

# CONTINUED LOCK-IN TO FOSSIL FUELS

*Definition: "Lock-in" refers to the inertia created by large economical and infrastructural investments. In the energy system lock-in to fossil fuels inhibits public and private efforts to introduce alternative energy technologies.*

Today, the share of fossil fuels account for approximately 86 pct. of all energy use and despite growing investments in renewable energy, this figure has been constant the last twenty years<sup>12</sup>. Over the coming 20 years, the annual costs of meeting the world's growing energy needs will rise steadily from \$1,600 billion to \$2,000 billion in 2035<sup>13</sup>. This requires huge investment in new energy infrastructure, and without a dramatic shift in investment patterns, the largest portion of new investments in energy infrastructure will go towards fossil fuels. This will

pull the energy system towards greater emissions of greenhouse gasses, making it even harder - if not impossible - to keep global warming under 2 degrees Celsius. If political pressure or consumer demand at a later time should shift energy demand away from fossil fuels, the continued high levels of investment in fossil fuel-based energy generation represents a major risk of stranded assets.

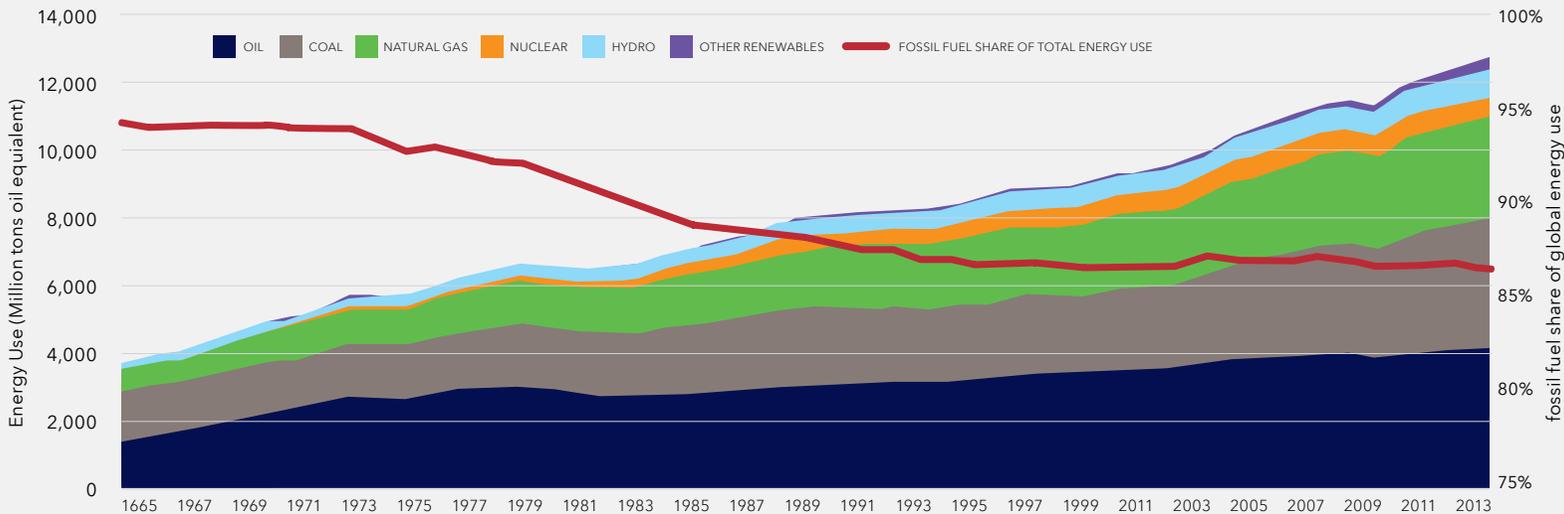
In the transport sector the lock-in to fossil fuels is mainly maintained by previous and ongoing investments in infrastructure such as refuelling

stations for fossil fuels, roads and urban zoning creating a growing transport need. The refuelling infrastructure servicing fossil fuel-based transport hinders the transition to alternative fuels for personal cars. Transport is the fastest growing source of CO2 emissions. It is estimated that the sector contributes about 20 pct. to energy-related CO2 emissions<sup>14</sup>.

Fossil fuel consumption in power and heat generation as well as transport also contributes significantly to local pollution causing widespread damage to health and comfort.

## FOSSIL FUELS KEEP THEIR SHARE OF THE ENERGY MIX

After a small decline in the dominance of fossil fuels from 1970 - 1995 the total fossil fuel share of global total energy consumption has been stable at around 86%<sup>12</sup>



### FACTS AND FIGURES

- Without dramatic change of policy or investment CO2 emissions from the energy sector is projected to rise from 13.0 Gt in 2011 to 15.2 Gt in 2035, retaining a share of around 40% of global emissions over the period.<sup>15</sup>
- The transport sector accounted for 27% of final energy use and 6.7 GtCO2 direct emissions in 2010, with CO2 emissions projected to approximately double by 2050.<sup>16</sup>
- According to WRI's estimates, 1,199 new coal-fired plants, with a total installed capacity of 1,401,278 megawatts (MW), are being proposed globally. These projects are spread across 59 countries. China and India together account for 76 pct. of the proposed new coal power capacities.<sup>17</sup>

### IMPACTS

- In 2012, the 200 largest listed oil, gas and coal companies spent \$674 billion on developing new reserves. This is five times as much as they returned to shareholders (\$126 billion). ExxonMobil alone plans to spend \$37 billion a year on exploration in each of the next three years.<sup>18</sup>
- Following the crisis in Fukushima, Japan, Germany is set to close all its nuclear power plants by 2022, which is expected to increase the country's reliance on coal. Utilities across Germany have resorted to coal as the mix of coal-generated electricity rose to 45 pct. in 2013, the highest level since 2007.<sup>19</sup>
- In 2009 annual damages due to air pollution in the EU from the energy sector was found to be between 66,473 and 111,606 million euros (including CO2 emissions).<sup>20</sup>

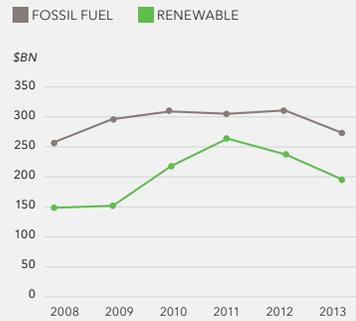
<sup>12</sup>BP, 'BP Statistical Review of World Energy 2014', Report, 2014. <sup>13</sup>EIA, 'World Energy Investment Outlook', Report, 2014. <sup>14</sup>Kopp, A., Block, R. I. and Limi, A., 'Turning the Right Corner - Ensuring Development through a Low-Carbon Transport Sector', Report, 2013. <sup>15</sup>OECD - EIA, 'World Energy Outlook Factsheet', 2013. <sup>16</sup>IPCC, 'WGIII AR5 Summary for Policymakers', Report, 2014. <sup>17</sup>Ailun, Y. and Yiyun, C., 'Global Coal Risk Assessment: Data Analysis and Market Research', WRI Working Paper, World Resources Institute, 2012. Ailun, Y. and Yiyun, C., 'Global Coal Risk Assessment: Data Analysis and Market Research', WRI Working Paper, World Resources Institute, 2012. <sup>18</sup>The Economist, 'Unburnable fuel', The Economist, May 2013. Online: www.economist.com/news/business/21577097-either-governments-are-not-serious-about-climate-change-or-fossil-fuel-firms-are

## RISK #2: CONTINUED LOCK-IN TO FOSSIL FUELS

### FOSSIL FUELS GET GREATEST PART OF ENERGY INVESTMENTS

Investment in energy 2008-2013<sup>22</sup>

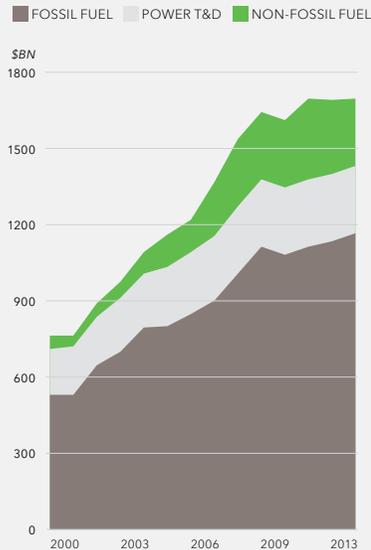
Investment in renewables has grown fast, but has fallen recently, while investments in fossil fuels are more evenly distributed - on a higher level.



### SPENDING ON FOSSIL FUELS IS 4X GREATER THAN ON RENEWABLES

Investment in global energy supply from fossil fuel, non-fossil fuel and power T&D<sup>23</sup>

Non-fossil fuel includes all renewable technologies, nuclear and biofuels. Power T&D is transmission and distribution for the power sector: this cannot be assigned to either fossil-fuel or non-fossil fuel use.

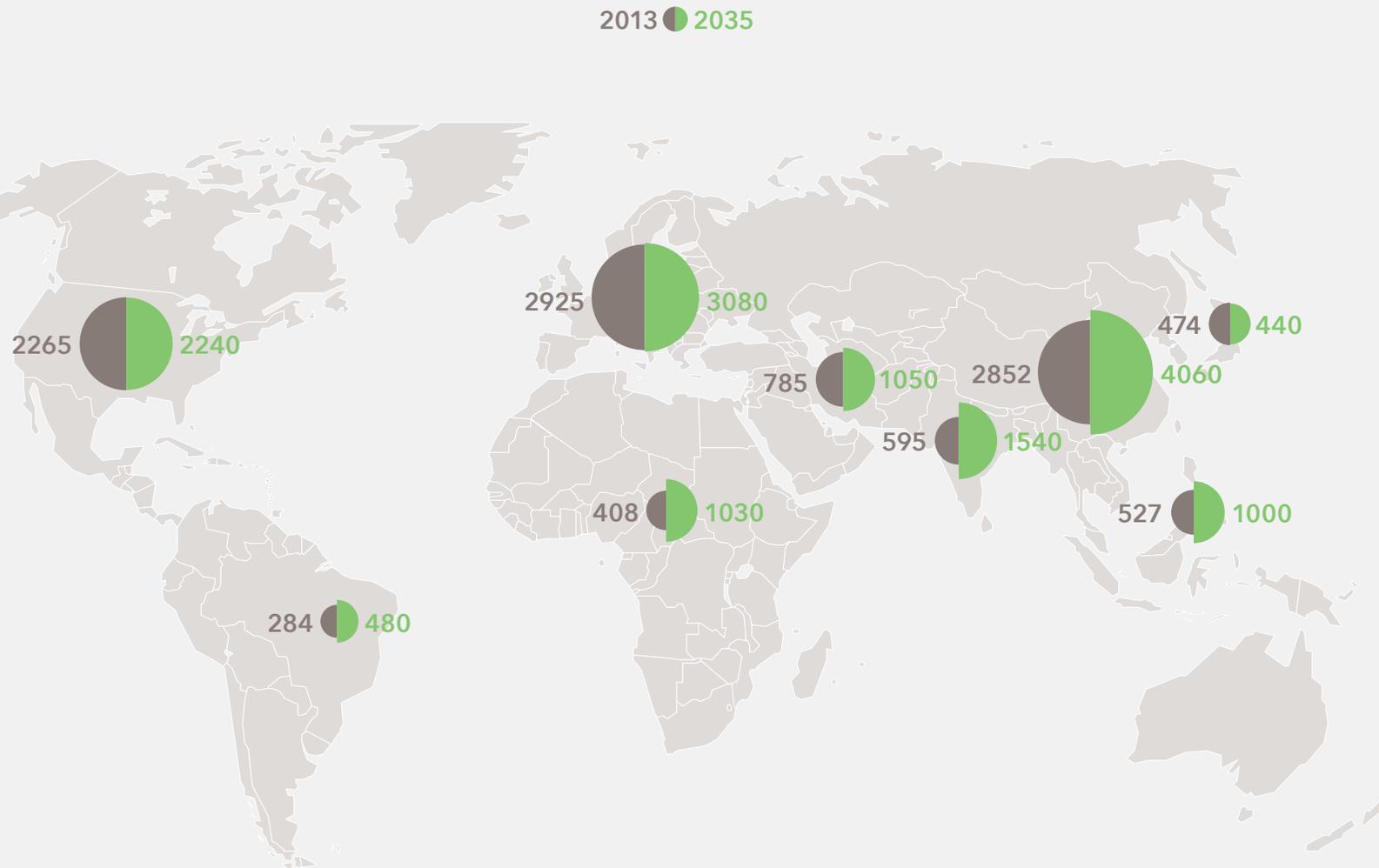


## EXPECTED GROWTH IN ENERGY DEMAND IS GREATEST IN ASIA

Primary energy demand 2013-2035<sup>24,25</sup>

Global energy demand is shifting its centre of gravity to Asia.

The region is expected to drive the 65% of global growth in energy demand over the next 20 years, (Mtoe)



<sup>19</sup> Bloomberg. 'Coal Returns to German Utilities Replacing Lost Nuclear'. April 2014. Online: [www.Bloomberg.com](http://www.Bloomberg.com) [ [bloomberg.com/news/2014-04-14/coal-rises-vampire-like-as-german-utilities-seek-survival.html](http://bloomberg.com/news/2014-04-14/coal-rises-vampire-like-as-german-utilities-seek-survival.html) ] <sup>19</sup> EEA. 'Revealing the costs of air pollution'. Report. 2011. <sup>21</sup> EIA. 'World Energy Investment Outlook'. Report. 2014. <sup>22</sup> Frankfurt School-UNEP. 'Global Trends in Renewable Energy Investment 2014'. Report. 2014. <sup>23</sup> EIA. 'World Energy Investment Outlook'. Report. 2014. <sup>24</sup> BP. 'BP Statistical Review of World Energy 2014'. Report. 2014. <sup>25</sup> EIA. 'World Energy Investment Outlook'. Report. 2014.