

# Natural Security Ranking Methodology

To better understand the relationship between China’s natural resources and strategic priorities, the Phase Zero project team identified 42 key indicators. These indicators measure China’s engagement with the world in various units, ranging from the dollar value of investments to the number of Confucius Institutes in a country, and are the most current data available for each category. The list has the potential to be iterative, as we find new relevant data and update some data. The team started building a matrix with countries China has publicly identified as important partners, such as participants in the Belt and Road Initiative, and then expanded to 180 countries, as trade and other data pointed to the importance of additional countries. The indicators we include are listed in Chart 1.

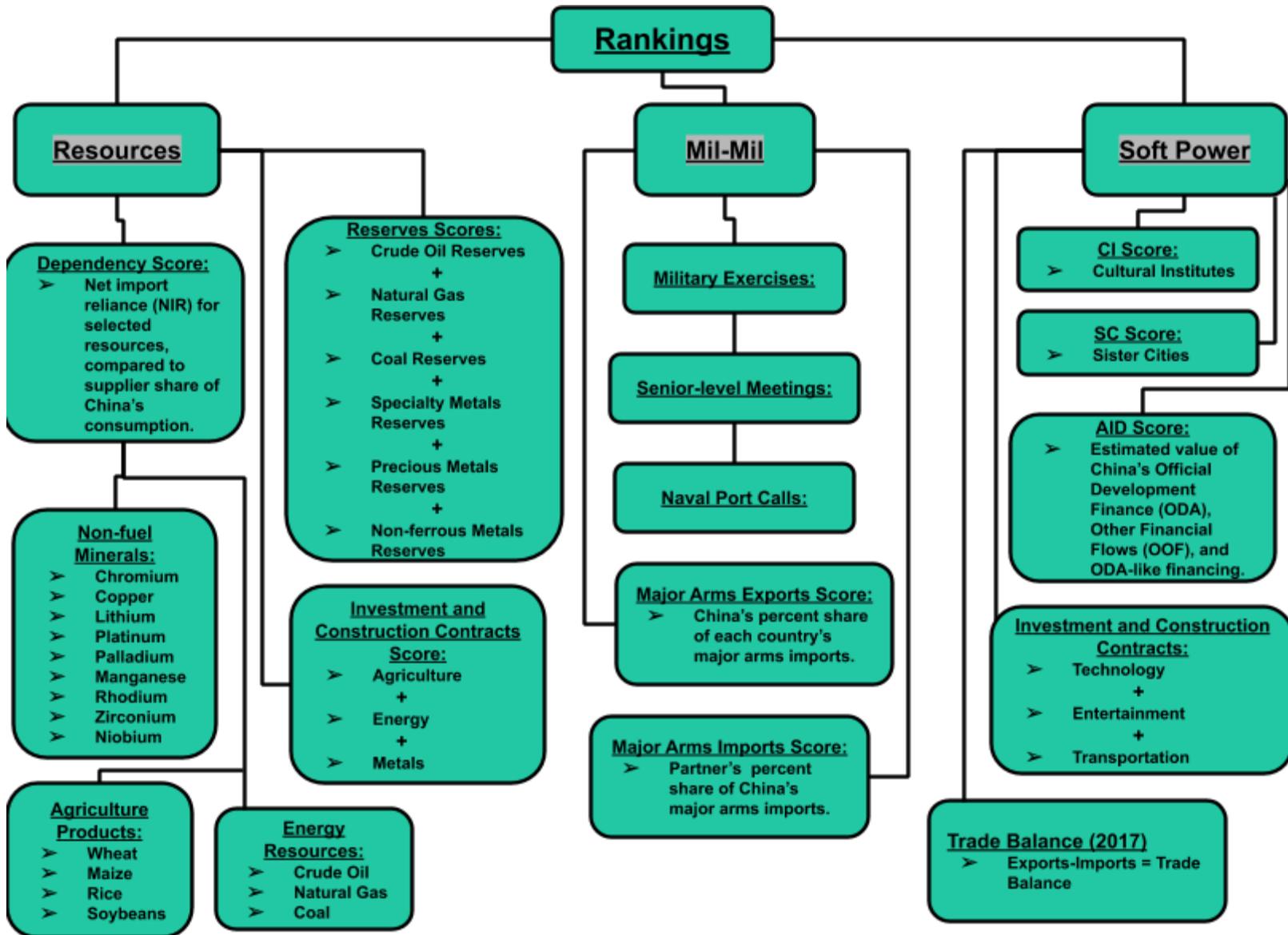
|                                      |                                 |                                 |  |   |                                     |
|--------------------------------------|---------------------------------|---------------------------------|--|---|-------------------------------------|
| Major Arms Imports                   | Major Arms Exports              | Military Exercises              | Senior-level Meetings                  | Naval Port Calls                        | Trade Balance                       |
| Reserves - Crude Oil                 | Reserves - Coal                 | Reserves - Natural Gas and LNG  | Reserves - Non-ferrous metals          | Reserves- Specialty Metals              | Reserves - Precious Metals          |
| Dependency - Copper                  | Dependency- Lithium             | Dependency - Palladium          | Dependency - Platinum                  | Dependency - Manganese                  | Dependency - Rhodium                |
| Dependency - Zirconium               | Dependency - Niobium            | Dependency - Wheat              | Dependency - Rice                      | Dependency - Maize                      | Dependency - Soybean                |
| Dependency - Crude                   | Dependency - Natural Gas        | Dependency - Coal               | Dependency - Chromium                  | Sister Cities                           | Confucius Institutes                |
| Construction Contracts - Agriculture | Construction Contracts - Metals | Construction Contracts - Energy | Construction Contracts - Entertainment | Construction Contracts - Transportation | Construction Contracts - Technology |
| Investments - Agriculture            | Investments - Metals            | Investments - Energy            | Investments - Entertainment            | Investments - Transportation            | Investments - Technology            |

*(Chart 1)*

The Phase Zero team then sorted certain indicators into three bins: (1) Resources; (2) Military-to-Military (Mil-Mil); and (3) Soft Power. The Resource Ranking Map reflects only the first bin, Resources.

The bins and their respective indicators are illustrated in Chart 2. The values of the indicators within each bin are scored on linear scales of 1-10. For the Resources bin, the indicators are not only significant in of themselves, but also in relative terms. China, for example, has 101

suppliers of oil, but Russia supplies over 14 percent of that oil, and Saudi Arabia almost 12 percent. We developed weighted Resources rankings to reflect the relative scale and scope of these resource relationships. Phase Zero took all of the indicators related to natural resources into account in ranking the countries in order of importance to China's resource security. This is a composite index based off of the data available.



(Chart 2)

# Resources

We grouped resources into three categories: proven reserves, investments and construction contracts, and dependencies.

## Proven Reserves

Proven reserve data are from the U.S. Energy Information Administration.<sup>[1]</sup> Proven reserves of crude oil and natural gas are resources that are commercially recoverable with current technology.

### Non-ferrous Metals:

- >170,000 Thousand MT = 10
- 88,000-170,000 Thousand tons = 9
- 81,000-88,000 Thousand tons = 8
- 54,000-81,000 Thousand tons = 7
- 46,000-54,000 Thousand tons = 6
- 26,000-45,000 Thousand tons = 5
- 20,000-26,000 Thousand tons = 4
- 11,000-20,000 Thousand tons = 3
- 620-11,000 Thousand tons = 2
- <620 Thousand tons = 1

### Specialty Metals:

- >200,000 tons = 10
- 140,000-200,000 tons = 9
- 120,000-140,000 = 8
- 60,000-120,000 tons = 7
- 48,000-60,000 tons = 6
- 23,000-48,000 tons = 5
- 13,000-23,000 tons = 4
- 5,000-13,000 tons = 3
- 1,800-5,000 tons = 2
- <1,800 tons = 1

### Precious Metals:

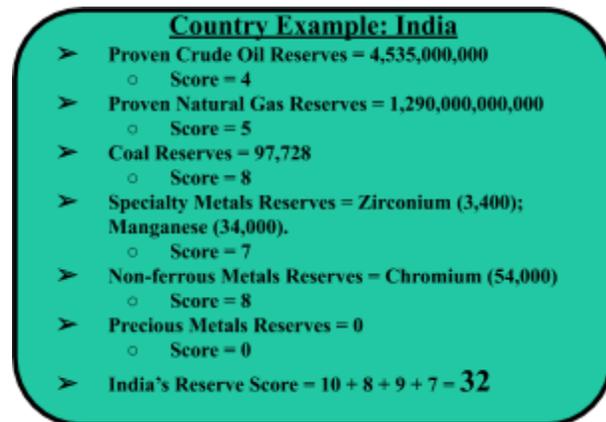
- >3,900 tons = 10
- 1,600-3,900 = 9
- 1,300-1,600 tons = 8
- 1,000-1,300 tons = 7
- 900-1000 tons = 6
- 800-900 tons = 5
- 700-800 tons = 4
- 500-700 tons = 3
- 310-500 tons = 2
- <310 tons = 1

### Crude Oil -

- $\geq$  300 billion bbl = 10
- 150-300 billion bbl = 9
- 120-150 billion bbl = 8
- 80-120 billion bbl = 7
- 20-80 billion bbl = 6
- 10-20 billion bbl = 5
- 1-10 billion bbl = 4
- 0.3-1 billion bbl = 3
- 0.1-0.3 billion bbl = 2
- < 0.1 billion bbl = 1

### Natural Gas -

- >8619 = 10
- 2500-8619 billion cu m = 9
- 1500-2500 billion cu m = 8
- 500-1500 billion cu m = 7
- 100-500 billion cu m = 6
- 60-100 billion cu m = 5
- 30-60 billion cu m = 4
- 10-30 billion cu m = 3
- 0.1-10 billion cu m = 2



- < 0.1 billion cu m = 1

### Coal -

- >97,728 million tons = 10
- 36,108-97,728 million tons = 9
- 11,353-36,108 million tons = 8
- 7,565-11,353 million tons = 7
- 4,881-7,575 million tons = 6
- 3,640-4,881 million tons = 5
- 2,366-3,640 million tons = 4
- 731-2,366 million tons = 3
- 70-731 million tons = 2
- >70 million tons = 1

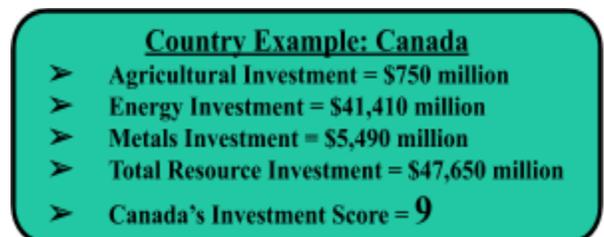
## Investments and Construction Contracts

The China Global Investment Tracker (CGIT),<sup>[2]</sup> developed by the American Enterprise Institute (AEI) and Heritage Foundation, documents the dollar values of China's investments and construction projects from 2005-2018. Overall, the CGIT dataset includes 2,900 large transactions (\$100 million or more), covering 2005-2018. We extract data from the CGIT dataset for investments in the agriculture, energy, and metals sectors, and sum that dollar amount for each country individually.



### Investment and Construction Contract Scale:

- >50,000 million = 10
- 35,000-55,000 million = 9
- 20,000-35,000 million = 8
- 14,000-20,000 million = 7
- 8,000-14,000 million = 6
- 5,000-8,000 million = 5
- 3,000-5,000 million = 4
- 1,000-3,000 million = 3
- 300-1,000 million = 2
- 1-300 million = 1



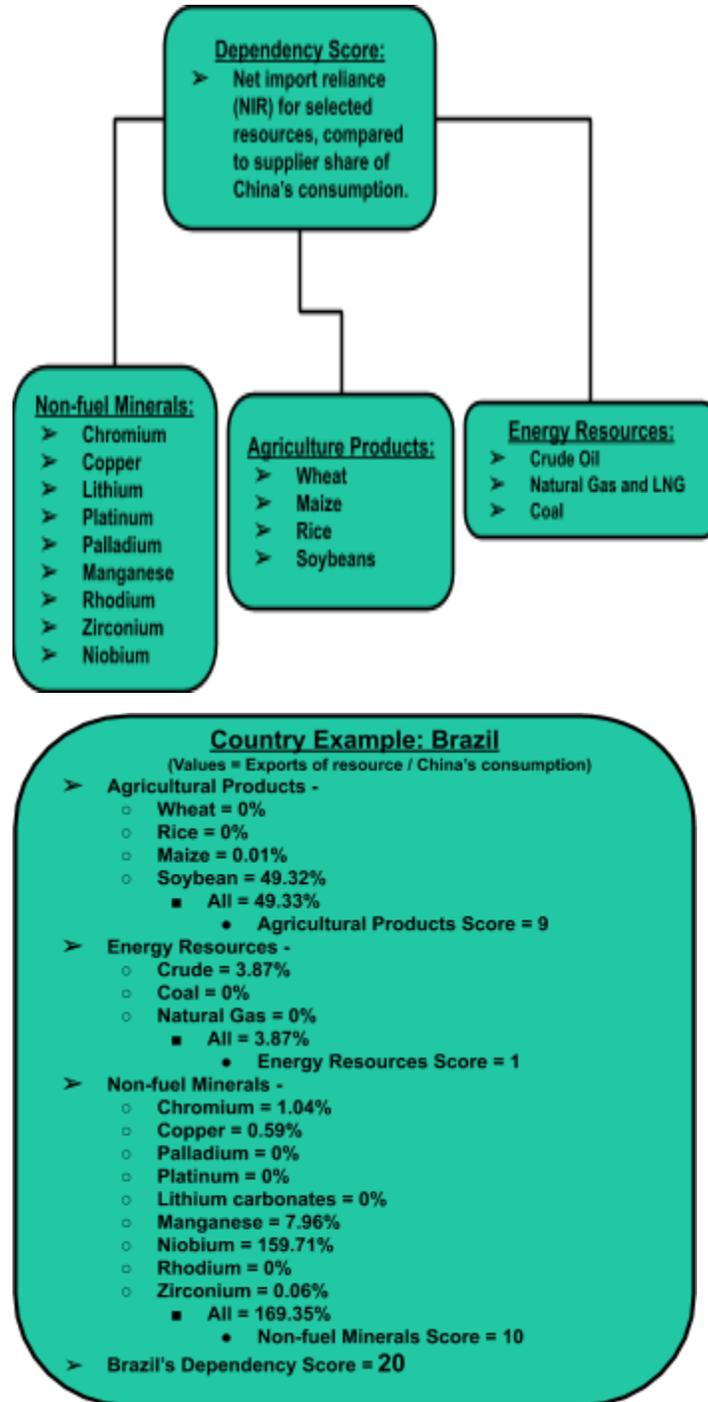
## Dependency

Chatham House's Resource Trade.Earth<sup>[3]</sup> provides data on China's imports and exports for a list of sixteen commodities. We focused on ten minerals,<sup>[4]</sup><sup>[5]</sup>,<sup>[6]</sup>,<sup>[7]</sup>,<sup>[8]</sup> four agricultural products,<sup>[9]</sup>,<sup>[10]</sup> and three hydrocarbons.<sup>[11]</sup> For minerals, we selected copper due to the fact that in 2000, China accounted for only 12% of world copper consumption, whereas in 2017 China accounted for 50%. The other minerals are all integral to the development of emerging technologies, and are also heavily concentrated in sources of supply. We selected staple crops, such as wheat, maize, and rice, which the Phase Zero team is also studying for vulnerability to climate change in a forthcoming report. We looked at soybeans because of their economic significance to the US-China relationship, but also in part due to the fact that soybean is a main ingredient in animal feed, and soy is a land-intensive crop, a limiting factor for China. We calculated Net Import Reliance (NIR) by using 2017 import and export data from Resource Trade.Earth, production data from several USGS reports, and production data from several USDA reports. Where possible, we used the most recent data. Net import reliance (NIR) for each of the selected resources ( $r$ ) in 2017 ( $t$ ) is calculated using the following equation, where ( $I_{,rt}$ ) represents China's imports of each resource, ( $E_{,rt}$ ) represents China's exports, ( $C_{,rt}$ ) represents China's domestic consumption, and ( $P_{,rt}$ ) represents China's production.

$$NIR_{,rt} = P_{,rt} - C_{,rt} / C_{,rt}$$

### Dependency Scale:

- >50% = 10
- 45-50% = 9
- 35-45% = 8
- 30-35% = 7
- 25-30% = 6



- 20-25% = 5
- 15-20% = 4
- 10-15% = 3
- 5-10% = 2
- <5% = 1

# Military-to-Military Relations

For military-to-military relations, we looked at a range of “military diplomacy” and arms transfers indicators. Note that China is not transparent about its defense activities and investments, so these sources are merely an estimate.

## Mil-Mil Diplomacy

A report, “*Chinese Military Diplomacy, 2003-2016: Trends and Implications*,” published by the Center for the Study of Chinese Military Affairs at National Defense University, lists PLA military diplomatic activities and objectives from 2003-2016. The report details each category (i.e. military exercises, port calls, senior-level meetings), as described below.<sup>[12]</sup>

- Military Exercises: includes both bilateral and multilateral exercises, as well as live-fire.
- Port Calls: includes both hosted and visited port calls, as well as Escort Task Force (ETF) and non-ETF port calls. Does not include port calls of foreign navies in China or Hong Kong.
- Senior-Level Meetings: “Senior-level meetings involve contact with high-level foreign military or civilian defense leaders, either hosted by the PLA in China or conducted abroad.” Senior leadership for the military, in this data set, consists of “officers at the Central Military Commission Vice Chairman and CMC member-grade levels, supplemented by the Deputy Chief of the CMC Joint Staff Department with responsibility for intelligence and foreign affairs.”

## Military Exercises Scale:

- > 30 = 10
- 26-30 = 9
- 17-25 = 8
- 14-16 = 7
- 12-13 = 6
- 10-11 = 5
- 7-9 = 4
- 5-6 = 3
- 2-4 = 2
- 1-2 = 1

## Naval Port Calls Scale:

- > 12 = 10
- 10-12 = 8
- 9 = 7
- 8 = 6
- 7 = 5
- 6 = 4
- 5 = 3
- 2-4 = 2
- 1 = 1

## Senior-level Meetings Scale:

- > 81 = 10
- 68-81 = 9
- 54-67 = 8
- 40-53 = 7
- 33-37 = 6
- 25-31 = 5
- 20-24 = 4
- 13-19 = 3
- 7-12 = 2
- 1-6 = 1



## Arms Imports

We drew arms trade data from the Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database.<sup>[13]</sup> We generated the data in this column of the matrix by running a full query for all countries total major arms imports for 2003-2016. We chose this time period as it spans the same time period as the Mil-Mil Diplomacy data. Next, we generated a query for all importers, with China as the exporter. China's percent share of each country's major arms imports is, in the matrix, equal to China's total exports of major arms to that country divided by that country's overall major arms imports. Countries without data in this column of the matrix either did not import major arms from China during the 2003-2016 period, or transactions were not in the SIPRI databases. This process was repeated for China's major arms imports, and the same scale used.

### Arms Imports Scale:

- 91%-100% = 10
- 81%-90% = 9
- 71%-80% = 8
- 61%-70% = 7
- 51%-60% = 6
- 41-50% = 5
- 31-40% = 4
- 21-30% = 3
- 11-20% = 2
- 1-10% = 1

### Major Arms Imports

#### Score:

- China's percent share of each country's major arms imports.

### Country Example: Tanzania

- Total major arms imports = 446
- Major arms supplied by China = 394
- China's Percent Share = 88.34%
- Tanzania's Arms Imports Score = **9**

# Soft Power

## Foreign Aid

For this category, we used data from AidData's Global Chinese Official Finance Dataset, 2000-2014, which captures 4,373 records totaling \$354.5 billion, including (a) highly concessional, Chinese development projects that meet the OECD's criteria for Official Development Assistance (ODA), and (b) officially-financed Chinese projects that lack development intent or have higher interest rates and lower grant elements (i.e. projects that fall into OECD's Other Financial Flows or OOF).<sup>[14]</sup> This category represents the totals of ODA, OOF, and ODA-like financing for each country. We downloaded the data and created a pivot table to filter for only the data that is "recommended for research." The source describes this as "all projects that meet two criteria: 1) they are not umbrella projects, and 2) they have moved through the project cycle to at least the committed, implementation, or completed stages."

### AID Scale:

- >20 billion = 10
- 12-20 billion = 9
- 10-12 billion = 8
- 9-10 billion = 7
- 8-9 billion = 6
- 7-8 billion = 5
- 5-7 billion = 4
- 2-5 billion = 3
- 1-2 billion = 2
- <1 billion = 1

**AID Score:**  
➤ **Estimated value of China's Official Development Finance (ODA), Other Financial Flows (OOF), and ODA-like financing.**

**Country Example: Russia**  
➤ **Estimated ODA, OOF, and ODA-like = 26,974,811,965**  
➤ **Russia's AID Score = 10**

## CI+SC

We created the second category in this bin, Confucius Institutes and Sister Cities (CI+SC), by examining the number of Confucius Institutes in each country and the number of sister city agreements between cities in a given country and Chinese cities.<sup>[15], [16]</sup>

### CI+SC Score:

- > Cultural Institutes
- +
- > Sister Cities

### Country Example: Japan

- > Confucius Institutes = 15
  - o CI Score = 7
- +
- > Sister Cities = 216
  - o SC Score = 10
- > Japan CI+SC Score = **17**

### SC Scale:

- > >216 = 10
- > 160-216 = 9
- > 97-160 = 8
- > 72-97 = 7
- > 51-72 = 6
- > 31-51 = 5
- > 20-31 = 4
- > 10-20 = 3
- > 1-10 = 2
- > <1 = 1

### CI Scale:

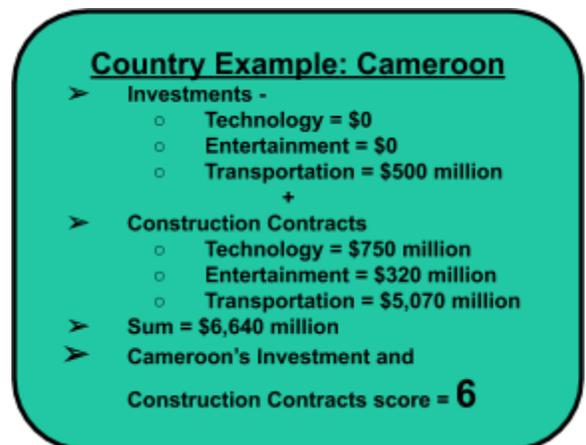
- > >29 = 10
- > 23-29 = 9
- > 19-23 = 8
- > 16-19 = 7
- > 12-16 = 6
- > 10-12 = 5
- > 7-10 = 4
- > 4-7 = 3
- > 1-4 = 2
- > <1 = 1

## Investments and Construction Contracts

We generated this category of the Soft Power bin by summing the values of China's construction contracts and investments in the Transportation, Technology, and Entertainment sectors of each country.<sup>[17]</sup>

### Investment and Construction Contract Scale:

- >30 billion = 10
- 20-30 billion = 9
- 15-20 billion = 8
- 10-15 billion = 7
- 5-10 billion = 6
- 1-5 billion = 5
- .7-1 billion = 4
- .3-.7 billion = 3
- .1-.3 billion = 2
- <.1 billion = 1



## Trade Balance

This category represents the overall trade balance for 2017 using data from World Integrated Trade Solution (WITS), developed by The World Bank in collaboration with the United Nations Conference on Trade and Development (UNCTAD) and in consultation with organizations such as International Trade Center, United Nations Statistical Division (UNSD) and the World Trade Organization (WTO). The scale is set up for both surplus and deficit, in order to reflect that China likely prioritizes its relationships with country's that it runs a large trade deficit and surplus with. <sup>[18]</sup>

**Trade Balance:**  
➤  $\text{Imports} - \text{Exports} = \text{Trade Balance.}$

**Country Example: United States**  
**Imports = \$154,441,855.87**  
**Exports = \$430,328,146.52**  
**China's Trade Surplus with United States = \$275,886,290.65**  
**USA Trade Balance Score = 10**

### Trade Balance Scale - Deficit:

- < -2740 million = 10
- -35-(-56) million = 9
- -20-(-35) million = 8
- -10-(20) million = 7
- -5-(-10) million = 6
- -2-(-5) million = 5
- -1-(-2) million = 4
- -0.5-(-1)million = 3
- -0.1-(-0.5)million = 2
- < 0 million = 1

### Trade Balance Scale - Surplus:

- >53 million = 10
- 25-30 million = 9
- 12-24 million = 8
- 9-12 million = 7
- 5-8 million = 6
- 3-4 million = 5
- 1-2 million = 4
- .5-.9 million = 3
- .2-.4 million = 2
- .001-.19 million = 1

## All Rankings by Country Alphabetically

*Note that this chart converts values that include weighted data into ordinal rankings for purposes of a side-by-side comparison. The Natural Security Map uses values, based on composite calculations described above.*

| <b>Country</b>     | <b>Mil_Mil Ranking</b> | <b>Soft Power Rankings</b> | <b>Resource Ranking</b> |
|--------------------|------------------------|----------------------------|-------------------------|
| <b>Afghanistan</b> | <b>84</b>              | <b>126</b>                 | <b>80</b>               |
| <b>Albania</b>     | <b>125</b>             | <b>138</b>                 | <b>122</b>              |
| <b>Algeria</b>     | <b>74</b>              | <b>47</b>                  | <b>43</b>               |
| <b>Angola</b>      | <b>67</b>              | <b>11</b>                  | <b>34</b>               |
| <b>Argentina</b>   | <b>51</b>              | <b>27</b>                  | <b>16</b>               |
| <b>Armenia</b>     | <b>104</b>             | <b>139</b>                 | <b>81</b>               |
| <b>Australia</b>   | <b>5</b>               | <b>4</b>                   | <b>1</b>                |
| <b>Austria</b>     | <b>105</b>             | <b>76</b>                  | <b>101</b>              |
| <b>Azerbaijan</b>  | <b>126</b>             | <b>127</b>                 | <b>47</b>               |
| <b>Bahamas</b>     | <b>156</b>             | <b>112</b>                 | <b>156</b>              |
| <b>Bahrain</b>     | <b>85</b>              | <b>140</b>                 | <b>82</b>               |
| <b>Bangladesh</b>  | <b>6</b>               | <b>28</b>                  | <b>38</b>               |
| <b>Barbados</b>    | <b>106</b>             | <b>128</b>                 | <b>113</b>              |
| <b>Belarus</b>     | <b>17</b>              | <b>38</b>                  | <b>83</b>               |
| <b>Belgium</b>     | <b>127</b>             | <b>42</b>                  | <b>114</b>              |
| <b>Belize</b>      | <b>157</b>             | <b>141</b>                 | <b>123</b>              |
| <b>Benin</b>       | <b>128</b>             | <b>113</b>                 | <b>102</b>              |
| <b>Bhutan</b>      | <b>158</b>             | <b>142</b>                 | <b>157</b>              |

|                                 |            |            |            |
|---------------------------------|------------|------------|------------|
| <b>Bolivia</b>                  | <b>52</b>  | <b>70</b>  | <b>56</b>  |
| <b>Bosnia &amp; Herzegovina</b> | <b>129</b> | <b>92</b>  | <b>124</b> |
| <b>Botswana</b>                 | <b>130</b> | <b>129</b> | <b>125</b> |
| <b>Brazil</b>                   | <b>33</b>  | <b>9</b>   | <b>3</b>   |
| <b>Brunei</b>                   | <b>53</b>  | <b>114</b> | <b>48</b>  |
| <b>Bulgaria</b>                 | <b>54</b>  | <b>93</b>  | <b>49</b>  |
| <b>Burkina Faso</b>             | <b>159</b> | <b>143</b> | <b>158</b> |
| <b>Burundi</b>                  | <b>55</b>  | <b>144</b> | <b>159</b> |
| <b>Cambodia</b>                 | <b>18</b>  | <b>40</b>  | <b>103</b> |
| <b>Cameroon</b>                 | <b>30</b>  | <b>63</b>  | <b>50</b>  |
| <b>Canada</b>                   | <b>56</b>  | <b>12</b>  | <b>4</b>   |
| <b>Cape Verde</b>               | <b>131</b> | <b>145</b> | <b>160</b> |
| <b>Central African Republic</b> | <b>132</b> | <b>146</b> | <b>161</b> |
| <b>Chad</b>                     | <b>86</b>  | <b>77</b>  | <b>91</b>  |
| <b>Chile</b>                    | <b>46</b>  | <b>64</b>  | <b>9</b>   |
| <b>Colombia</b>                 | <b>87</b>  | <b>78</b>  | <b>35</b>  |
| <b>Comoros</b>                  | <b>133</b> | <b>147</b> | <b>162</b> |
| <b>Costa Rica</b>               | <b>107</b> | <b>106</b> | <b>137</b> |
| <b>Cote d'Ivoire</b>            | <b>108</b> | <b>71</b>  | <b>75</b>  |
| <b>Croatia</b>                  | <b>88</b>  | <b>115</b> | <b>92</b>  |
| <b>Cuba</b>                     | <b>41</b>  | <b>94</b>  | <b>76</b>  |
| <b>Curacao</b>                  | <b>160</b> | <b>148</b> | <b>163</b> |
| <b>Cyprus</b>                   | <b>134</b> | <b>149</b> | <b>93</b>  |
| <b>Czech Republic</b>           | <b>89</b>  | <b>95</b>  | <b>77</b>  |
| <b>Denmark</b>                  | <b>75</b>  | <b>52</b>  | <b>68</b>  |
| <b>Djibouti</b>                 | <b>13</b>  | <b>79</b>  | <b>164</b> |
| <b>Dominica</b>                 | <b>161</b> | <b>150</b> | <b>165</b> |

|                                 |            |            |            |
|---------------------------------|------------|------------|------------|
| <b>Dominican Republic</b>       | <b>162</b> | <b>151</b> | <b>166</b> |
| <b>DRC</b>                      | <b>109</b> | <b>130</b> | <b>69</b>  |
| <b>East Timor (Timor-Leste)</b> | <b>42</b>  | <b>131</b> | <b>94</b>  |
| <b>Ecuador</b>                  | <b>68</b>  | <b>43</b>  | <b>70</b>  |
| <b>Egypt</b>                    | <b>31</b>  | <b>53</b>  | <b>30</b>  |
| <b>El Salvador</b>              | <b>163</b> | <b>152</b> | <b>167</b> |
| <b>Equatorial Guinea</b>        | <b>135</b> | <b>107</b> | <b>71</b>  |
| <b>Eritrea</b>                  | <b>136</b> | <b>116</b> | <b>138</b> |
| <b>Estonia</b>                  | <b>110</b> | <b>153</b> | <b>126</b> |
| <b>Ethiopia</b>                 | <b>164</b> | <b>19</b>  | <b>168</b> |
| <b>Eswatini</b>                 | <b>111</b> | <b>154</b> | <b>95</b>  |
| <b>Fiji</b>                     | <b>90</b>  | <b>132</b> | <b>139</b> |
| <b>Finland</b>                  | <b>57</b>  | <b>48</b>  | <b>104</b> |
| <b>France</b>                   | <b>19</b>  | <b>14</b>  | <b>78</b>  |
| <b>Gabon</b>                    | <b>91</b>  | <b>96</b>  | <b>51</b>  |
| <b>Gambia, the</b>              | <b>165</b> | <b>155</b> | <b>169</b> |
| <b>Georgia</b>                  | <b>166</b> | <b>117</b> | <b>105</b> |
| <b>Germany</b>                  | <b>23</b>  | <b>3</b>   | <b>19</b>  |
| <b>Ghana</b>                    | <b>47</b>  | <b>54</b>  | <b>57</b>  |
| <b>Greece</b>                   | <b>48</b>  | <b>41</b>  | <b>65</b>  |
| <b>Grenada</b>                  | <b>112</b> | <b>156</b> | <b>170</b> |
| <b>Guatemala</b>                | <b>167</b> | <b>157</b> | <b>106</b> |
| <b>Guinea</b>                   | <b>137</b> | <b>97</b>  | <b>115</b> |
| <b>Guinea-Bissau</b>            | <b>138</b> | <b>158</b> | <b>140</b> |
| <b>Guyana</b>                   | <b>139</b> | <b>133</b> | <b>141</b> |
| <b>Haiti</b>                    | <b>168</b> | <b>55</b>  | <b>142</b> |
| <b>Honduras</b>                 | <b>169</b> | <b>159</b> | <b>143</b> |

|                   |            |            |            |
|-------------------|------------|------------|------------|
| <b>Hungary</b>    | <b>69</b>  | <b>44</b>  | <b>72</b>  |
| <b>Iceland</b>    | <b>170</b> | <b>160</b> | <b>171</b> |
| <b>India</b>      | <b>9</b>   | <b>15</b>  | <b>8</b>   |
| <b>Indonesia</b>  | <b>7</b>   | <b>13</b>  | <b>10</b>  |
| <b>Iran</b>       | <b>43</b>  | <b>49</b>  | <b>13</b>  |
| <b>Iraq</b>       | <b>140</b> | <b>118</b> | <b>20</b>  |
| <b>Ireland</b>    | <b>171</b> | <b>56</b>  | <b>107</b> |
| <b>Israel</b>     | <b>92</b>  | <b>39</b>  | <b>52</b>  |
| <b>Italy</b>      | <b>34</b>  | <b>10</b>  | <b>58</b>  |
| <b>Jamaica</b>    | <b>113</b> | <b>80</b>  | <b>127</b> |
| <b>Japan</b>      | <b>35</b>  | <b>6</b>   | <b>73</b>  |
| <b>Jordan</b>     | <b>76</b>  | <b>108</b> | <b>96</b>  |
| <b>Kazakhstan</b> | <b>20</b>  | <b>17</b>  | <b>7</b>   |
| <b>Kenya</b>      | <b>58</b>  | <b>29</b>  | <b>79</b>  |
| <b>Kiribati</b>   | <b>172</b> | <b>161</b> | <b>172</b> |
| <b>Kuwait</b>     | <b>93</b>  | <b>72</b>  | <b>84</b>  |
| <b>Kyrgyzstan</b> | <b>44</b>  | <b>30</b>  | <b>26</b>  |
| <b>Laos</b>       | <b>24</b>  | <b>31</b>  | <b>85</b>  |
| <b>Latvia</b>     | <b>141</b> | <b>134</b> | <b>144</b> |
| <b>Lebanon</b>    | <b>142</b> | <b>162</b> | <b>173</b> |
| <b>Lesotho</b>    | <b>143</b> | <b>163</b> | <b>174</b> |
| <b>Liberia</b>    | <b>144</b> | <b>119</b> | <b>145</b> |
| <b>Libya</b>      | <b>173</b> | <b>98</b>  | <b>36</b>  |
| <b>Lithuania</b>  | <b>145</b> | <b>164</b> | <b>128</b> |
| <b>Luxembourg</b> | <b>174</b> | <b>99</b>  | <b>129</b> |
| <b>Macedonia</b>  | <b>114</b> | <b>120</b> | <b>146</b> |
| <b>Madagascar</b> | <b>146</b> | <b>81</b>  | <b>130</b> |

|                    |            |            |            |
|--------------------|------------|------------|------------|
| <b>Malawi</b>      | <b>147</b> | <b>165</b> | <b>147</b> |
| <b>Malaysia</b>    | <b>11</b>  | <b>25</b>  | <b>27</b>  |
| <b>Maldives</b>    | <b>94</b>  | <b>109</b> | <b>148</b> |
| <b>Mali</b>        | <b>148</b> | <b>82</b>  | <b>131</b> |
| <b>Malta</b>       | <b>115</b> | <b>166</b> | <b>149</b> |
| <b>Mauritania</b>  | <b>59</b>  | <b>121</b> | <b>97</b>  |
| <b>Mauritius</b>   | <b>149</b> | <b>100</b> | <b>150</b> |
| <b>Mexico</b>      | <b>60</b>  | <b>32</b>  | <b>24</b>  |
| <b>Micronesia</b>  | <b>175</b> | <b>167</b> | <b>175</b> |
| <b>Moldova</b>     | <b>150</b> | <b>168</b> | <b>151</b> |
| <b>Mongolia</b>    | <b>61</b>  | <b>73</b>  | <b>86</b>  |
| <b>Montenegro</b>  | <b>151</b> | <b>83</b>  | <b>132</b> |
| <b>Morocco</b>     | <b>95</b>  | <b>65</b>  | <b>116</b> |
| <b>Mozambique</b>  | <b>96</b>  | <b>74</b>  | <b>37</b>  |
| <b>Myanmar</b>     | <b>15</b>  | <b>57</b>  | <b>53</b>  |
| <b>Namibia</b>     | <b>16</b>  | <b>101</b> | <b>87</b>  |
| <b>Nepal</b>       | <b>49</b>  | <b>84</b>  | <b>117</b> |
| <b>Netherlands</b> | <b>97</b>  | <b>16</b>  | <b>44</b>  |
| <b>New Zealand</b> | <b>14</b>  | <b>58</b>  | <b>45</b>  |
| <b>Nicaragua</b>   | <b>176</b> | <b>122</b> | <b>152</b> |
| <b>Niger</b>       | <b>116</b> | <b>135</b> | <b>98</b>  |
| <b>Nigeria</b>     | <b>62</b>  | <b>20</b>  | <b>11</b>  |
| <b>North Korea</b> | <b>70</b>  | <b>85</b>  | <b>133</b> |
| <b>Norway</b>      | <b>117</b> | <b>110</b> | <b>39</b>  |
| <b>Oman</b>        | <b>21</b>  | <b>86</b>  | <b>40</b>  |
| <b>Pakistan</b>    | <b>1</b>   | <b>7</b>   | <b>21</b>  |
| <b>Panama</b>      | <b>177</b> | <b>66</b>  | <b>134</b> |

|                              |            |            |            |
|------------------------------|------------|------------|------------|
| <b>Papua New Guinea</b>      | <b>118</b> | <b>111</b> | <b>41</b>  |
| <b>Paraguay</b>              | <b>178</b> | <b>169</b> | <b>176</b> |
| <b>Peru</b>                  | <b>71</b>  | <b>59</b>  | <b>14</b>  |
| <b>Philippines</b>           | <b>36</b>  | <b>34</b>  | <b>59</b>  |
| <b>Poland</b>                | <b>63</b>  | <b>33</b>  | <b>31</b>  |
| <b>Portugal</b>              | <b>77</b>  | <b>87</b>  | <b>118</b> |
| <b>Qatar</b>                 | <b>98</b>  | <b>88</b>  | <b>28</b>  |
| <b>ROC</b>                   | <b>119</b> | <b>67</b>  | <b>46</b>  |
| <b>Romania</b>               | <b>45</b>  | <b>89</b>  | <b>60</b>  |
| <b>Russia</b>                | <b>2</b>   | <b>5</b>   | <b>6</b>   |
| <b>Rwanda</b>                | <b>120</b> | <b>123</b> | <b>108</b> |
| <b>Sao Tome and Principe</b> | <b>179</b> | <b>136</b> | <b>153</b> |
| <b>Saudi Arabia</b>          | <b>37</b>  | <b>45</b>  | <b>15</b>  |
| <b>Senegal</b>               | <b>78</b>  | <b>102</b> | <b>119</b> |
| <b>Serbia</b>                | <b>79</b>  | <b>60</b>  | <b>42</b>  |
| <b>Seychelles</b>            | <b>50</b>  | <b>170</b> | <b>177</b> |
| <b>Sierra Leone</b>          | <b>25</b>  | <b>103</b> | <b>120</b> |
| <b>Singapore</b>             | <b>8</b>   | <b>50</b>  | <b>99</b>  |
| <b>Slovakia</b>              | <b>80</b>  | <b>124</b> | <b>109</b> |
| <b>Slovenia</b>              | <b>152</b> | <b>75</b>  | <b>135</b> |
| <b>Somalia</b>               | <b>99</b>  | <b>171</b> | <b>154</b> |
| <b>South Africa</b>          | <b>32</b>  | <b>18</b>  | <b>5</b>   |
| <b>South Korea</b>           | <b>26</b>  | <b>2</b>   | <b>110</b> |
| <b>South Sudan</b>           | <b>153</b> | <b>172</b> | <b>61</b>  |
| <b>Spain</b>                 | <b>121</b> | <b>21</b>  | <b>74</b>  |
| <b>Sri Lanka</b>             | <b>10</b>  | <b>22</b>  | <b>111</b> |
| <b>Sudan</b>                 | <b>64</b>  | <b>68</b>  | <b>62</b>  |

|                             |            |            |            |
|-----------------------------|------------|------------|------------|
| <b>Suriname</b>             | <b>154</b> | <b>173</b> | <b>136</b> |
| <b>Sweden</b>               | <b>81</b>  | <b>51</b>  | <b>121</b> |
| <b>Switzerland</b>          | <b>72</b>  | <b>35</b>  | <b>54</b>  |
| <b>Syria</b>                | <b>100</b> | <b>174</b> | <b>55</b>  |
| <b>Tajikistan</b>           | <b>38</b>  | <b>104</b> | <b>100</b> |
| <b>Tanzania</b>             | <b>12</b>  | <b>61</b>  | <b>112</b> |
| <b>Thailand</b>             | <b>4</b>   | <b>26</b>  | <b>63</b>  |
| <b>Togo</b>                 | <b>155</b> | <b>137</b> | <b>155</b> |
| <b>Tonga</b>                | <b>122</b> | <b>175</b> | <b>178</b> |
| <b>Trinidad and Tobago</b>  | <b>82</b>  | <b>176</b> | <b>66</b>  |
| <b>Tunisia</b>              | <b>101</b> | <b>177</b> | <b>88</b>  |
| <b>Turkey</b>               | <b>39</b>  | <b>23</b>  | <b>25</b>  |
| <b>Turkmenistan</b>         | <b>102</b> | <b>62</b>  | <b>32</b>  |
| <b>Tuvalu</b>               | <b>180</b> | <b>178</b> | <b>179</b> |
| <b>Uganda</b>               | <b>103</b> | <b>90</b>  | <b>64</b>  |
| <b>Ukraine</b>              | <b>73</b>  | <b>36</b>  | <b>12</b>  |
| <b>United Arab Emirates</b> | <b>83</b>  | <b>46</b>  | <b>22</b>  |
| <b>United Kingdom</b>       | <b>22</b>  | <b>8</b>   | <b>18</b>  |
| <b>United States</b>        | <b>3</b>   | <b>1</b>   | <b>2</b>   |
| <b>Uruguay</b>              | <b>123</b> | <b>179</b> | <b>180</b> |
| <b>Uzbekistan</b>           | <b>65</b>  | <b>91</b>  | <b>33</b>  |
| <b>Vanuatu</b>              | <b>124</b> | <b>180</b> | <b>89</b>  |
| <b>Venezuela</b>            | <b>66</b>  | <b>37</b>  | <b>17</b>  |
| <b>Vietnam</b>              | <b>27</b>  | <b>24</b>  | <b>23</b>  |
| <b>Yemen</b>                | <b>40</b>  | <b>125</b> | <b>67</b>  |
| <b>Zambia</b>               | <b>28</b>  | <b>69</b>  | <b>90</b>  |
| <b>Zimbabwe</b>             | <b>29</b>  | <b>105</b> | <b>29</b>  |

## **Endnotes:**

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- 2: American Enterprise Institute and Heritage Foundation, China Global Investment Tracker (CGIT), available at <http://www.aei.org/china-global-investment-tracker/>.
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- 4: USGS, “Mineral Commodities Summaries 2018,” (31 January 2018), available at <https://minerals.usgs.gov/minerals/pubs/mcs/2018/mcs2018.pdf>.
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- 7: For 2014 data see downloadable supplemental information for Gulley et al., (PNAS, 2018), available at <https://www.pnas.org/content/suppl/2018/03/28/1717152115.DCSupplemental>.
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