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TEN TRENDS IN CLEAN ENERGY INVESTMENT

ARPA-E Workshop

Nathan Serota

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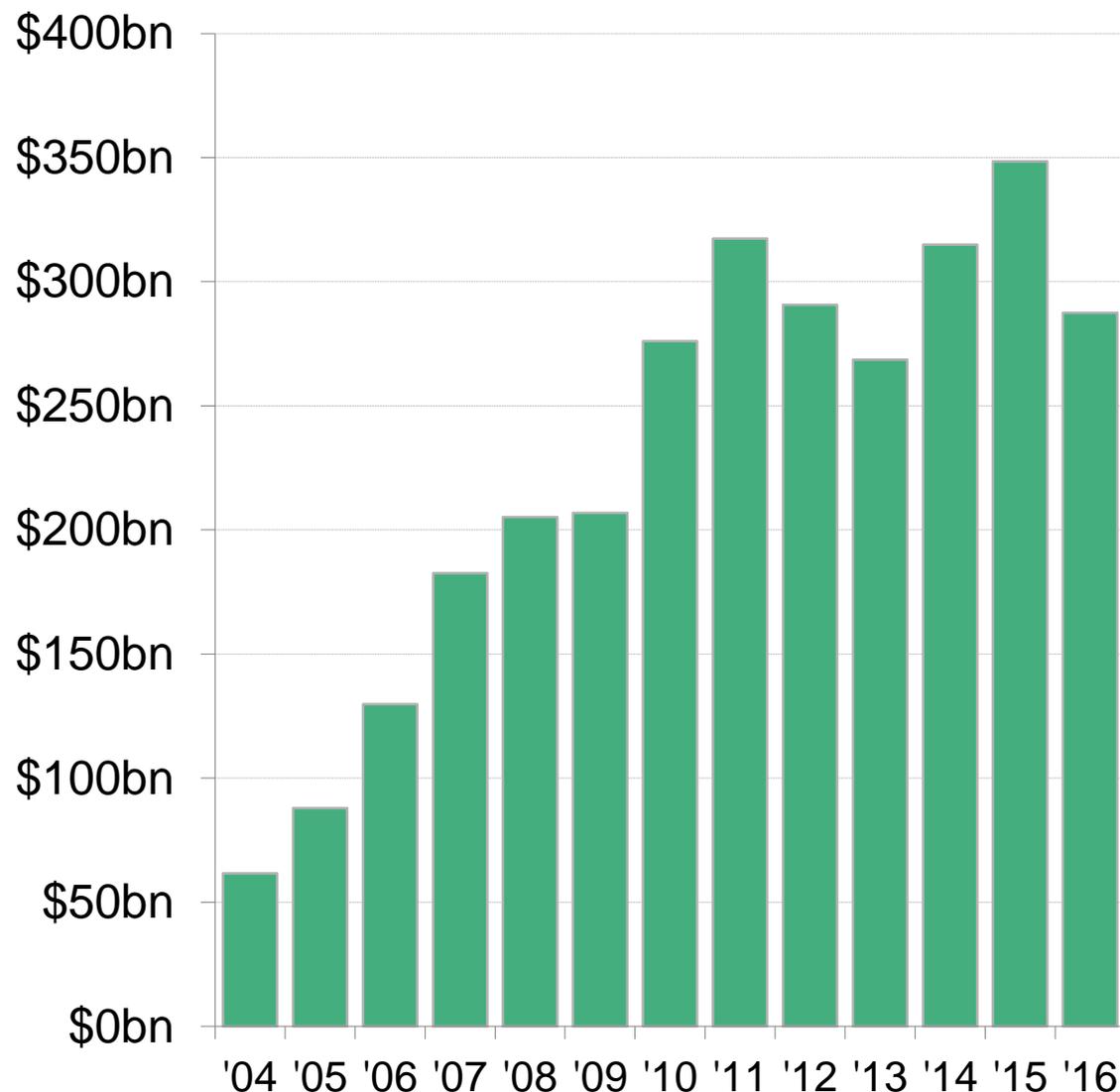
Asia Pacific

Ten trends in clean energy investment

1. Global clean energy investment fell 18% in 2016
2. Clean energy acquisition activity topped \$100bn
3. Green bond issuance boomed, despite the slowdown in 2016 investment
4. A new era in clean energy investment has begun
5. Zero-carbon generation: 81% of all investment under 'business as usual'
6. Meeting 2°C goal requires doubling 'business as usual' investment
7. Clean energy's share of overall venture capital spending is shrinking
8. Early-stage clean energy investment remains below all-time highs
9. Utilities are using venture capital to gain exposure 'behind the meter'
10. Cleantech VC has shifted away from new technology, at least in solar

1. GLOBAL CLEAN ENERGY INVESTMENT FELL 18% IN 2016 (1 OF 3)

New financial investment in clean energy

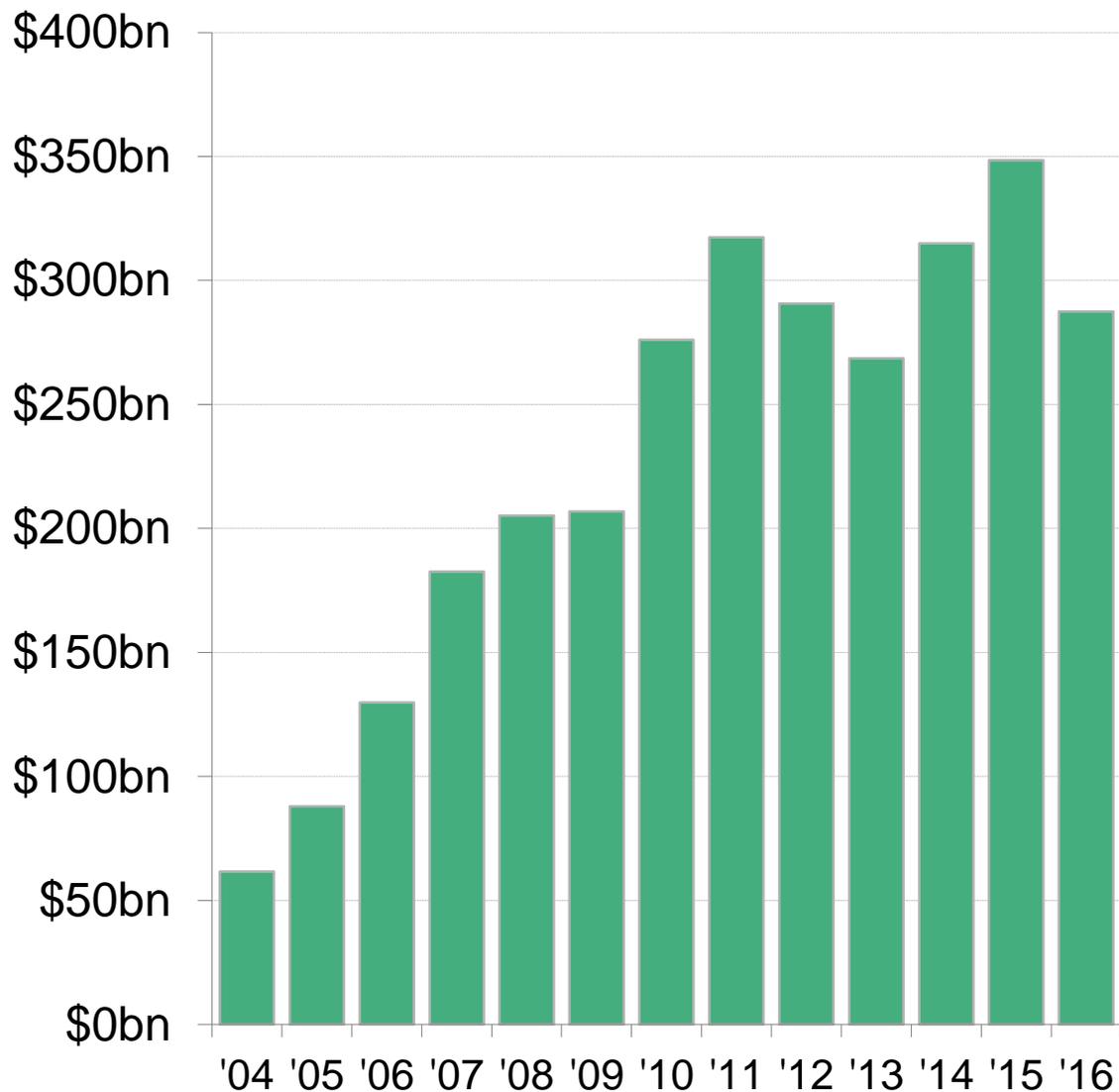


Notes: Total values include estimates for non-disclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects. Nominal USD.

Source: Bloomberg New Energy Finance

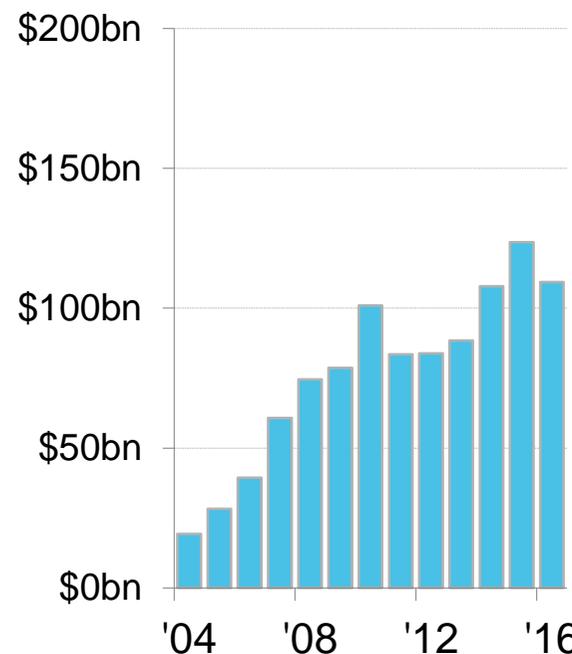
1. GLOBAL CLEAN ENERGY INVESTMENT FELL 18% IN 2016 (2 OF 3)

New financial investment in clean energy

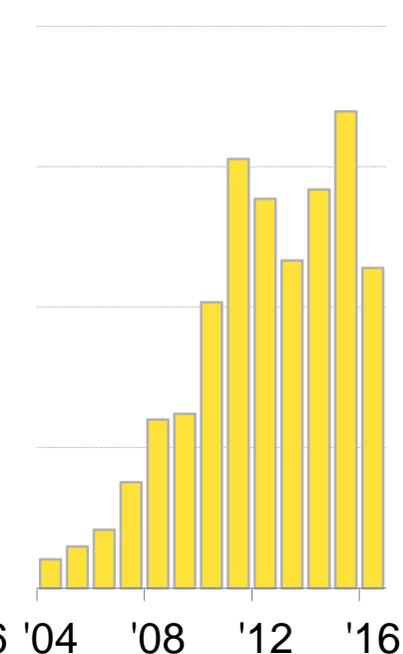


Note: 'EST' is 'energy smart technologies.'

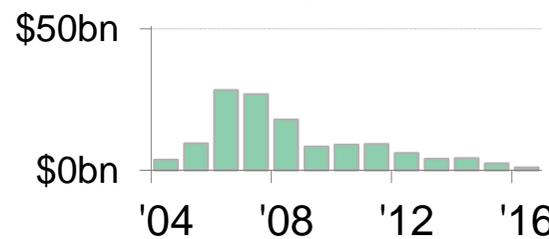
Wind



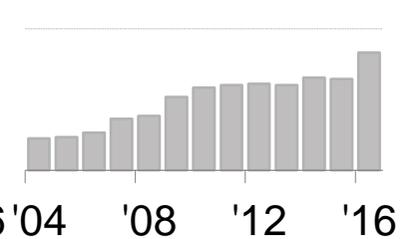
Solar



Biofuels



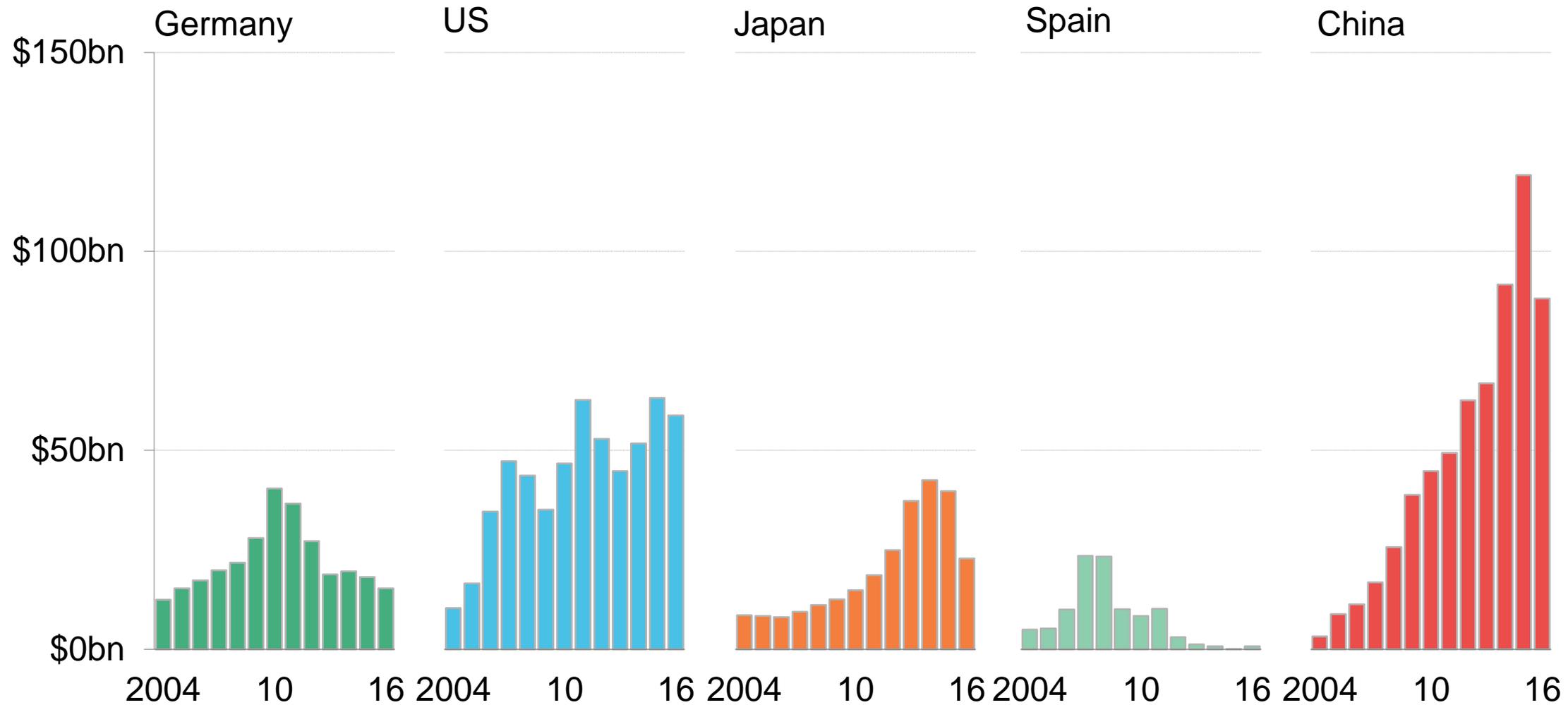
EST



Source: Bloomberg New Energy Finance

1. GLOBAL CLEAN ENERGY INVESTMENT FELL 18% IN 2016 (3 OF 3)

Clean energy investment in key markets, 2004 – 2016

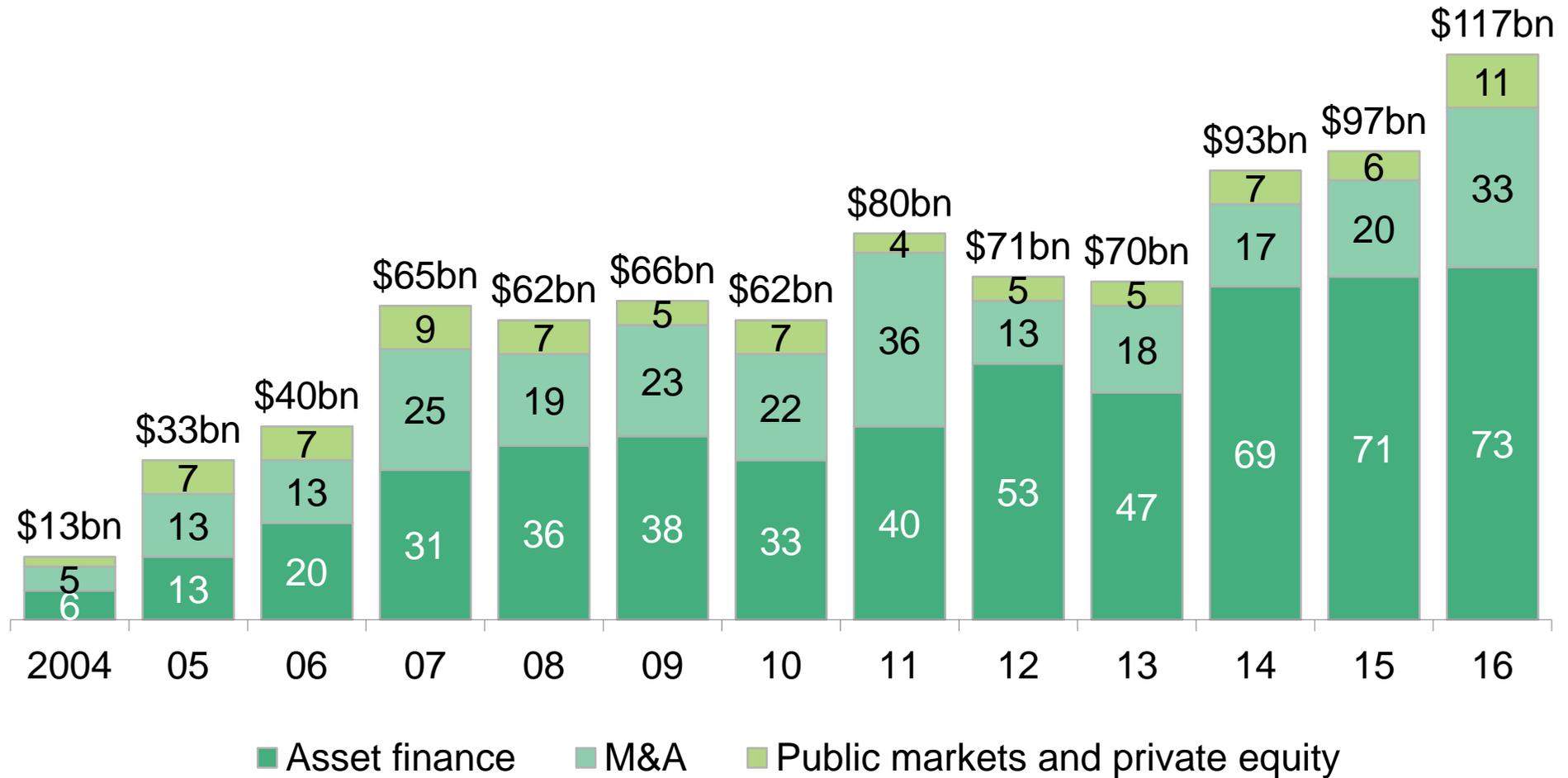


Note: Nominal USD.

Source: Bloomberg New Energy Finance

2. CLEAN ENERGY ACQUISITIONS TOPPED \$100BN

Clean energy acquisition activity by type, 2004 – 2016

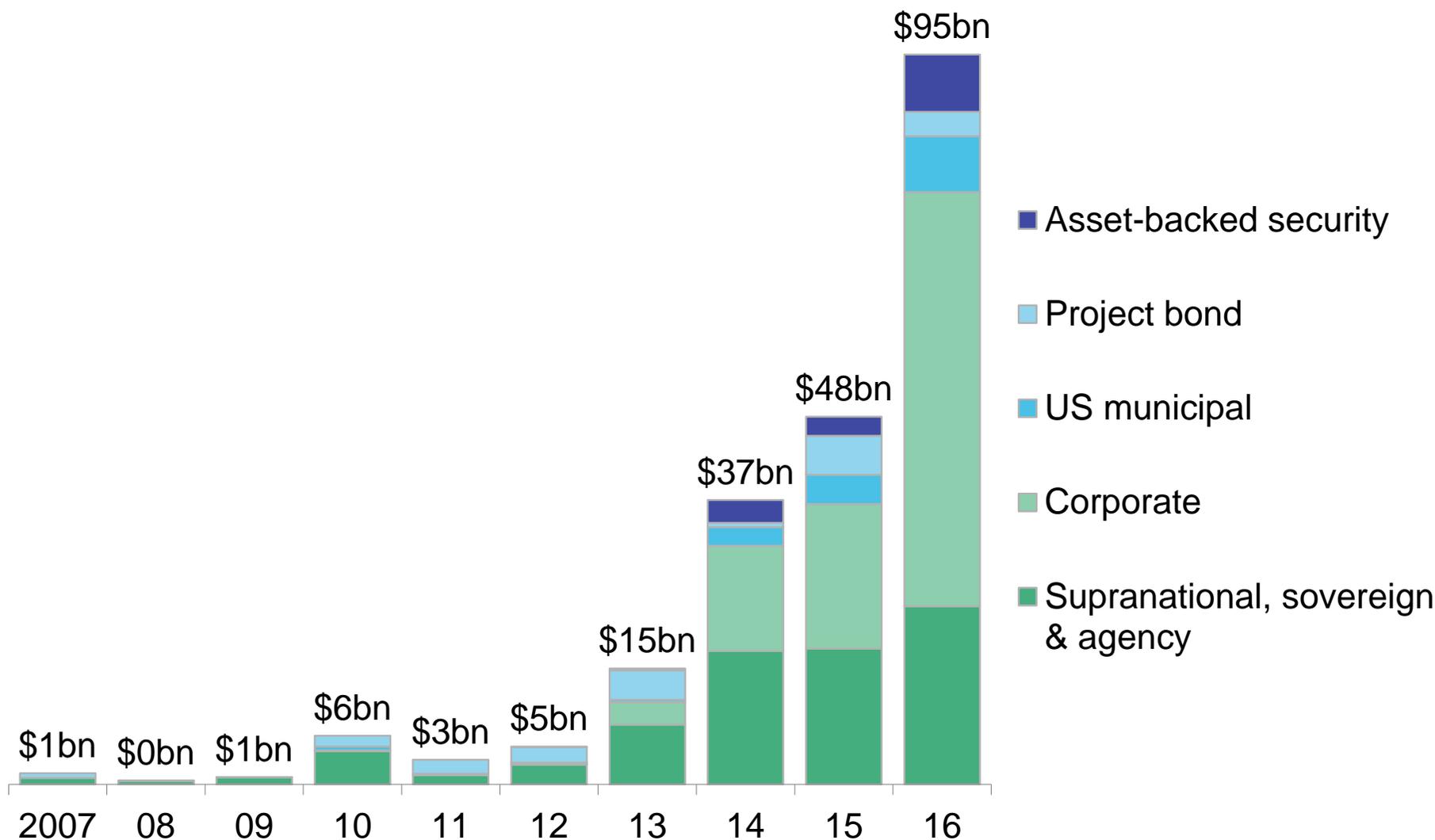


Note: Nominal USD.

Source: Bloomberg New Energy Finance

3. GREEN BOND ISSUANCE BOOMED, DESPITE THE SLOWDOWN IN NEW CLEAN ENERGY INVESTMENT

Total green bond issuance by bond type, 2007 – 2016

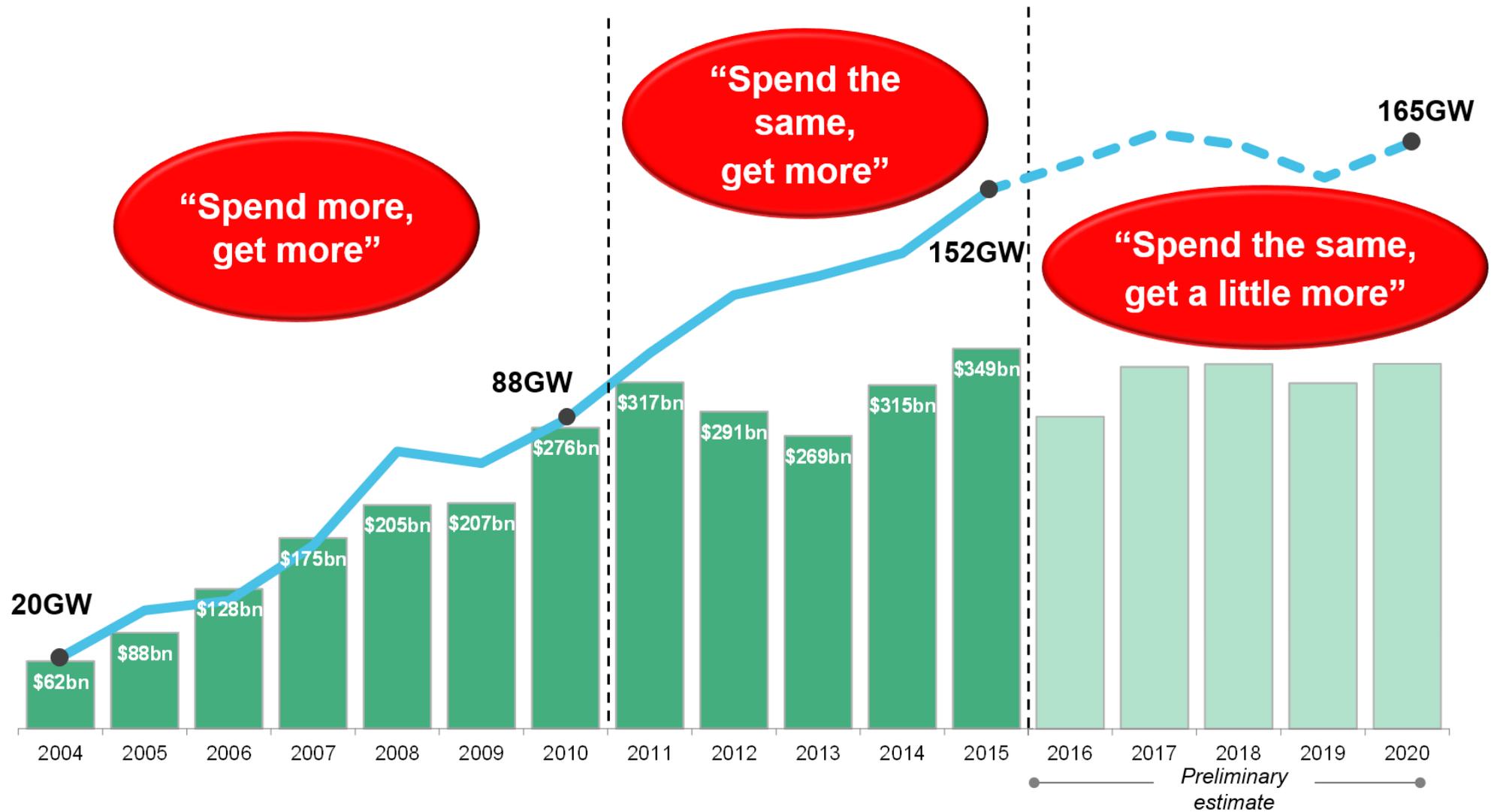


Notes: ABS stands for asset-back securities. Bonds issued in other currencies are converted to USD using the exchange rate on the day of issue

Source: Bloomberg New Energy Finance

4. WE ARE ENTERING A NEW ERA IN CLEAN ENERGY INVESTMENT

Global clean energy investment vs capacity installations, 2004 – 2015

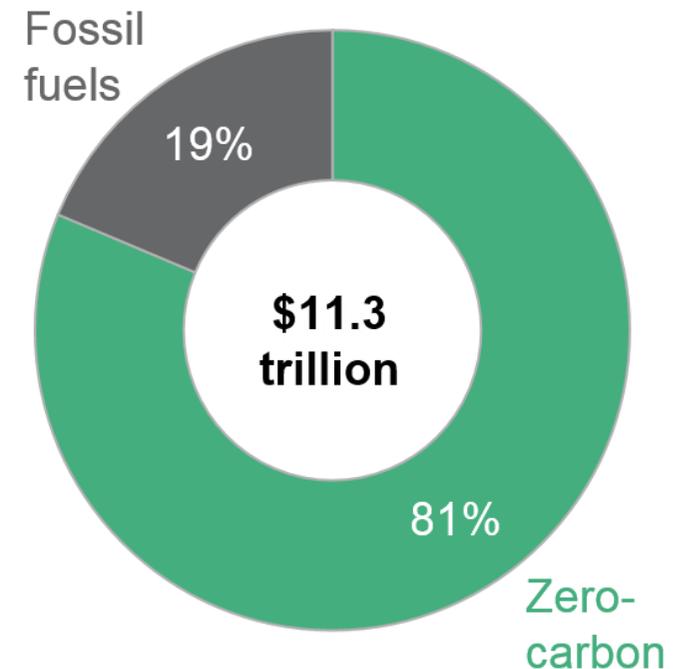
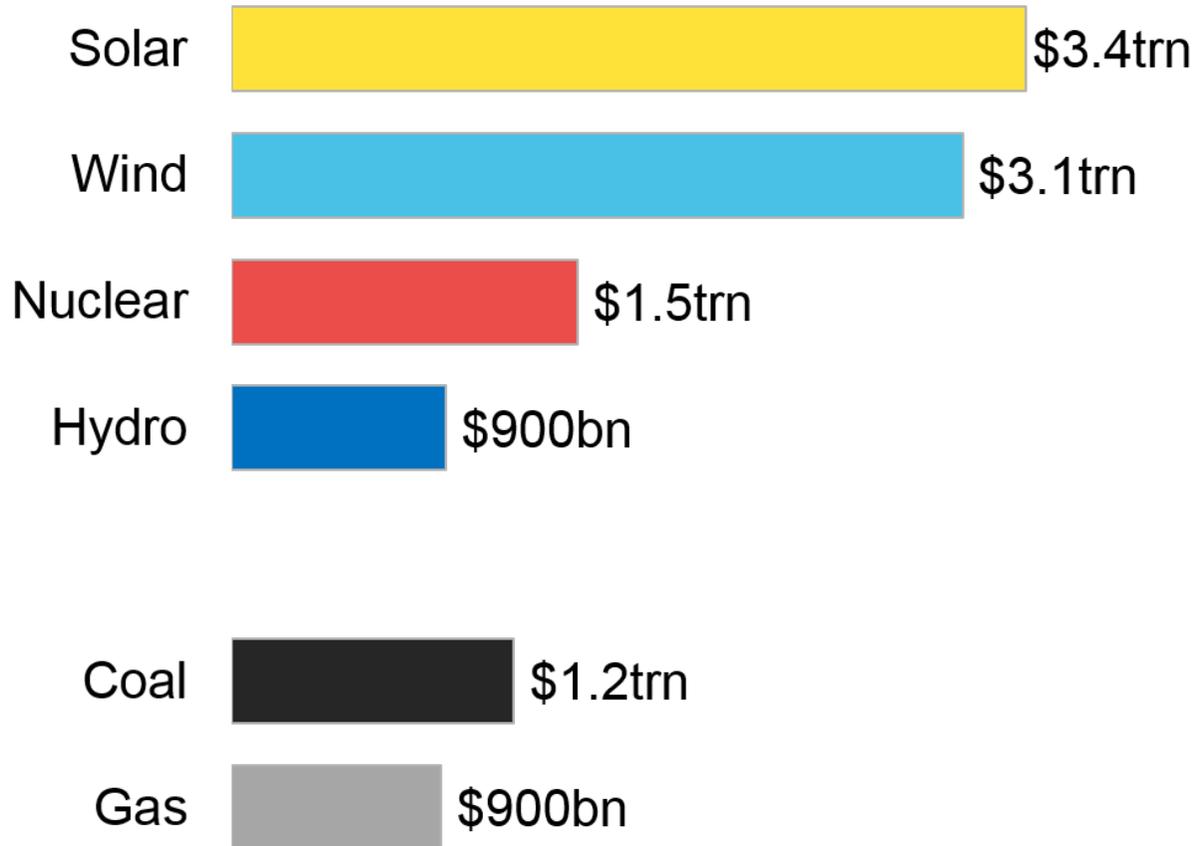


Note: Total values include estimates for undisclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects (not reported in quarterly statistics). Excludes large hydro, nuclear. Nominal USD.

Source: Bloomberg Intelligence, Bloomberg New Energy Finance

5. ZERO-CARBON GENERATION WILL BE 81% OF ALL INVESTMENT UNDER 'BUSINESS AS USUAL'

Power generation capacity investment, 2016 – 2040



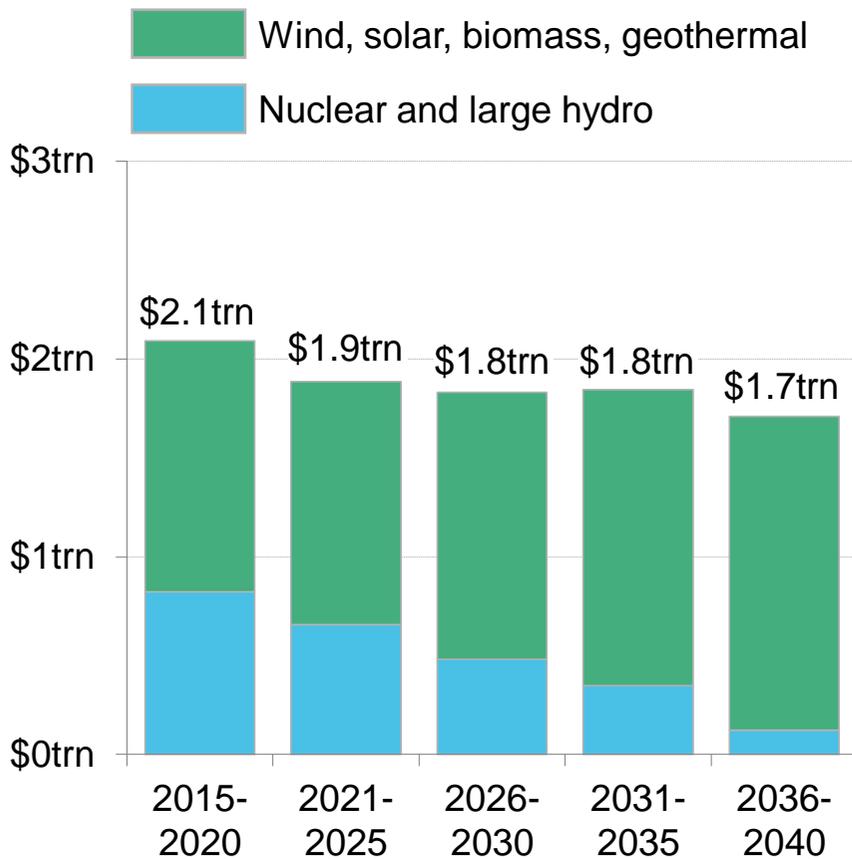
Note: Real 2015 USD.

Source: Bloomberg New Energy Finance

6. MEETING 2° C GOAL REQUIRES DOUBLING 'BUSINESS AS USUAL' INVESTMENT (1 OF 2)

Global business as usual

\$6.9trn
to 2040



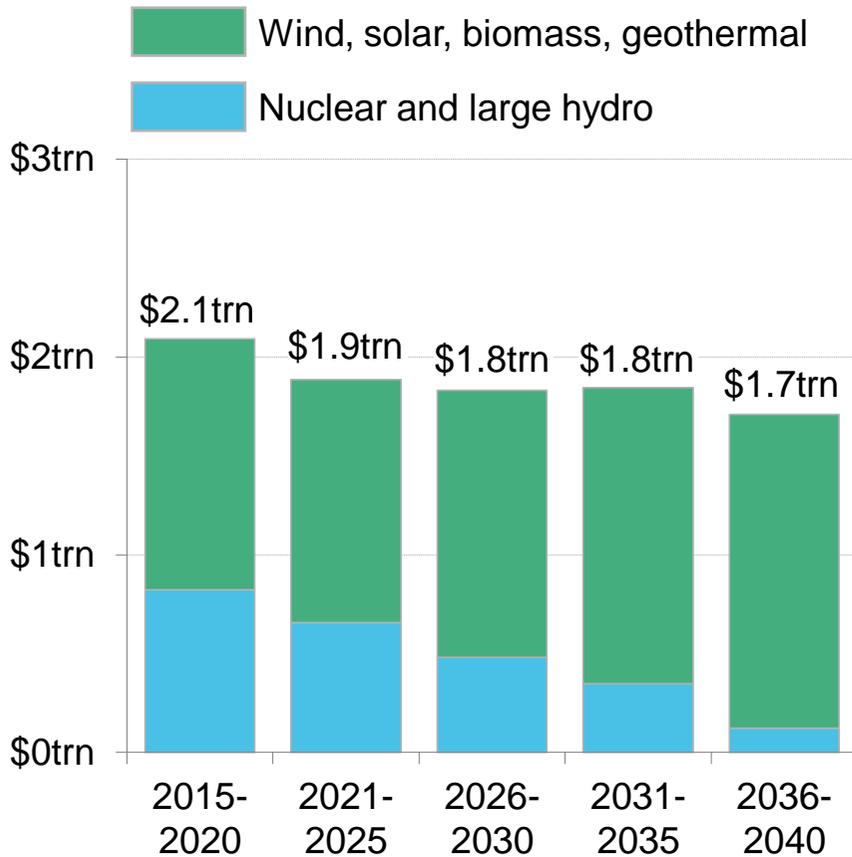
Note: Real 2015 USD.

Source: Bloomberg New Energy Finance

6. MEETING 2° C GOAL REQUIRES DOUBLING 'BUSINESS AS USUAL' INVESTMENT (2 OF 2)

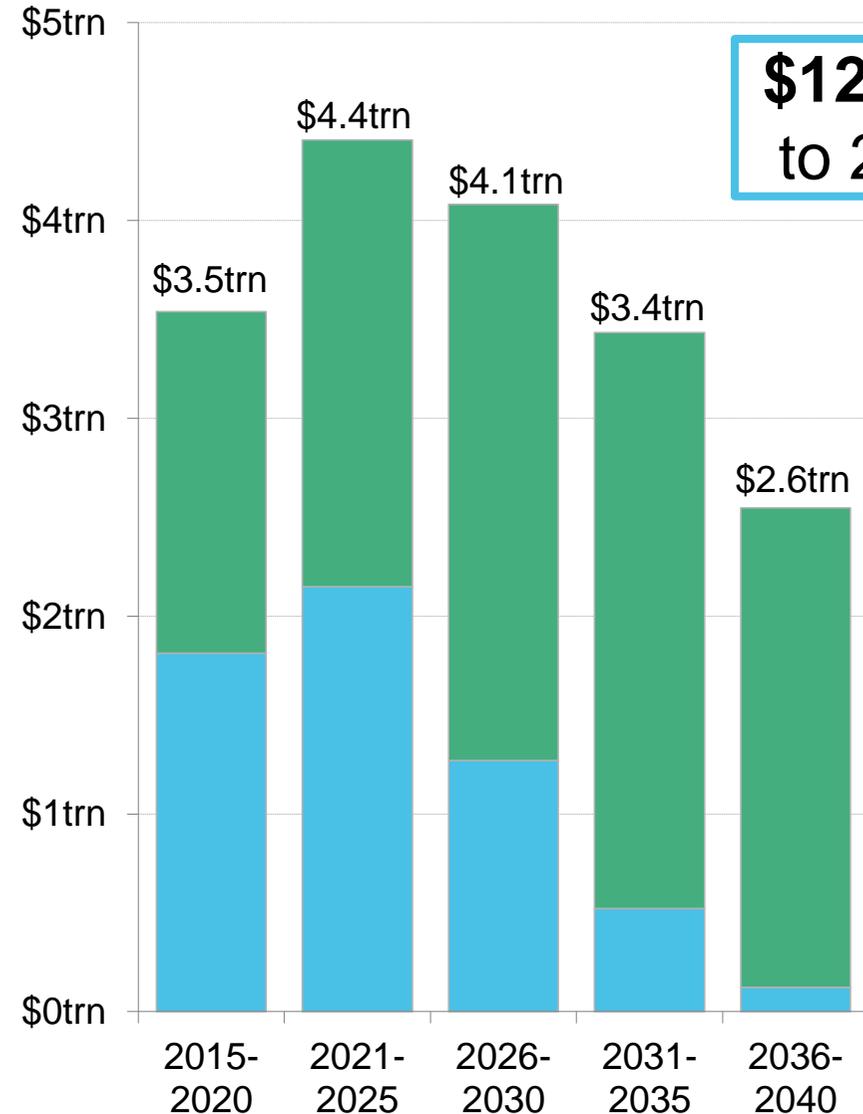
Global business as usual

\$6.9trn
to 2040



Global 2° C scenario

\$12.1trn
to 2040

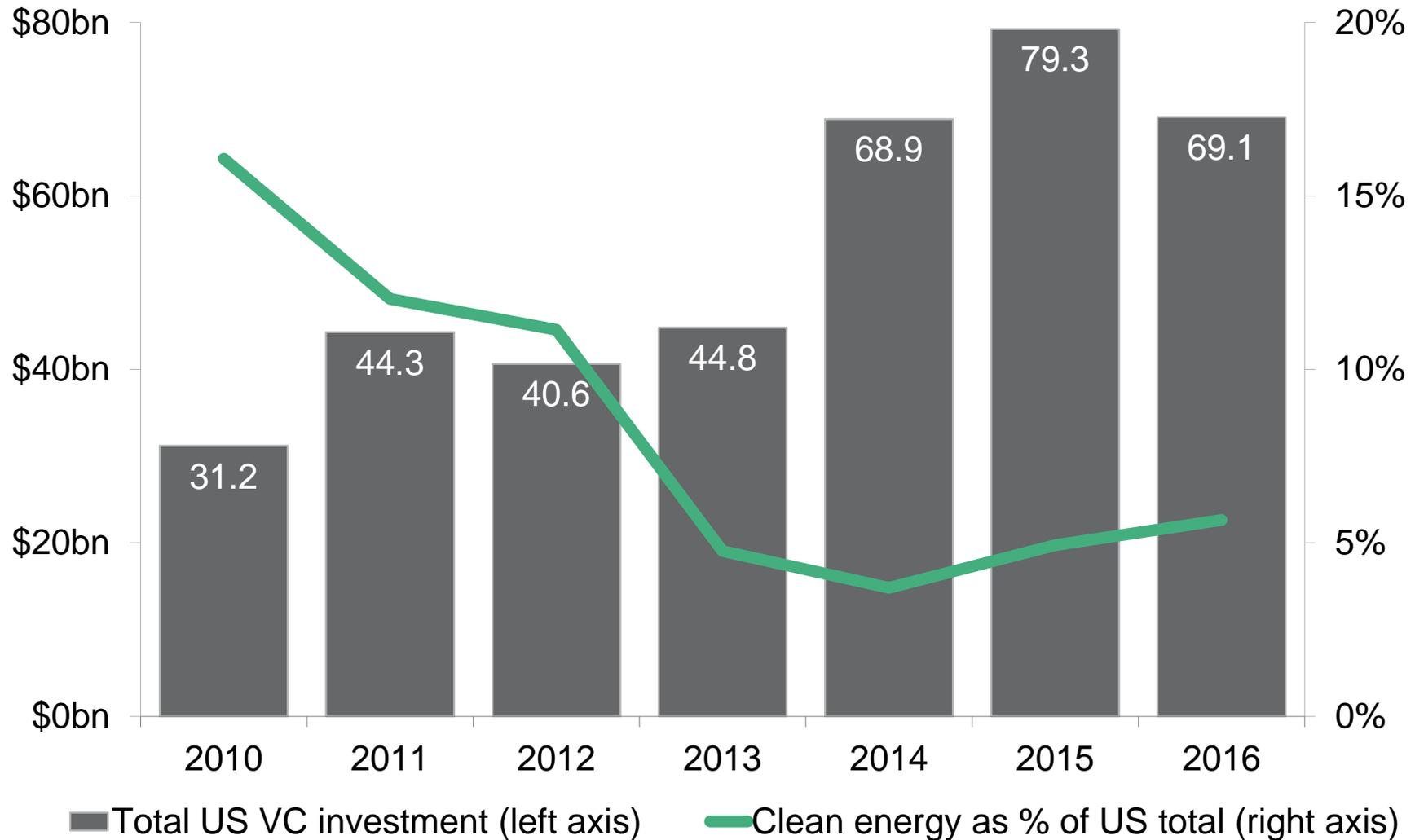


Note: Real 2015 USD.

Source: Bloomberg New Energy Finance

7. CLEAN ENERGY'S SHARE OF OVERALL VENTURE CAPITAL SPENDING IS SHRINKING

Venture capital investment, 2010 – 2016

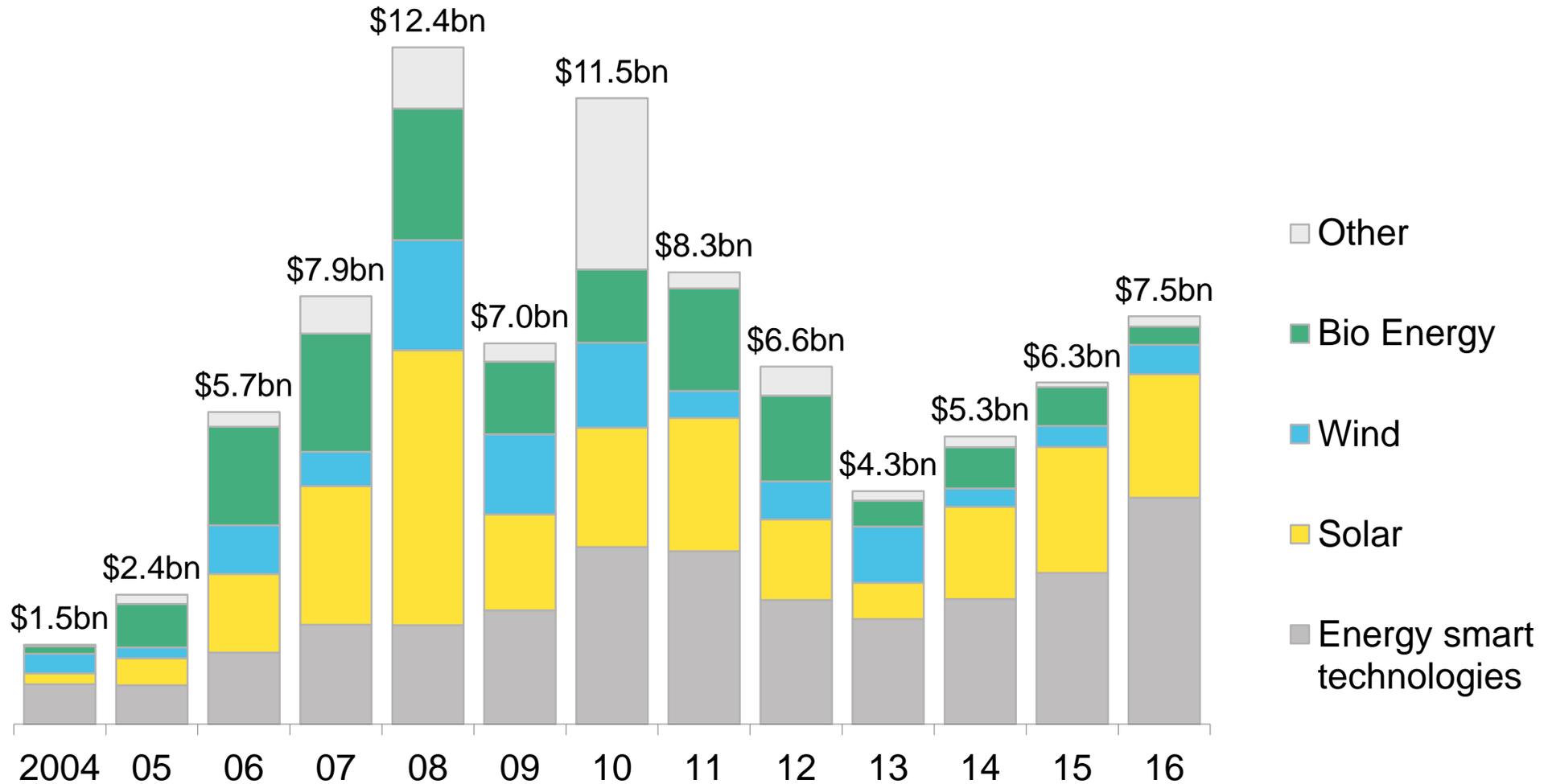


Notes: Total US VC investment comes from PitchBook while total clean energy VC comes from Bloomberg New Energy Finance. Nominal USD.

Source: PitchBook, Bloomberg New Energy Finance

8. EARLY-STAGE CLEAN ENERGY INVESTMENT REMAINS BELOW ALL-TIME HIGHS

Early-stage* investment in clean energy by sector, 2004 – 2016

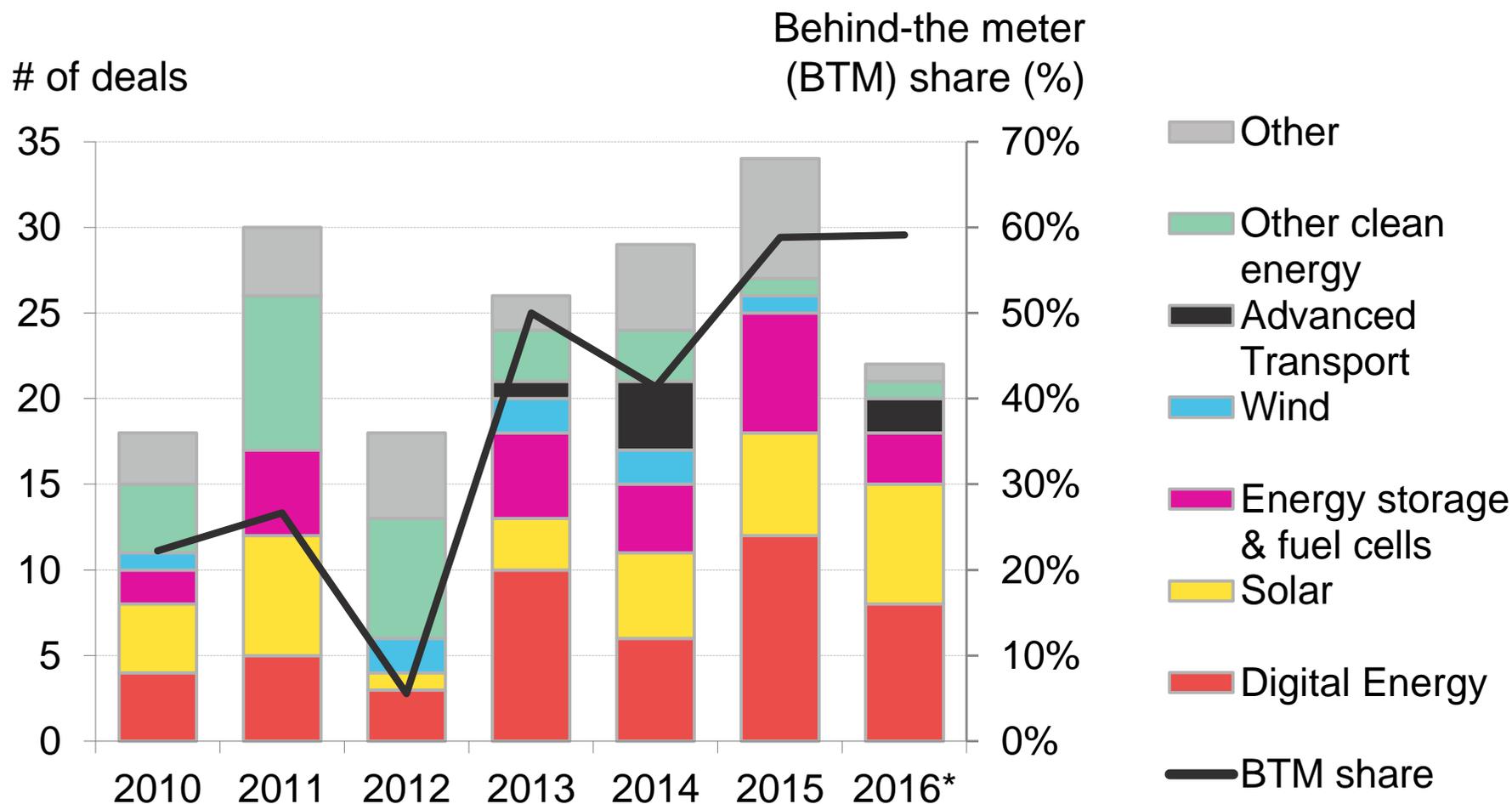


Notes: Early-stage investment includes early-stage VC, late-stage VC and PE expansion capital (ie, growth equity). Nominal USD.

Source: Bloomberg New Energy Finance

9. UTILITIES ARE USING VENTURE CAPITAL TO GAIN EXPOSURE 'BEHIND THE METER'

Utility venture capital by technology, 2010 – 2016*

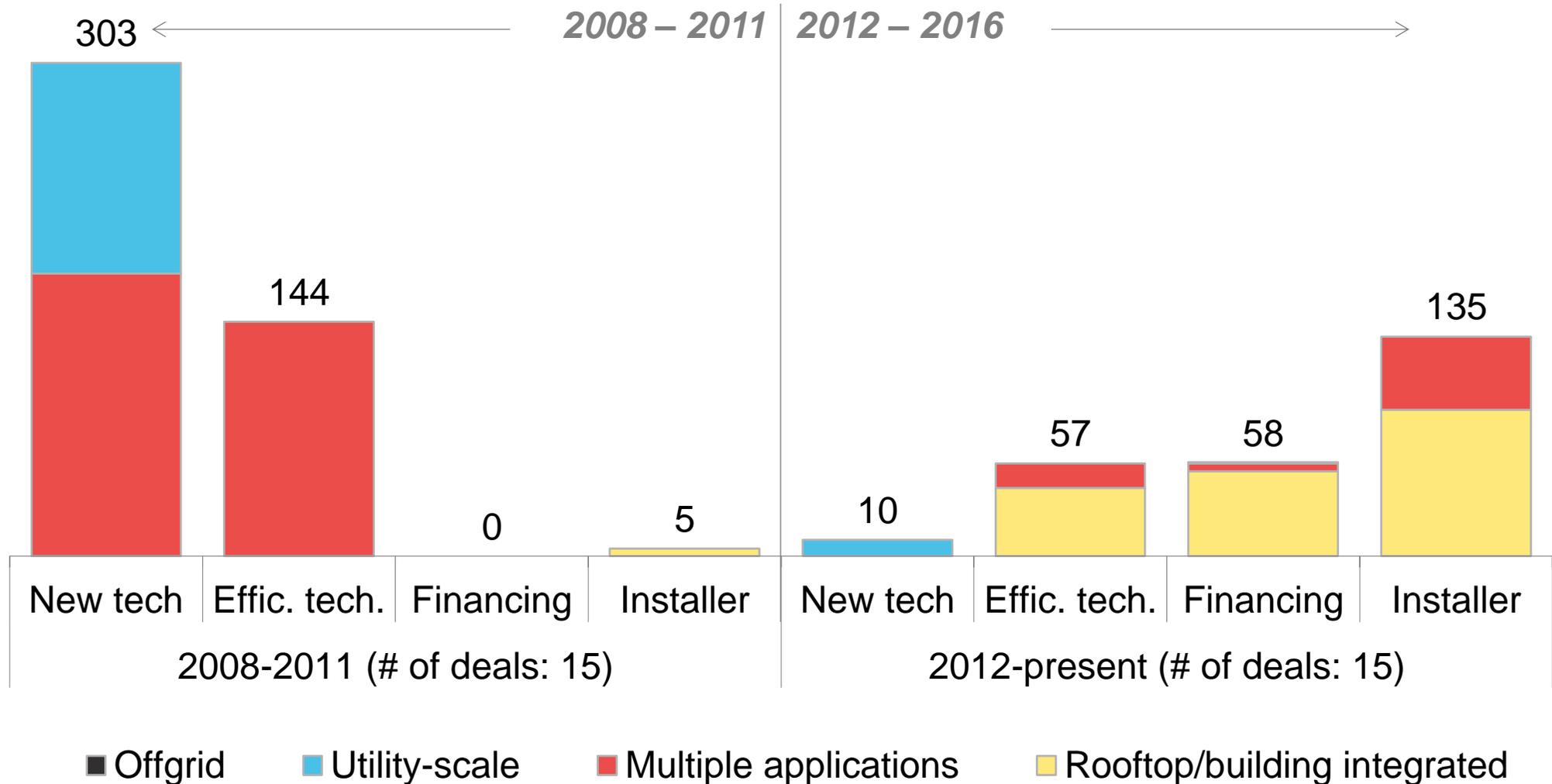


Notes: Investments made by the 30 largest North American and European utilities. (*) VC only runs through Q3 2016. Digital energy includes, demand response, energy management and smart grid.

Source: Bloomberg New Energy Finance

10. CLEANTECH VC HAS SHIFTED AWAY FROM NEW TECHNOLOGY, AT LEAST IN SOLAR

Utility VC investment into solar companies, by target's activity and application (\$m)



Notes: Engie Rassembleurs d'Energies' offgrid investments are non-strategic and thus excluded. Amount is total disclosed value in utility-backed deals. Data covers the venture capital arms of 29 North American and European utilities. Nominal USD.

Source: Bloomberg New Energy Finance, company disclosures

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sales.bnef@bloomberg.net

Nathan Serota

nserota1@bloomberg.net

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