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Stewart joined OMAM in June 2009 from Newton Investment Management where he held a similar role and managed the Newton International Bond Fund and BNY Mellon Global Bond Funds, both rated AAA by Standard & Poor's. He has more than 20 years' experience of global fixed income markets, having begun his career in 1987 as a broker before subsequently switching to fund management.

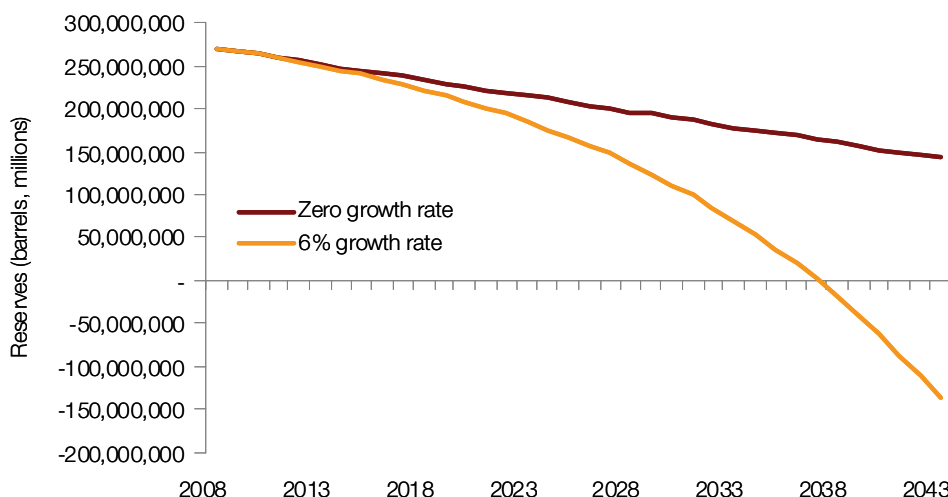
## There's an awful lot of oil in Brazil?

### Looking to increase Canadian dollars at the expense of the Norwegian krone

Since our investment note 'One Minute to Midnight' discussing the amount of time before the world's oil reserves run out, we have had a chance to meet with investors and discuss their thoughts on our carbonless future. Overwhelmingly, the question has not been so much "if" but "when" will our oil reserves run out.

Readers will recall that we posited that, at current rates of growth in our consumption of oil, the problem of period doubling meant that as time goes by, the rate at which we run out of oil accelerates until an end game is reached within our lifetimes. All of the politics in the world resolve into a couple of numbers: whether that growth rate is high or low, positive or negative has major consequences for the world. According to the latest data we are currently in the territory of increasing the growth rate of our consumption of carbon-based fuels and specifically oil at around 6% per year (roughly equal to nominal global GDP). Developed nations and developing nations are doing their bit to increase alternative fuel sources but progress is slower than the rising demands of the world as a whole.

#### Saudi Arabia: oil reserves



Source: Bloomberg

This might not sound very much, but the period doubling problem means that for every 2% increase in consumption, usage doubles in approximately 35 years, for a 5% increase the time period is every 22 years, and a 10% increase means usage doubles every 7 years. In other words, within the area of uncertainty, if carbon-fuelled economies accelerate their usage the end game could come rushing towards us faster than anyone imagined.

<sup>1</sup> Source: <http://www.eia.doe.gov>

Take the example of Saudi Arabia. Using some simple maths and starting from the point of published known reserves<sup>1</sup>, it's easy to see why some people say the oil will "never" run out. Apply a zero growth rate for usage and the depletion rate (at current daily extraction rates) stretches out into a distant future which is, to all intents and purposes, beyond worth considering as we should have transitioned from our present energy dependencies to alternatives by that time. However, apply the 6% growth rate and the last drop of oil in Saudi Arabia drips out sometime in 2037. In fact this is true of most of the big Middle Eastern producers; Iran, Iraq, Kuwait etc. However, you might imagine that people will start getting a bit twitchy when only 50% of the current reserves are left. To coin a phrase, let's call it "the twitching point". and in Saudi's case, this turns out to be in 2028.

It is interesting to repeat this exercise on some of the known and favored oil producers around the world and ask the same questions; "At a 6% growth rate when do the current known oil reserves run out and at what point will 50% be depleted?". The results are shown below.

Country	6% growth rate	The twitching point
Norway	2016	2012
Canada	2048	2037
Russia	2019	2015
Brazil	2018	2014

Something to notice is how quickly Norway is running out of oil (obviously it has massive gas reserves). The known reserves of around 7bn barrels will be gone in just 7 years. Canada is the standout country in this group – massive known reserves stretch its production capacity out close to where the Middle East is. However, Russia and Brazil appear to be somewhat troubling. Given that both these economies are increasingly strapped to a dwindling set of known reserves, the end game comes swiftly and within the next decade. Unless new discoveries are made in Russia and Brazil that add substantially to their useable reserves, then economic instability looms large for them if their societies have become too dependent for their survival on handouts created by oil revenues. There may be an awful lot of coffee in Brazil, but there doesn't appear to be enough oil.....

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