APPROACHES FOR USING SCENARIOS IN STRATEGIC DECISION MAKING

TCFD

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Bloomberg New Energy Finance

Analysis to help you understand the future of energy

Solar | Wind | Power and Utilities | Gas | Carbon Markets & Climate | Energy Smart Technologies | Storage | Electric Vehicles | Mobility and Autonomous Driving | Frontier Power | Emerging Technologies

Americas

Europe, Middle East & Africa

Asia Pacific

New Energy Outlook

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Key points

- Use a range of scenarios from multiple sources
- Ask – what do I have to believe?
- Be sceptical of futures that look just like the past
- Get the most up to date data and review often
- Identify climate risk primarily at a country level

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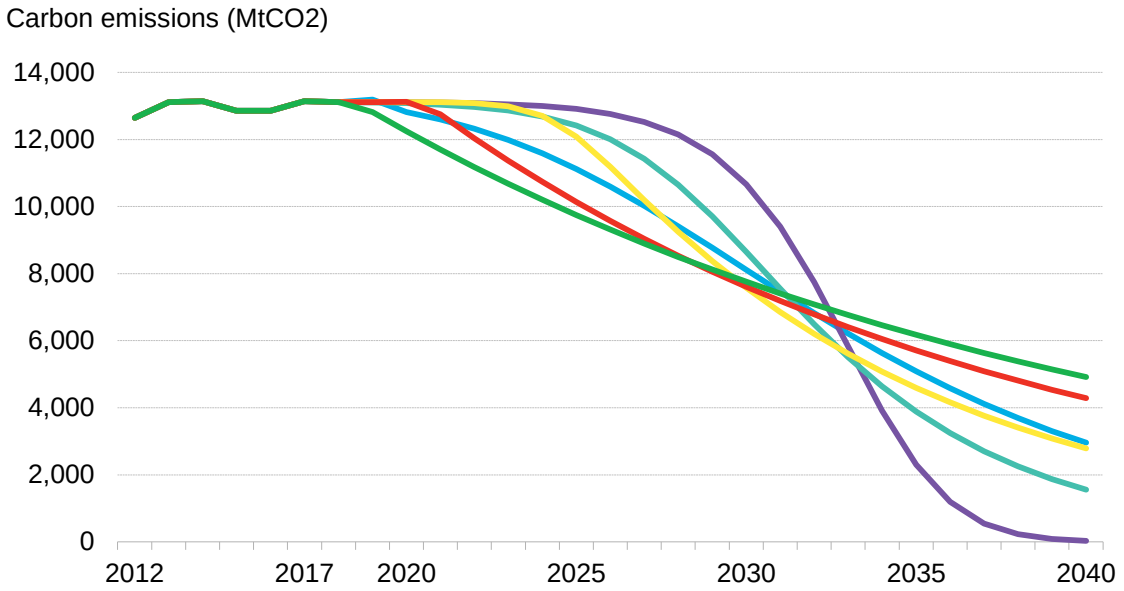
Many routes to meet two degree carbon budget…



Source: Bloomberg New Energy Finance Note: data is for power sector only.

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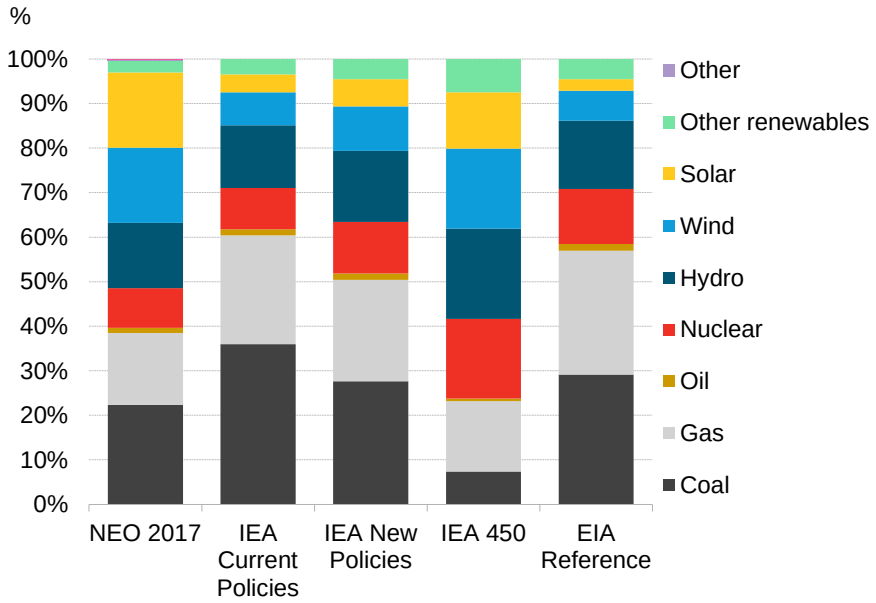
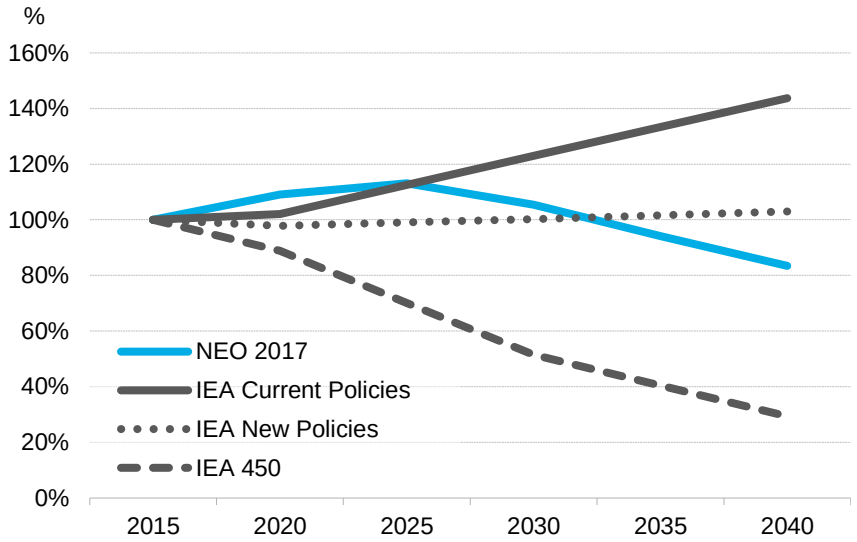
…and many tech pathways

Installed capacity by technology, 2040



Change in gas demand, 2015-2040



Source: Bloomberg New Energy Finance, IEA, EIA; Note: solar includes PV & solar thermal; wind includes onshore and offshore wind.

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CCS is still used everywhere

Company	Role of CCS in forecast
Bloomberg New Energy Finance	CCS not part of analysis
IEA	450 scenario: “(…) Carbon capture and storage (CCS) picking up in the 2030s (…); 70% of coal plants equipped with CCS New Policies scenario: <1,000 Mtce of coal demand for CCS/IGCC
BP	Base case: not clear Even Faster transition: “more than a third of the carbon emissions from the remaining coal and gas power generation are capture and stored”
ExxonMobil	“[Technological] Advances will promote (…) emerging opportunities for technologies like carbon capture and storage (CCS).”
Shell	Mountains scenario: “(…) success of carbon capture and storage technologies.” Oceans scenario: “(…) carbon capture and storage is delayed”
Statoil	Reform scenario: “Many successful [CCS] projects (…)” Renewal scenario: “Significant growth [of CCS] (…)”

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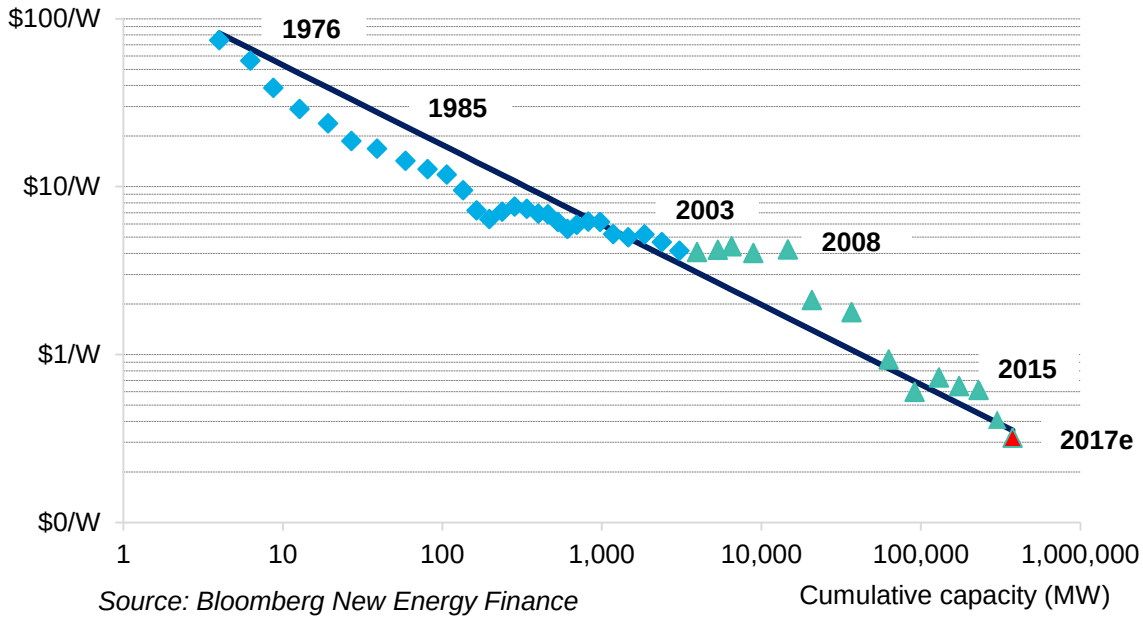
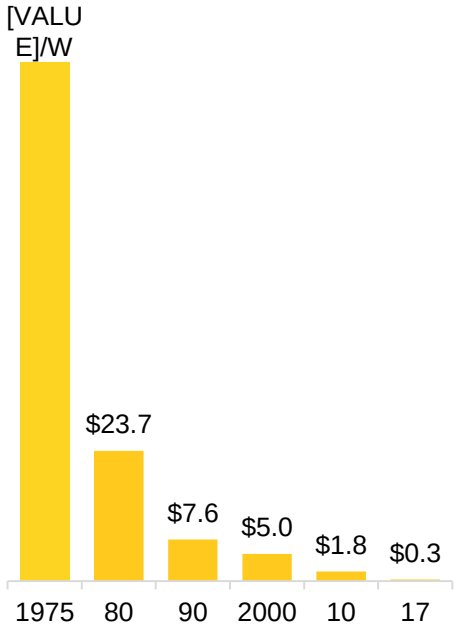
PV got cheap, and will get cheaper

Crystalline silicon solar PV experience curve



Source: Bloomberg New Energy Finance



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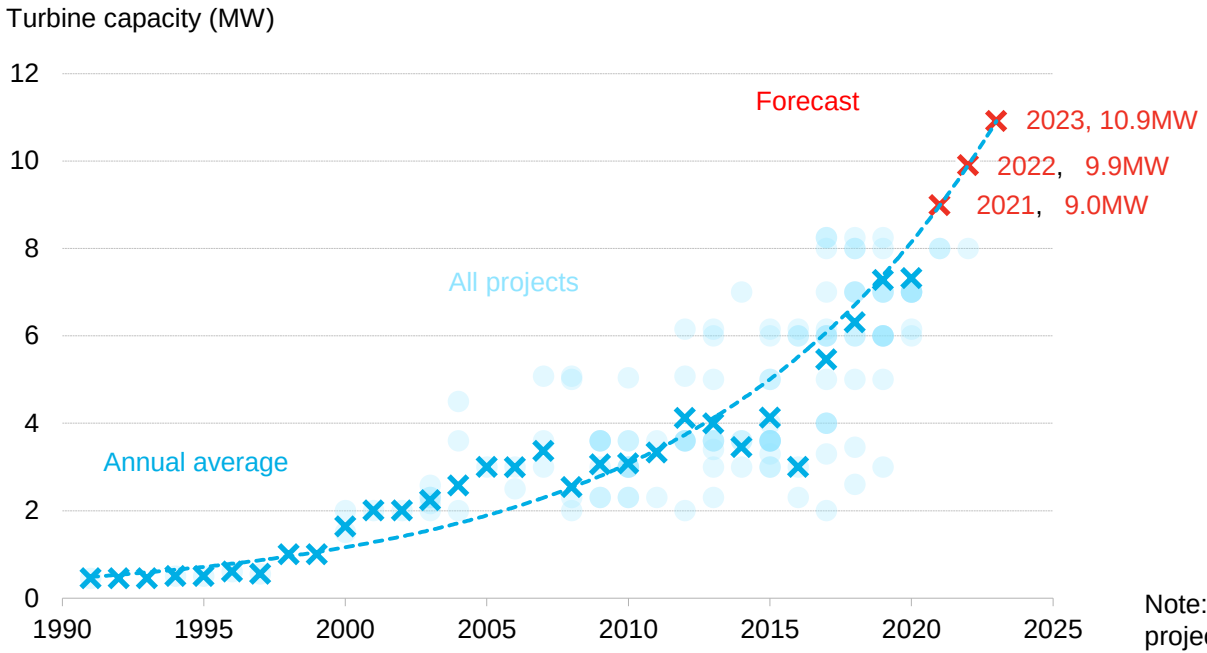
Offshore wind turbine capacity by commissioning date



Note: X-axis denotes commissioning date. A project-weighted average was used for projects with multiple turbine models.

Source: Bloomberg New Energy Finance

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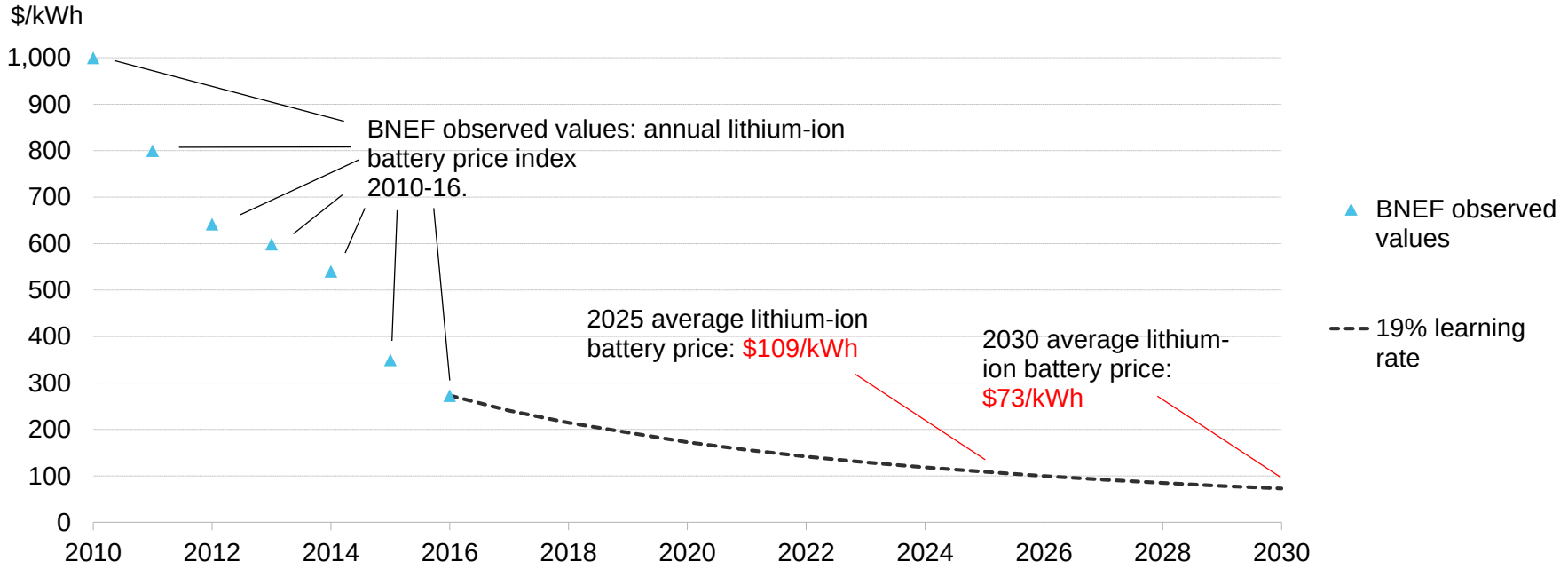
Lithium-ion battery prices, historical and forecast



Source: Bloomberg New Energy Finance EVO 2017; Note: Prices are an average of BEV and PHEV batteries and include both cell and pack costs. Cell costs alone will be lower. Historical prices are nominal, future ones are in real 2016 U.S. dollars.

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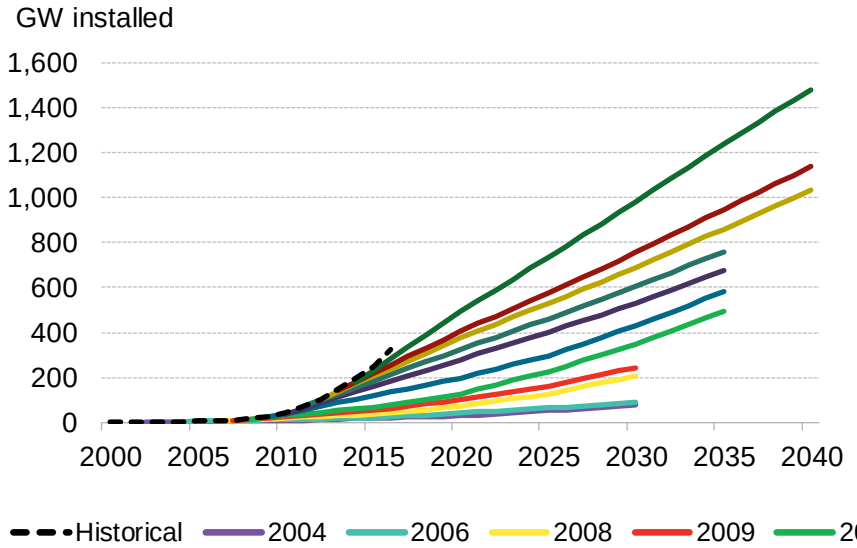
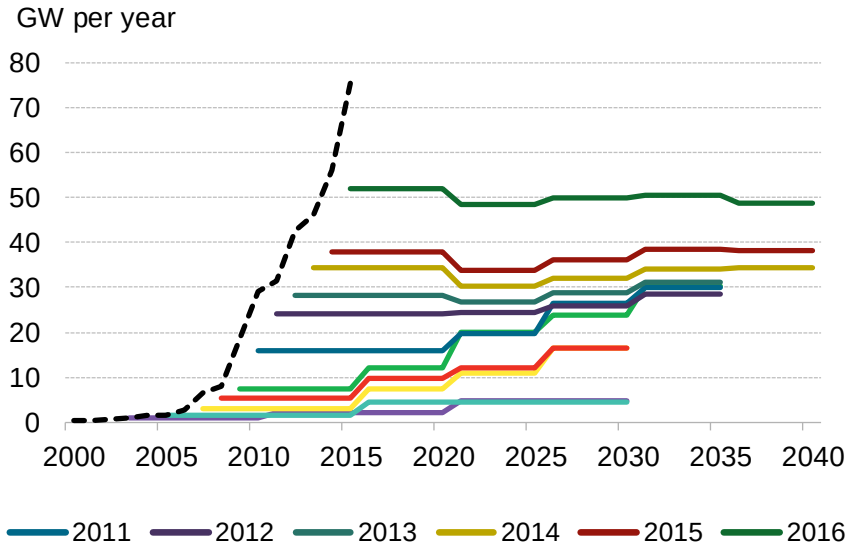
IEA solar capacity forecast evolution

Global cumulative solar installations



Annual solar additions



Historical 2004 2006 2008 2009 2010 2011 2012 2013 2014 2015 2016

Note: 2004-2009 Reference, 2010-2016 New Policies Scenario

Source: IEA World Energy Outlook

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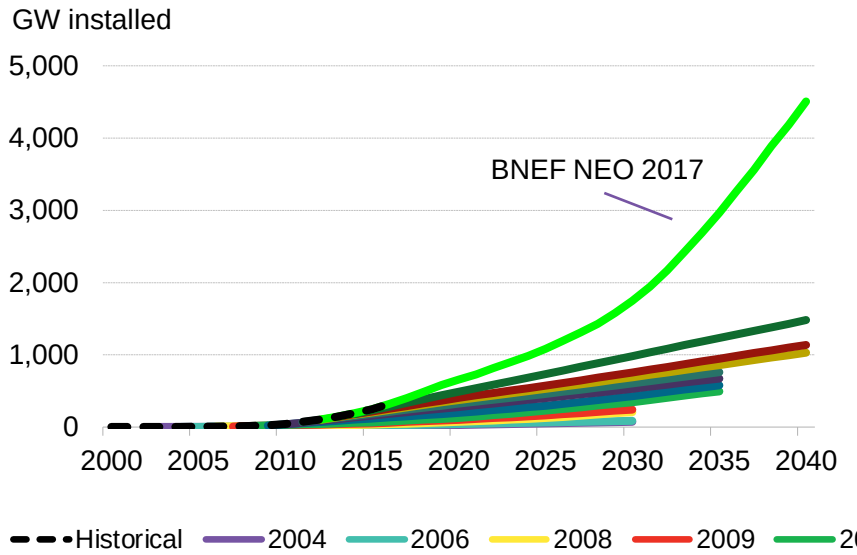
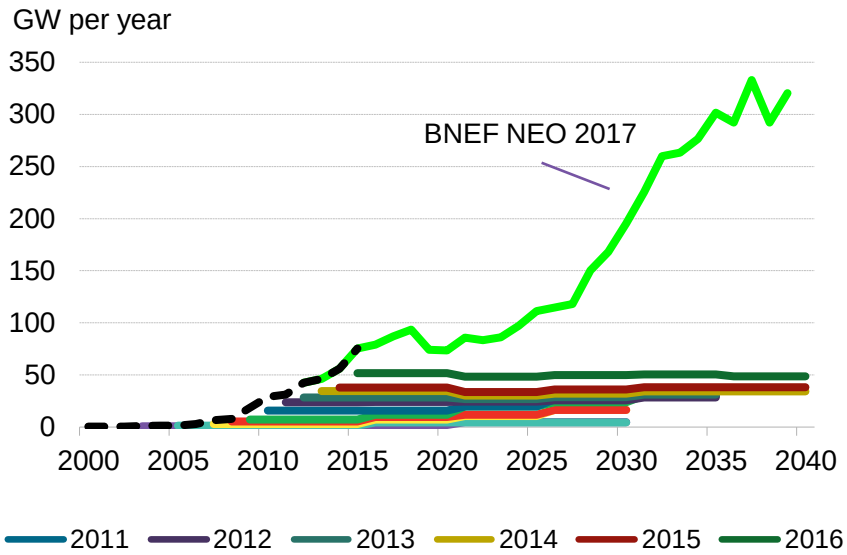


Annual solar additions



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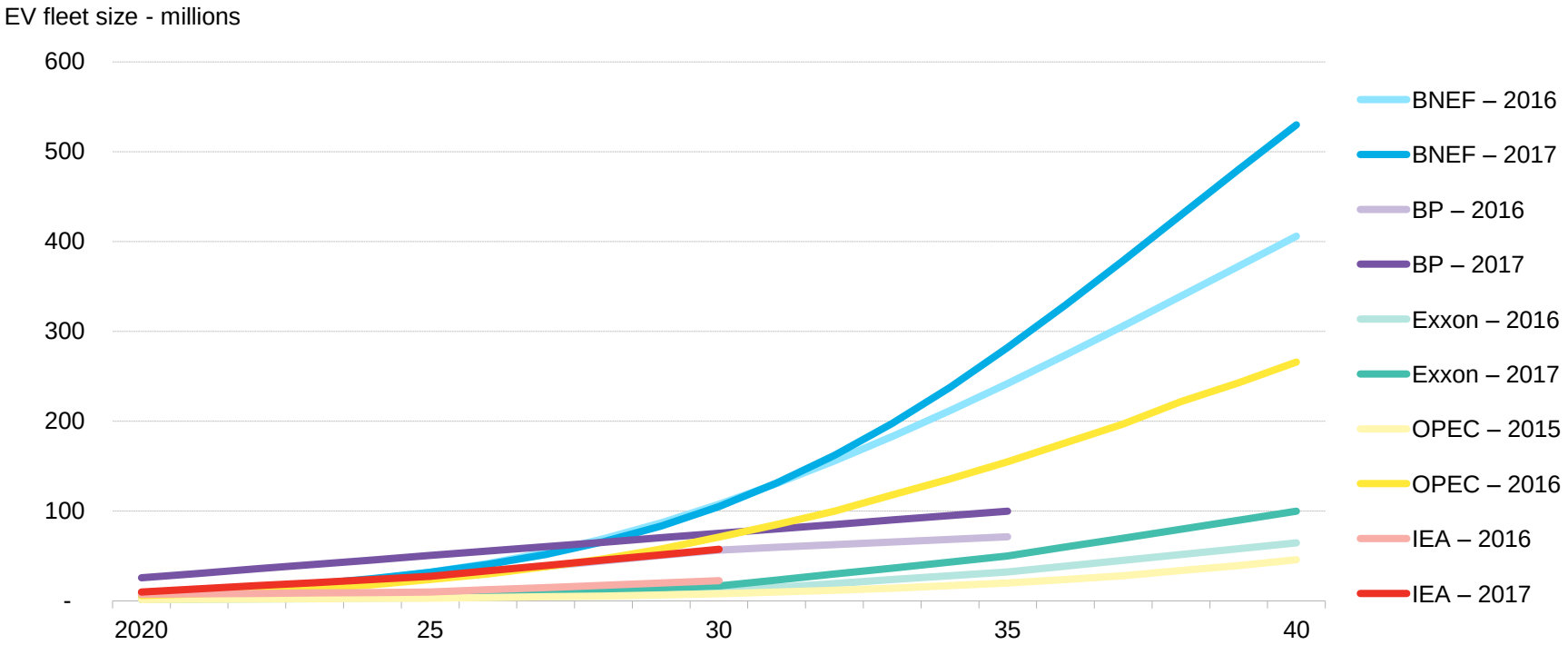
EV forecasts – look familiar?



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Which NDCs pose the greatest risk for business?

Country	2014 emissions* (MtCO2e/yr)	NDC permitted % change in emissions 2014-30	2014 emissions intensity (ktCO2e/PJ)	2030 projected NDC consistent emissions intensity (ktCO2e/PJ)	10-year historical trend in emissions intensity (% change yoy)	Projected NDC consistent trend in emissions intensity (% change yoy to 2030)	Minimum shift from historical to NDC trend (% change yoy)
1. Philippines	96	-67% to +9%	48.0	7.6 to 25.3	+1.0%	-3.9% to -10.9%	-4.9%
2. Canada	555	-32%	47.3	30.4	+0.2%	-2.7%	-2.9%
3. Japan	1,189	-23%	64.3	56.5	+1.8%	-0.8%	-2.6%
4. Australia	374	-26% to -28%	71.3	42.0 to 43.2	-0.9%	-3.1% to -3.4%	-2.2%
5. South Korea	568	-7%	50.5	34.6	-0.4%	-2.3%	-1.9%
6. U.S.	5,176	-27% to -30%†	55.8	36.8 to 38.4	-0.5%	-2.3% to -2.6%	-1.8%
7. India	2,020	+85% to +91%	58.5	58.8 to 60.6	+1.7%	0.0% to +0.2%	-1.5%
8. Brazil	476	+12%	37.5	33.5	+0.6%	-0.7%	-1.3%
9. South Africa	437	-20% to +24%	71.1	40.9 to 63.1	+0.2%	-0.7% to -3.4%	-0.9%
10. Mexico	431	-6% to +14%	54.8	39.0 to 47.4	-0.3%	-0.9% to -2.1%	-0.6%
11. Vietnam	143	+145% to +180%	51.4	52.5 to 60.0	+1.3%	+1.0% to +0.1%	-0.4%
12. China	9,135	+4% to +19%	71.2	65.0 to 74.3	+0.4%	+0.3% to -0.6%	-0.1%
13. E.U.	3,160	-24%	48.2	41.8	-0.9%	-0.9%	0.0%
14. Indonesia	437	+34% to +76%	46.2	41.8 to 54.8	+0.8%	+1.1% to -0.6%	+0.3%
15. Saudi Arabia	507	+34% to +64%	56.7	55.4 to 67.7	+0.1%	+1.1% to -0.1%	+1.0%
16. Thailand	244	+28% to +37%	43.2	42.5 to 45.3	-1.1%	+0.3% to -0.1%	+1.4%
17. Russia	1,468	+3% to +37%	49.3	63.0 to 83.7	-1.1%	+3.4% to +1.5%	+4.4%
ROW	5,968	+41% to +57%	54.6	39.5 to 43.9	+0.2%	-1.4%	-1.5%
World	**32,381**	**+7% to +18%**	**56.5**	**47.1 to 52.4**	**+0.2%**	**-0.5% to -1.2%**	**-0.6%**

Greater risk

Lesser risk

*Source: Bloomberg New Energy Finance Note:*energy -related emissions only.† U.S. 2030 target is extrapolated based on target trend to 2025*

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