Energy trends 1990-2025

Insights derived from publicly available data sets that help drive conversations around the energy sector across the Americas

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Celebrating 35 years at the center of the energy debate

35th annual La Jolla energy conference

Institute of the Americas

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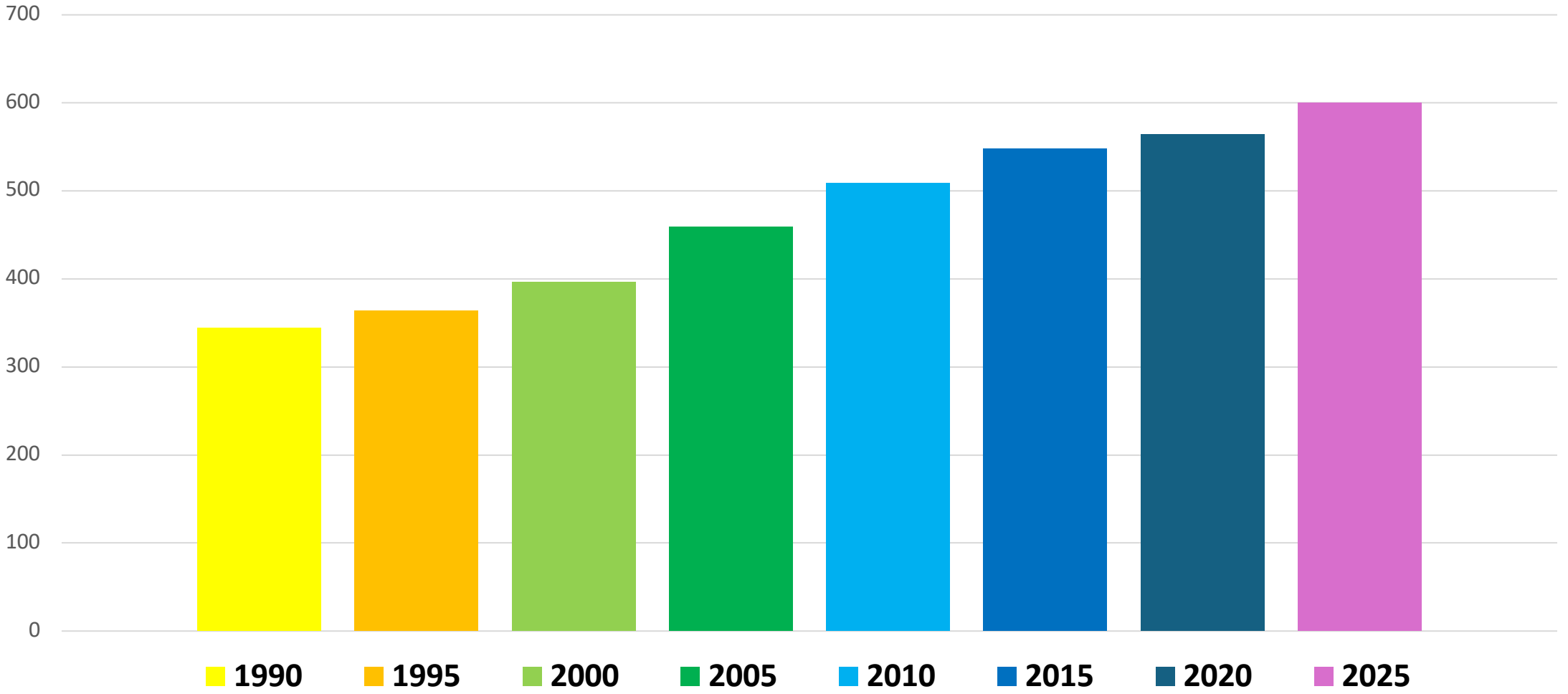
Notes about the data that follows:

- uses data published annually by the Energy Institute https://www.energyinst.org/statistical-review/home
- many past data compiled & published by the BP over 70 years in their Statistical Review of World Energy
- best quality freely available global data sets, does not mean that the data are perfect
- relies heavily on accuracy of data inputs provided by governments, agencies and institutes
- data here are plotted at 5-year intervals, this highlights longer-term trends rather than short-term crises
- some observations are made; however, data are presented in ways that enable you to draw your own conclusions
- information used covers the period 1990 through to 2025, the latest full year data set before 2026 La Jolla conference
- some numbers have minor rounding to make data handling a little easier
- any errors belong to the authors!

Primary energy consumption

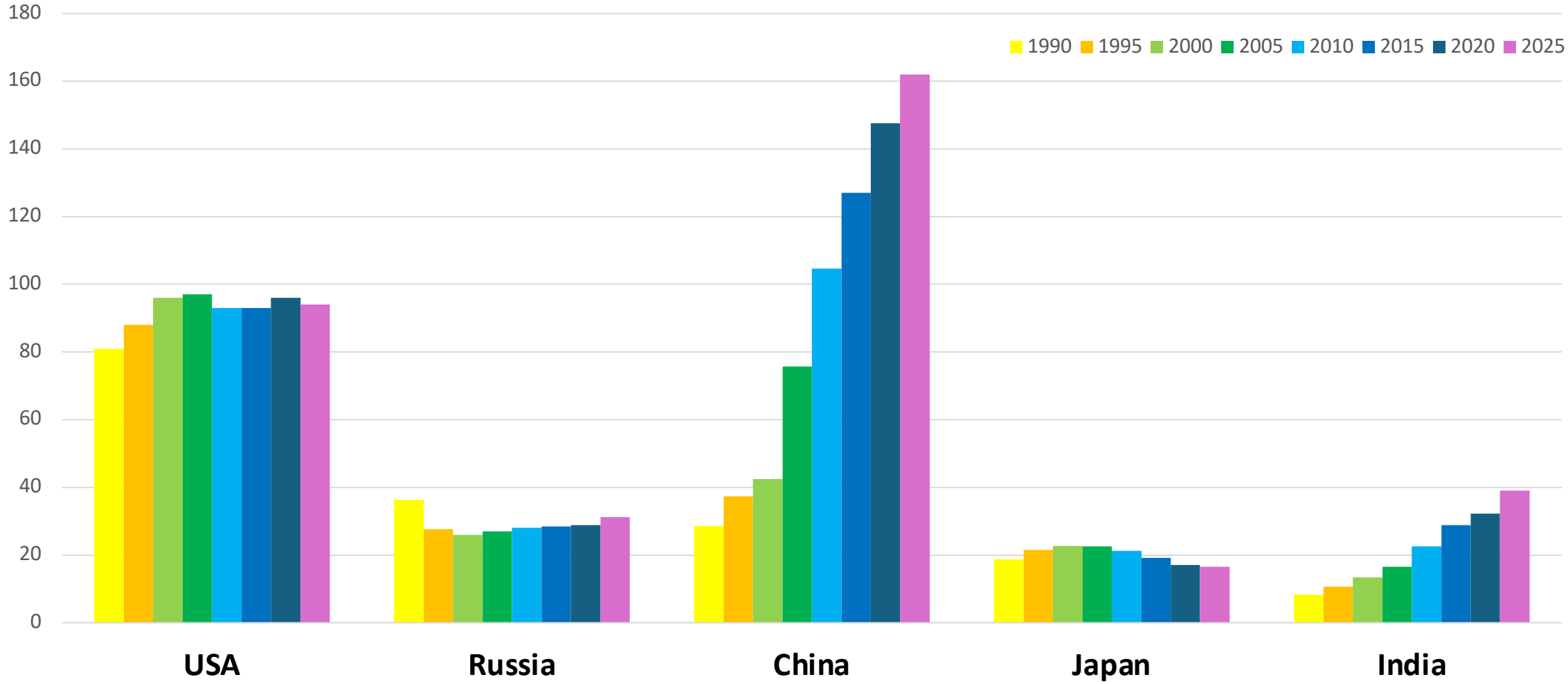
n.b. includes commercially-traded fuels, including modern renewables used to generate electricity

Primary energy consumption (exajoules) - global picture



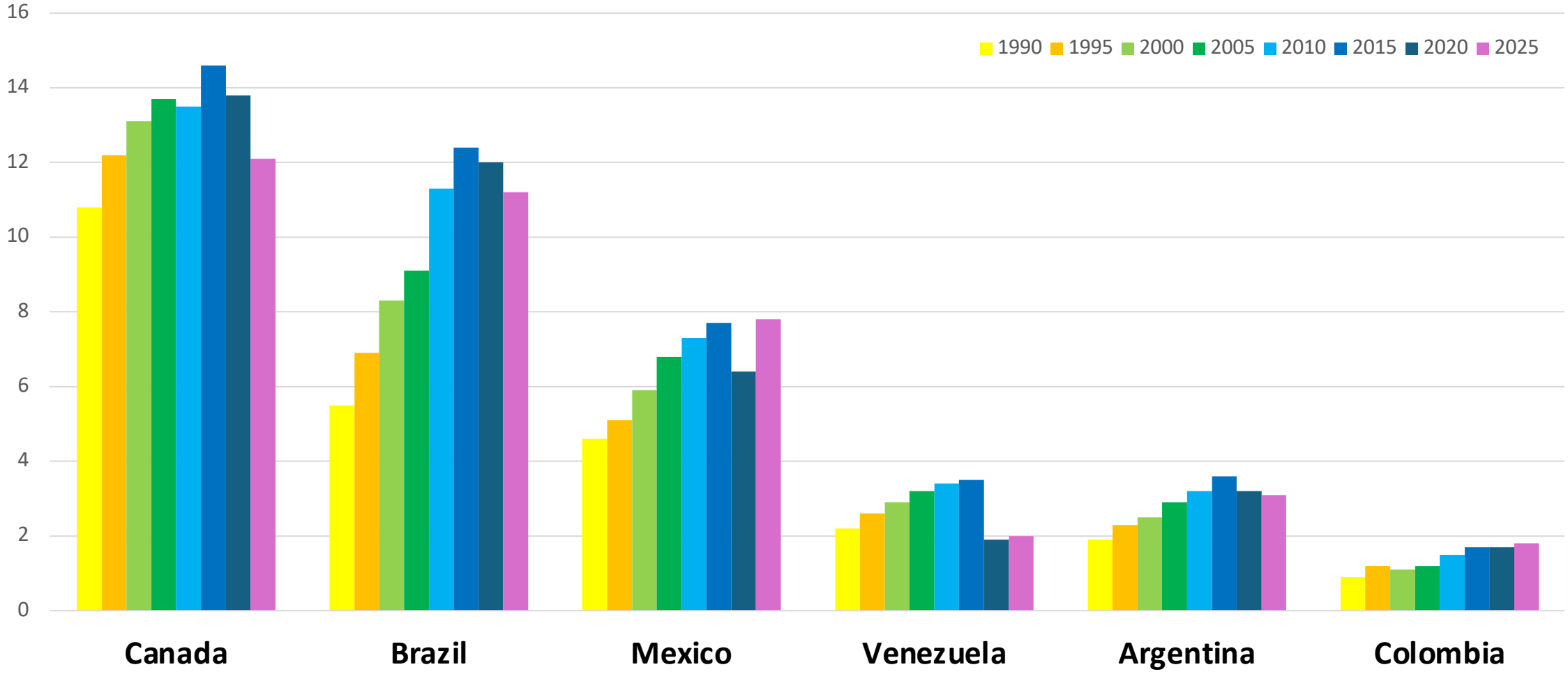
- consumption has steadily increased, up ~85% since 1990, underpinned by increasing economic activity & population
- events & crises such as wars, Covid, GFC, price volatility, regime changes have little overall impact on long-term trend
- in 2025, renewables were single fastest growing energy source, but fossil fuels still dominate sources of supply (~86%)

Primary energy consumption (exajoules) - big countries, large economies



- continual growth and big consumption increases in China (6-fold) and India (5-fold) since 1990
- in 2025, China accounted for ~27% of all energy use, USA ~16%
- India has now overtaken Russia and Japan

Primary energy consumption (exajoules) - Western hemisphere countries

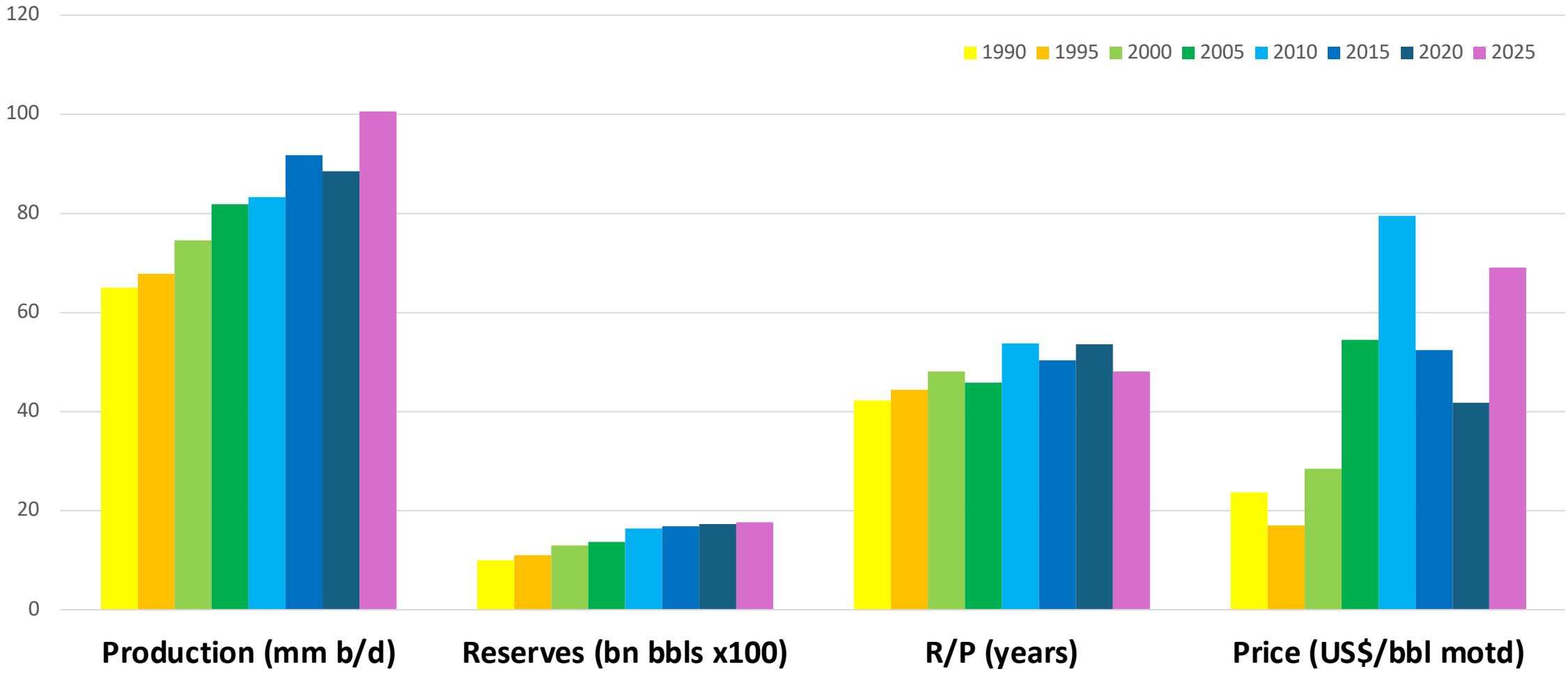


- energy consumption typically increased from 1990 until the last 10-15 years when trends become less clear
- Brazil shows the most notable growth, more than doubling, but still only 12% of USA consumption in 2025
- Argentina consumption has overtaken Venezuela in last 15 years

Oil

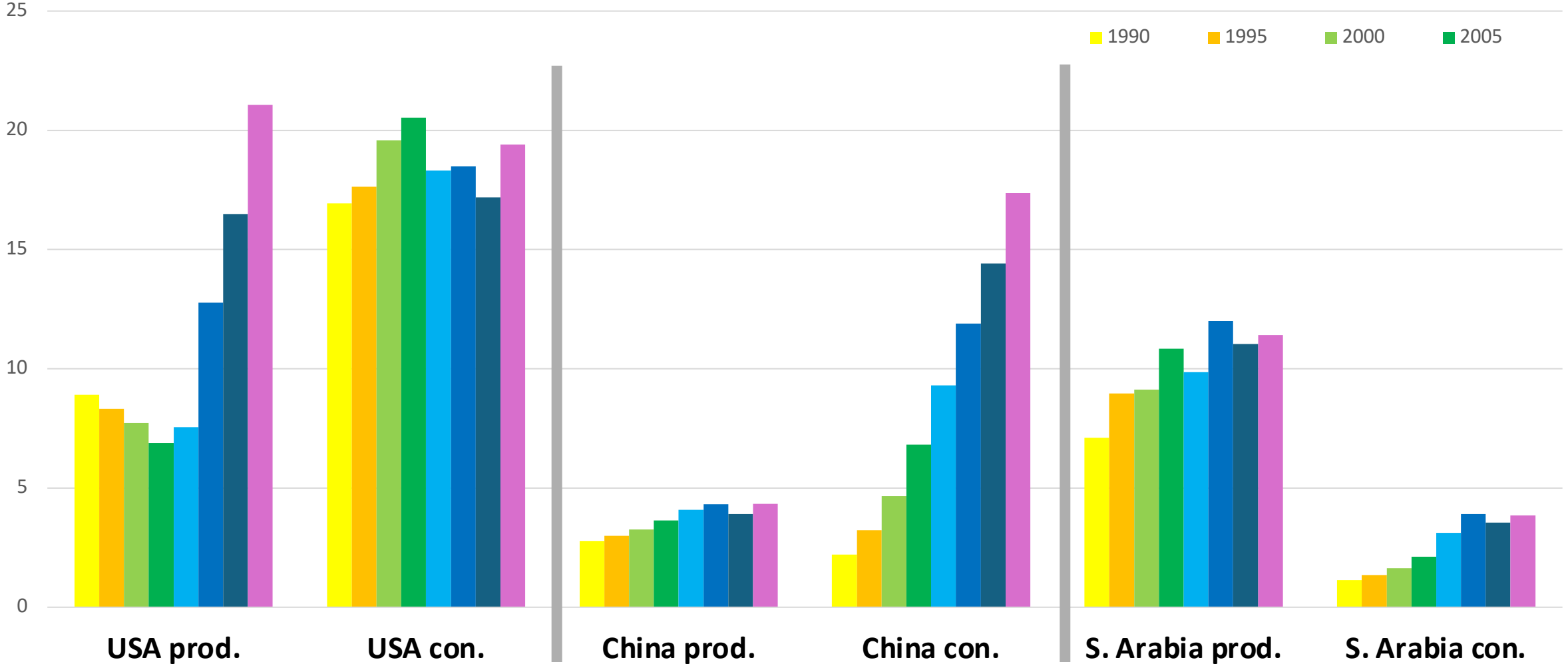
n.b. includes crude oil, shale oil, oil sands, condensates (lease condensate or gas condensates that require further refining) and NGLs

Oil - global production, reserves, reserves to production ratio (R/P), price



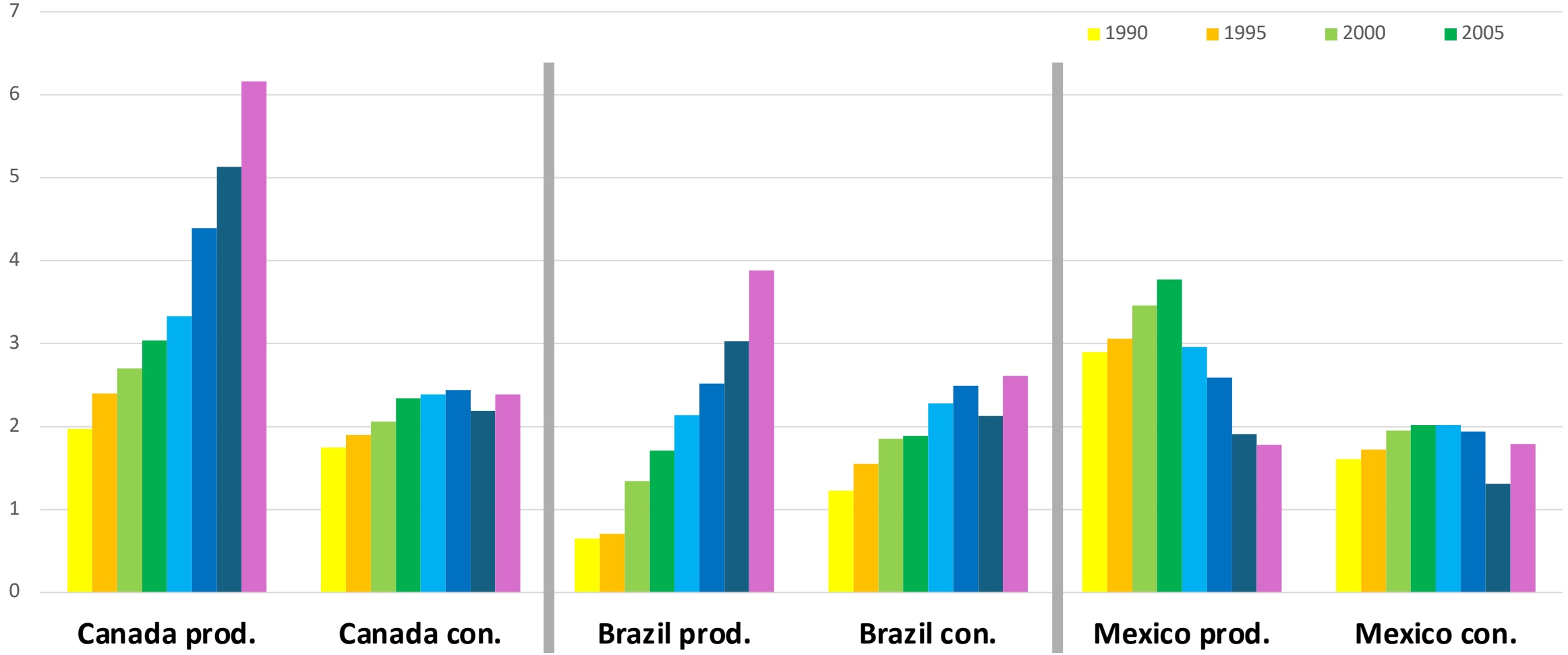
- no signs that oil production has peaked; in 2025, oil production exceeded 100mm b/d for first time
- reserves up ~76% compared to 1990; R/P stays above 40 years; no indication that world is running out of oil
- price fluctuations due to supply/demand, global recession, coups, wars and Covid

Oil - big producers and consumers (mmb/d)



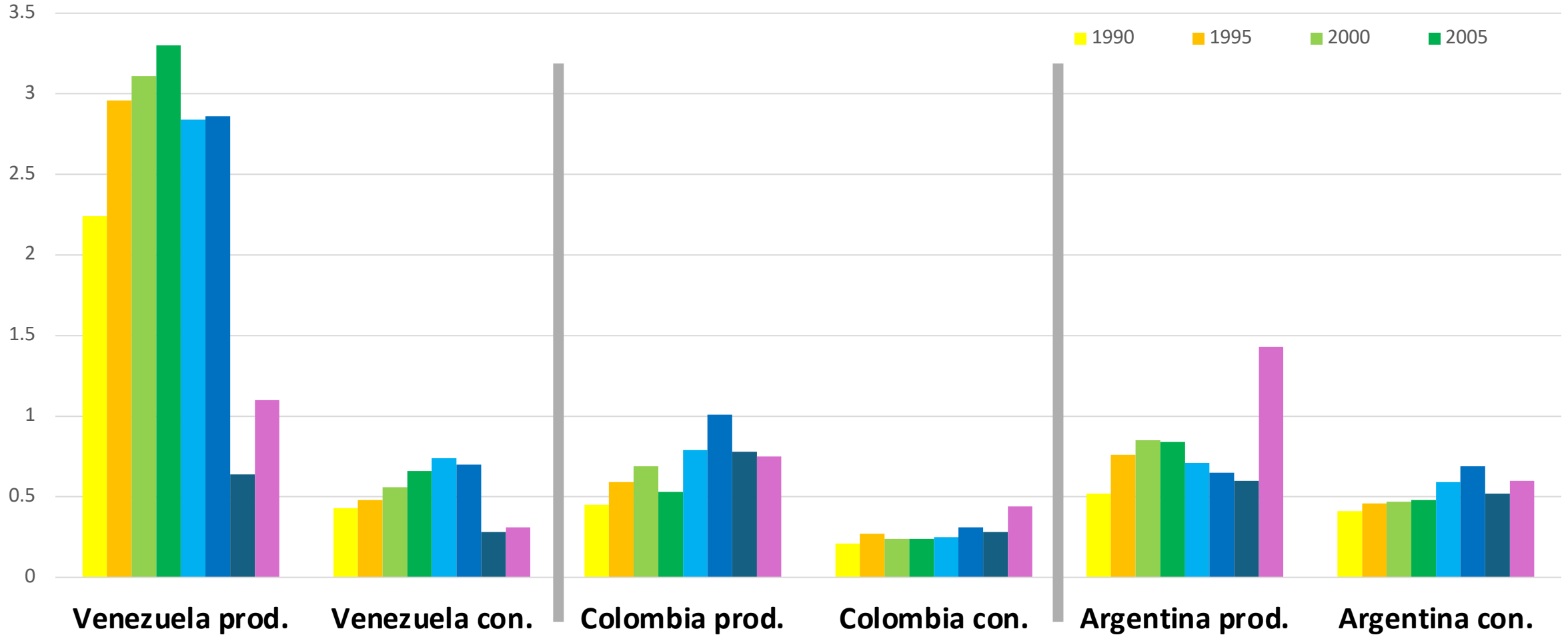
- USA production was in decline until shale revolution, switching from importer to exporter in last few years
- China increased domestic production, but surging demand has led to massive imports
- Saudi Arabia grows production but remains a swing producer and now has its own demand growth to deal with

Oil - large oil producers and consumers - Western Hemisphere (mmb/d)



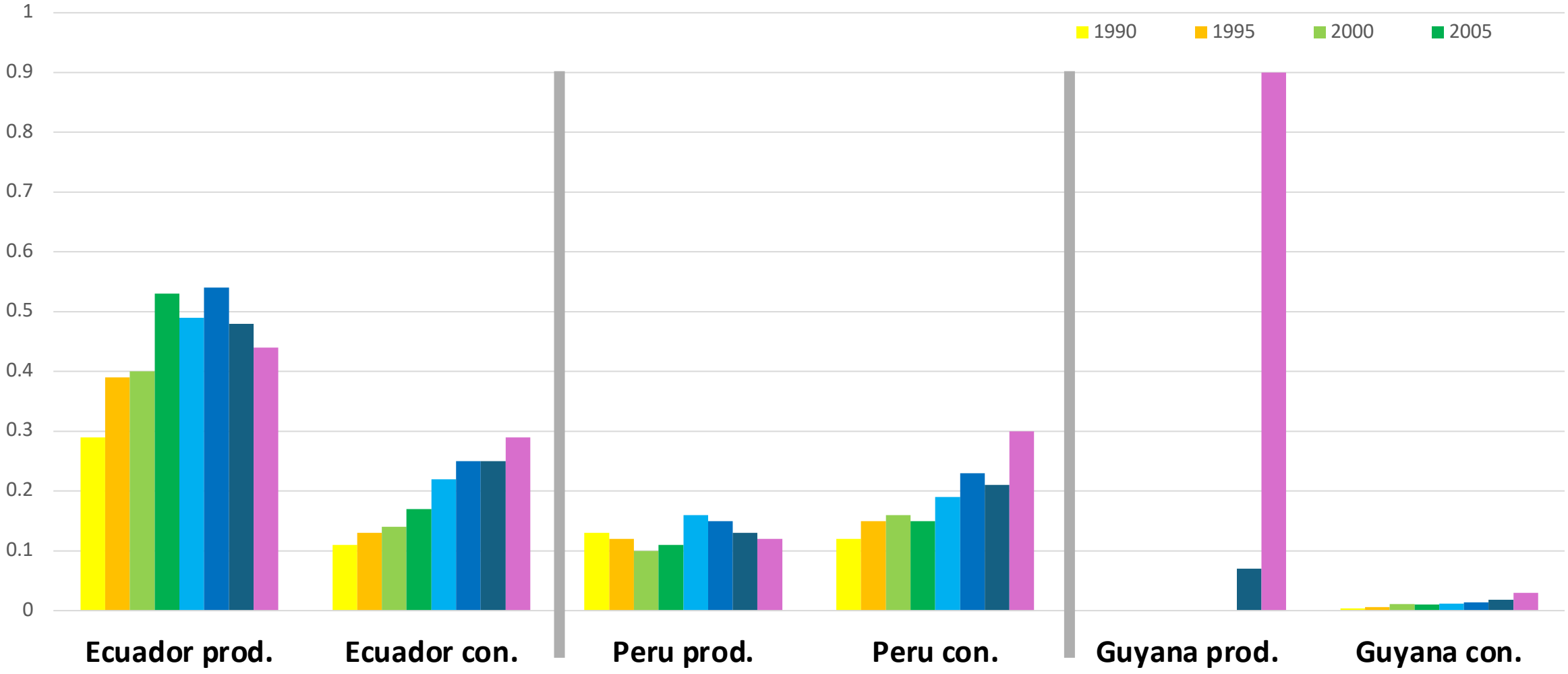
- Canada production up over 3-fold since 1990; oil sands remain key contributor; importance as net exporter increases
- Brazil production up 6-fold, underpinned by vast pre-salt deepwater fields; important exporter in last 15 years
- Mexico peaks early 2000s, then decline with under-investment & failed reforms; significance as exporter largely gone

Oil - some LatAm producers and consumers (mmb/d)



- Venezuela production fell after 2003 purge of experts, underinvestment, then sanctions/export blockades; still net exporter
- Colombia impacted by policy changes, left & right-wing ideologies, & frequent rebel pipeline attacks; still net exporter
- Argentine production grew then faded, until recent Vaca Muerta shale development, enabling it to continue as net exporter

Oil - some other LatAm producers and consumers (mmb/d)

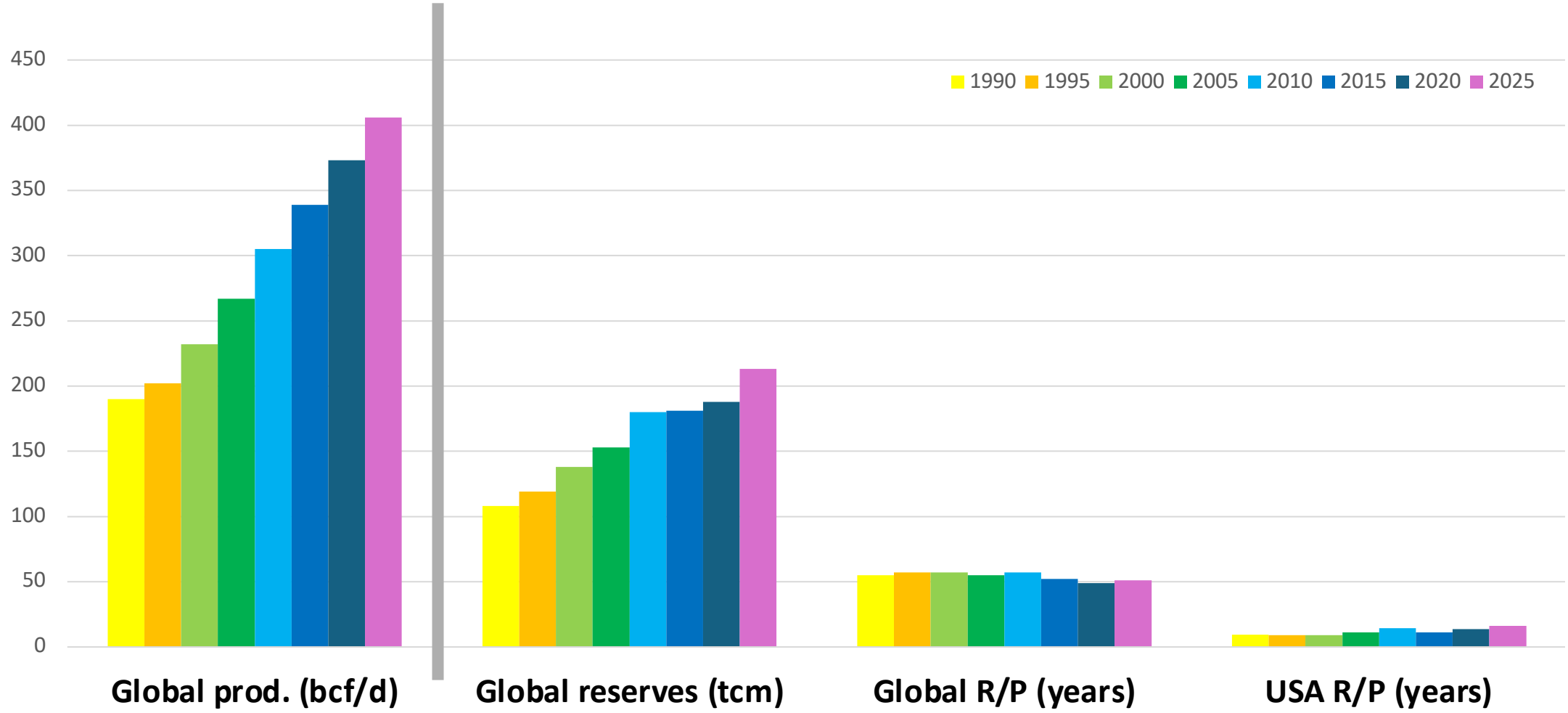


- Ecuador production peaks but decline has now set in, still net exporter but left OPEC in 2020
- Peru has complex political upheavals and Amazon pipeline issues; production cannot keep up with demand
- Guyana's deepwater production creates major new LatAm oil exporter; domestic demand picks up but no refinery

Natural gas

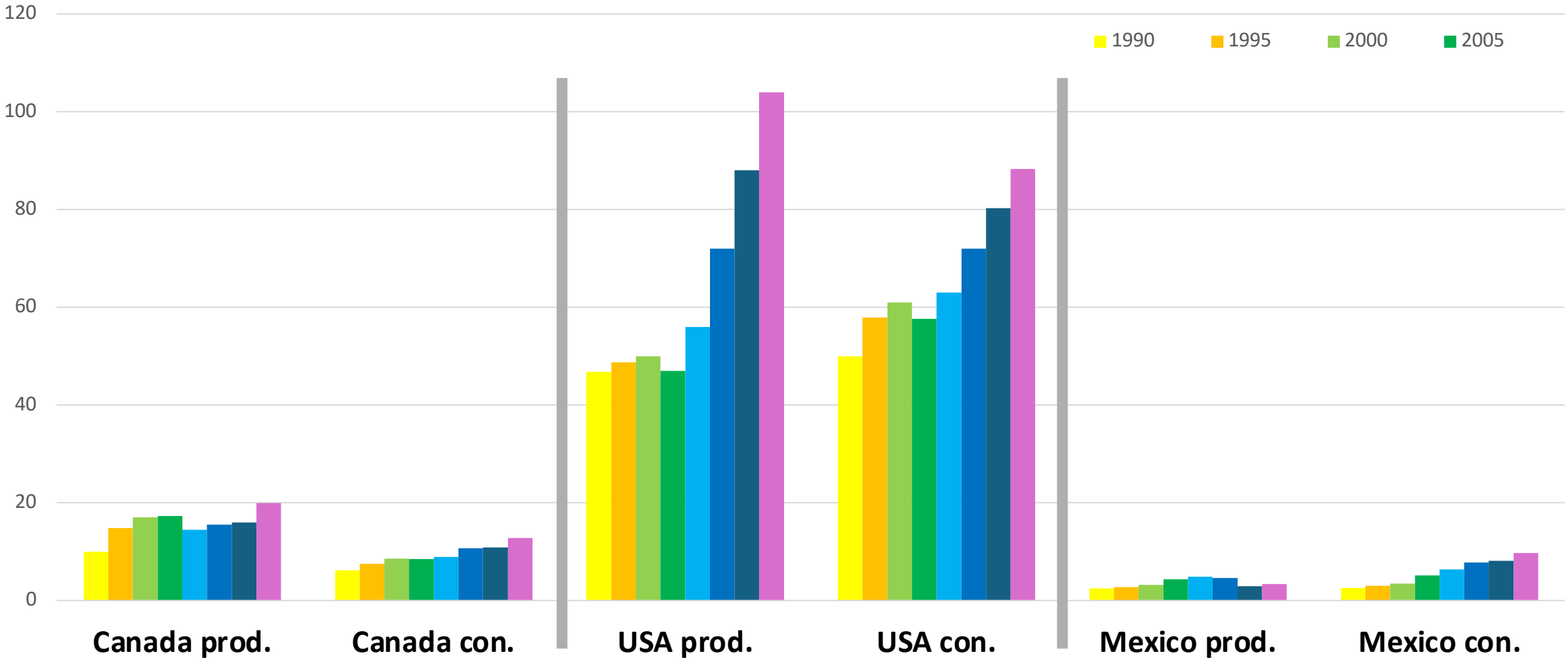
n.b. production includes natural gas produced for Gas-to-Liquids transformation; excludes gas flared or recycled gas

Natural gas - production, reserves, R/P



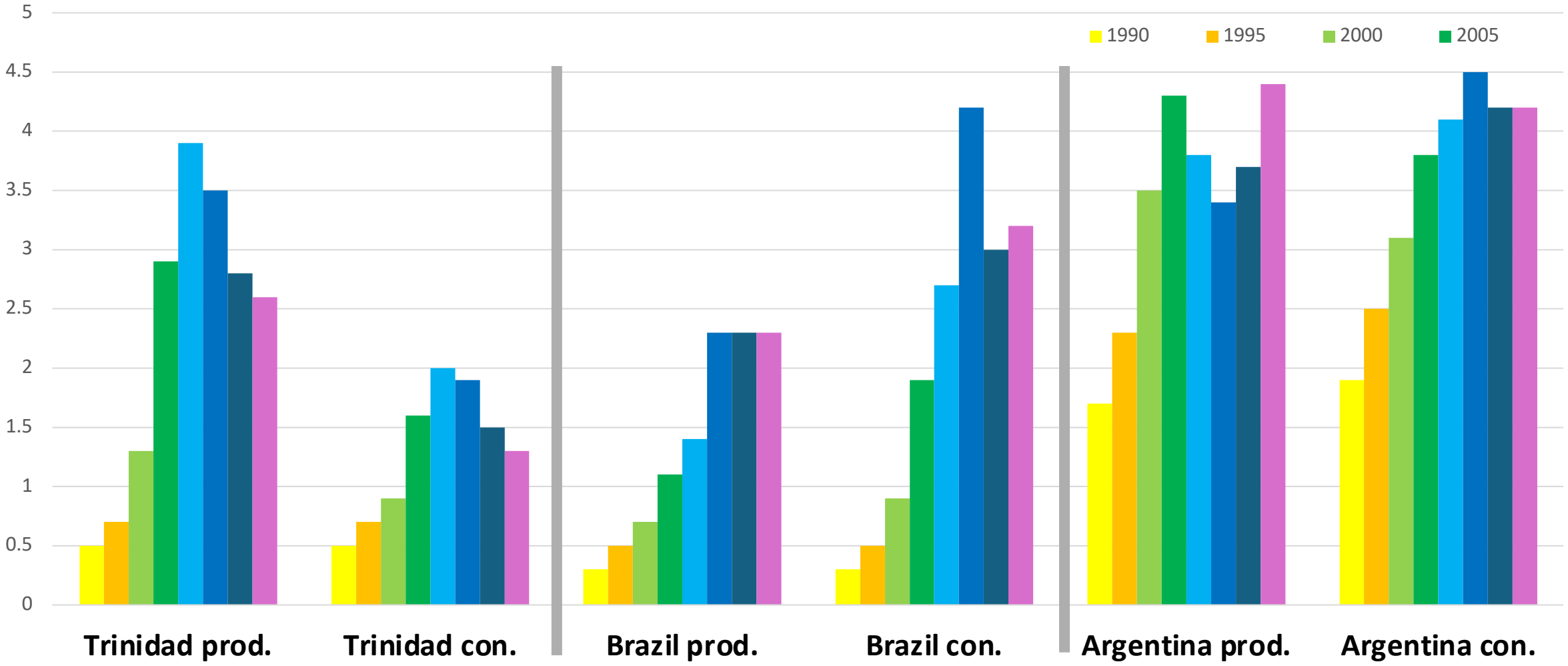
- strong rise in gas production, more than doubles since 1990; single largest producer in 2025 is USA (~25%)
- steady growth in global gas reserves, almost doubles; R/P remains strong, over 50 years;
- minor indication of decline in R/P as preference for natural gas rises strongly; USA R/P relatively low

Natural gas - North American producers and consumers (bcf/d)



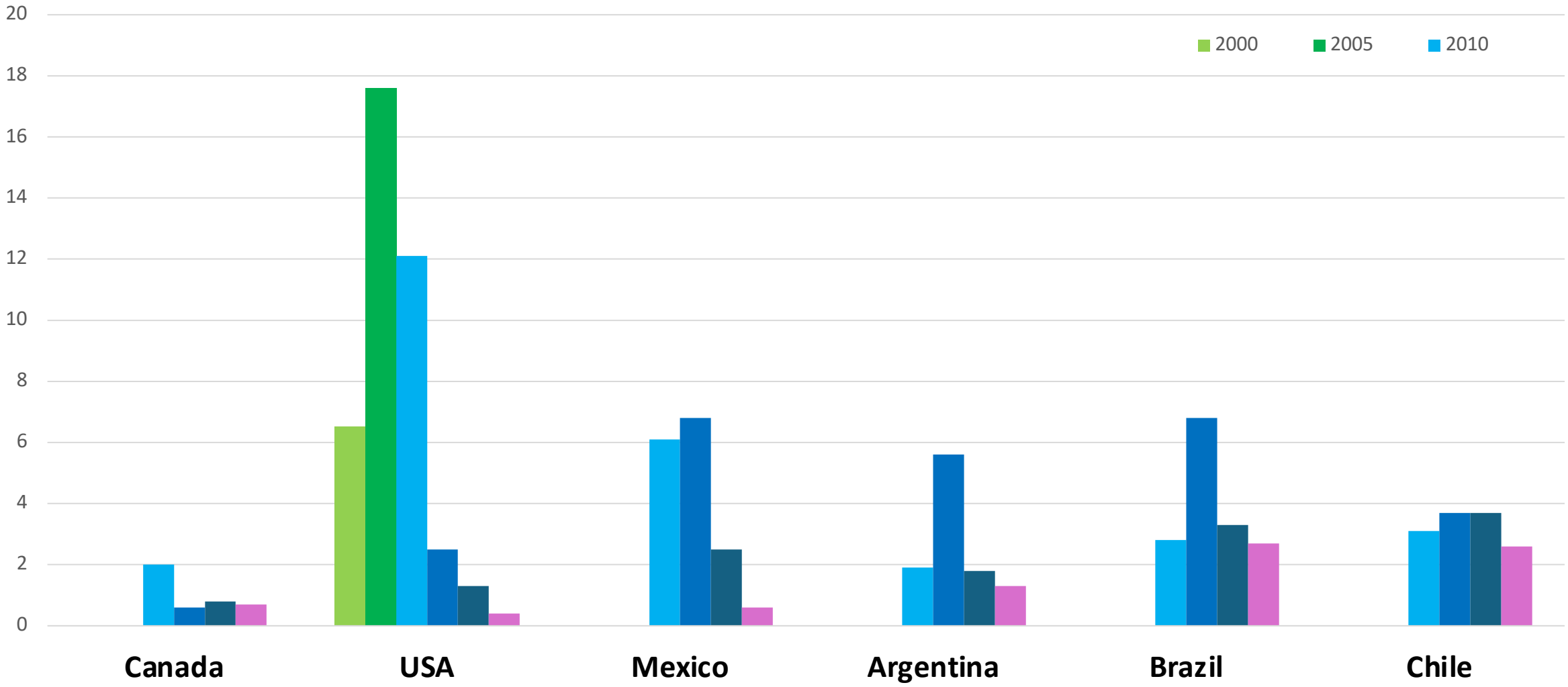
- Canada production fluctuates and consumption grows but continues to be a net exporter
- USA - importer then exporter (piped & LNG); production leaps 2010 onwards due to shale, breaks 100bcf/d in 2025
- Mexico production peaks then fades; shale remains undeveloped; strong demand for power met by US piped gas

Natural gas - significant producers and consumers (bcf/d)



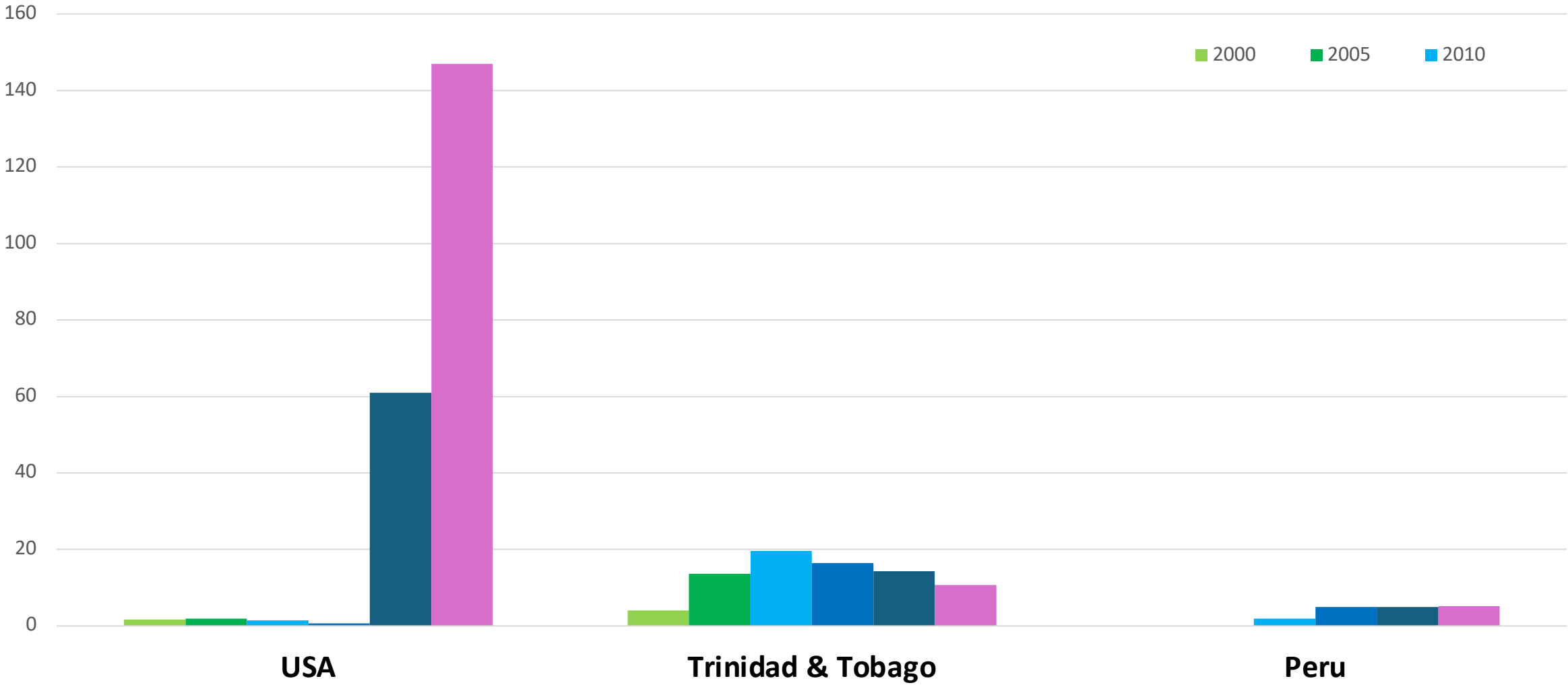
- Trinidad production peaks; consumption by heavy industries is trimmed & rationed, helping maintain LNG exports
- Brazil production grows strongly but consumption fluctuates to meet power demand swings, LNG importer
- Argentina production more than doubles, shale gas now dominant; strong demand, complex politics/policies

Natural gas - LNG importers in Western Hemisphere (bcm/y) - 2000-2025



- many countries became LNG importers in last 15-20 years; high LNG prices discourage growth
- USA was becoming a major importer in early 2000s until boom in shale gas; Brazil and Chile largest importers in 2025
- Mexico reduces LNG imports, increases piped gas from USA; Argentina reduces imports as Vaca Muerta developed

Natural gas - LNG exporters in Western Hemisphere (bcm/y) - 2000-2025

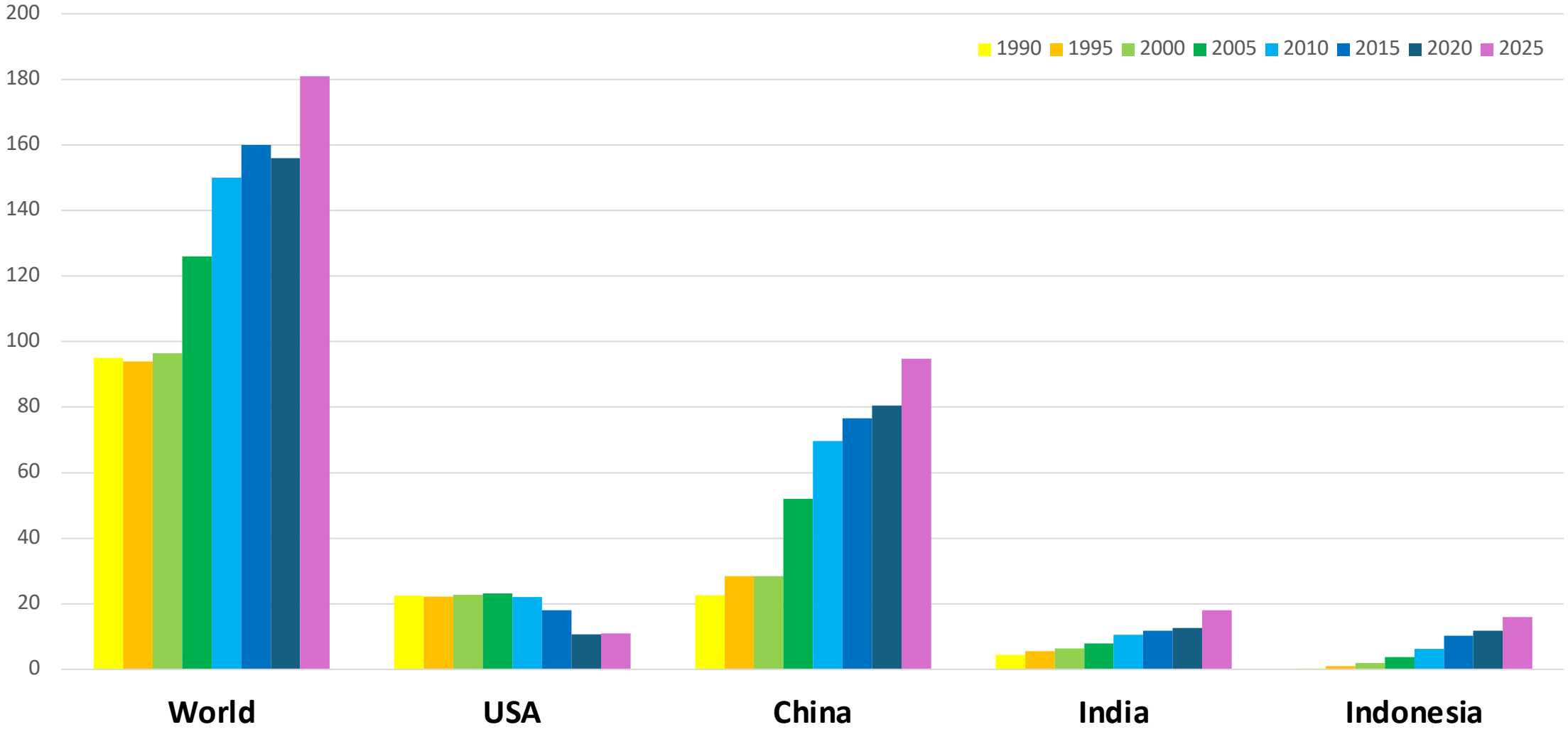


- dramatic increase in USA exports as multiple large LNG liquefaction projects built to exploit US shale gas boom
- Trinidad LNG exports grow but then fall as insufficient gas production to keep infrastructure full; new fields needed
- Peru develops the giant onshore Camisea gas field both for LNG exports and for domestic markets

Coal

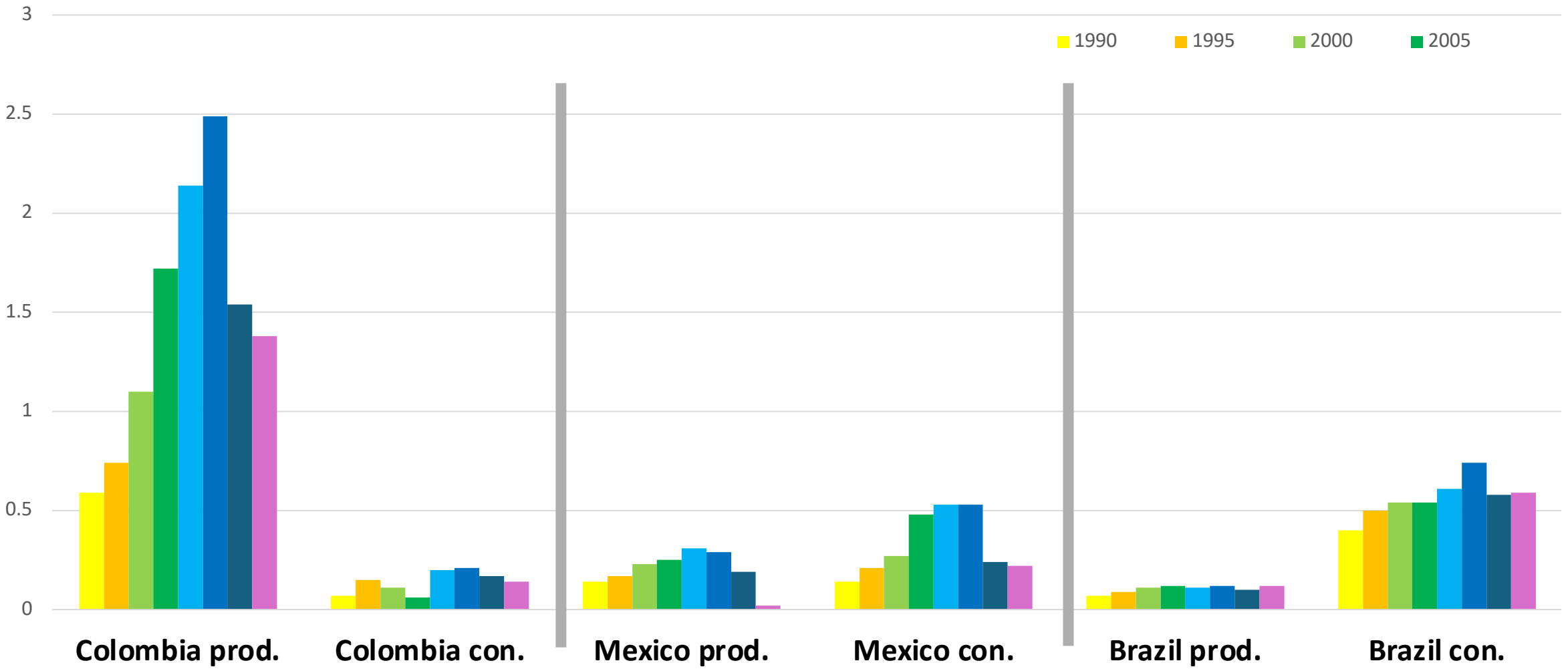
n.b. includes commercial solid fuels only, i.e. bituminous coal and anthracite (hard coal), and lignite and brown (sub-bituminous) coal, and other commercial solid fuels; includes coal produced for Coal-to-Liquids and Coal-to-Gas transformations

Coal - major producers (exajoules)



- global production at all-time highs; by 2025 almost double 1990; China coal boom in early 2000s
- in 2025, half of production in China (52%); India & Indonesia grow strongly; USA coal displaced by gas & renewables
- no substantial signs of global coal phase down, or phase out of unabated coal

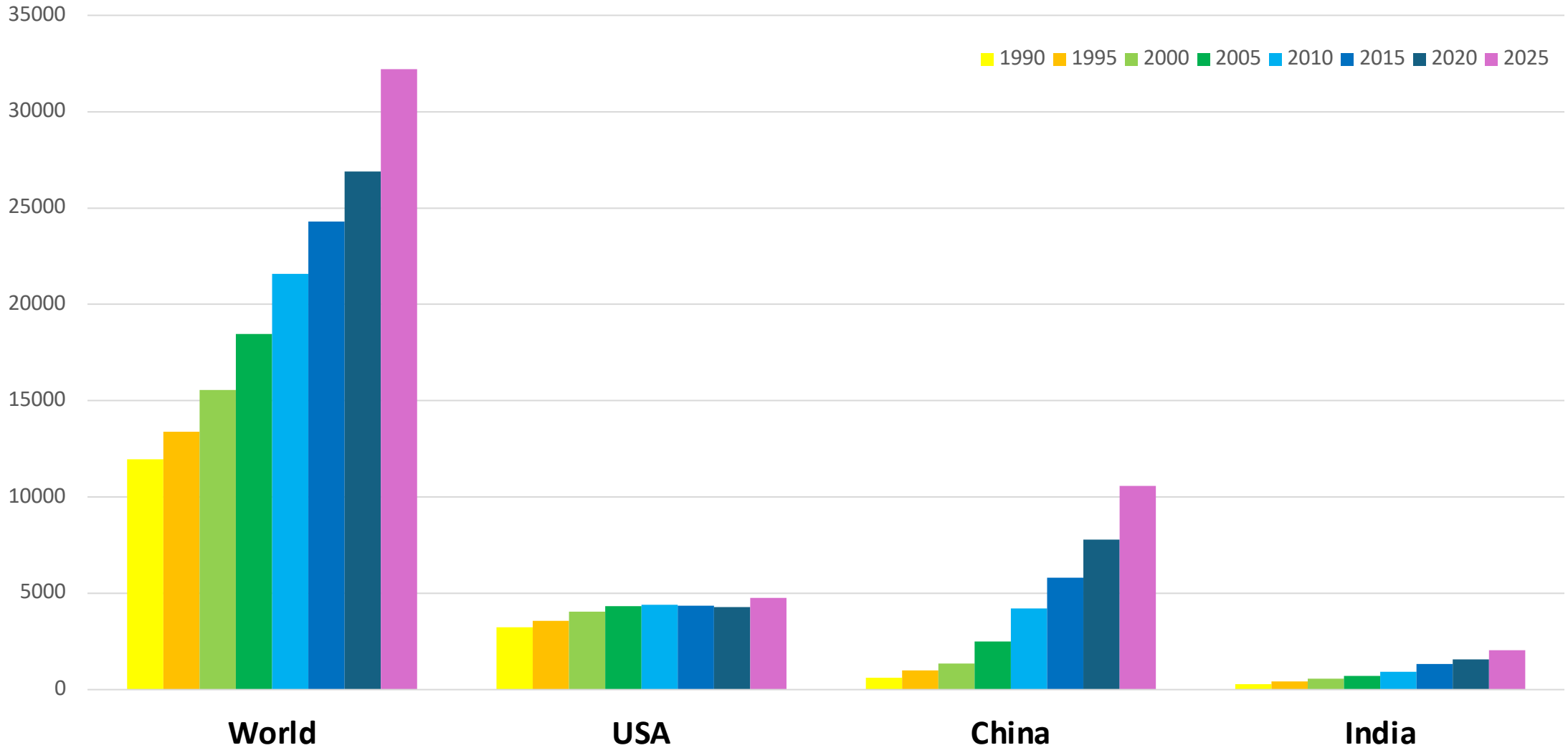
Coal - main LatAm coal producers and consumers (exajoules)



- Colombia significant exporter, 2nd largest producer in Western Hemisphere in 2025 (~10% of USA)
- Mexico & Colombia appear to pass peak production & consumption; deadly explosion in 2006 reduces Mexico production
- declining regional importance; Western Hemisphere now <10% of global production/consumption

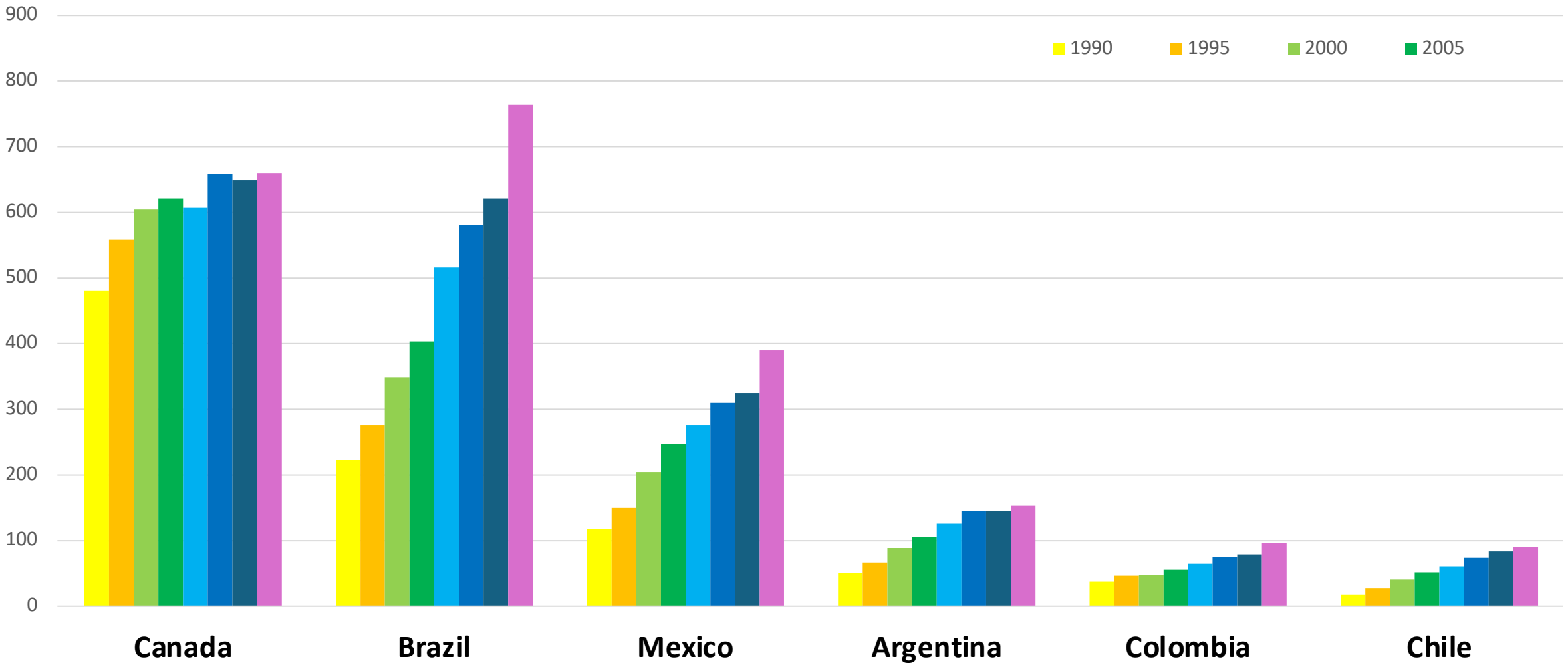
Electricity generation

Electricity generation (TWh)



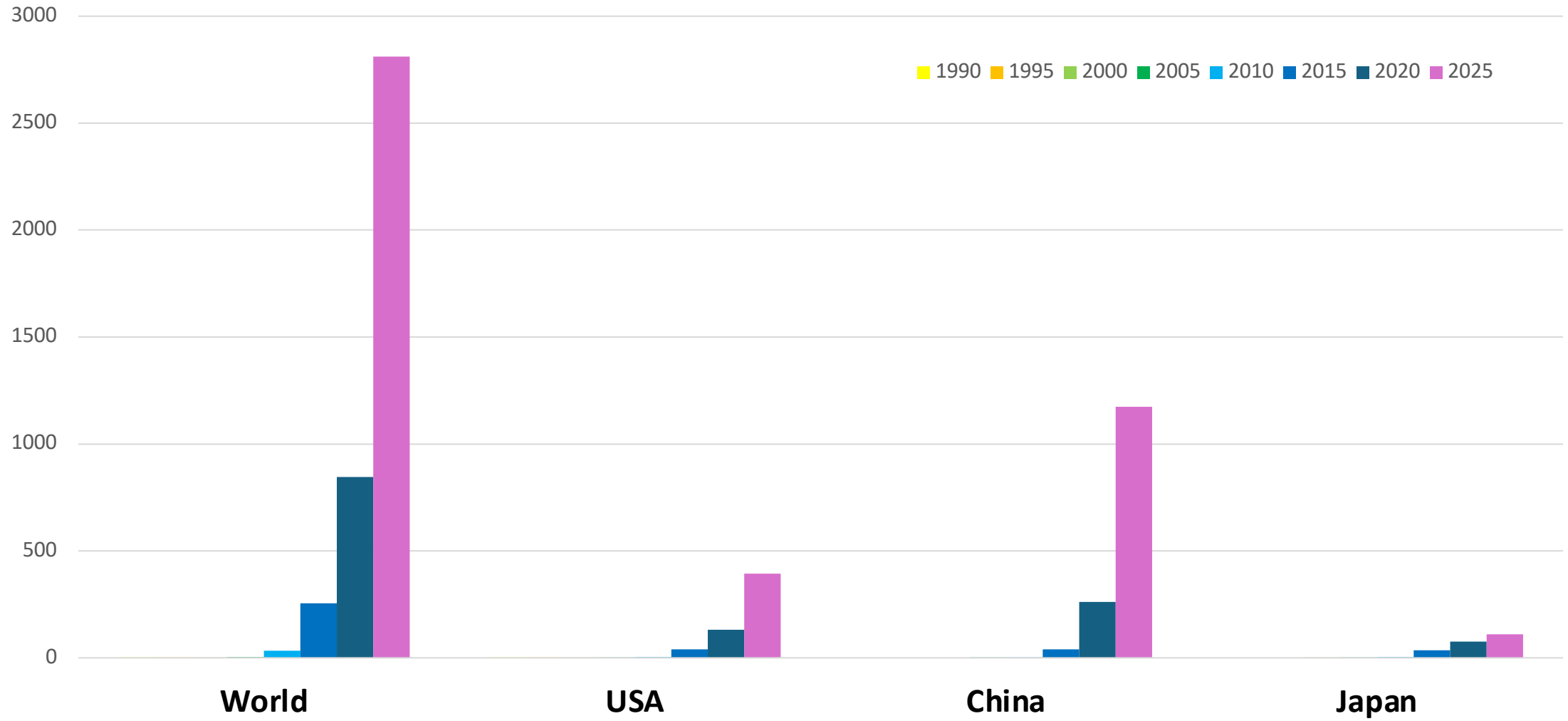
- strong global growth, nearly 3-fold since 1990; in 2025, generation at all-time high; era of electrifying everything
- ~50% growth in last 15 years; China & India more than double generation in last 15 years
- in 2025, China and USA around half of all generation (48%); EV and AI demand surge has started, but still in infancy

Electricity generation - selected Western Hemisphere countries (TWh)



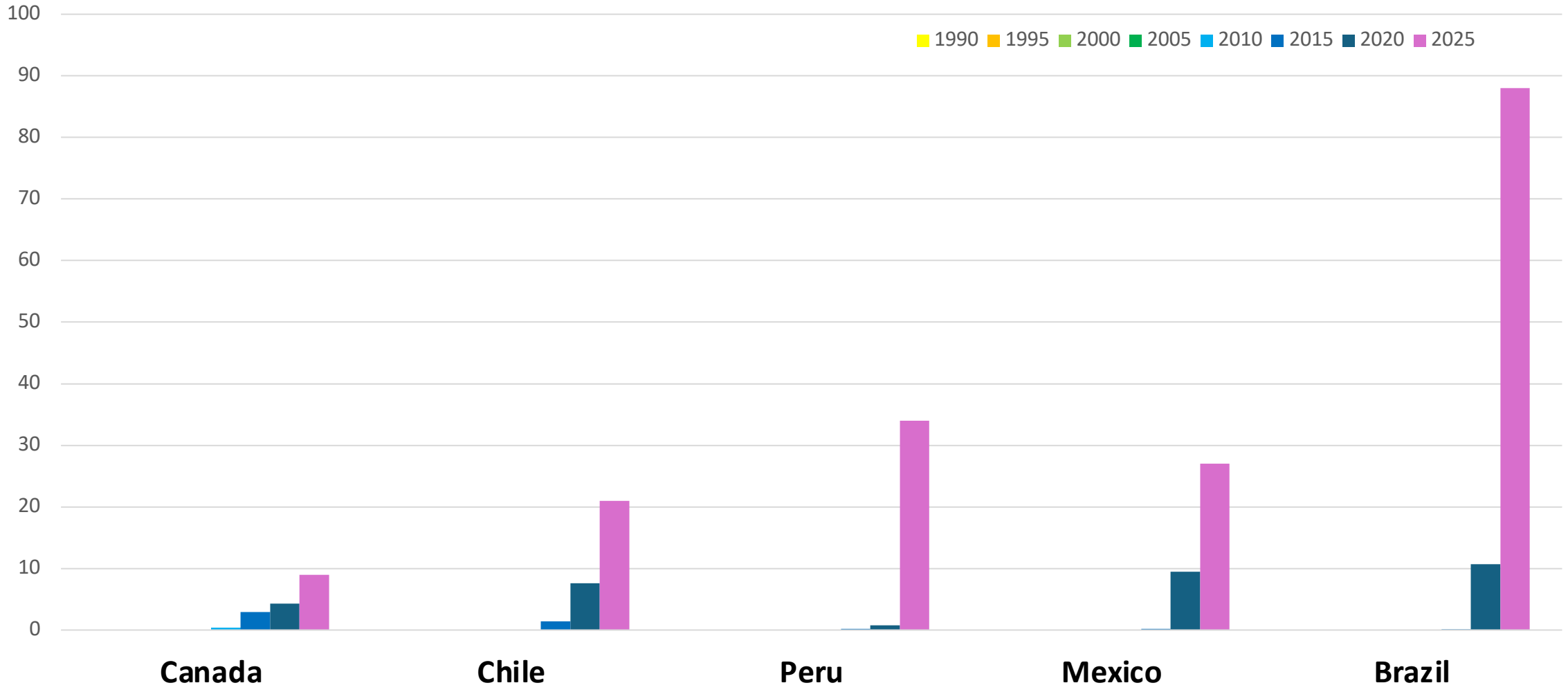
- each country at highest-ever generation in 2025
- Brazil, Mexico, Argentina, Colombia and Chile, all more than double their generation in last 25 years
- in 2025, generation in Brazil now 2nd only to USA in Western Hemisphere (though USA over 6 times greater)

Electricity generation - big solar power generators (TWh)



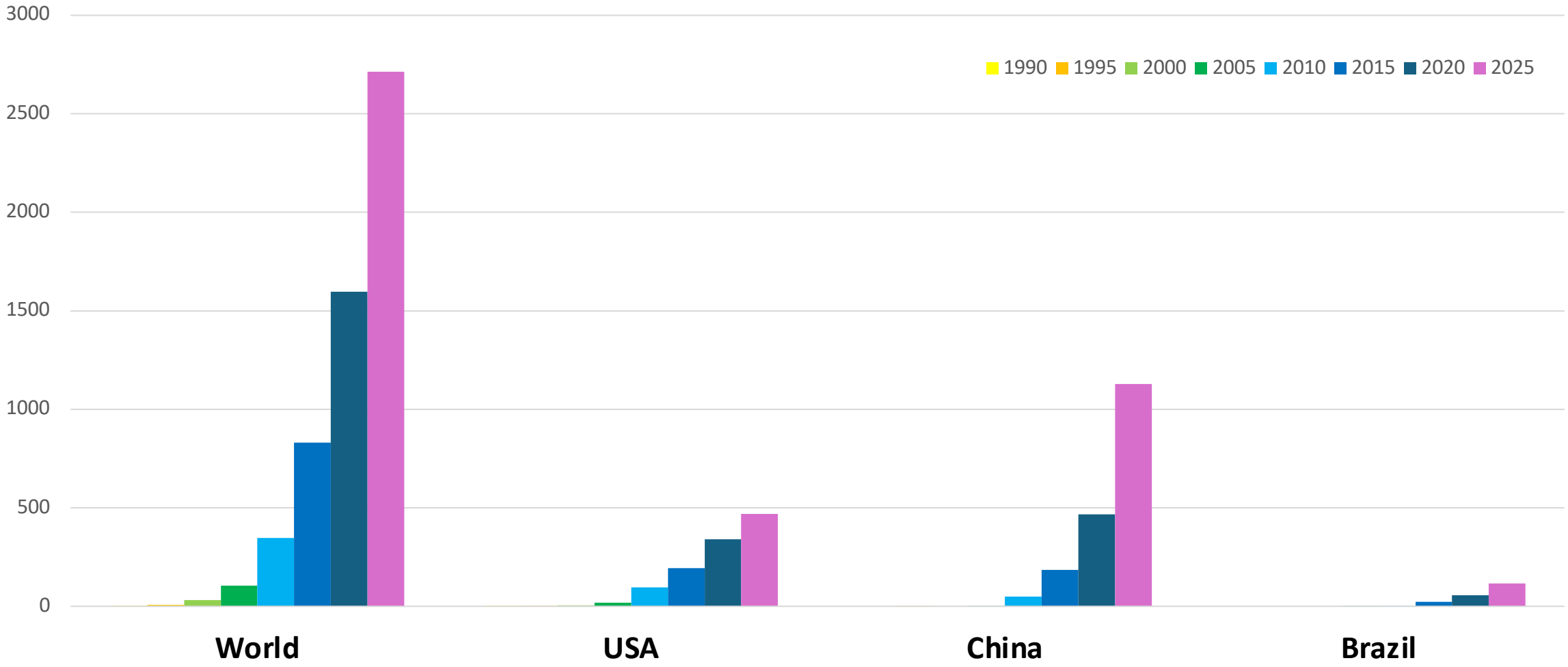
- USA led the way, started ~15 years before China; until 2015, Japan kept pace; in last 10 years China accelerates
- by 2025, China & USA dominate the world of solar power (56% of total production)
- recent decades have highlighted solar in energy security & reaching Net Zero, accelerating its global rollout

Electricity generation - new solar generators in Western Hemisphere (TWh)



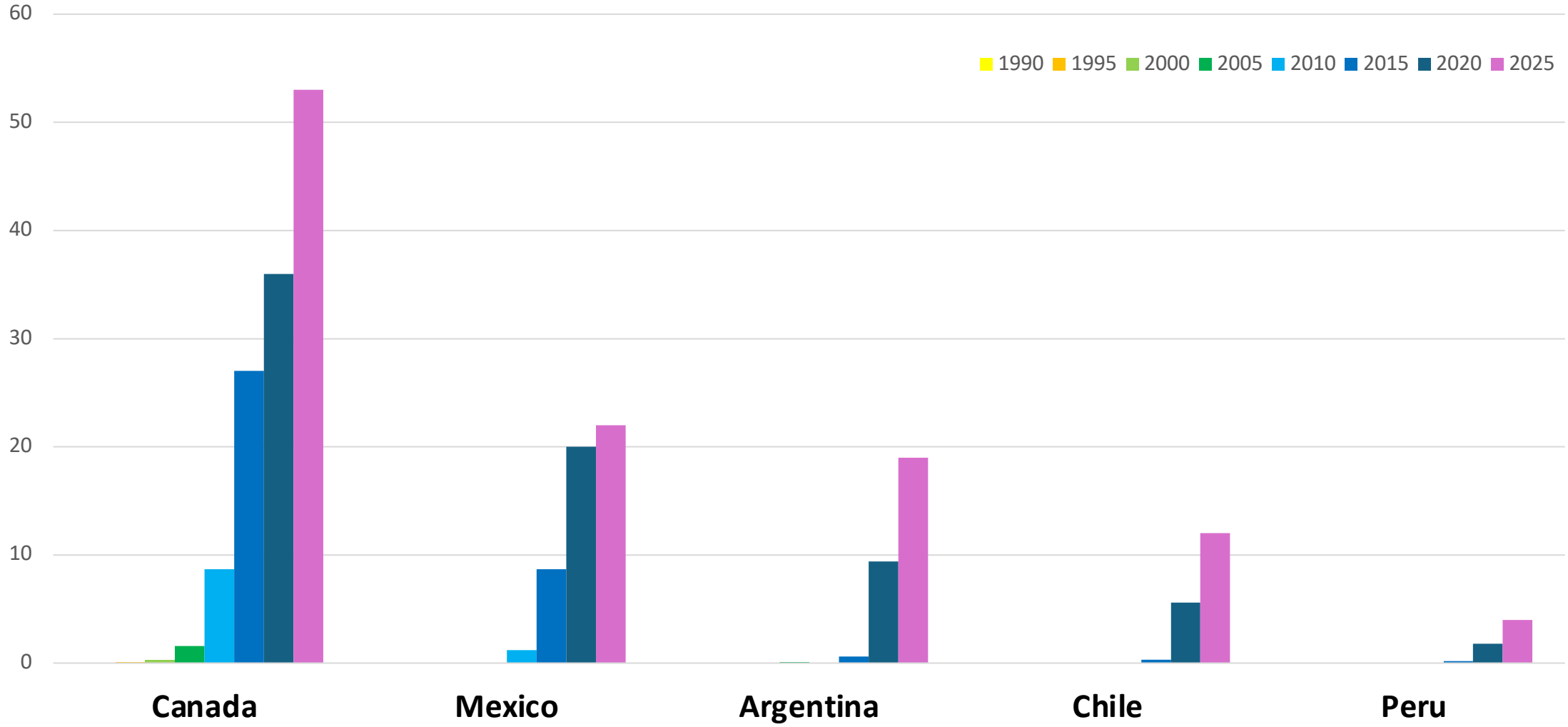
- each country shows significant growth in last 10 years, and many more large projects coming
- taken together now ~6% of global production; Brazil is 2nd largest solar producer in Western Hemisphere
- increasingly recognized role for energy security & independence, diversity, lower costs and Net Zero

Electricity generation - big wind power generators (TWh)



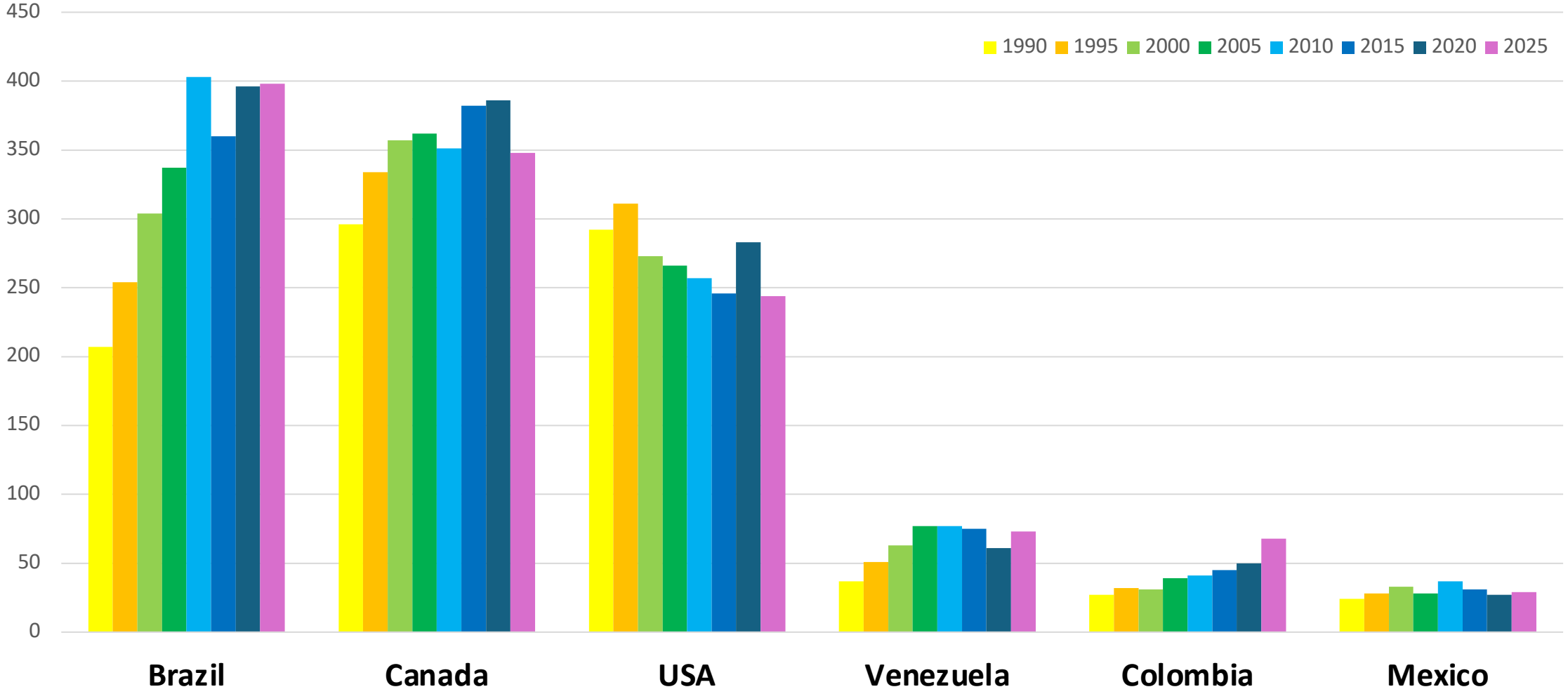
- USA led the way 10 years ago; in last 10 years China has surged ahead
- in 2025, USA & China together dominate the world of wind power production (59% of total)
- Brazil is 2nd largest producer in Western Hemisphere

Electricity generation - some new wind power generators (TWh)



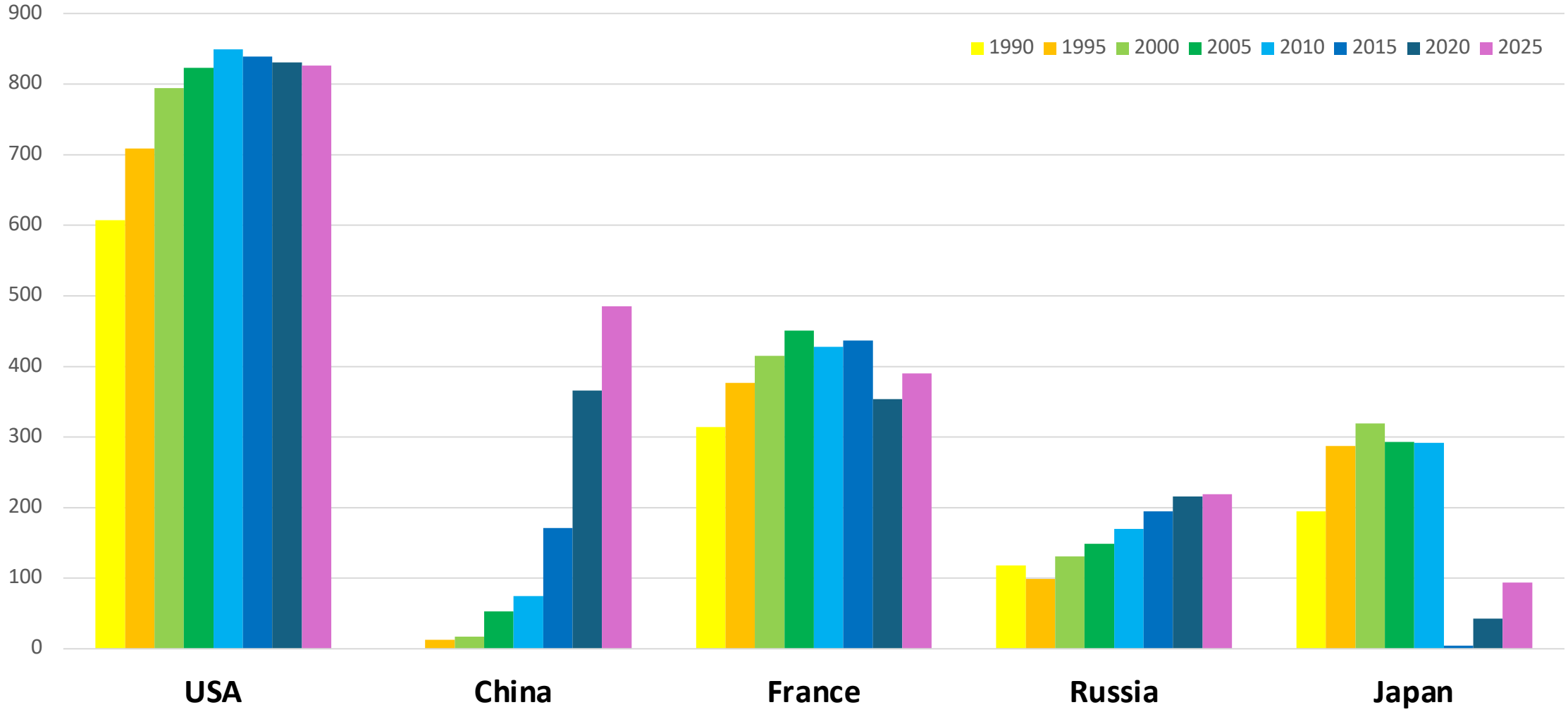
- significant growth in last 10-15 years onshore; together ~4% of global production; vast offshore potential available
- importance of wind in energy security, Net Zero and low power costs, accelerates rollout
- enormous opportunities for excess wind & solar power storage - compressed air, BESS, hydrogen, heat & CO2

Electricity generation - hydro power in Western Hemisphere (TWh)



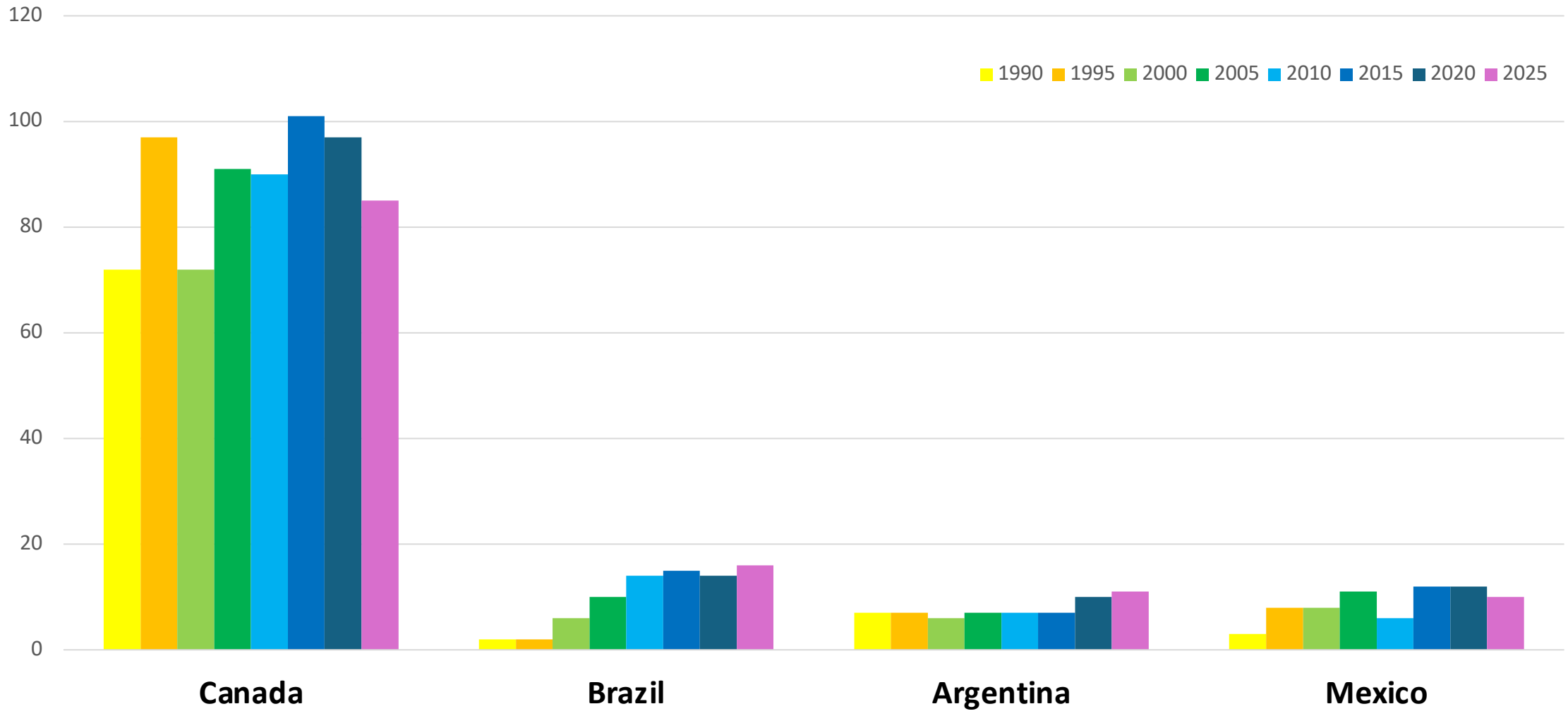
- much capacity built 1930-1990s; important for energy security; vulnerable to seasonal rainfall changes
- Brazil, Venezuela & Colombia added further capacity since 2000; Venezuela & Colombia doubled output since 1990
- Brazil is largest producer in Western Hemisphere over last 20 years; output is globally 2nd only to China

Electricity generation - nuclear power global leaders (TWh)



- nuclear plays key role in energy independence producing clean baseload power; USA has led generation for decades
- China growing very rapidly, France struggling to manage ageing plants, Russia growing steadily
- Japan ceased production after Fukushima earthquake in 2011, has restarted nuclear to cut massive LNG/coal imports

Electricity generation - other nuclear power in Western Hemisphere (TWh)

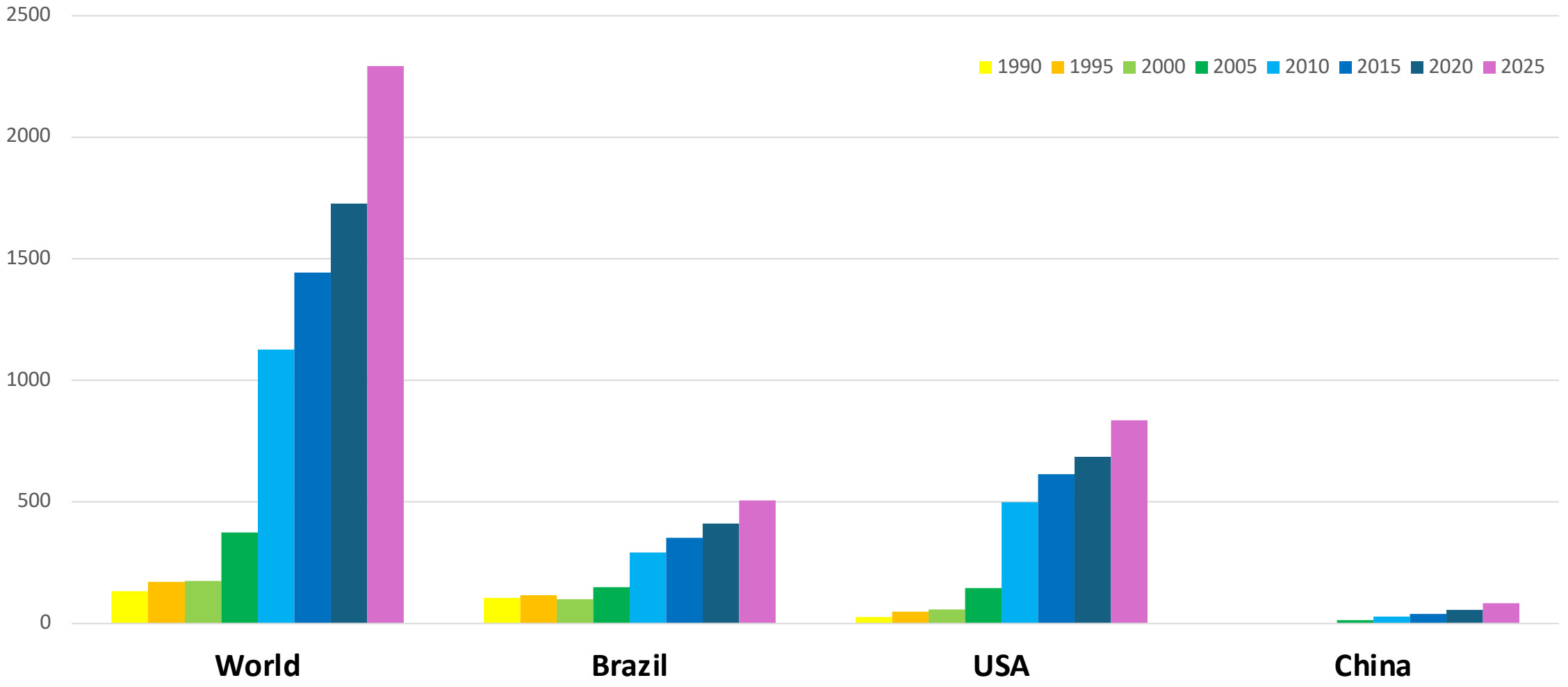


- apart from USA, only Canada, Brazil, Argentina & Mexico have commercial nuclear generation in Western Hemisphere
- Brazil has continued to grow nuclear since 1990, adding clean baseload power to diverse energy mix
- nuclear contributions are much lower than hydro; many plans to introduce more nuclear, including SMRs

Biofuels

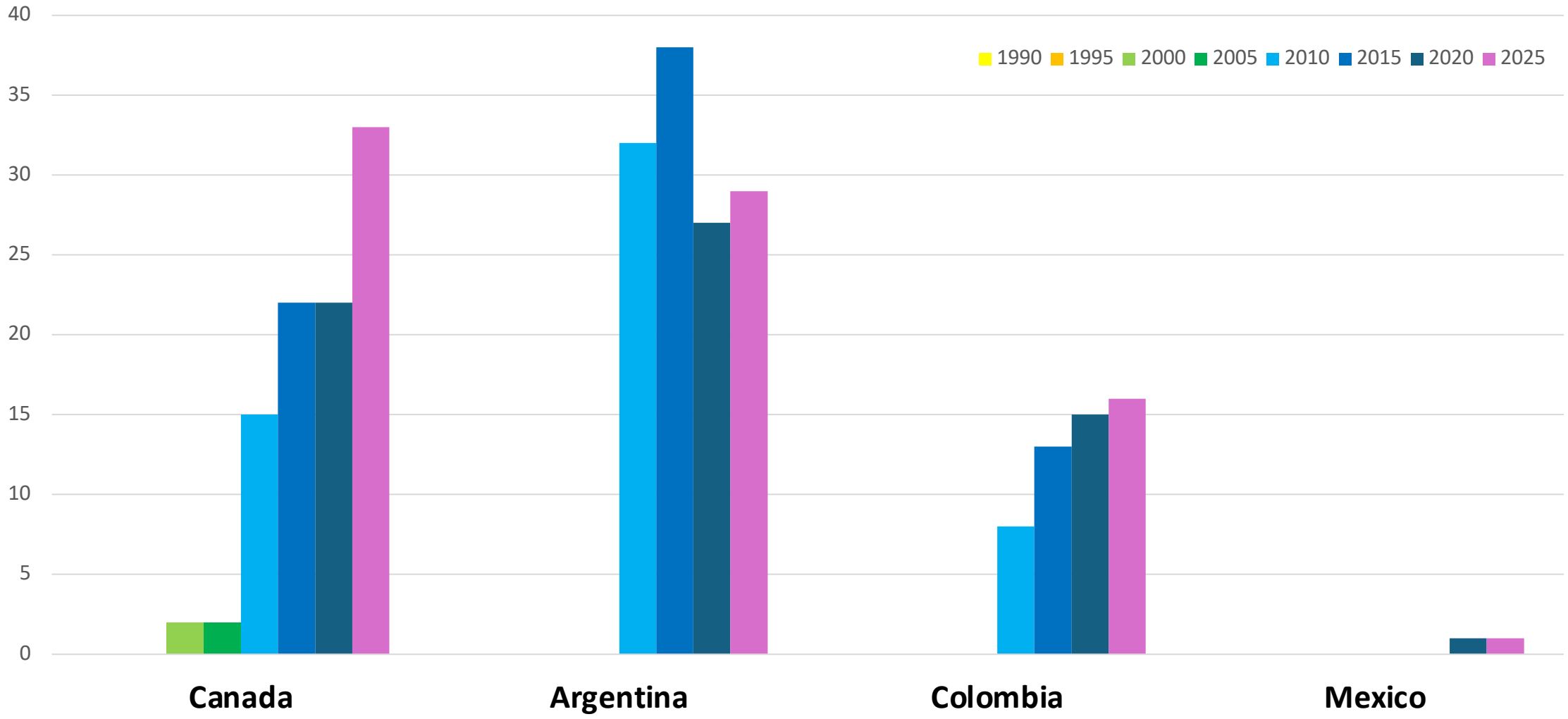
n.b. includes biogasoline (such as ethanol) and biodiesel; volumes have been adjusted for energy content

Biofuels - big producers (m b/d)



- significant growth since 1990; in 2025, Brazil and USA lead the world; in 2025, 36% and 22% of global production
- USA growth has accelerated since 2005 when fuel standards changed and MTBE banned; corn ethanol booms
- many other countries have become producers in last 10-20 years

Biofuels - Western Hemisphere new entrants (m b/d)

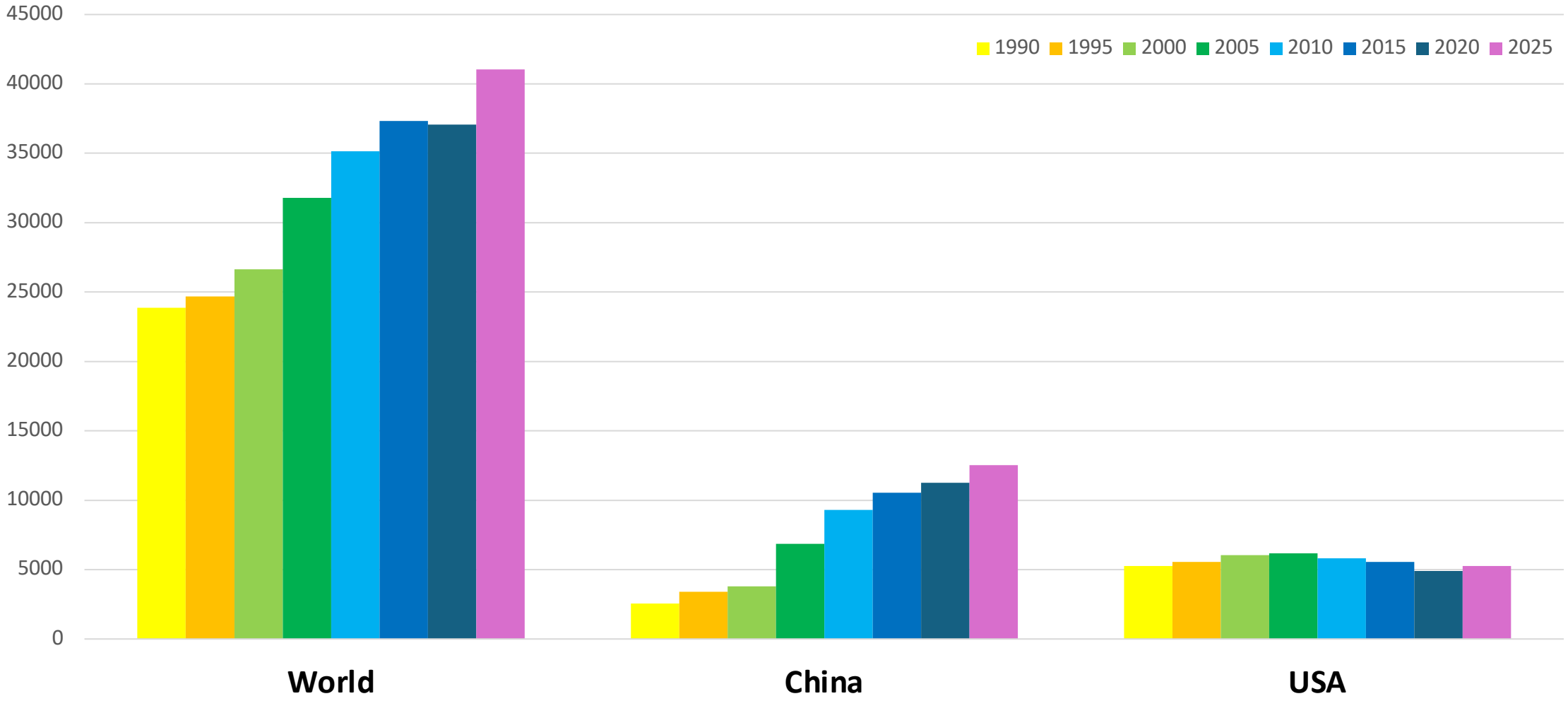


- Canada was followed by Argentina & Colombia, then recently Mexico
- volumes yet to have major impact; together 3.5% of global production in 2025
- very large expansion potential, both bioethanol and biodiesel

Carbon dioxide emissions

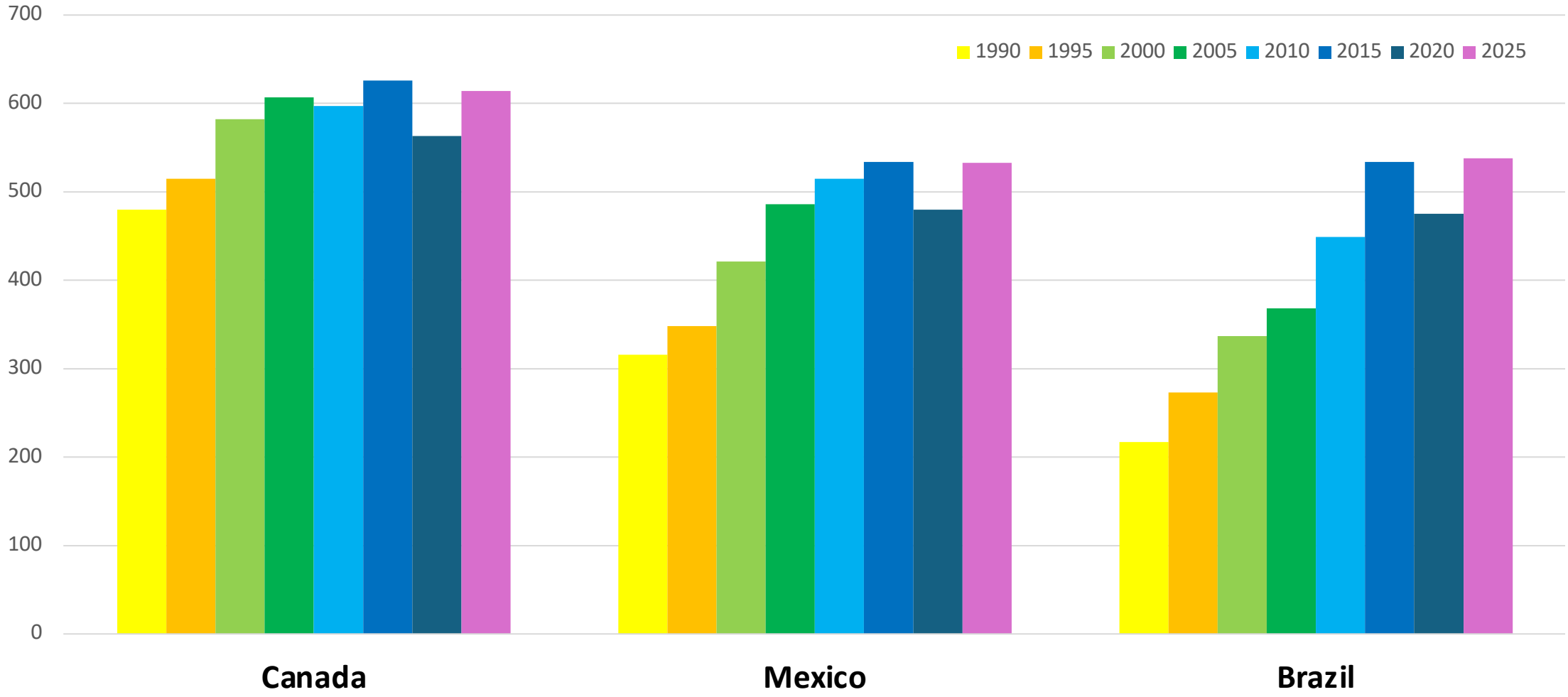
n.b. emissions are the sum of carbon dioxide emissions from energy, carbon dioxide emissions from flaring, methane emissions in carbon dioxide equivalent and carbon dioxide emissions from industrial processes

Carbon dioxide emissions - big emitters (mm t CO2eq)



- since 1990, 72% global increase; by 2025, China and USA generate ~43% of total; note World & USA show Covid impact
- USA emissions peak, then fall when coal displaced by natural gas & renewables; AI/datacenter energy use yet to explode
- China emissions show strong (5-fold) growth since 1990 as coal, oil & natural gas use surges, despite major renewables

Carbon dioxide emissions - other emitters in Western Hemisphere (mm t CO2eq)



- Canada, Mexico and Brazil emissions have increased significantly since 1990
- together they account for ~4% of global emissions in 2025; each exhibits a clear Covid-related drop
- Brazil has increased fastest (up ~150% since 1990) - emissions now on a par with Mexico

Some conclusions, 1990-2025

- over 35 years, global energy consumption increased 85% underpinned by growing economic activity & population
- overall, hydrocarbons production and consumption increases strongly; many countries increase, whilst some decline
- in 2025, oil and natural gas production at highest-ever levels; no indication of either peak oil, peak gas or peak coal
- when plotting data at 5-year intervals, long-term trends become apparent, whilst short-term crises often lost/diminished
- impacts of Covid seen in many 2020 data - lower economic activity, home working, reduced travel & fuel consumption
- very strong growth in electricity generation, ~3-fold since 1990; most countries now at highest-ever generation
- surge in solar and wind power over last 10-15 years; hydro important contributor; nuclear in certain countries
- expected surge in power demand from AI/data centres still in its infancy
- in 2025, Brazil and USA dominated the world of biofuels production; many new entrants appearing
- over 35 years, global emissions increased 72%; in most Western Hemisphere countries, Covid caused a temporary decline