

BRITISH INSTITUTE OF ENERGY ECONOMICS

**ST JOHN'S COLLEGE OXFORD
20 SEPTEMBER 2012**

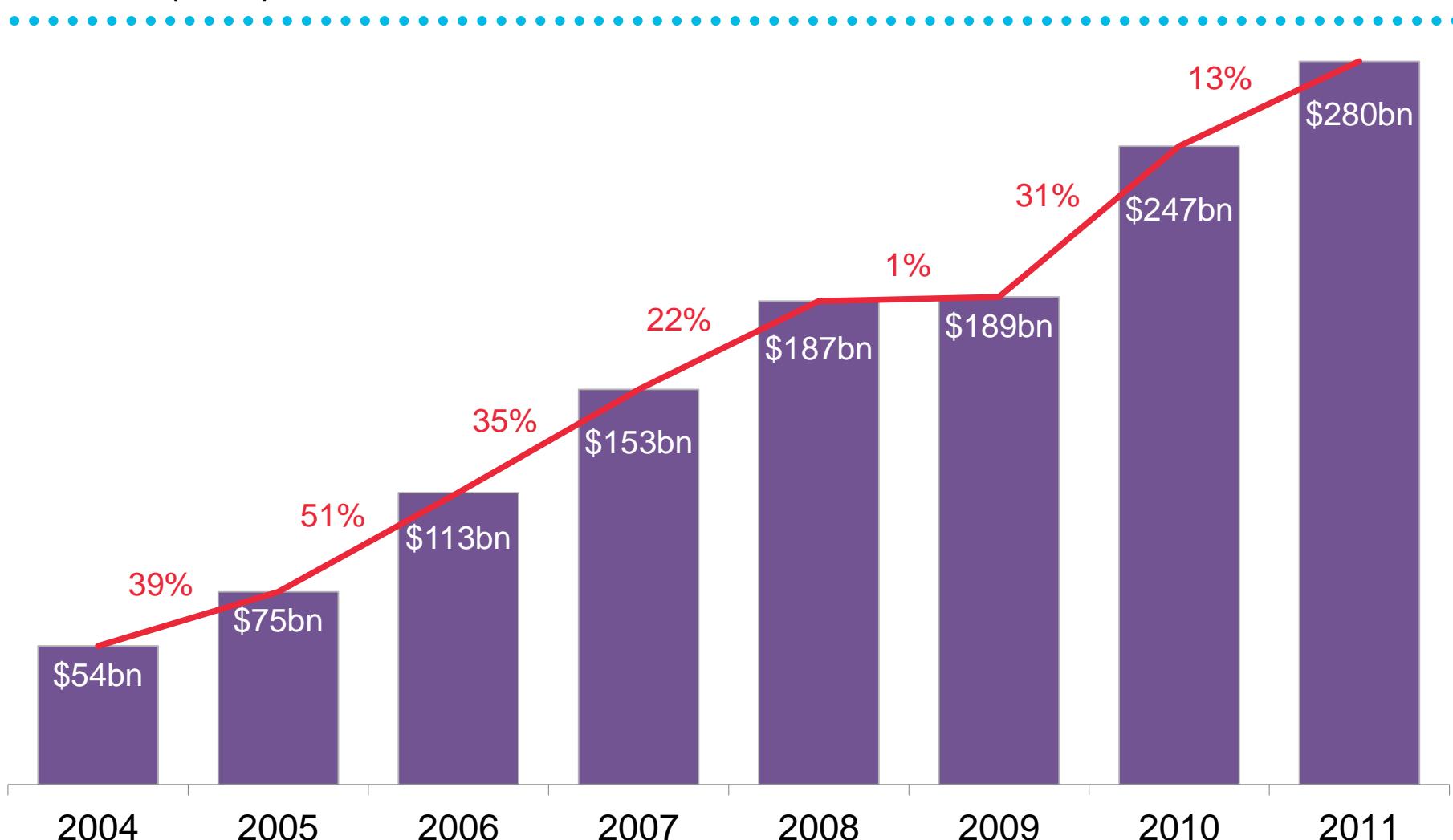
**Michael Liebreich, Chief Executive
Bloomberg New Energy Finance**

Twitter: @MLiebreich



GLOBAL NEW INVESTMENT IN CLEAN ENERGY

2004–11 (\$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

TOTAL INVESTMENT IN CLEAN ENERGY

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In energy, a billion dollars
isn't cool. You know what's
cool?

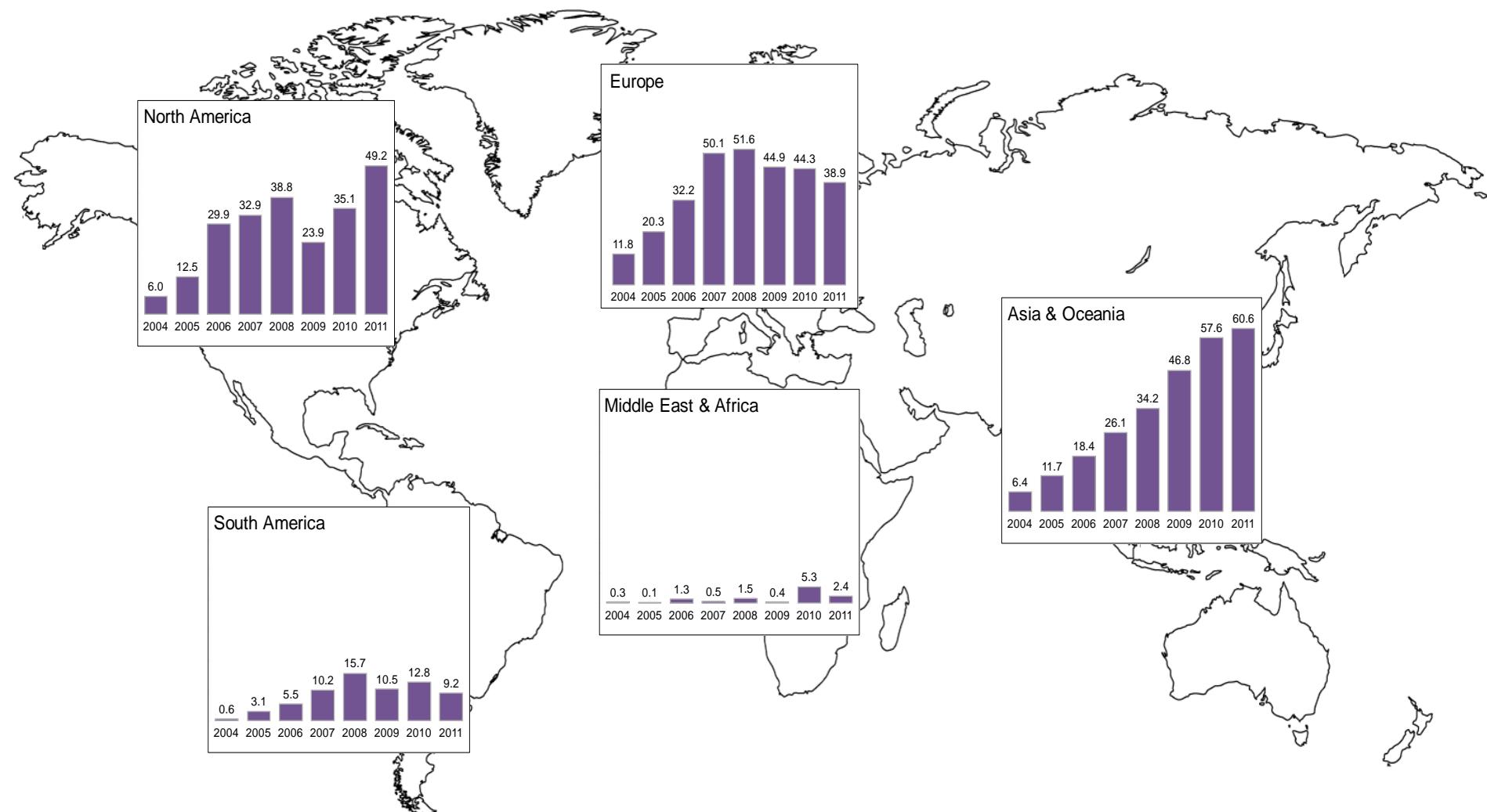
A trillion dollars.

That's cool



Source: Bloomberg New Energy Finance, Columbia Pictures

FINANCIAL NEW INVESTMENT IN RENEWABLE ENERGY BY REGION, 2004-2011 (\$BN)



Note: New investment volume adjusts for re-invested equity. Total values include estimates for undisclosed deals. This comparison does not include small-scale projects or R&D estimates.

Source: Bloomberg New Energy Finance

NEX CLEAN ENERGY INDEX 2003 – 2012 YTD

.....
NEX
NASDAQ
S&P 500

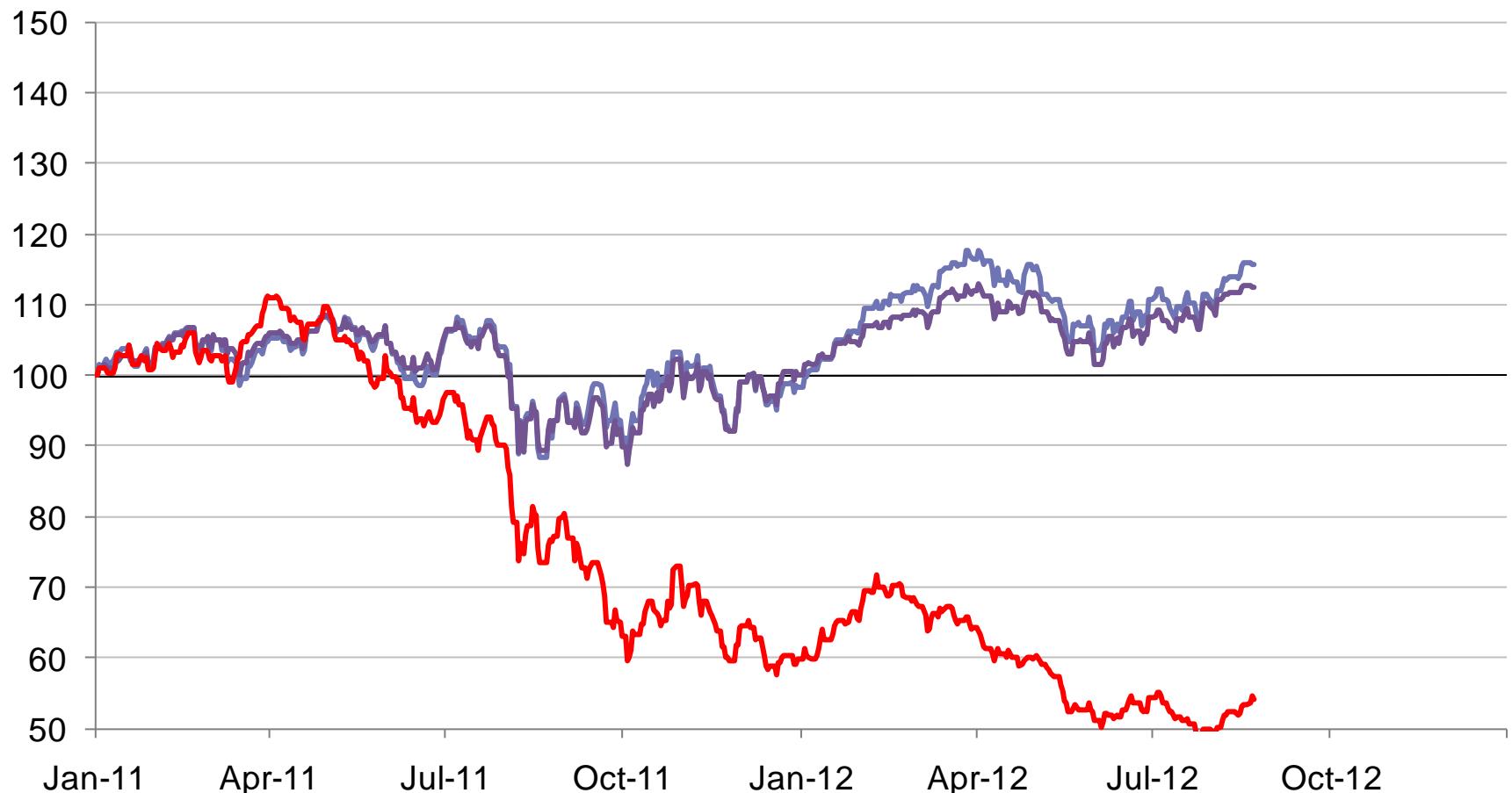


Note: Values as of 22 August 2012; NASDAQ and S&P 500 rebased to 100 on 01 Jan 2003

Source: Bloomberg New Energy Finance

NEX CLEAN ENERGY INDEX 2011 – 2012 YTD

.....
NEX
NASDAQ
S&P 500

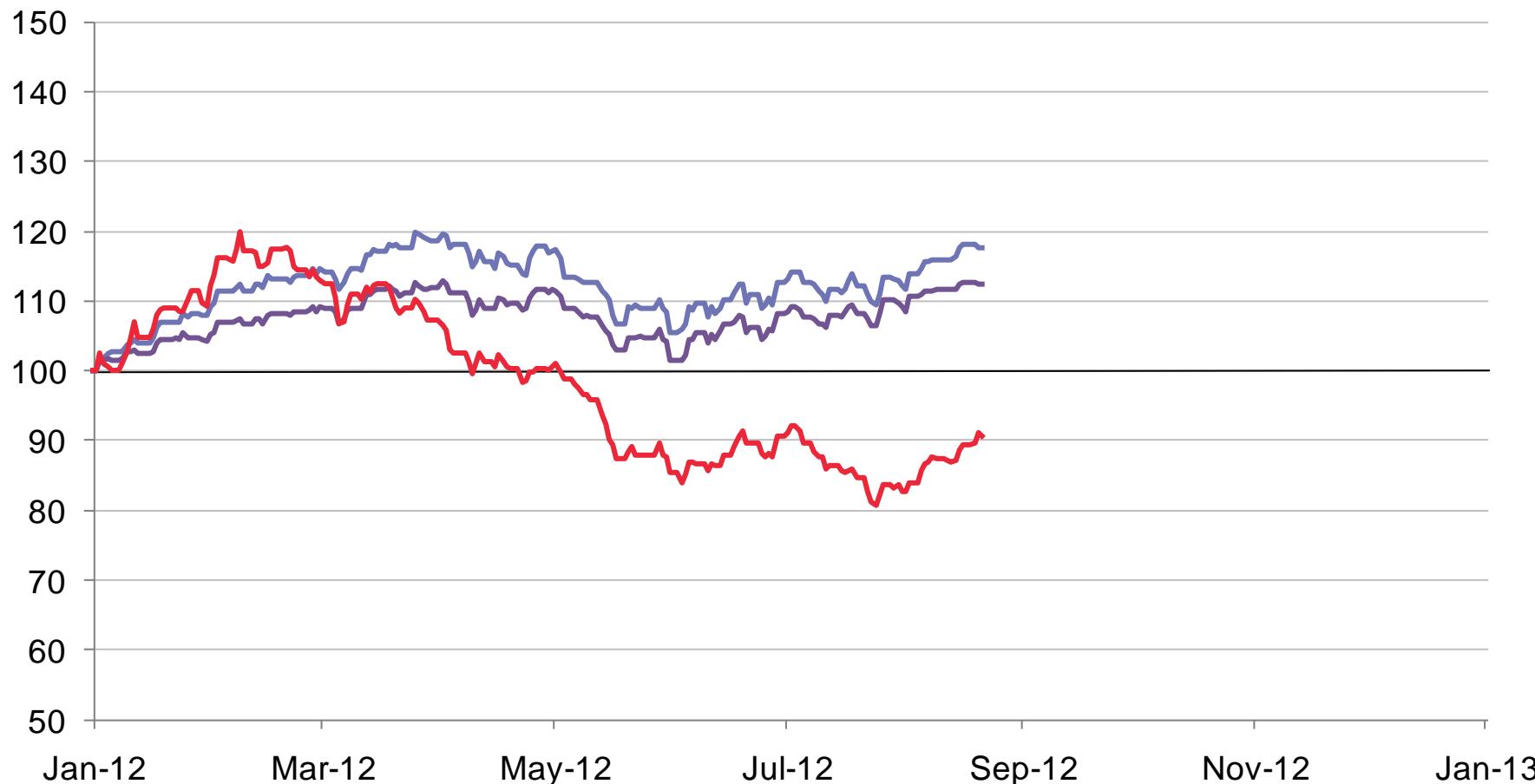


Note: Values as of 22 August 2012; NASDAQ and S&P 500 rebased to 100 on 01 Jan 2011.

Source: Bloomberg New Energy Finance

NEX CLEAN ENERGY INDEX 2012 YTD

● NEX
■ NASDAQ
■ S&P 500



Note: Values as of 22 August 2012; NASDAQ and S&P 500 rebased to 100 on 01 Jan 2012.

Source: Bloomberg New Energy Finance

UNCOMPETITIVE TECHNOLOGY

.....



Source: Bloomberg

EUROPEAN FINANCIAL CRISIS

.....



Photo: Bloomberg

US POLITICAL CRISIS

.....

*He's going to stop us from
drilling our way to energy
independence!*



*He's ignoring the really bad
thing beginning with C which
we can't mention any more!*



NEW ENERGY FINANCE UNDERLYING THESIS, 2004

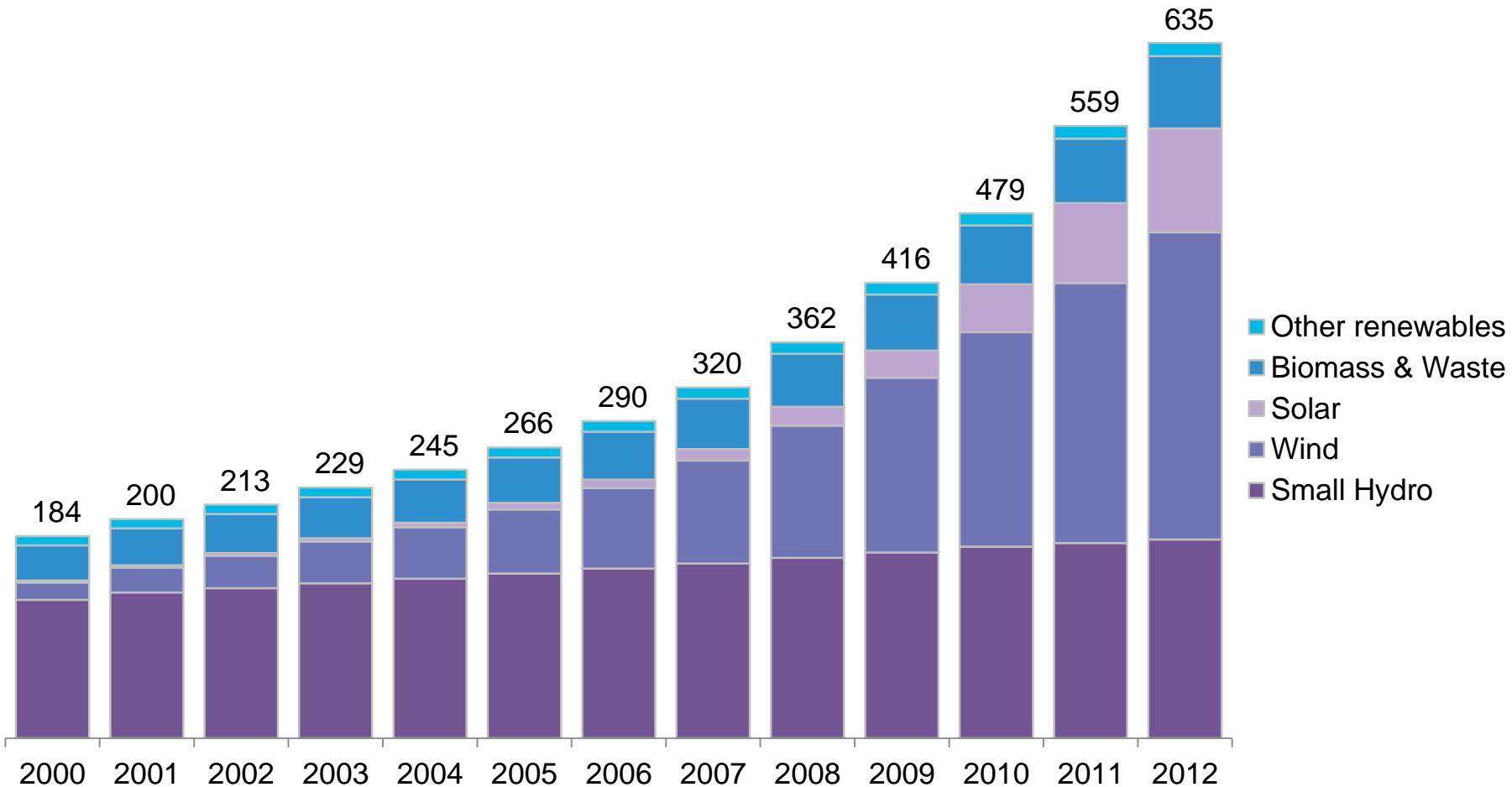
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Fundamental re-engineering of the world's energy industry around low carbon, more secure solutions and architecture

- Will cost trillions
- Will take decades
- Will be supported by government actions
- Will be funded largely by capital markets

Source: New Energy Finance

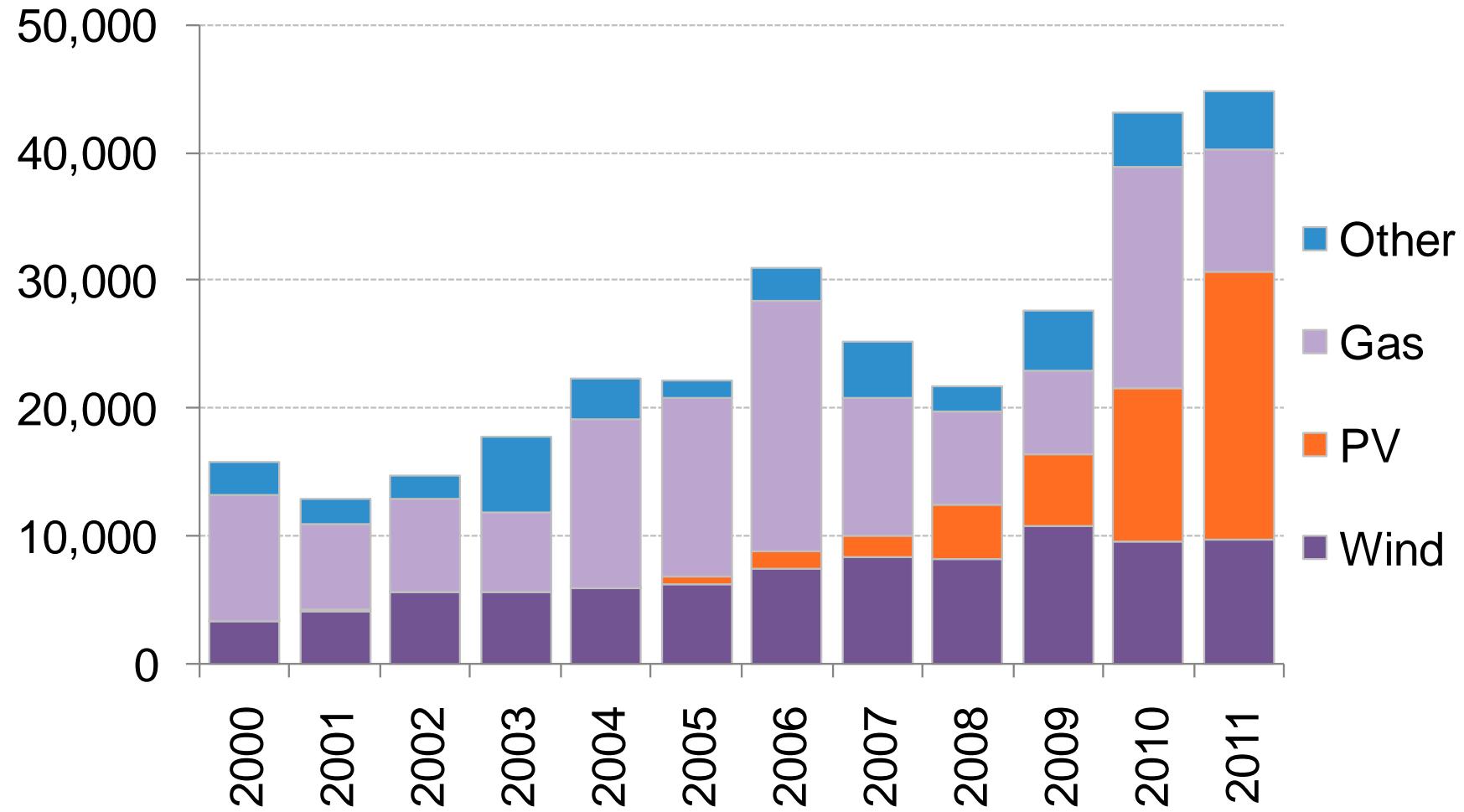
GLOBAL CUMULATIVE RENEWABLE ENERGY CAPACITY INSTALLATIONS BY SECTOR, 2000–12 (GW)



Note: Other renewables includes geothermal and marine

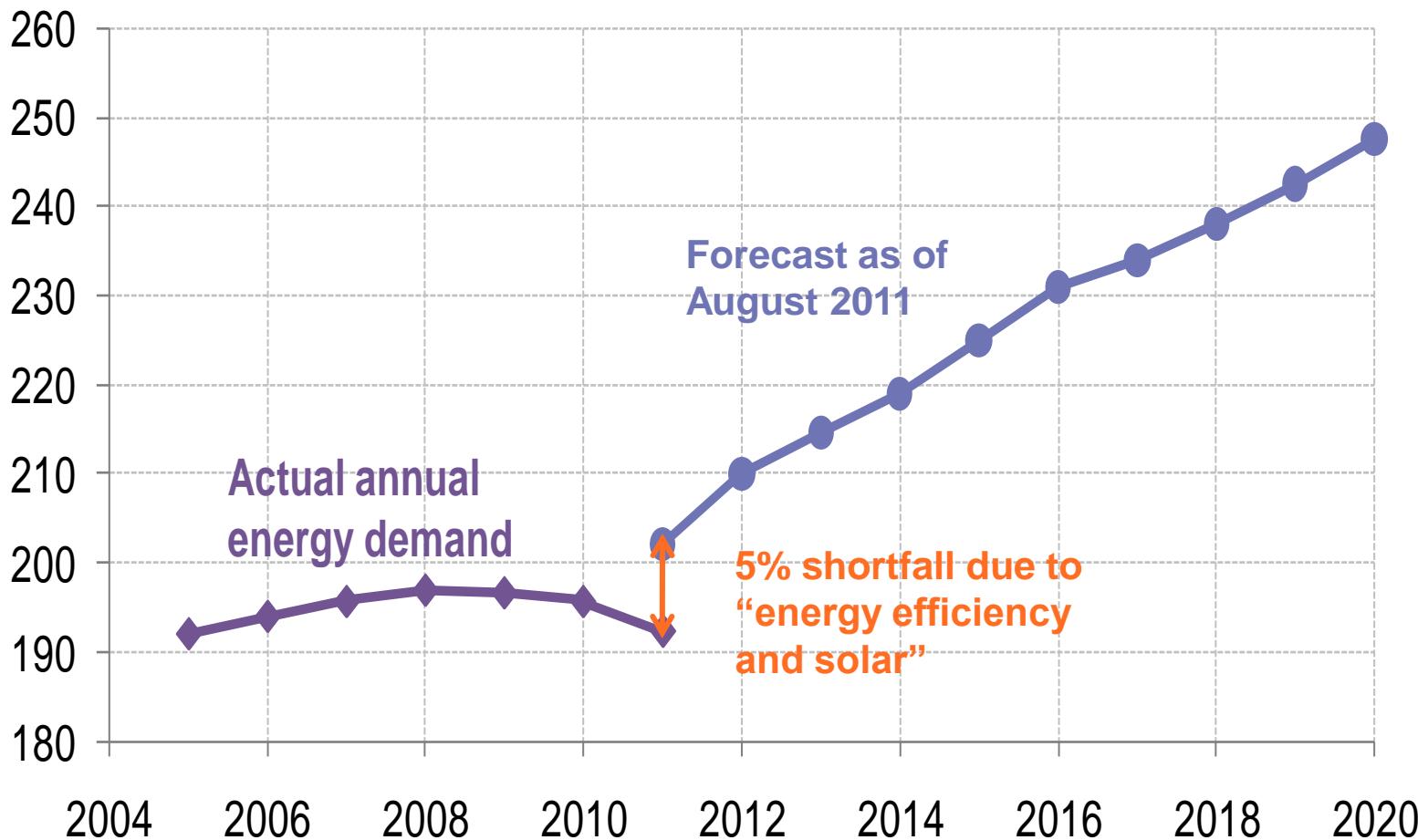
Source: Bloomberg New Energy Finance

EU NET CAPACITY ADDITIONS (GW)



Source: EWEA, Bloomberg New Energy Finance,

AUSTRALIA ACTUAL VS FORECASTED ELECTRICITY DEMAND, 2005–2020 (TWH)



Source: Australian Energy Market Operator, Bloomberg
New Energy Finance

INDUSTRY IN TRANSITION

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1. Cost competitiveness
2. Supply chain
3. Intelligence (smart grid / big data, internet of things, etc)
4. Advanced transportation
5. Next-gen bioenergy
6. Geographic diversity

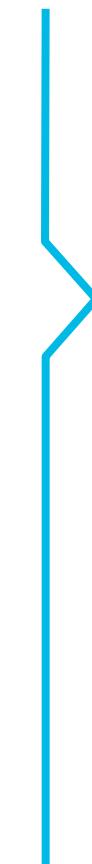
Source: New Energy Finance

TS ELIOT, THE HOLLOW MEN, 1925

“

“Between the idea
And the reality
Between the motion
And the act
Falls the Shadow.

”



TS ELIOT, THE HOLLOW MEN, 1925

“

“Between the idea
And the reality
Between the motion
And the act
Falls the Shadow.

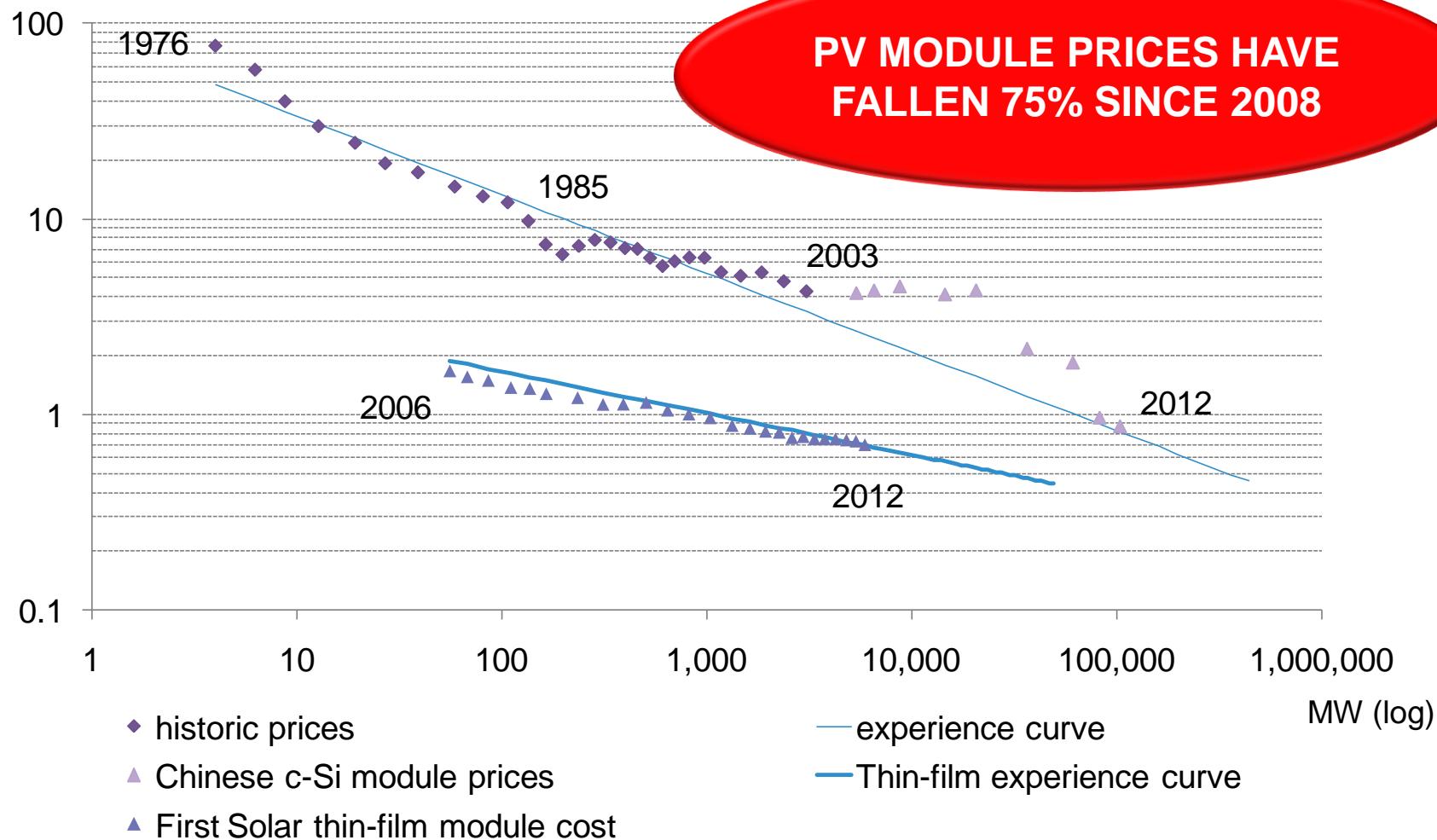


”

“This is the way the world ends.
Not with a bang but a whimper.”

PV MODULE PRICES, 1976–2012

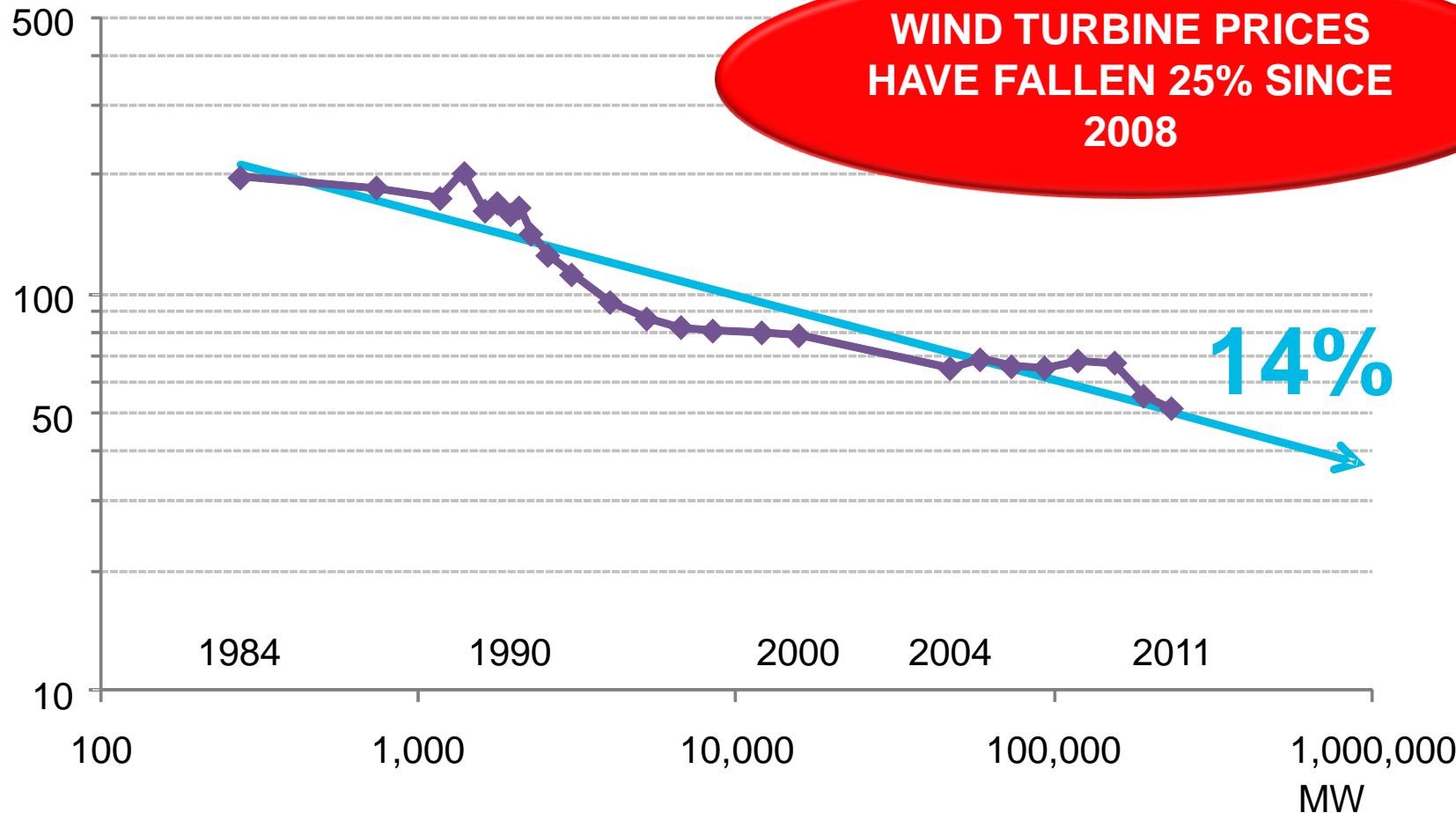
(\$/W)



Notes: Inflation adjustment using US PPI, R² of c-Si regression = 0.94, R² of FSLR regression = 0.98; data since 2007 based on Bloomberg New Energy Finance Solar Spot Market Price Index

Source: Paul Maycock, Bloomberg New Energy Finance, FSLR filings

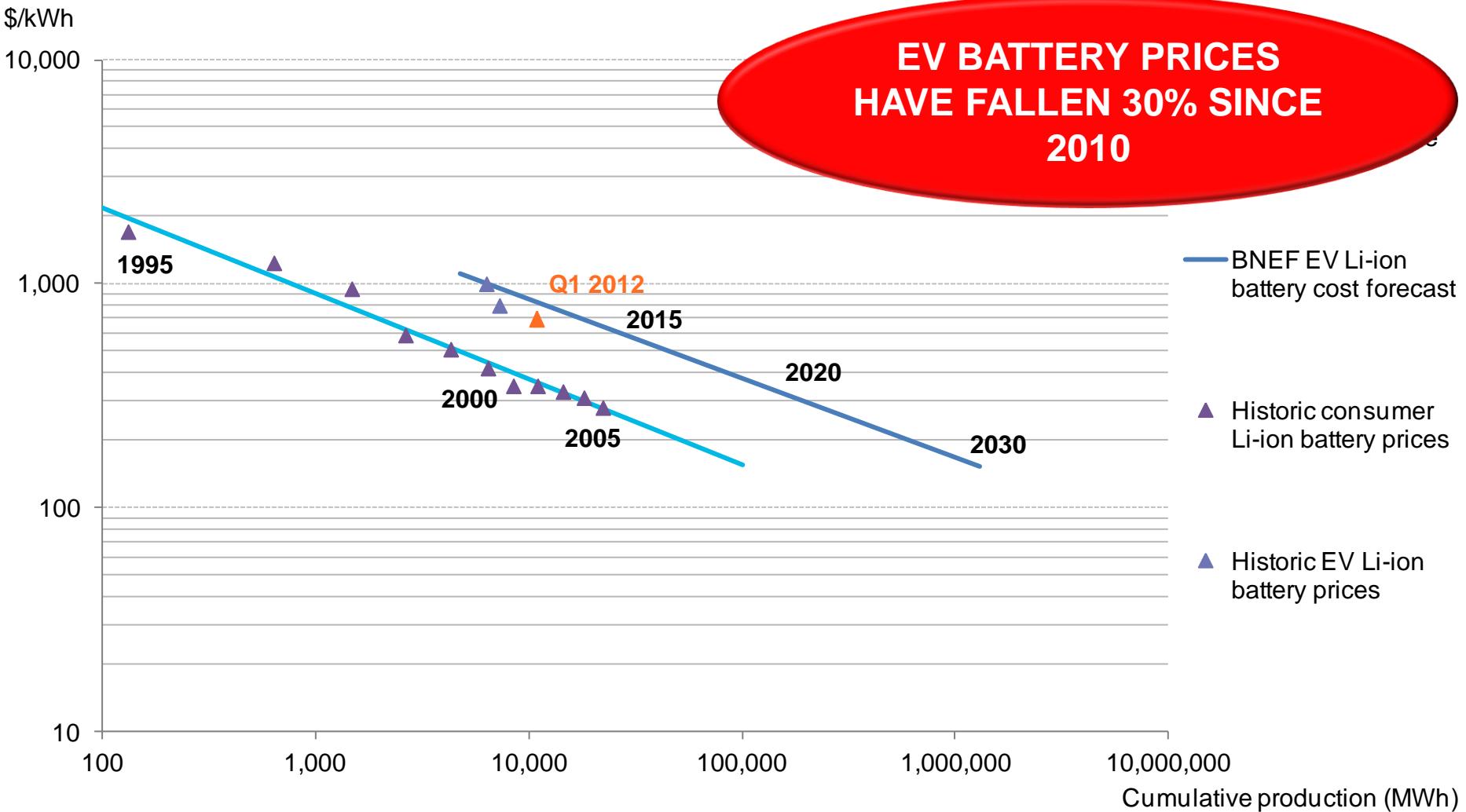
AVERAGE LEVELISED COST OF ONSHORE WIND, 1984-2011 (€/MWH)



Note: Learning curve (blue line) is least square regression: $R^2 = 0.88$ and 14% learning rate.

Source: Bloomberg New Energy Finance, ExTool

LITHIUM-ION BATTERY EXPERIENCE CURVE



Source: Battery University, MIIT, IIT, Bloomberg New Energy Finance

GRID-COMPETITIVE CLEAN ENERGY

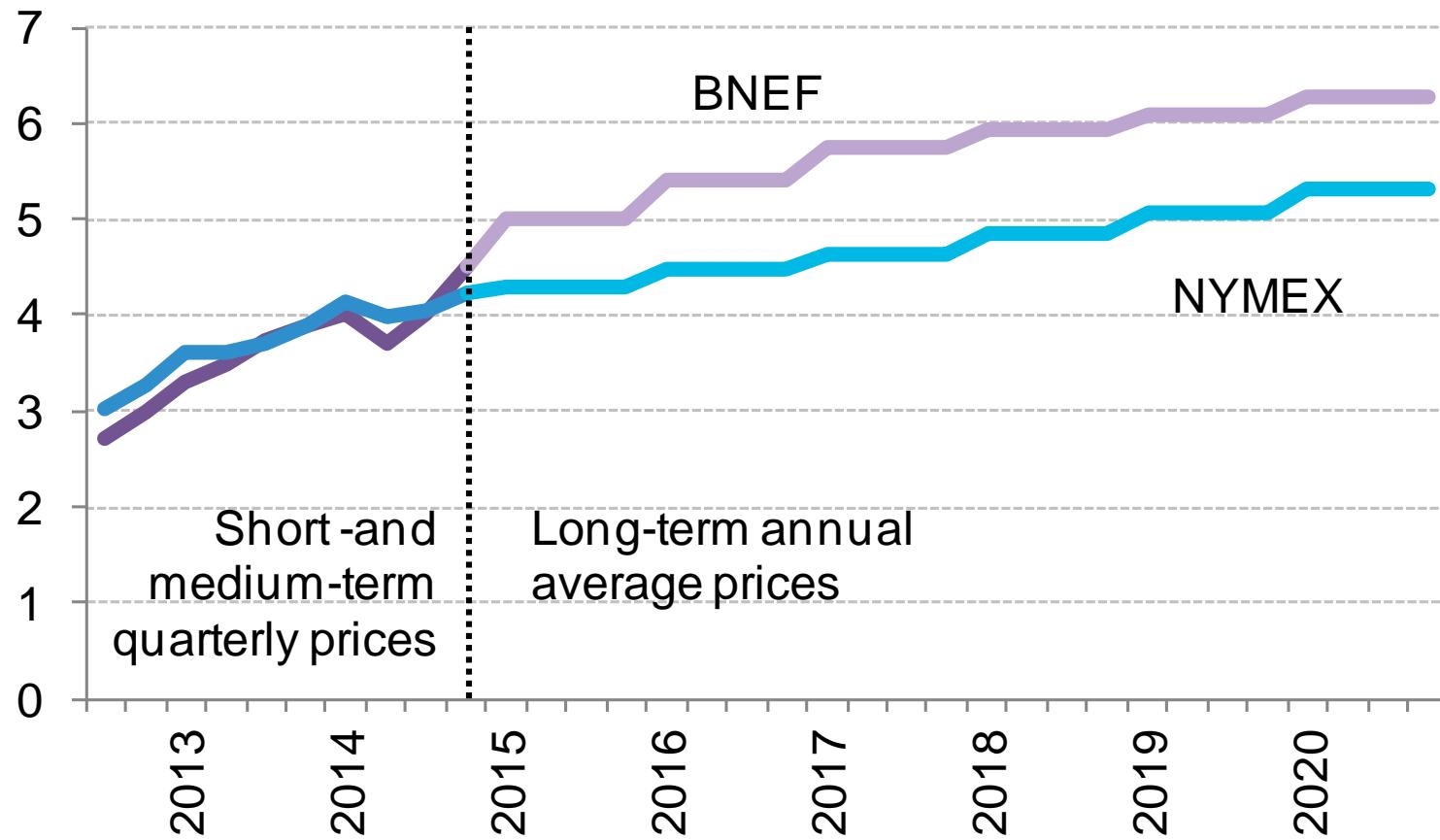
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Source: Bloomberg New Energy Finance

BLOOMBERG NEW ENERGY FINANCE GAS PRICE FORECASTS VS. NYMEX STRIP (\$/MMBTU)

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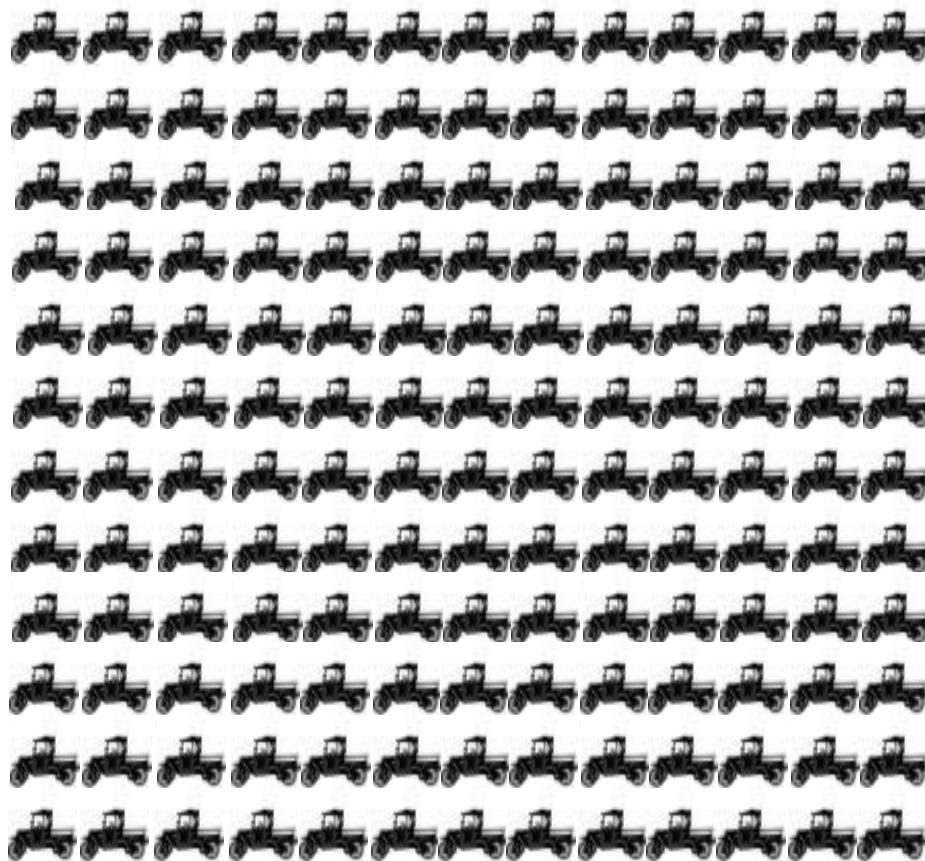


Source: Bloomberg New Energy Finance

SUPPLY CHAIN CASE STUDY - US CAR MANUFACTURERS

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1903



2012 Major Manufacturers

CHRYSLER



Source: Bloomberg New Energy Finance

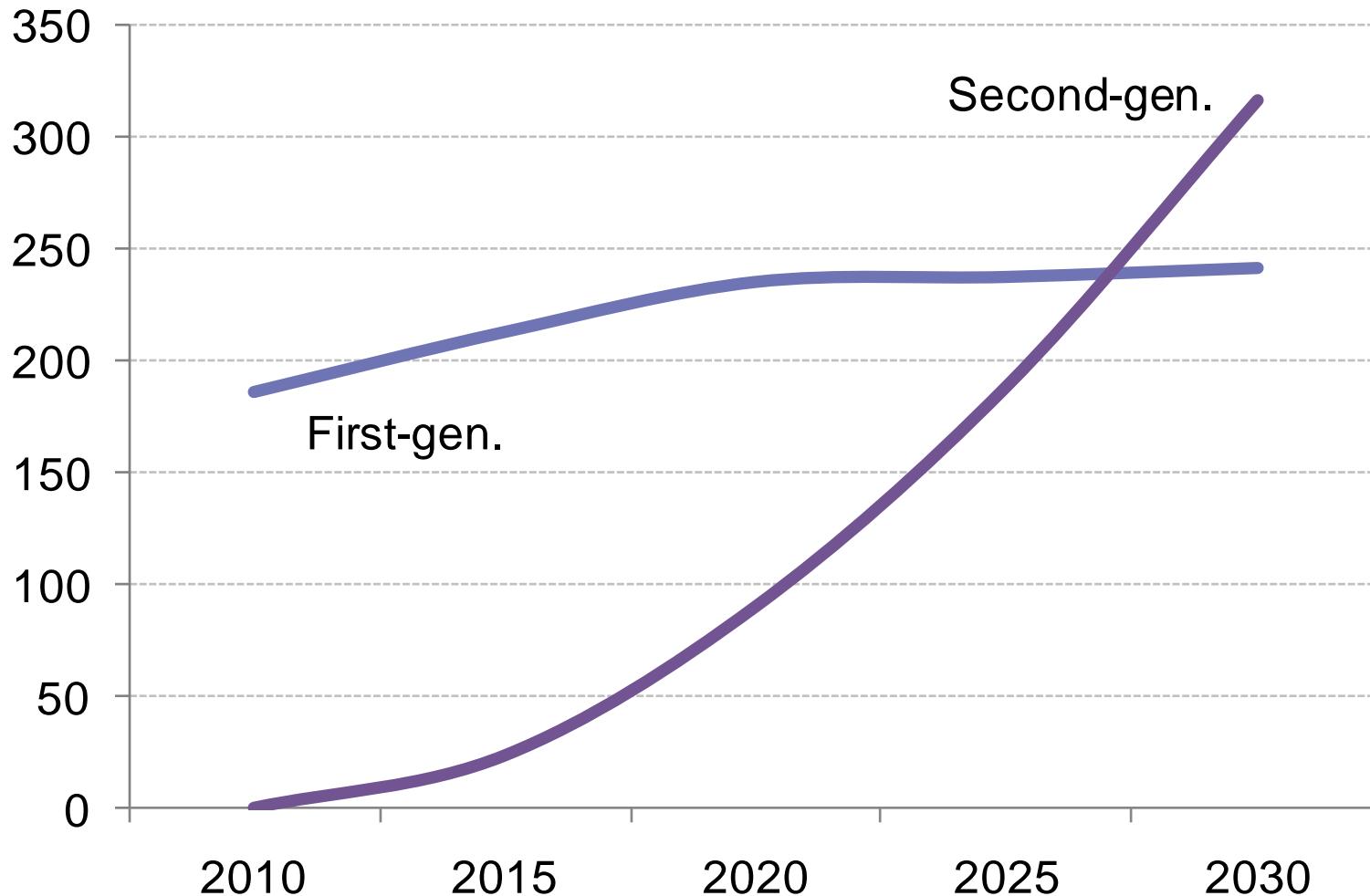
GLOBAL LIGHT VEHICLE SALES, 2011 ('000 VEHICLES)



Global auto & light commercial
vehicle production

Source: Bloomberg New Energy Finance

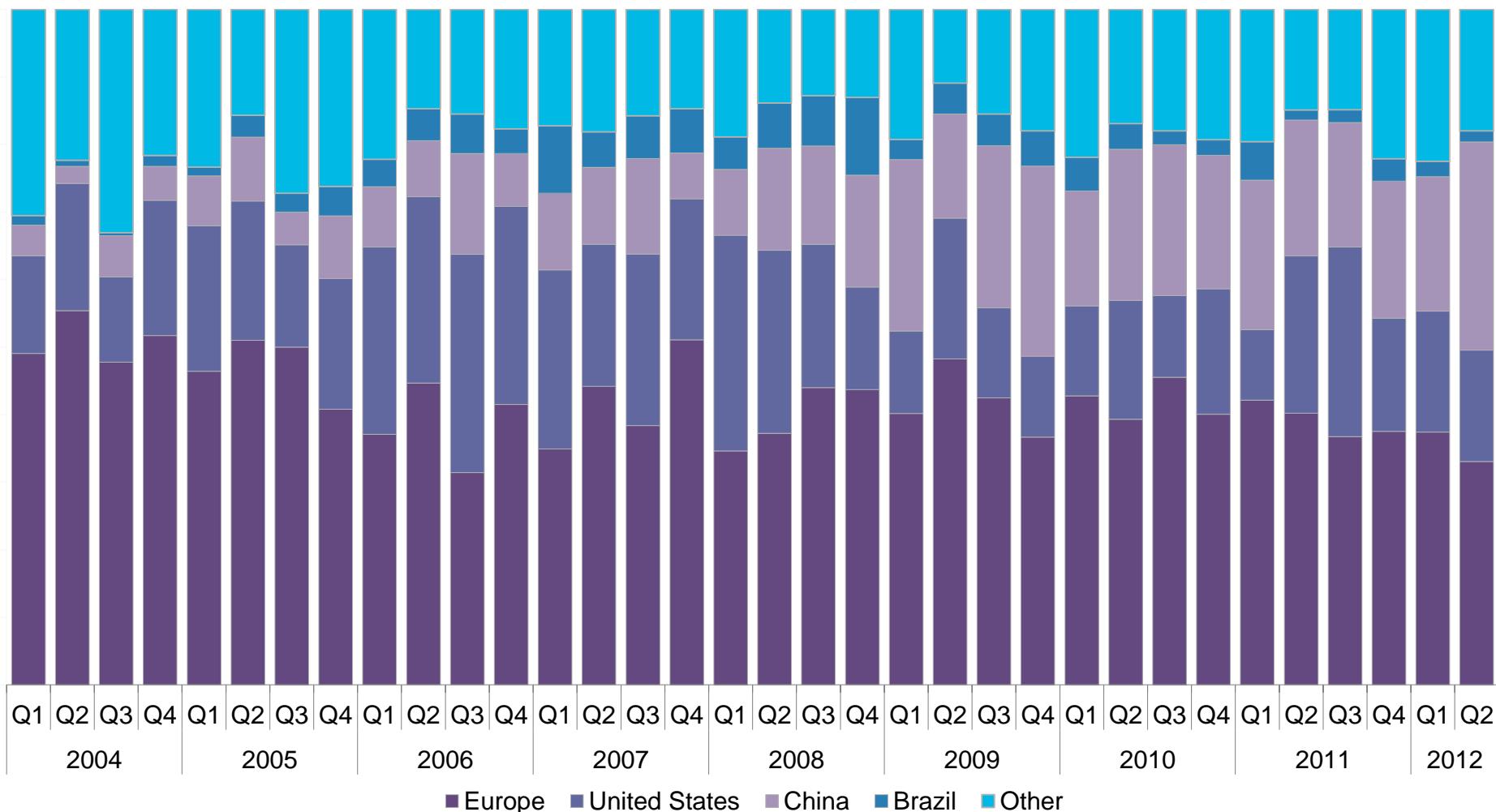
FIRST- VERSUS SECOND-GENERATION BIOFUEL PRODUCTION CAPACITY, 2010-30 (BN LITRES)



Source: Bloomberg New Energy Finance

NEW INVESTMENT IN CLEAN ENERGY BY REGION

Q1 2004–Q2 2012 (\$BN)



Note: Total values include estimates for undisclosed deals. Excludes corporate and government R&D.

Now includes small distributed capacity & adjustment for re-invested equity. [NEW](#)

Source: Bloomberg New Energy Finance

INDUSTRY IN TRANSITION

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3. Intelligence (smart grid / big data, internet of things, etc)
4. Advanced transportation
5. Next-gen bioenergy
6. Geographic diversity

Source: New Energy Finance

INDUSTRY IN TRANSITION

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1. Cost competitiveness
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3. Intelligence (smart grid / big data, internet of things, etc)
4. Advanced transportation
5. Next-gen bioenergy
6. Geographic diversity
7. Capital markets

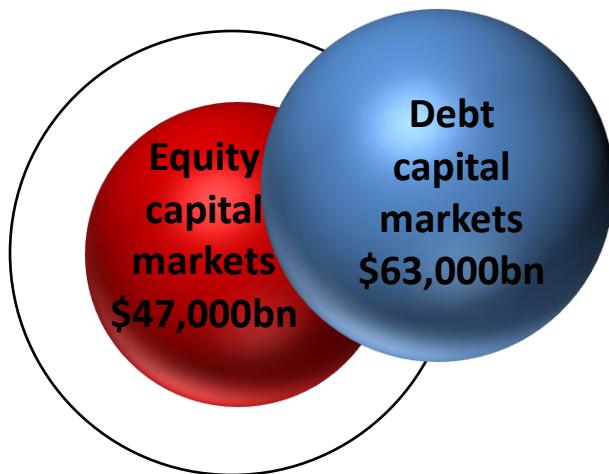
Source: New Energy Finance

GLOBAL CAPITAL MARKET SIZES IN PERSPECTIVE (\$BN)



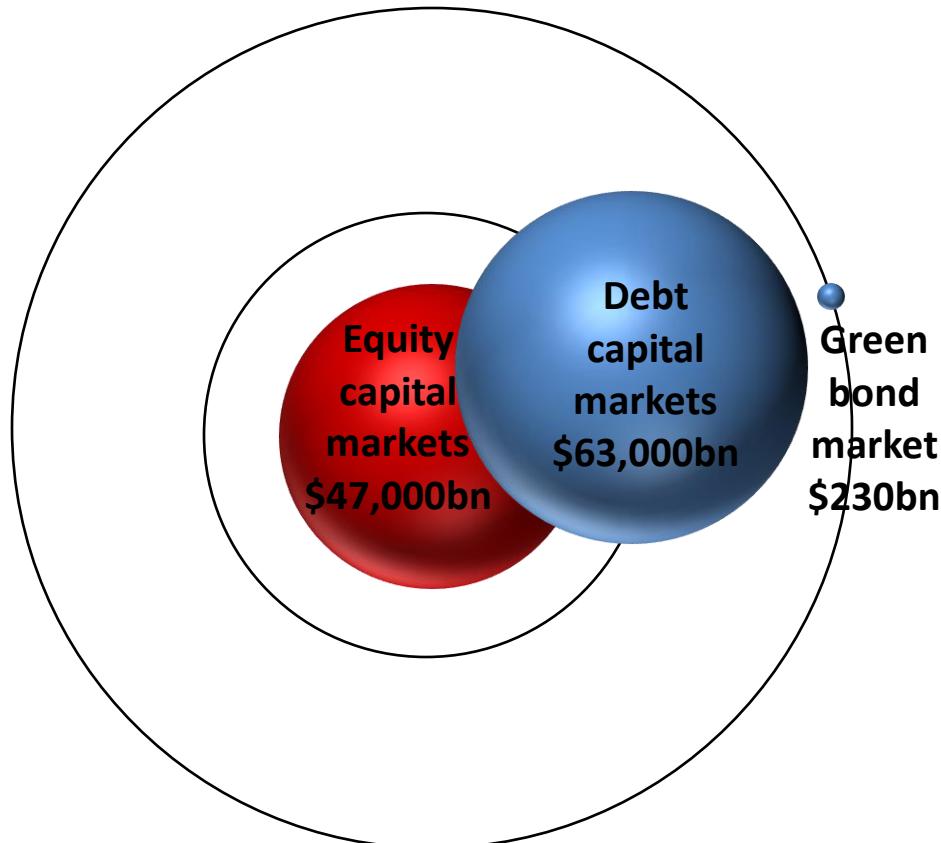
Source: Bloomberg New Energy
Finance, Bank for International
Settlements, Citi

GLOBAL CAPITAL MARKET SIZES IN PERSPECTIVE (\$BN)



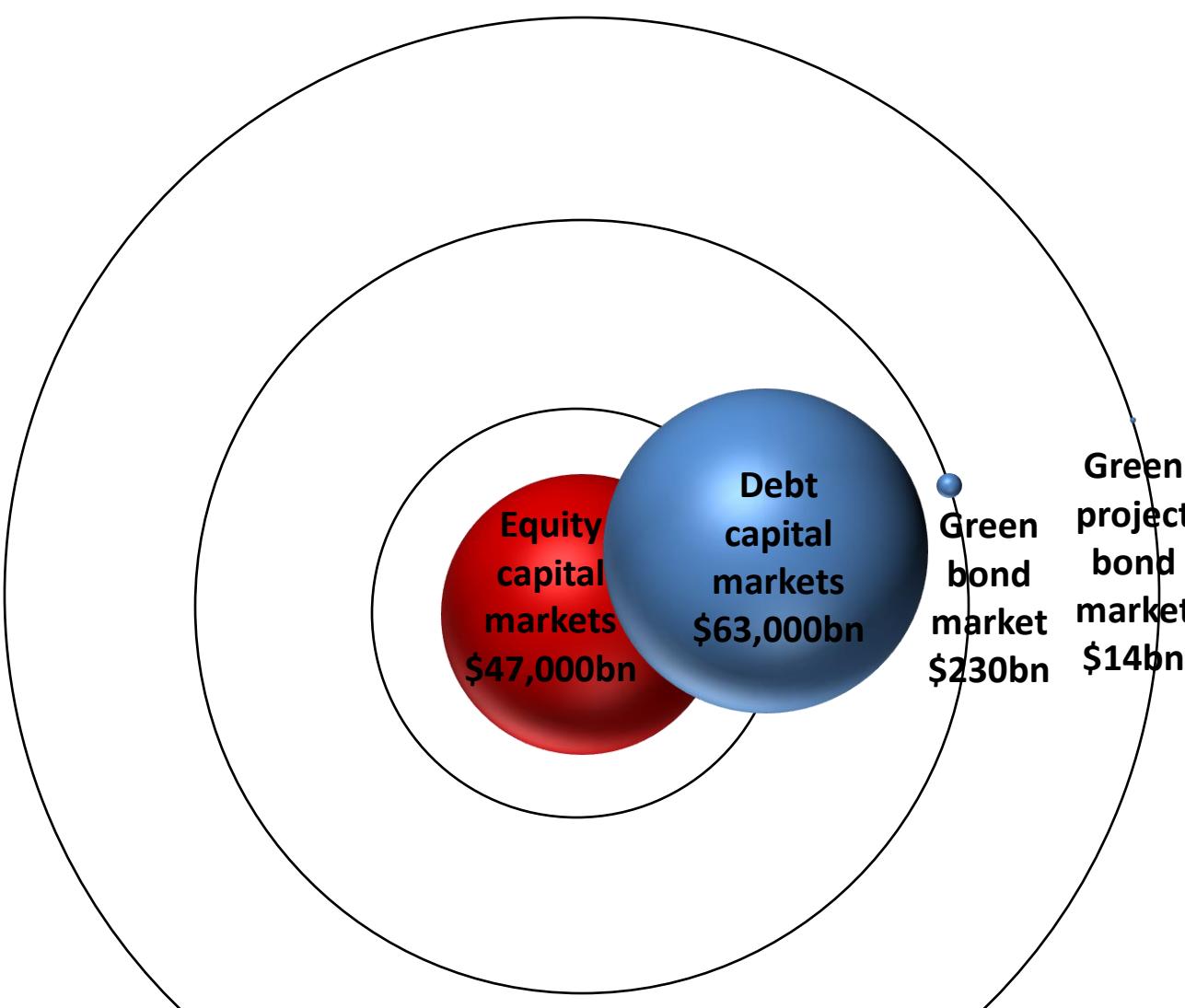
Source: Bloomberg New Energy
Finance, Bank for International
Settlements, Citi

GLOBAL CAPITAL MARKET SIZES IN PERSPECTIVE (\$BN)



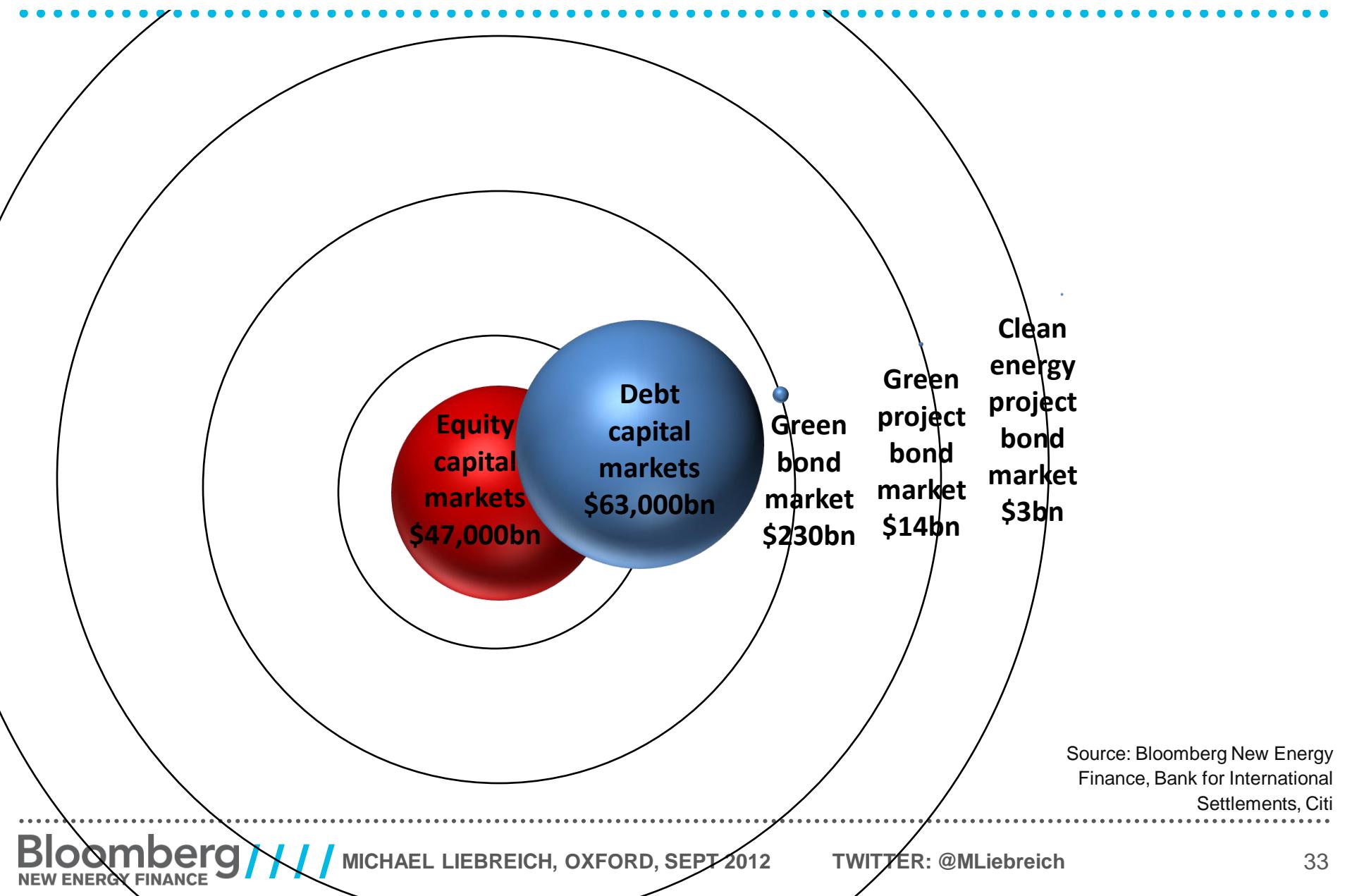
Source: Bloomberg New Energy
Finance, Bank for International
Settlements, Citi

GLOBAL CAPITAL MARKET SIZES IN PERSPECTIVE (\$BN)



Source: Bloomberg New Energy Finance, Bank for International Settlements, Citi

GLOBAL CAPITAL MARKET SIZES IN PERSPECTIVE (\$BN)



Source: Bloomberg New Energy Finance, Bank for International Settlements, Citi

UK CLEAN ENERGY-RELATED POLICY & REGULATION

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- Climate Change Levy
- Renewables Obligation Certificates
- Cap & Trade - EU-ETS
- Cap & Trade - CDM
- Carbon Reduction Commitment
- Climate Change Act
- ROC banding
- Carbon Floor Price
- Feed-in-Tariffs
- Contracts for Difference
- Capacity Market
- CCS Commercialisation Programme
- Accelerated Depreciation for energy efficiency

THANK YOU!

MICHAEL LIEBREICH

TWITTER: @MLiebreich

MARKETS

Renewable Energy

Carbon Markets

Energy Smart Technologies

Renewable Energy Certificates

Carbon Capture & Storage

Power

Water

Nuclear

SERVICES

Insight: research, analysis & forecasting

Industry Intelligence: data & analytics

News & Briefing: daily, weekly & monthly

Applied Research: custom research & data mining

Knowledge Services: Summit, Leadership Forums, Executive
Briefings & workshops

Subscription-based news, data
and analysis to support your
decisions in clean energy, power
and water and the carbon markets

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