CLEAN ENERGY INVESTMENT TRENDS IN 2011

DELIVERING ZERO CARBON ELECTRICITY, LONDON

BENJAMIN KAFRI

22 SEPTEMBER 2011

Bloomberg NEW ENERGY FINANCE

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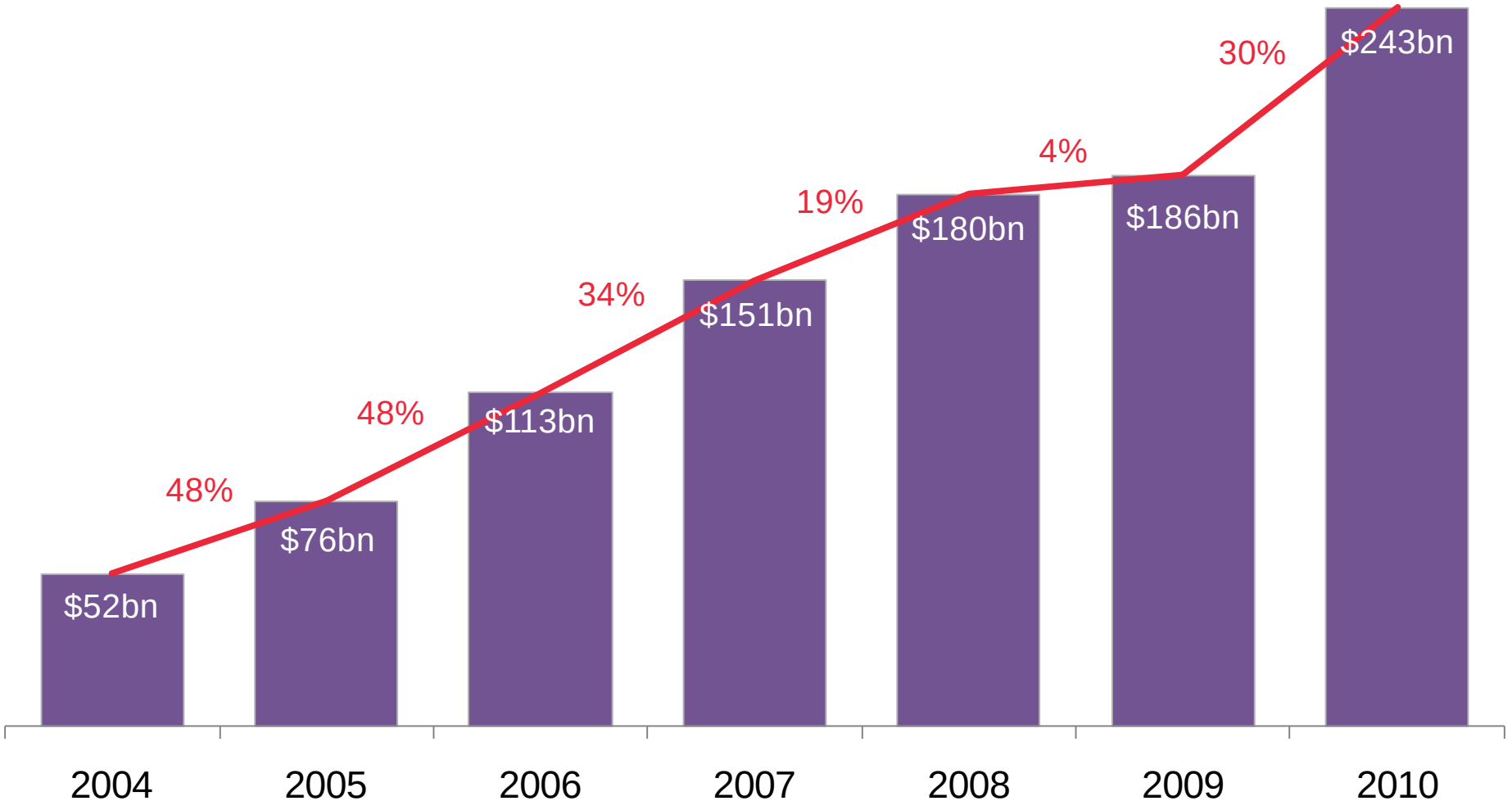
GLOBAL TOTAL NEW INVESTMENT IN CLEAN ENERGY

2004–10 ($BN)

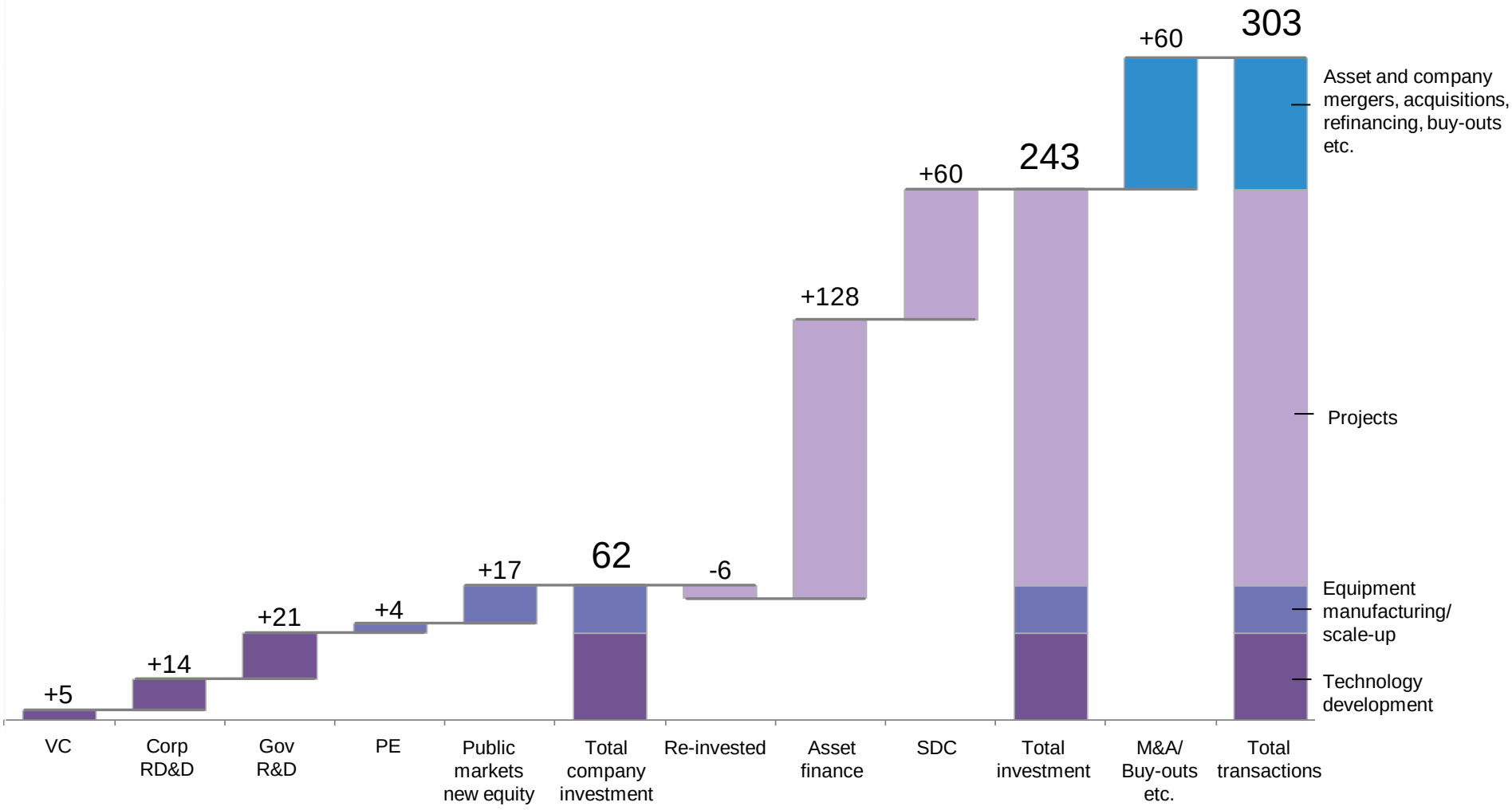


Note: Includes corporate and government R&D, and small distributed capacity. Adjusted for re-invested equity. Does not include proceeds from acquisition transactions

Source: Bloomberg New Energy Finance

GLOBAL CLEAN ENERGY INVESTMENT TYPES AND FLOWS

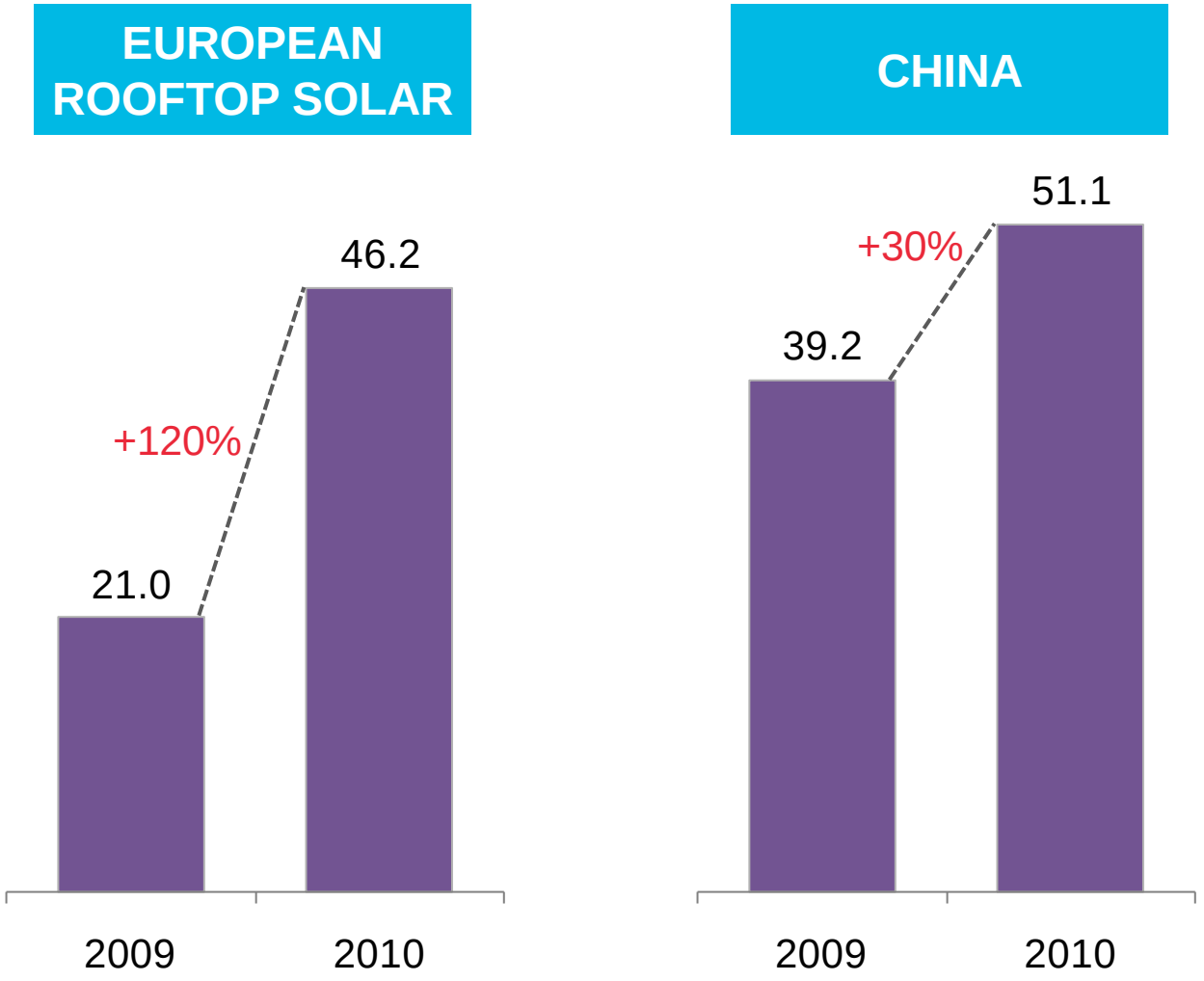
2010 ($BN)



Note: SDC = small distributed capacity. Total values include estimates for undisclosed deals.

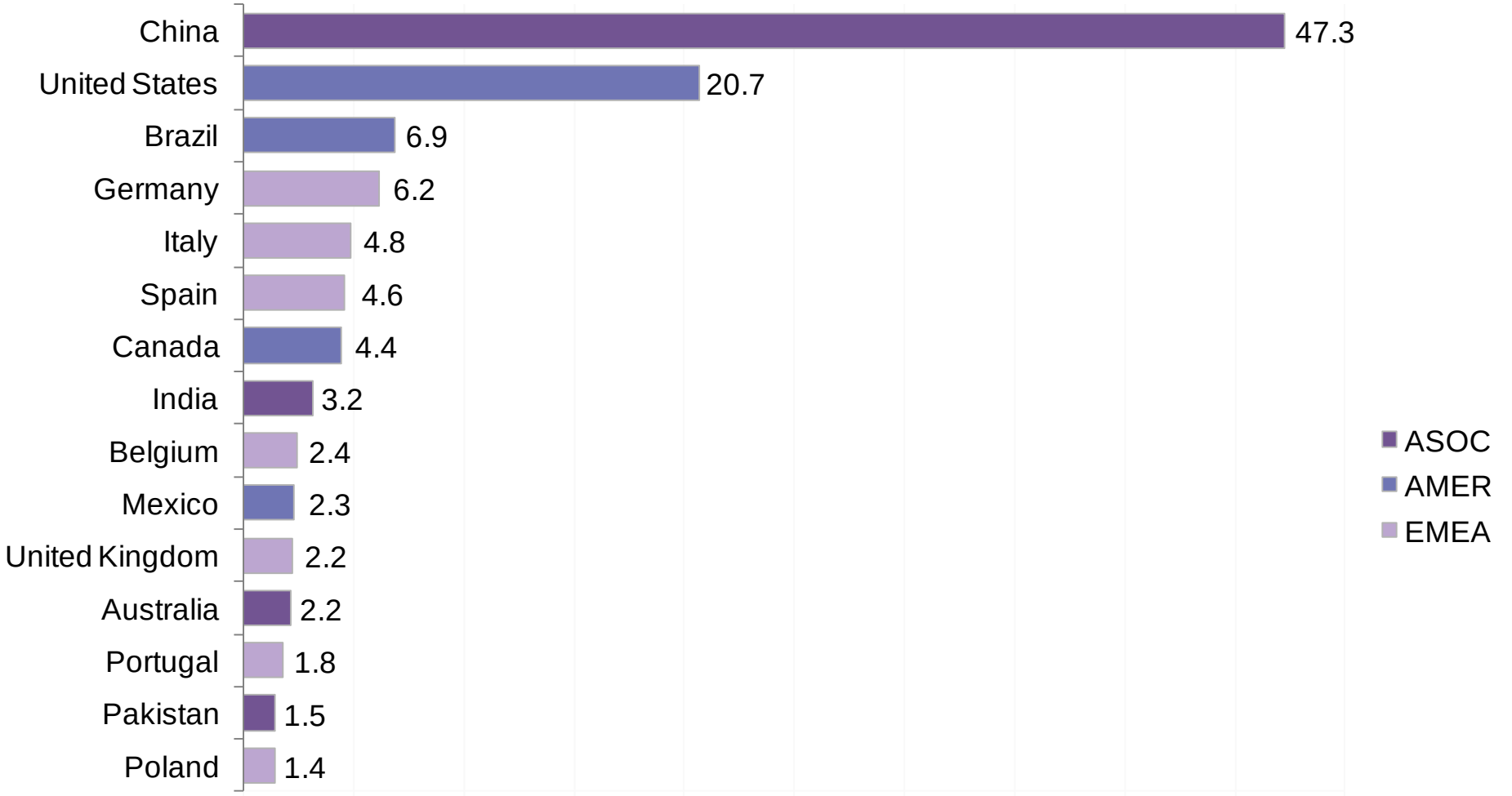
Source: Bloomberg New Energy Finance

DRIVERS OF INVESTMENT GROWTH, 2009–10 ($BN)



Source: Bloomberg New Energy Finance

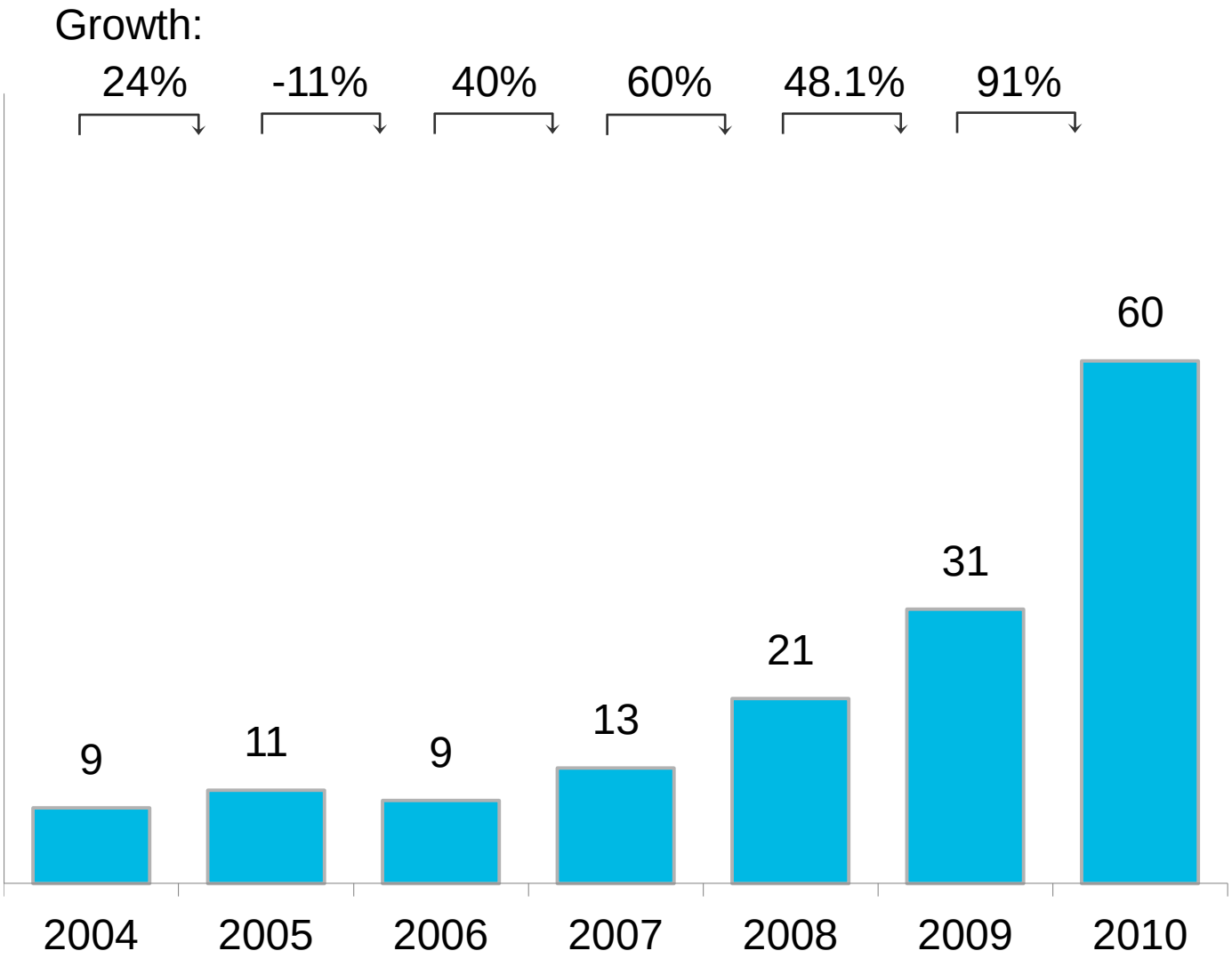
ASSET FINANCE FOR NEW BUILD CLEAN ENERGY – TOP 15 COUNTRIES, 2010 ($BN)



Note: Total values include estimates for undisclosed deals

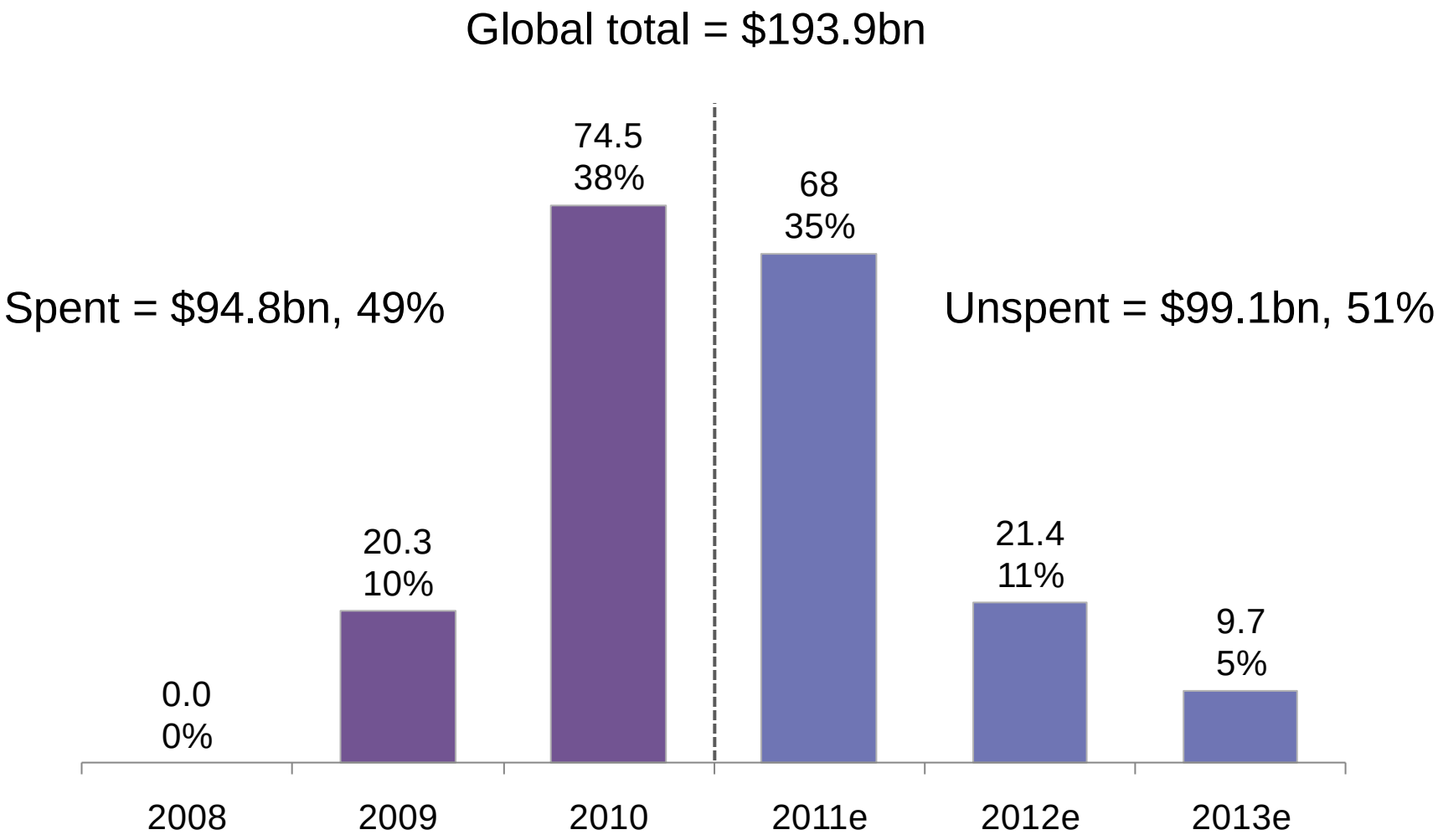
Source: Bloomberg New Energy Finance

SMALL DISTRIBUTED CAPACITY INVESTMENT ($BN)



Source: Bloomberg New Energy Finance

GLOBAL CLEAN ENERGY STIMULUS SPENDING BY YEAR, 2011–13 ($BN)



Note: 2011–13 according to Bloomberg New Energy Finance expectations

Source: Bloomberg New Energy Finance

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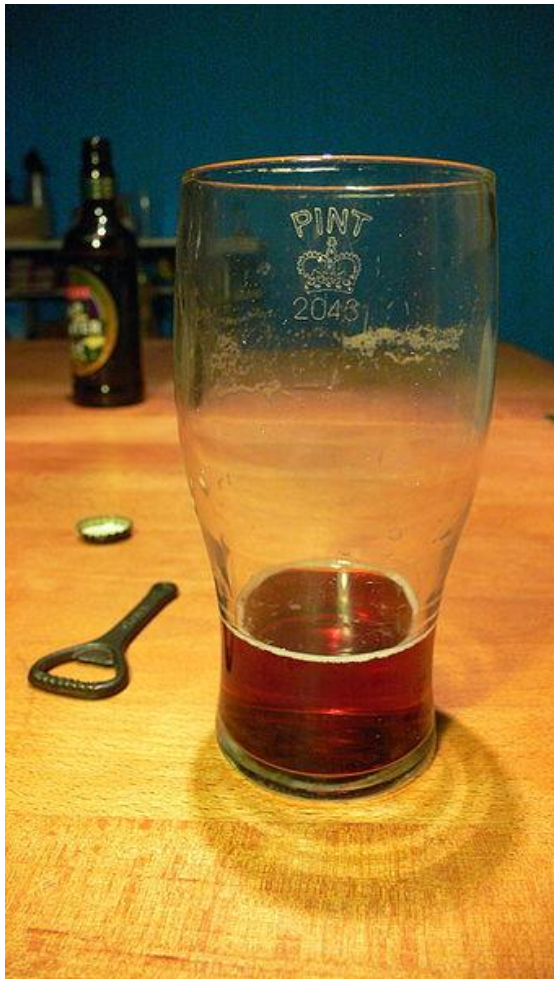
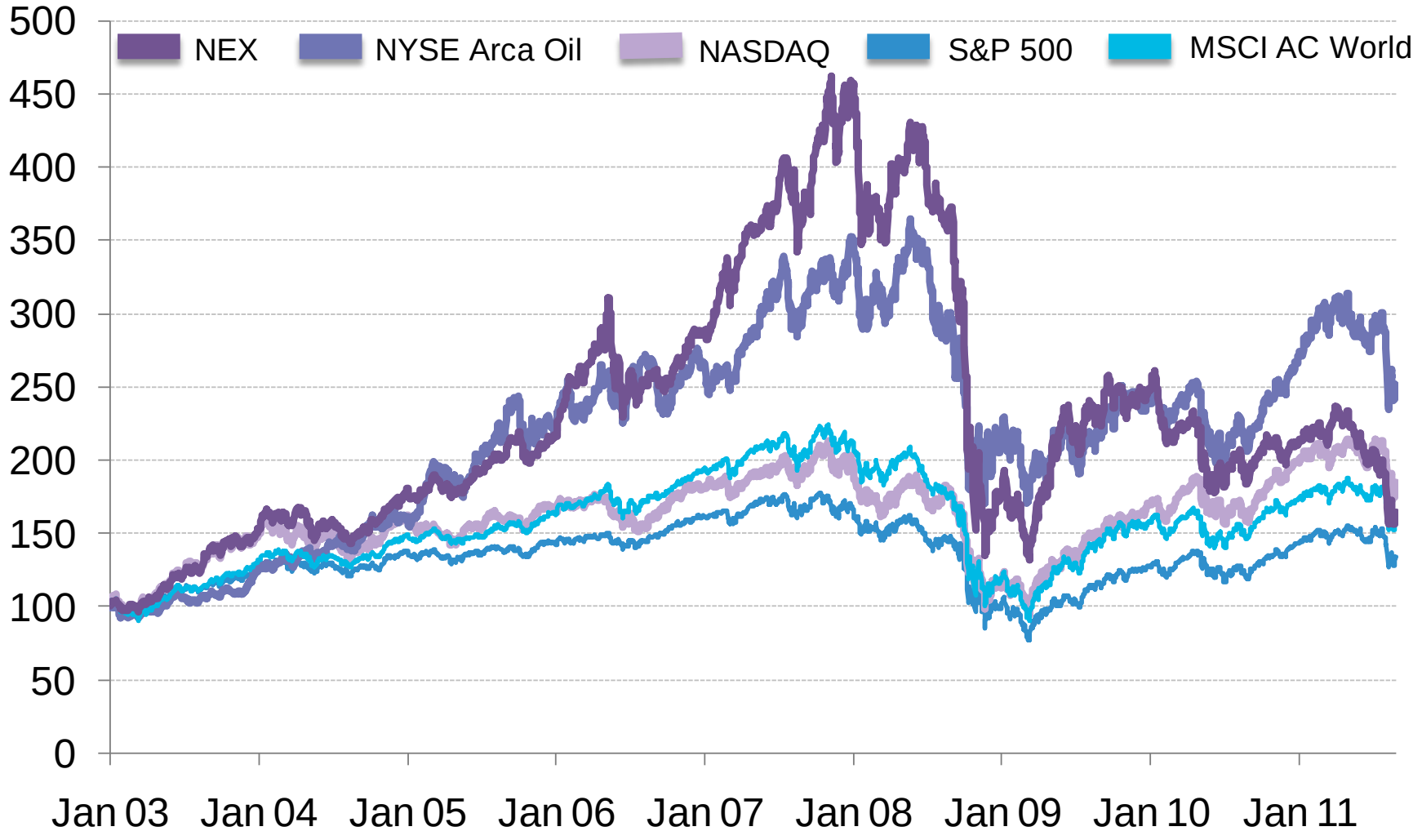
GLASS HALF EMPTY?



Source: Bloomberg New Energy Finance

NEX CLEAN ENERGY INDEX

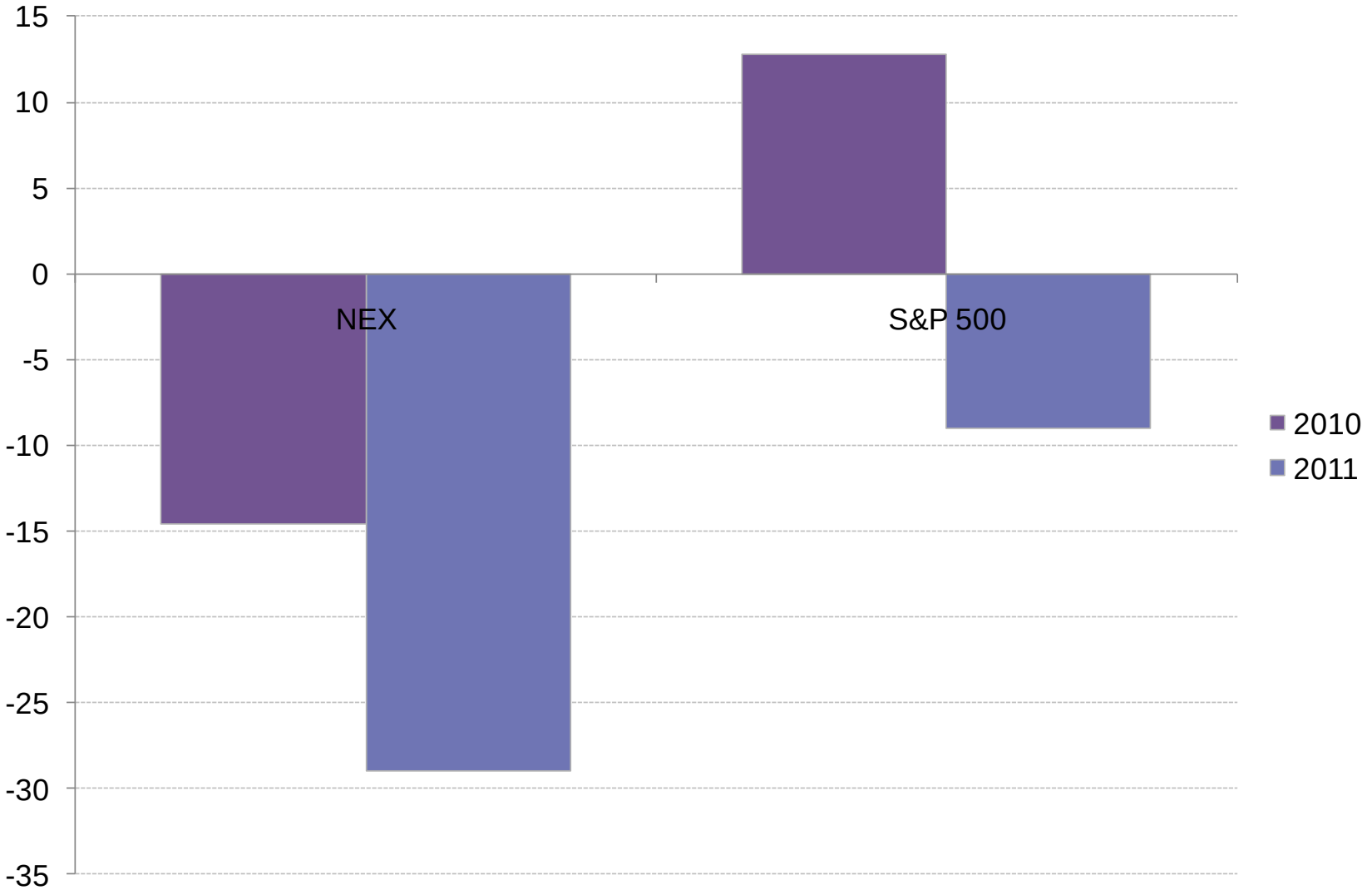
2003–Q3 2011



Note: Values as at 26 August 2011; AMEX Oil, NASDAQ and S&P rebased to 100 on 1 January 2003

Source: Bloomberg New Energy Finance

NEX AND S&P 500 IN 2010 AND 2011 (% CHANGE)



Source: Bloomberg New Energy Finance

CORPORATE CASUALTIES SUMMER 2011

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SpectraWatt
capture the sun

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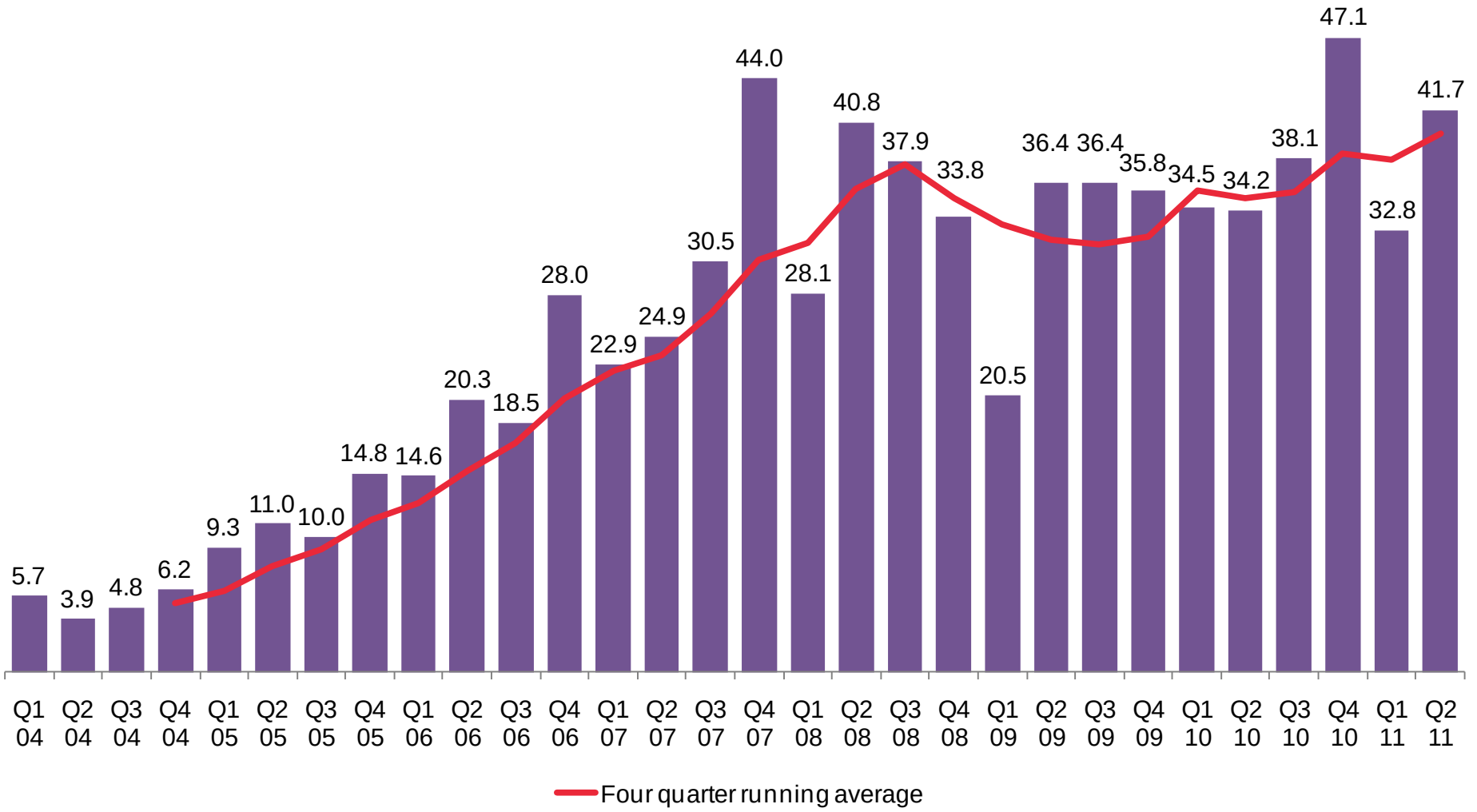
NEW FINANCIAL INVESTMENT IN CLEAN ENERGY

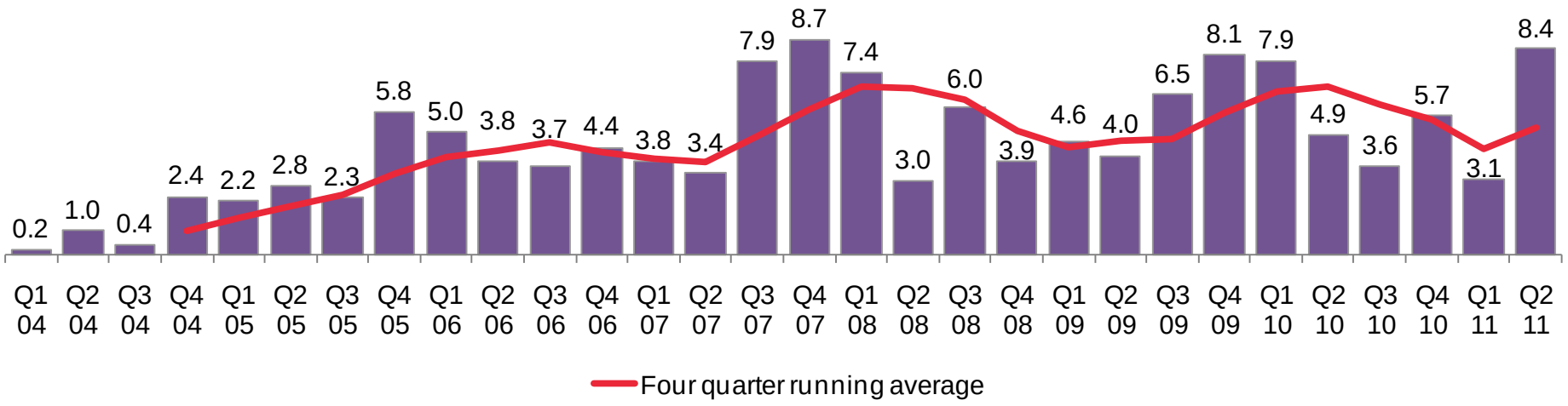
Q1 2004–Q2 2011 ($BN)



Note: Excludes corporate and government R&D, and small distributed capacity. Not adjusted for re-invested equity

Source: Bloomberg New Energy Finance

GLOBAL CORPORATE M&A TRANSACTIONS IN CLEAN ENERGY, Q1 2004–Q2 2011 ($BN)

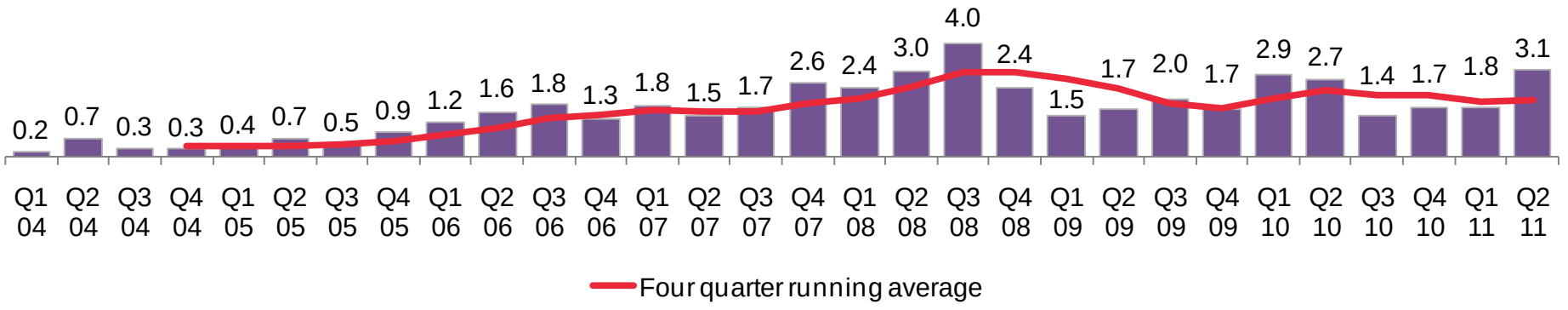


Note: Total values include estimates for undisclosed deals

Source: Bloomberg New Energy Finance

GLOBAL VC AND PE NEW INVESTMENT IN CLEAN ENERGY

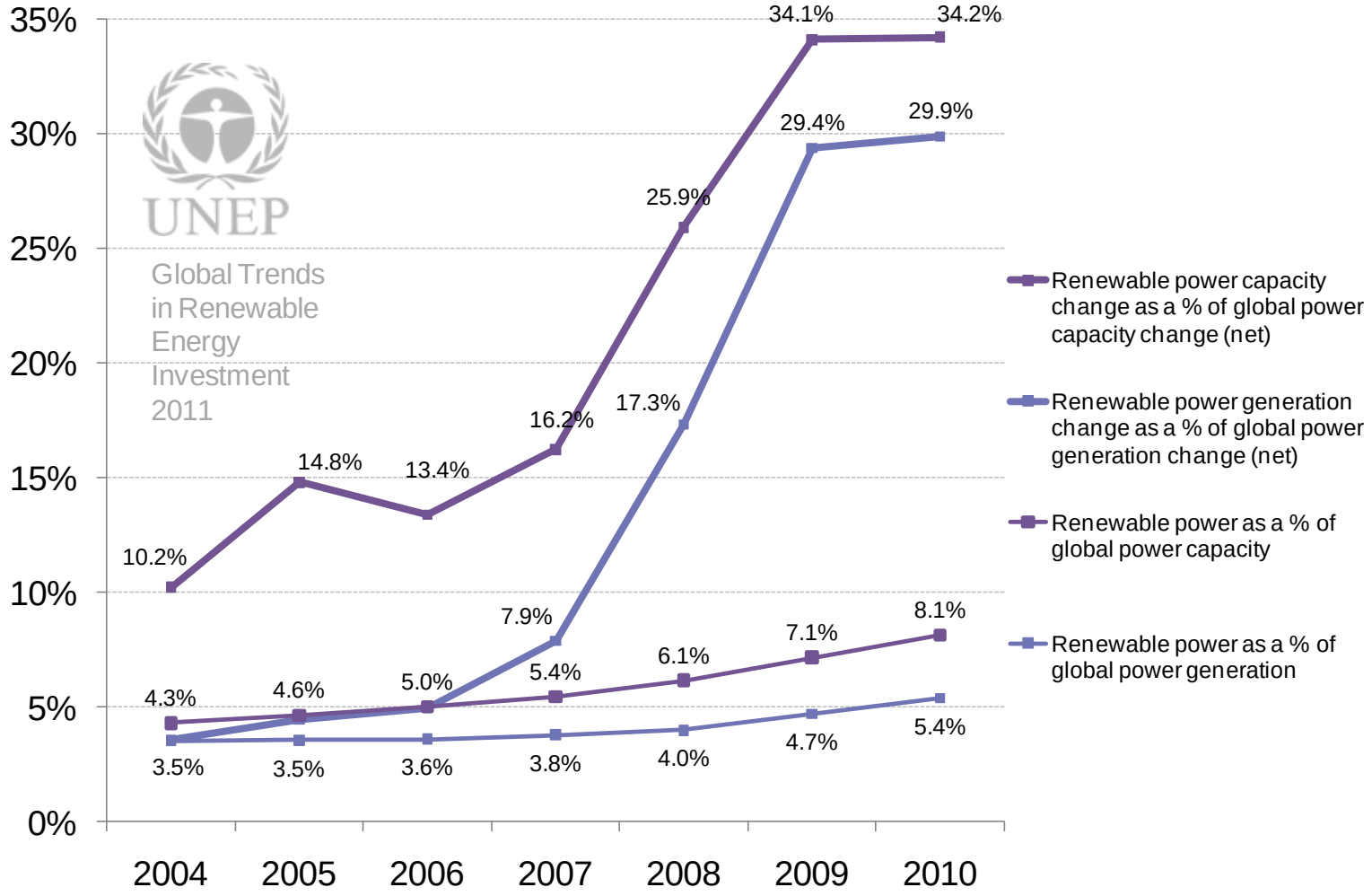
Q1 2004–Q2 2011 ($BN)



Note: Total values include estimates for undisclosed deals

Source: Bloomberg New Energy Finance

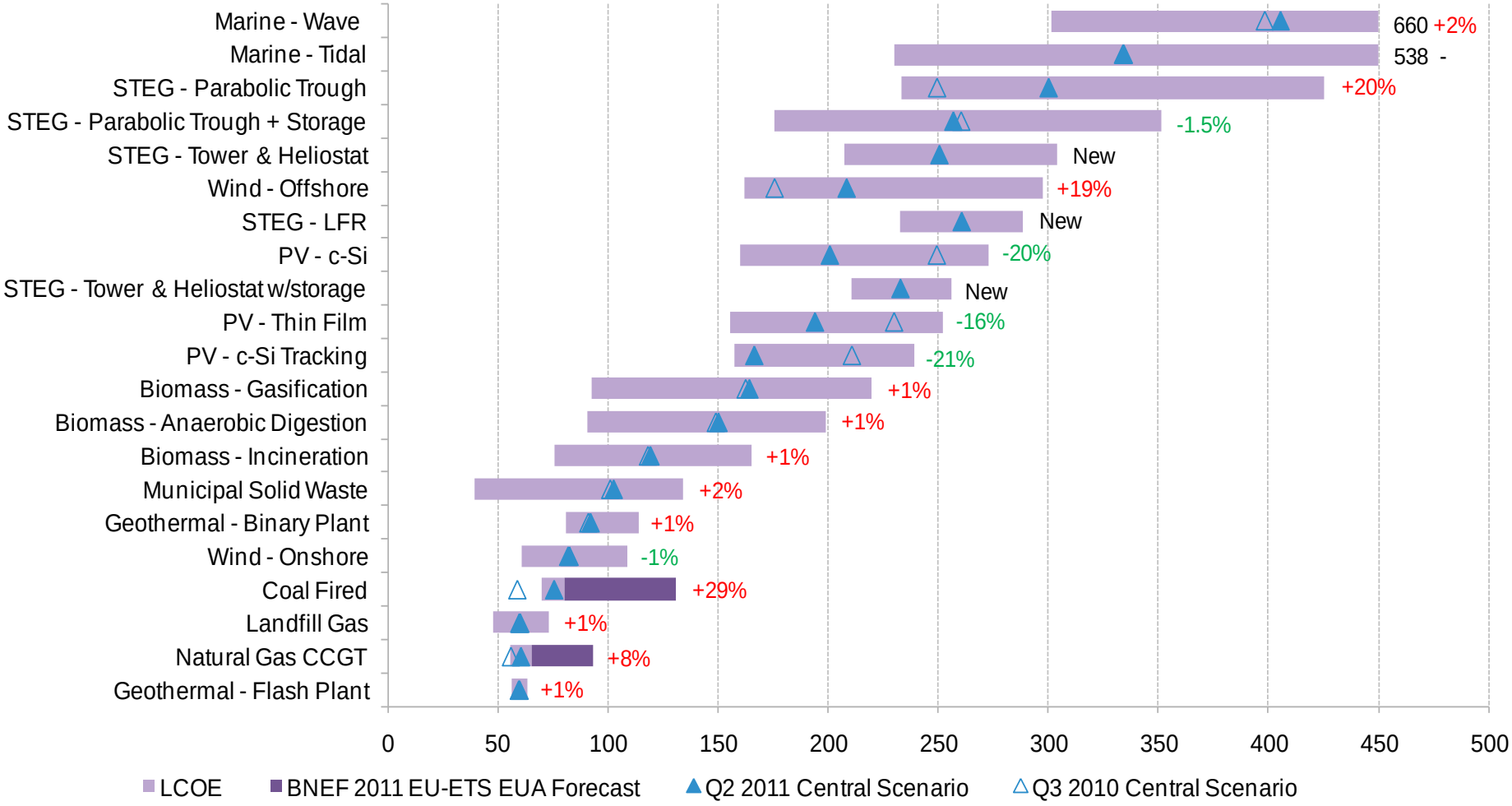
RENEWABLE ADDITION AS % OF TOTAL POWER CAPACITY AND GENERATION ADDED, 2004–2010



Note: Renewable power excludes large hydro. Renewable capacity figures based on Bloomberg New Energy Finance global totals.

Source: Bloomberg New Energy Finance, EIA, IEA

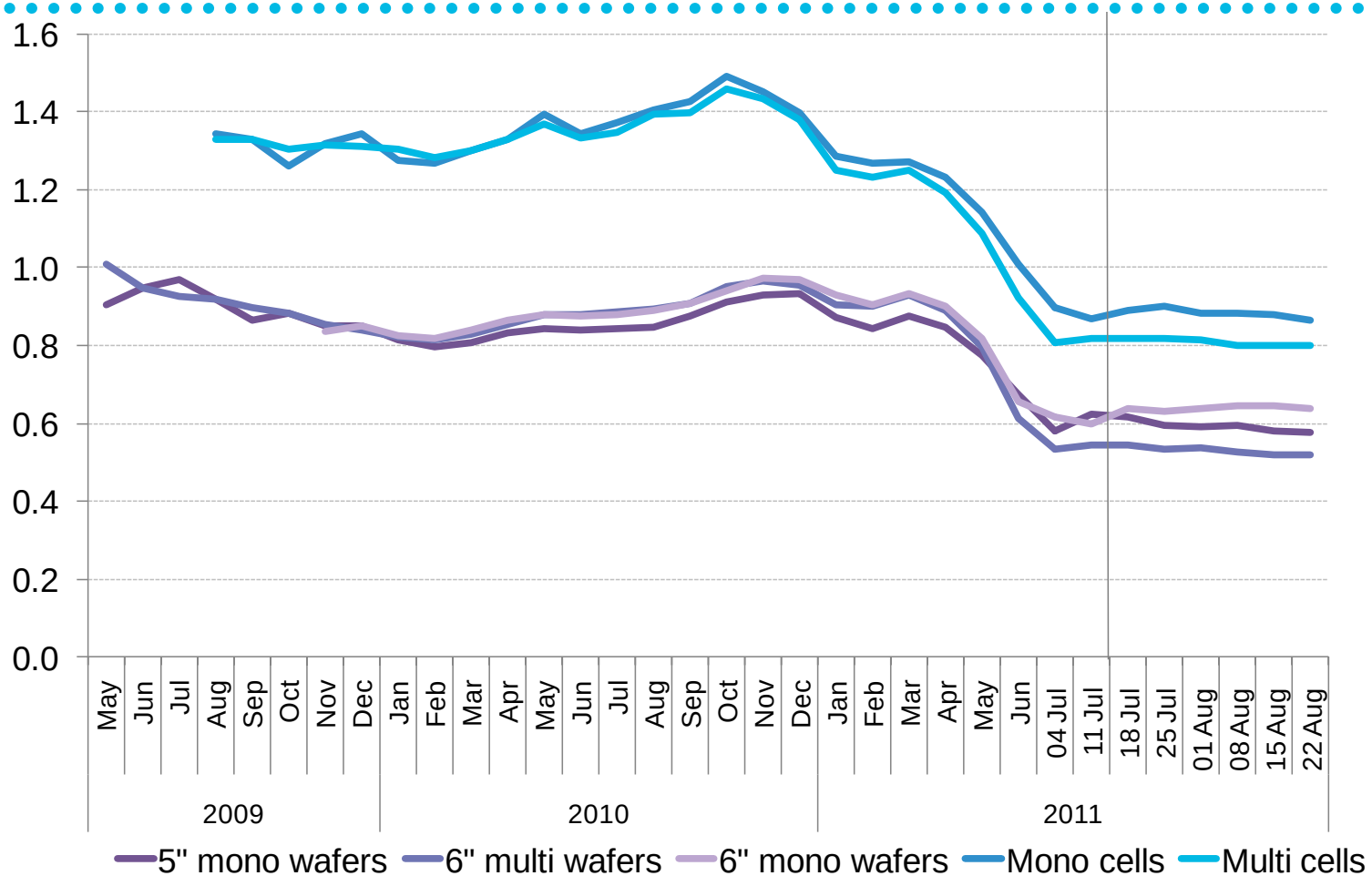
LEVELISED COST OF ENERGY Q2 2011 ($/MWH)



Carbon forecasts from the BNEF European Carbon Model with a 2020 horizon $60/tCO2.
Coal and nat gas prices from the US Department of Energy EIA Annual Energy Outlook 2011. % change represents change in mid from Q3 2010.

Source: Bloomberg New Energy Finance

SPOT PRICES OF WAFERS AND CELLS, MAY 2009 – 22 AUGUST 2011 ($/W)



We assumed that a 5" monocrystalline silicon wafer or cell is 2.6W/piece, a 6" multicrystalline silicon wafer or cell is 3.9W/piece, and a 6" monocrystalline silicon wafer is 4.1W/piece. From 11 July 2011 the Index is conducted weekly and the dates in chart represent first day of the week over which the price has been averaged. Ie 8 August represents average quote for data collected in the week 8-14 August.

Source: Bloomberg New Energy Finance Solar Spot Survey

THEMES FOR NEXT THREE YEARS

- 2011 investment levels likely to be strong, perhaps a record
- 2012 could be difficult – US subsidies expire, China wind peaks, European economic malaise, green stimulus fades
- But falling technology costs are increasingly driving investment
- Low natural gas prices remain a threat
- Electric vehicles may be approaching faster than people realise
- Non-China emerging economies increasingly important, for instance South America, India, Africa

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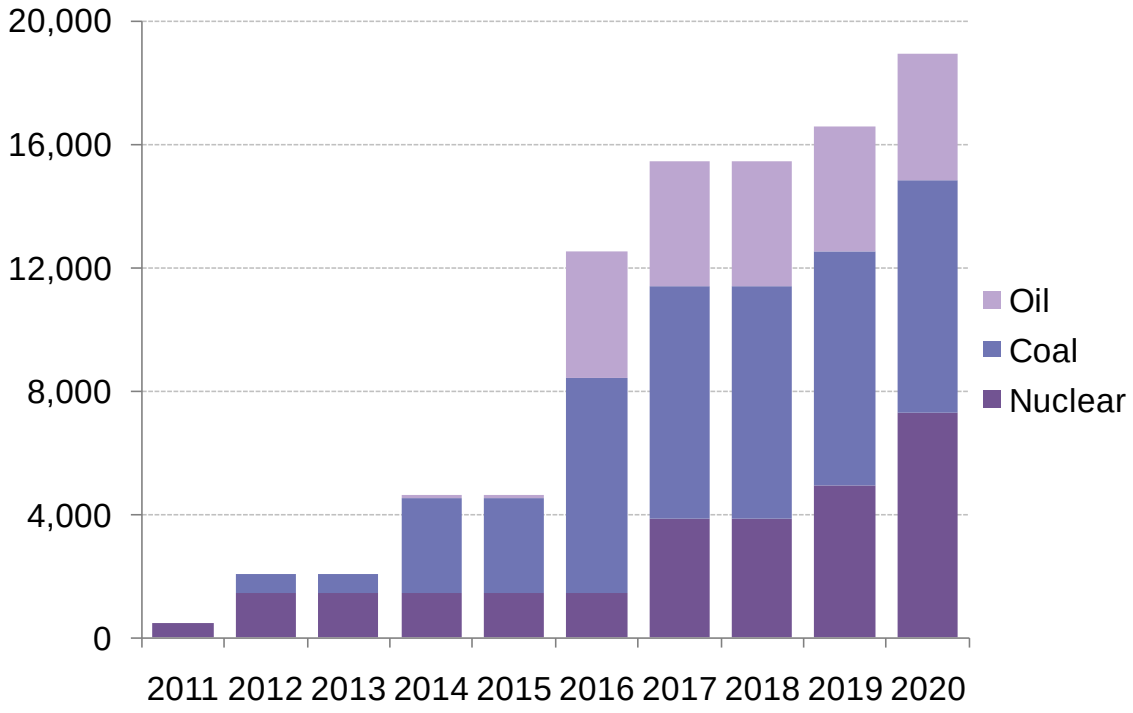
A CHANGING THERMAL LANDSCAPE IN GREAT BRITAIN

Cumulative plant retirements (MW)

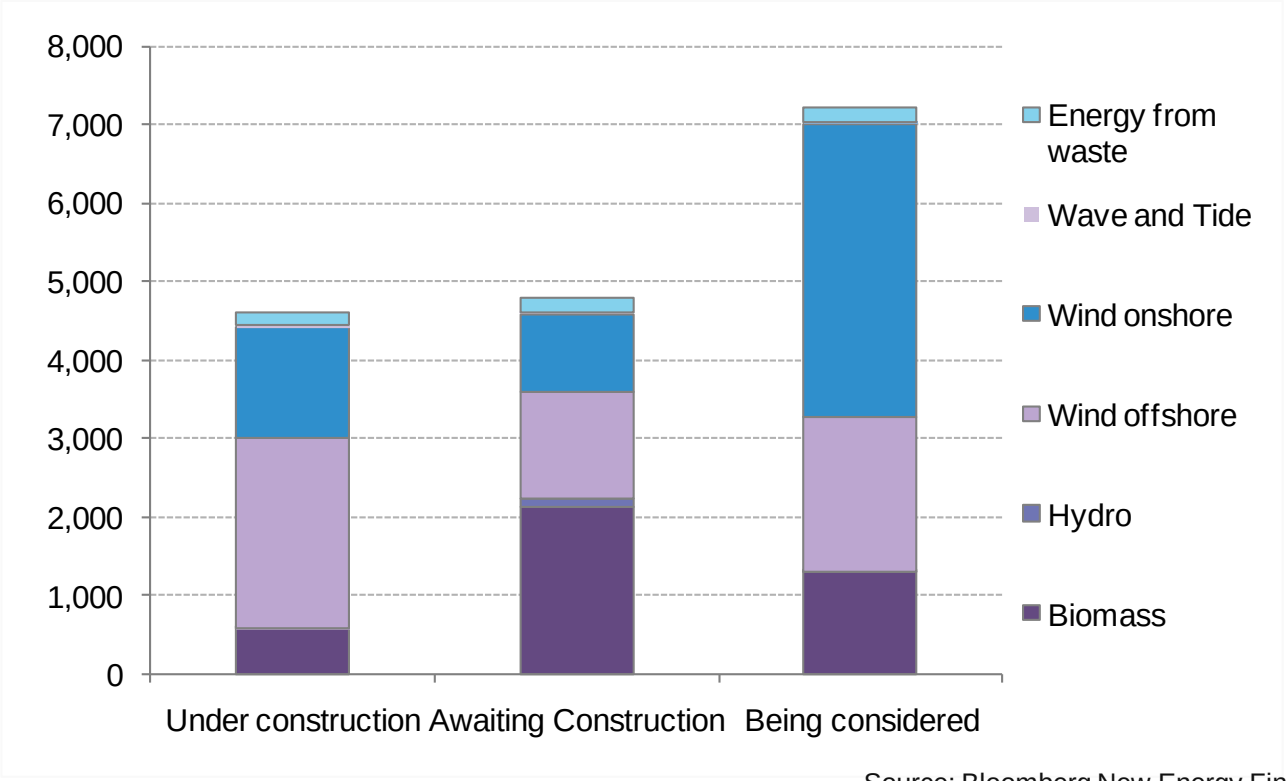


Source: Bloomberg New Energy Finance

By 2020, Great Britain is set to lose around 19GW of thermal capacity due to age, environmental legislation (the Large Combustion Plant Directive) and the full auctioning of carbon allowances in 2013.

WITH LARGE GROWTH OF RENEWABLES

Nameplate capacity (MW)

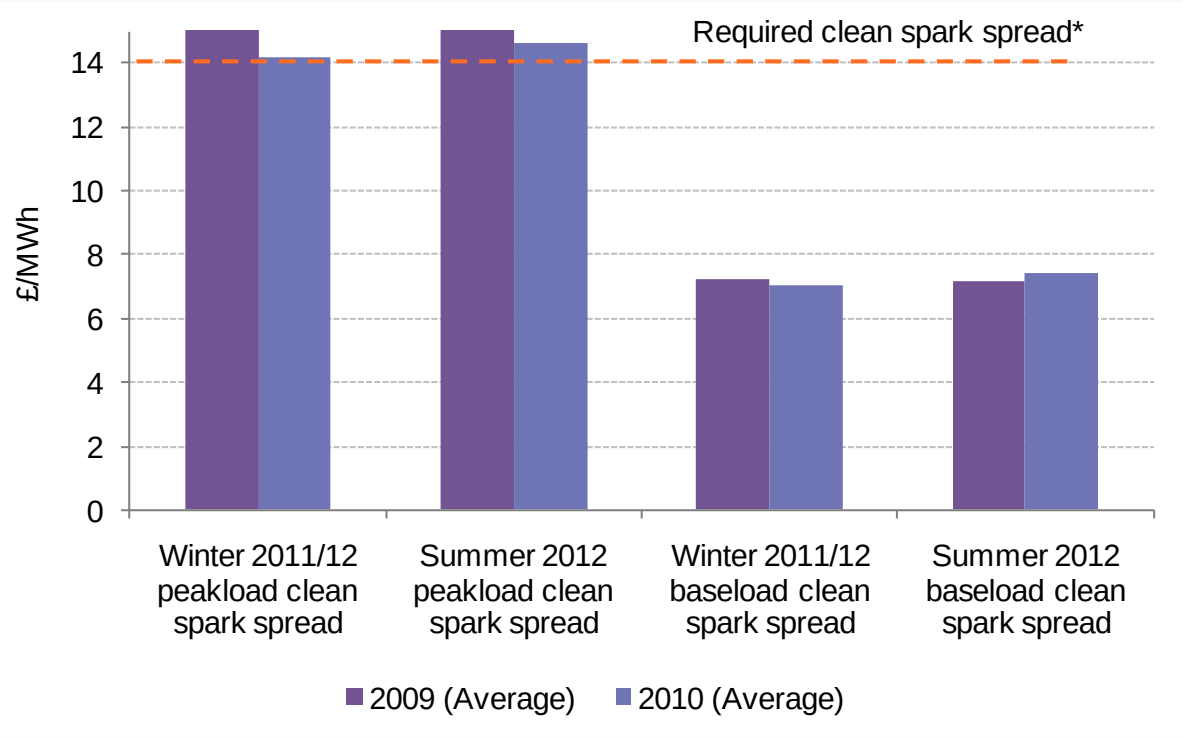


Source: Bloomberg New Energy Finance, DECC.

At the same time, around 16GW of renewables are at various stages of development.

AND POWER PRICES ARE NOT ATTRACTIVE ENOUGH TO INCENTIVISE NEW THERMAL PLANTS

Average forward spark spreads in 2009 and 2010



- The British power market is liberalised
  - Market forces determine the power price
- Current 'spark spreads' are not attractive enough to incentivise new thermal plants
- Power prices will have to rise as plant retirements cause the system to tighten

Source: Bloomberg New Energy Finance

BUT WILL THE MARKET DELIVER WHAT IS NEEDED?

- The lights are not going to turn off anytime soon in Great Britain

- However, a high penetration of renewables is cause for longer term concern
  - What happens on a cold, winter night when the wind is not blowing?
    - The intermittent nature of renewables requires flexible thermal generation to respond to changes in supply
  - Periods of negative prices when demand is low
    - Already seeing this elsewhere (e.g. Germany) as the penetration of renewables increases
    - Decreased rents for existing generators and lower returns for new entrants
  - Ultimately, will the markets deliver the price signals to incentivise the required investment?

- Do these potential challenges warrant pre-emptive intervention in the power market?

GREAT BRITAIN'S ANSWER IS 'NO'

- By proposing a capacity mechanism in its Electricity Market Reform proposals, Great Britain is departing from the 'energy only' concept
  - A capacity mechanism sets a price for capacity by establishing a separate market for capacity from energy
  - Designed to ensure the lights stay on by ensuring sufficient capacity is on the system

- The government is refining its proposal by considering two approaches
  - Strategic reserve in which capacity is procured when needed
    - Only certain resources targeted
    - Withheld from the market to avoid adverse impacts on power prices
  - Market wide mechanism in which a larger type of resources participate
    - This can be structured in a variety of ways such as auctions or bilateral trades

Source: Bloomberg New Energy Finance

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CLEAN ENERGY INVESTMENT TRENDS IN 2011

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MARKETS

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Carbon Capture & Storage
Power
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Nuclear

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