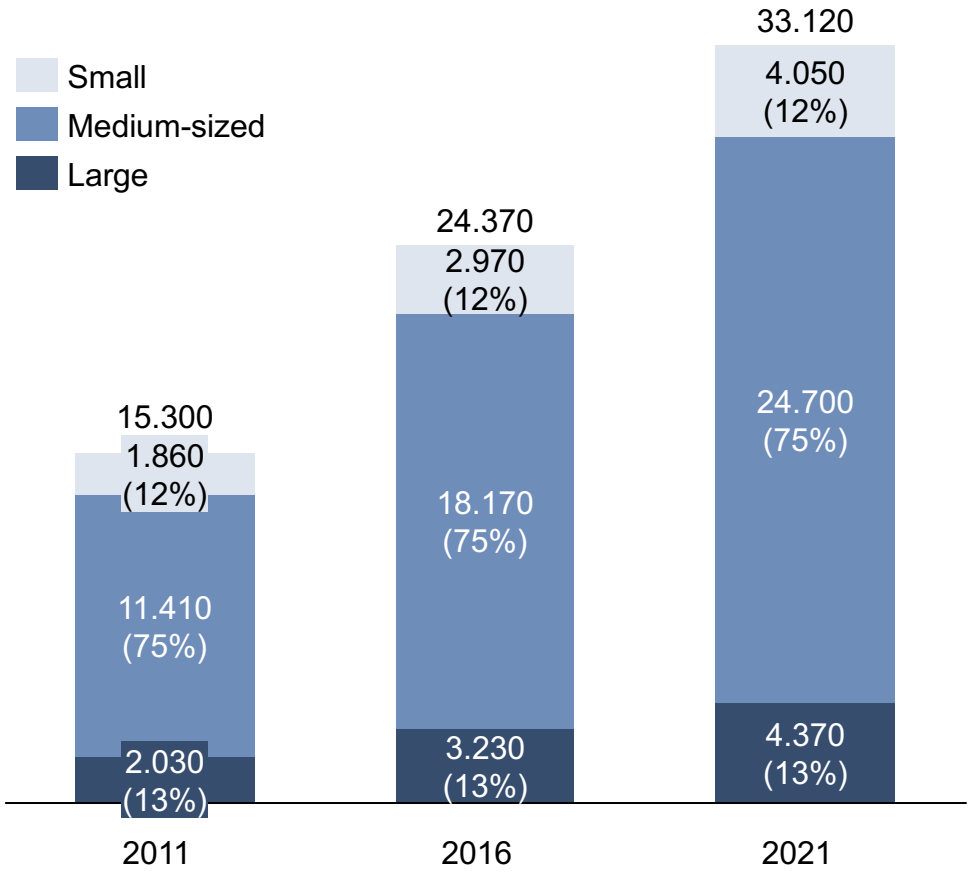
Medium sized-companies benefit significantly from offshore wind (Example Germany)

Example Germany: Offshore wind job development by company size (in FTE)



Source: Volle Kraft aus Hochseewind, PWC and WAB, 2011

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Thank you for your time

Siemens Wind Power

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