

*2022-2030*

***USA Climate Change Mitigation  
Technologies & Markets  
With Corona & COP26 Impacts***



# ***USA Climate Change Mitigation Technologies & Markets - 2022-2030 With Corona & COP26 Impacts***

***HSRC** is an American Israeli market intelligence & technology research firm specializing in Climate Mitigation Technologies, Transformational Technologies & Transformational Markets research and the Public Safety Industry. HSRC provides premium market off-the-shelf and custom reports on present and emerging technologies and industry expertise, enabling global clients to gain time-critical insight into business opportunities. HSRC's clients include over 1240 private sector clients (75% repeat customers), including major Fortune 2000 companies, the E.U., NATO, U.S. Congress and DOD, as well as government agencies in Japan, Korea, Taiwan, Israel, Canada, UK, Germany, Australia, Sweden, Finland and Singapore.*

*Washington D.C. 20004, 601 Pennsylvania Ave., NW Suite 900,  
Tel: 202-455-0966, [info@hsrc.biz](mailto:info@hsrc.biz), [www.hsrc.biz](http://www.hsrc.biz)*

## Contents

<b>1</b>	<b>The Report Key Assumptions .....</b>	<b>40</b>
<b>2</b>	<b>Executive Summary .....</b>	<b>41</b>
2.1	Key Findings .....	41
2.2	Key Conclusions .....	54
2.3	USA Climate Change Mitigation Market Segmentation Vectors.....	64
2.4	USA Climate Change Mitigation Market – 2022-2030.....	65
2.4.1	USA Market by Technology – 2022-2030.....	65
2.4.2	USA Market by Sector – 2022-2030.....	67
2.4.3	USA Market by Revenue Source – 2022-2030.....	68
2.4.4	USA Market by Region – 2022-2030.....	68
2.4.5	USA Market by Country – 2022-2030.....	70
<b>3</b>	<b>COP26 &amp; COVID-19 Implications.....</b>	<b>71</b>
3.1	COP26 Takeaway.....	71
3.2	COVID-19 Implications .....	72
<b>4</b>	<b>The Industry Value Chain.....</b>	<b>74</b>
<b>5</b>	<b>Business Opportunities .....</b>	<b>75</b>
<b>6</b>	<b>Market Drivers.....</b>	<b>86</b>
<b>7</b>	<b>Market Inhibitors.....</b>	<b>87</b>
<b>8</b>	<b>SWOT Analysis .....</b>	<b>88</b>
8.1	Strengths .....	88
8.2	Weaknesses .....	89
8.3	Opportunities.....	90
8.4	Threats.....	91
	<b>TECHNOLOGY, PRODUCT &amp; SERVICE MARKETS.....</b>	<b>93</b>
<b>9</b>	<b>USA Climate Change Mitigation Technologies, Products &amp; Services Markets – 2020-2030 .....</b>	<b>93</b>
9.1	Technology, Products & Services Markets Size.....	93
9.2	Technology Products & Services Markets Dynamics.....	94
9.3	Technology Products & Services Markets Share .....	96
<b>10</b>	<b>Air Sourced Heat Pumps Market – 2022-2030.....</b>	<b>98</b>
10.1	CEO Takeaway.....	98
10.1.1	Summary .....	98
10.1.2	Heat Pump Technologies .....	104
10.1.3	Heat Pump Cost Performance.....	105
10.1.4	Legislation .....	106
10.2	Key Vendors .....	106

10.3	USA Air Sourced Heat Pumps Market – 2020-2030 .....	107
10.3.1	Air Sourced Heat Pumps Market Size .....	107
10.3.2	Air Sourced Heat Pumps Market Dynamics .....	107
10.3.3	Air Sourced Heat Pumps Market Share.....	107
<b>11</b>	<b>Big Data &amp; AI Market – 2022-2030 .....</b>	<b>108</b>
11.1	CEO Takeaway.....	108
11.1.1	Summary .....	108
11.1.2	Application of Artificial Intelligence (AI) in the USA Warming Mitigation Industry .....	111
11.2	Key Vendors .....	111
11.3	USA Big Data & AI Market – 2020-2030 .....	112
11.3.1	Big Data & AI Market Size .....	112
11.3.2	Big Data & AI Market Dynamics .....	113
11.3.3	Big Data & AI Market Share .....	113
<b>12</b>	<b>Bioenergy Market – 2022-2030 .....</b>	<b>114</b>
12.1	CEO Takeaway.....	114
12.1.1	Summary .....	114
12.1.2	Bioenergy for Electricity Generation .....	117
12.1.3	Bioenergy in Industry.....	117
12.1.4	Thermo-Chemical Process .....	118
12.1.5	Bio-Chemical Process .....	119
12.1.6	Bioenergy Conversion Technologies .....	120
12.1.7	USA Bioenergy Market.....	121
12.1.8	USA Bio-Heating Market .....	121
12.1.9	Biomass Heating For Buildings .....	122
12.1.10	USA Bio-Power Markets.....	123
12.1.11	The USA Solid Biomass Industry .....	124
12.1.12	The USA Liquid Biofuels Industry.....	125
12.1.13	The USA Gaseous Biomass Industry .....	125
12.1.14	USA Bioenergy CCS & CCU .....	125
12.1.15	Thermal Conversions .....	127
12.1.16	Chemical Conversion .....	127
12.1.17	Biochemical Conversion.....	127
12.1.18	Electrochemical Conversions .....	128
12.2	Key Vendors .....	128
12.3	USA Bioenergy Market – 2020-2030 .....	129
12.3.1	Bioenergy Market Size .....	129
12.3.2	Bioenergy Market Dynamics.....	129
12.3.3	Bioenergy Market Share.....	129
<b>13</b>	<b>Biological Carbon Capture &amp; Sequestration Market – 2022- 2030 .....</b>	<b>130</b>
13.1	CEO Takeaway.....	130

13.1.1	Summary .....	130
13.1.2	Kelp Farms Products .....	132
13.1.3	Biological Carbon Sequestration .....	132
13.1.4	Microalgae Carbon Biological Capture & Utilization .....	132
13.1.5	Oceans Carbon Sequestration .....	133
13.1.6	Soil Carbon Sequestration.....	133
13.1.7	Forests Carbon Sequestration.....	133
13.1.8	Grasslands Carbon Sequestration .....	134
13.1.9	Impacts of Carbon Sequestration .....	134
13.2	USA Biological Carbon Capture & Sequestration Market – 2020-2030.....	134
13.2.1	Biological Carbon Capture & Sequestration Market Size ....	134
13.2.2	Biological Carbon Capture & Sequestration Market Dynamics.....	135
13.2.3	Biological Carbon Capture & Sequestration Market Share.....	135
<b>14</b>	<b>Bioremediation Market – 2022-2030.....</b>	<b>136</b>
14.1	CEO Takeaway.....	136
14.1.1	Summary .....	136
14.1.2	Bioremediation Cleanup Strategy .....	140
14.2	Key Vendors .....	143
14.3	USA Bioremediation Market – 2020-2030.....	145
14.3.1	Bioremediation Market Size.....	145
14.3.2	Bioremediation Market Dynamics.....	145
14.3.3	Bioremediation Market Share .....	145
<b>15</b>	<b>Carbon Capture &amp; Storage Market – 2022-2030.....</b>	<b>146</b>
15.1	CEO Takeaway.....	146
15.1.1	Summary .....	146
15.1.2	Geological Carbon Sequestration.....	148
15.1.3	Technological Carbon Sequestration .....	148
15.1.4	Graphene Production .....	148
15.1.5	Direct Air Capture (DAC).....	148
15.1.6	Engineered Molecules.....	148
15.1.7	CCS, DOE Investments.....	149
15.2	Key Vendors .....	150
15.3	USA Carbon Capture & Storage Market – 2020-2030 .....	151
15.3.1	Carbon Capture & Storage Market Size .....	151
15.3.2	Carbon Capture & Storage Market Dynamics .....	151
15.3.3	Carbon Capture & Storage Market Share.....	152
<b>16</b>	<b>Carbon Capture &amp; Utilization Market – 2022-2030.....</b>	<b>153</b>
16.1	CEO Takeaway.....	153
16.1.1	Summary .....	153

16.1.2	CCU Proliferation .....	155
16.1.3	Carbon Capture and Utilization Applications .....	156
16.1.4	Algae Cultivation .....	157
16.2	Key Vendors .....	159
16.3	USA Carbon Capture & Utilization Market – 2020-2030 .....	160
16.3.1	Carbon Capture & Utilization Market Size .....	160
16.3.2	Carbon Capture & Utilization Market Dynamics .....	160
16.3.3	Carbon Capture & Utilization Market Share.....	160
<b>17</b>	<b>Climate Adapted Agriculture Market – 2022-2030.....</b>	<b>161</b>
17.1	CEO Takeaway.....	161
17.1.1	Summary.....	161
17.2	Agriculture GHG Emission .....	165
17.3	Key Vendors .....	167
18.1	USA Climate Adapted Agriculture Market – 2020-2030 .....	168
18.1.1	Climate Adapted Agriculture Market Size .....	168
18.1.2	Climate Adapted Agriculture Market Dynamics .....	168
18.1.3	Climate Adapted Agriculture Market Share .....	168
<b>19</b>	<b>Climate Adapted Water Infrastructure Market – 2022-2030.....</b>	<b>169</b>
19.1	CEO Takeaway.....	169
19.1.1	Summary.....	169
19.1.2	Digital Technologies .....	177
19.1.3	Water Management Strategy.....	178
19.1.4	Agriculture Water Management.....	182
19.1.5	Urban Water Management .....	183
19.1.6	Urban Decision Support System .....	184
19.2	Key Vendors .....	184
19.3	USA Climate Adapted Water Infrastructure Market – 2020- 2030.....	186
19.3.1	Climate Adapted Water Infrastructure Market Size .....	186
19.3.2	Climate Adapted Water Infrastructure Market Dynamics.....	186
19.3.3	Climate Adapted Water Infrastructure Market Share .....	187
<b>20</b>	<b>Compressed-Air Storage Market – 2022-2030.....</b>	<b>189</b>
20.1	CEO Takeaway.....	189
20.1.1	Summary.....	189
20.1.2	Adiabatic Compressed-Air Energy Storage .....	191
20.1.3	Diabatic Compressed-Air Energy Storage.....	191
20.2	Key Vendors .....	192
20.3	USA Compressed-Air Storage Market – 2020-2030 .....	192
20.3.1	Compressed-Air Storage Market Size .....	192
20.3.2	Compressed-Air Storage Market Dynamics .....	193
20.3.3	Compressed-Air Storage Market Share.....	193
<b>21</b>	<b>Concentrating Solar Power (CSP) Market – 2022-2030 .....</b>	<b>194</b>

21.1	CEO Takeaway .....	194
21.1.1	Summary .....	194
21.1.2	CSP Projects .....	196
21.1.3	CSP vs. Solar PV .....	197
21.2	CSP Key Vendors .....	197
21.3	USA Concentrating Solar Power (CSP) Market – 2020-2030 .....	198
21.3.1	Concentrating Solar Power (CSP) Market Size .....	198
21.3.2	Concentrating Solar Power (CSP) Market Dynamics .....	199
21.3.3	Concentrating Solar Power (CSP) Market Share .....	199
<b>22</b>	<b>Cybersecurity Market – 2022-2030 .....</b>	<b>200</b>
22.1	CEO Takeaway .....	200
22.1.1	Summary .....	200
22.1.2	Cybersecurity in the USA Warming Mitigation Industry .....	202
22.1.3	Cybercrime in the Electric Power Industry .....	202
22.2	Key Vendors .....	203
22.3	USA Cybersecurity Market – 2020-2030 .....	204
22.3.1	Cybersecurity Market Size .....	204
22.3.2	Cybersecurity Market Dynamics .....	204
22.3.3	Cybersecurity Market Share .....	204
<b>23</b>	<b>Desalination Plants Market – 2022-2030 .....</b>	<b>205</b>
23.1	CEO Takeaway .....	205
23.2	Technologies .....	209
23.2.1	Solar Distillation .....	210
23.2.2	Natural Evaporation .....	210
23.2.3	Vacuum Distillation .....	210
23.2.4	Multi-Stage Flash Distillation .....	210
23.2.5	Multiple-Effect Distillation .....	210
23.2.6	Vapor-Compression Distillation .....	211
23.2.7	Wave-Powered Desalination .....	211
23.2.8	Membrane Distillation .....	211
23.2.9	Reverse Osmosis .....	211
23.2.10	Forward Osmosis .....	212
23.2.11	Freeze–Thaw .....	212
23.2.12	Electrodialysis Membrane .....	213
23.2.13	Technical Challenges .....	213
23.3	Key Vendors .....	214
23.4	USA Desalination Plants Market – 2020-2030 .....	215
23.4.1	Desalination Plants Market Size .....	215
23.4.2	Desalination Plants Market Dynamics .....	216
23.4.3	Desalination Plants Market Share .....	216
<b>24</b>	<b>Direct Geothermal Heating &amp; Cooling Market – 2022-2030 .....</b>	<b>217</b>
24.1	CEO Takeaway .....	217

24.1.1	Summary .....	217
24.1.2	Direct Geothermal Heating & Cooling Applications .....	218
24.1.3	Geothermal Heat Pumps. Heating and Cooling.....	218
24.1.4	Geothermal District Heating .....	219
24.1.5	Geothermal Heating Pump Price Competitiveness .....	220
24.2	USA Direct Geothermal Heating & Cooling Market – 2020-2030.....	221
24.2.1	Direct Geothermal Heating & Cooling Market Size.....	221
24.2.2	Direct Geothermal Heating & Cooling Market Dynamics .....	222
24.2.3	Direct Geothermal Heating & Cooling Market Share .....	222
<b>25</b>	<b>Direct Solar Water Heating Market – 2022-2030.....</b>	<b>223</b>
25.1	CEO Takeaway.....	223
25.1.1	Summary.....	223
25.2	Key Vendors .....	227
25.3	USA Direct Solar Water Heating Market – 2020-2030.....	227
25.3.1	Direct Solar Water Heating Market Size .....	227
25.3.2	Direct Solar Water Heating Market Dynamics .....	228
25.3.3	Direct Solar Water Heating Market Share .....	228
<b>26</b>	<b>Electric Buses Market – 2022-2030 .....</b>	<b>229</b>
26.1	CEO Takeaway.....	229
26.1.1	Summary.....	229
26.1.2	E-Bus Economy.....	231
26.1.3	COVID-19 Effects.....	233
26.2	Key Vendors .....	233
26.4	USA Electric Buses Market – 2020-2030.....	234
26.4.1	Electric Buses Market Size.....	234
26.4.2	Electric Buses Market Dynamics .....	234
26.4.3	Electric Buses Market Share .....	234
<b>27</b>	<b>Energy-Efficient Air Conditioning &amp; Refrigeration (ACR) Market – 2022-2030.....</b>	<b>235</b>
27.1	CEO Takeaway.....	235
27.1.1	Summary.....	235
27.1.2	Example 1. Thermoelectric Effect.....	238
27.1.3	Example 2: Reciprocating Compressors .....	239
27.1.4	Example 3: Energy Efficient HVAC Ducts .....	240
27.2	Key Vendors .....	241
27.3	USA Energy-Efficient Air Conditioning & Refrigeration (ACR) Market – 2020-2030.....	241
27.3.1	Energy-Efficient Air Conditioning & Refrigeration (ACR) Market Size .....	241
27.3.2	Energy-Efficient Air Conditioning & Refrigeration (ACR) Market Dynamics.....	241



27.3.3	Energy-Efficient Air Conditioning & Refrigeration (ACR) Market Share.....	242
<b>28</b>	<b>Energy-Efficient Electric Appliances (w/o ACR) Market – 2022-2030 .....</b>	<b>243</b>
28.1	CEO Takeaway.....	243
28.1.1	Summary.....	243
28.2	Key Vendors .....	247
28.3	USA Energy-Efficient Electric Appliances (w/o ACR) Market – 2020-2030.....	247
28.3.1	Energy-Efficient Electric Appliances (w/o ACR) Market Size .....	247
28.3.2	Energy-Efficient Electric Appliances (w/o ACR) Market Dynamics.....	248
28.3.3	Energy-Efficient Electric Appliances (w/o ACR) Market Share.....	248
<b>29</b>	<b>EV Charging Systems Market – 2022-2030.....</b>	<b>249</b>
29.1	CEO Takeaway.....	249
29.1.1	Summary.....	249
29.1.2	Light-Duty Vehicle Chargers.....	252
29.1.3	Private Home And Workplace Chargers.....	253
29.1.4	Charging Heavy-Duty Electric Trucks.....	254
29.1.5	Mega-High Power Charging Standarts.....	254
29.1.6	EVs and Energy Storage .....	255
29.1.7	Wireless Charging.....	256
29.2	Key Vendors .....	257
29.3	USA EV Charging Systems Market – 2020-2030.....	257
29.3.1	EV Charging Systems Market Size .....	257
29.3.2	EV Charging Systems Market Dynamics.....	258
29.3.3	EV Charging Systems Market Share.....	258
<b>30</b>	<b>Extreme Weather Public Warning Systems Market – 2022-2030 .....</b>	<b>259</b>
30.1	CEO Takeaway.....	259
30.1.1	Summary.....	259
30.1.2	Cell Baed Broadcast.....	263
30.1.3	Location Based Alert SMS.....	265
30.2	USA Extreme Weather Public Warning Systems Market – 2020-2030.....	267
30.2.1	Extreme Weather Public Warning Systems Market Size .....	267
30.2.2	Extreme Weather Public Warning Systems Market Dynamics.....	268
30.2.3	Extreme Weather Public Warning Systems Market Share.....	268

<b>31</b>	<b>Flood Control Market – 2022-2030</b>	<b>269</b>
31.1	CEO Takeaway	269
31.1.1	Summary	269
31.1.2	Structural Forms of Mitigation	272
31.1.3	Nonstructural Measures	273
31.1.4	Floodwater Diversion and Storage	273
31.1.5	Floodplain and Stream Restoration	273
31.2	Key Vendors	273
31.3	USA Floods Control Market – 2020-2030	274
31.3.1	Floods Control Market Size	274
31.3.2	Floods Control Market Dynamics	275
31.3.3	Floods Control Market Share	275
<b>32</b>	<b>Freight BEVs Market – 2022-2030</b>	<b>276</b>
32.1	CEO Takeaway	276
32.1.1	Summary	276
32.1.2	COVID-19 Effects	277
32.2	Key Vendors	278
32.3	USA Freight BEVs Market – 2020-2030	278
32.3.1	Freight BEVs Market Size	278
32.3.2	Freight BEVs Market Dynamics	279
32.3.3	Freight BEVs Market Share	279
<b>33</b>	<b>GHG Emission Tracking Market – 2022-2030</b>	<b>280</b>
33.1	CEO Takeaway	280
33.1.1	Summary	280
33.1.2	Methane Emission Tracking Technologies	284
33.2	Key Vendors	286
33.3	USA GHG Emission Tracking Market – 2020-2030	286
33.3.1	GHG Emission Tracking Market Size	286
33.3.2	GHG Emission Tracking Market Dynamics	287
33.3.3	GHG Emission Tracking Market Share	287
<b>34</b>	<b>Geothermal Power Generation Market – 2022-2030</b>	<b>288</b>
34.1	CEO Takeaway	288
34.1.1	Summary	288
34.1.2	Geothermal Electric Power Generation	290
34.1.3	Geothermal Power Plants LCOE	291
34.1.4	Enhanced Geothermal Systems (EGS)	291
34.1.5	The 2022-2030 Market Growth Drivers	293
34.2	Key Vendors	294
34.3	USA Geothermal Power Generation Market – 2020-2030	295
34.3.1	Geothermal Power Generation Market Size	295
34.3.2	Geothermal Power Generation Market Dynamics	295
34.3.3	Geothermal Power Generation Market Share	296

<b>35</b>	<b>Green Cement Market – 2022-2030 .....</b>	<b>297</b>
35.1	CEO Takeaway .....	297
35.1.1	Summary .....	297
35.1.2	Cement Decarbonization Options.....	301
35.1.3	Cement Negative Emission Technologies .....	301
35.2	Key Vendors .....	303
35.3	USA Green Cement Market – 2020-2030 .....	303
35.3.1	Green Cement Market Size .....	303
35.3.2	Green Cement Market Dynamics .....	303
35.3.3	Green Cement Market Share .....	304
<b>36</b>	<b>Green Hydrogen Production Market – 2022-2030 .....</b>	<b>305</b>
36.1	CEO Takeaway .....	305
36.1.1	Summary .....	305
36.1.2	Green Hydrogen.....	309
36.1.3	The European Hydrogen Market .....	310
36.1.4	The Asia-Pacific Hydrogen Market .....	310
36.2	A Net-Zero“Hydrogen Economy” by 2050 Scenario.....	311
36.3	Key Vendors .....	312
36.4	USA Green Hydrogen Production Market – 2020-2030 .....	313
36.4.1	Green Hydrogen Production Market Size .....	313
36.4.2	Green Hydrogen Production Market Dynamics .....	313
36.4.3	Green Hydrogen Production Market Share .....	313
<b>37</b>	<b>Green Steel Market – 2022-2030 .....</b>	<b>314</b>
37.1	CEO Takeaway .....	314
37.1.1	Summary .....	314
37.1.2	CHG Emissions & Decarbonized (Green) Steel. ....	316
37.2	USA Green Steel Market – 2020-2030 .....	317
37.2.1	Green Steel Market Size .....	317
37.2.2	Green Steel Market Dynamics.....	318
37.2.3	Green Steel Market Share .....	318
<b>38</b>	<b>Grid Modernization Market – 2022-2030 .....</b>	<b>319</b>
38.1	CEO Takeaway .....	319
38.1.1	Summary .....	319
38.1.2	Smart Grid.....	321
38.1.3	Transmission Lines Modernization .....	322
38.1.4	Demand Response.....	323
38.1.5	Hardening the Grid .....	323
38.1.6	Advanced Distribution Management Systems .....	324
38.1.7	Smart Inverters.....	324
38.1.8	Smart Meters.....	324
38.1.9	Microgrids.....	324
38.2	USA Grid Modernization Market – 2020-2030 .....	326

38.2.1	Grid Modernization Market Size .....	326
38.2.2	Grid Modernization Market Dynamics.....	327
38.2.3	Grid Modernization Market Share.....	327
<b>39</b>	<b>Grid-Scale Battery Storage Market – 2022-2030 .....</b>	<b>328</b>
39.1	CEO Takeaway.....	328
39.1.1	Summary.....	328
39.1.2	The U.S. Energy Storage Market .....	331
39.1.3	Grid-Scale Battery Storage Benefits.....	331
39.1.4	EVs and Energy Storage .....	332
39.2	Key Vendors .....	334
39.3	USA Grid-Scale Battery Storage Market – 2020-2030.....	334
39.3.1	Grid-Scale Battery Storage Market Size.....	334
39.3.2	Grid-Scale Battery Storage Market Dynamics .....	335
39.3.3	Grid-Scale Battery Storage Market Share .....	335
<b>40</b>	<b>Hydroelectric Energy Storage Market – 2022-2030.....</b>	<b>336</b>
40.1	CEO Takeaway.....	336
40.1.1	Summary.....	336
40.1.2	Facts & Figures .....	339
40.1.3	Pumped Hydroelectric Storage Technologies .....	339
40.1.4	Variable-Speed Pump-Storage Technology .....	340
40.1.5	Key Vendors.....	340
40.2	USA Hydroelectric Energy Storage Market – 2020-2030.....	341
40.2.1	Hydroelectric Energy Storage Market Size.....	341
40.2.2	Hydroelectric Energy Storage Market Dynamics .....	342
40.2.3	Hydroelectric Energy Storage Market Share .....	342
<b>41</b>	<b>Hydroelectric Power Market – 2022-2030 .....</b>	<b>343</b>
41.1	CEO Takeaway.....	343
41.1.1	Summary.....	343
41.1.2	Hydropower LCOE .....	346
41.1.3	Hydropower Technology.....	346
41.1.4	Hydroelectric Power Project Construction Cost.....	347
41.2	Key Vendors .....	348
41.3	USA Hydroelectric Power Market – 2020-2030 .....	348
41.3.1	Hydroelectric Power Market Size .....	348
41.3.2	Hydroelectric Power Market Dynamics.....	348
41.3.3	Hydroelectric Power Market Share.....	349
<b>42</b>	<b>Hydrogen Vehicles Market – 2022-2030.....</b>	<b>350</b>
42.1	CEO Takeaway.....	350
42.1.1	Summary.....	350
42.1.2	Fuel Cell Passenger Vehicles.....	356
42.1.3	Fuel-cell Buses.....	356
42.1.4	Fuel-cell Trams and Trains.....	356

42.1.5	Hydrogen Vehicles Advantages .....	357
42.1.6	Hydrogen Vehicles Disadvantages.....	357
42.1.7	Hydrogen Storage .....	357
42.2	Key Vendors .....	358
42.3	USA Hydrogen Vehicles Market – 2020-2030 .....	358
42.3.1	Hydrogen Vehicles Market Size .....	358
42.3.2	Hydrogen Vehicles Market Dynamics.....	359
42.3.3	Hydrogen Vehicles Market Share.....	359
<b>43</b>	<b>Hydrogen Electrolyzers Market – 2022-2030 .....</b>	<b>360</b>
43.1	CEO Takeaway.....	360
43.1.1	Summary .....	360
43.2	Key Vendors .....	365
43.3	USA Hydrogen Electrolyzers Market – 2020-2030.....	365
43.3.1	Hydrogen Electrolyzers Market Size .....	365
43.3.2	Hydrogen Electrolyzers Market Dynamics.....	365
43.3.3	Hydrogen Electrolyzers Market Share.....	366
<b>44</b>	<b>Hydrogen Fueling Infrastructure Market – 2022-2030 .....</b>	<b>367</b>
44.1	CEO Takeaway.....	367
44.1.1	Summary .....	367
44.2	Key Vendors .....	371
44.3	USA Hydrogen Fueling Infrastructure Market – 2020-2030 .....	371
44.3.1	Hydrogen Fueling Infrastructure Market Size .....	371
44.3.2	Hydrogen Fueling Infrastructure Market Dynamics .....	371
44.3.3	Hydrogen Fueling Infrastructure Market Share.....	371
<b>45</b>	<b>ICT (w/o Cyber, AI, Big Data) Market – 2022-2030.....</b>	<b>373</b>
45.1	CEO Takeaway.....	373
45.1.1	Summary .....	373
45.1.2	Distributed Energy Resources ICT .....	374
45.2	Key Vendors .....	374
45.3	USA ICT (w/o Cyber, AI, Big Data) Market – 2020-2030 .....	375
45.3.1	ICT (w/o Cyber, AI, Big Data) Market Size .....	375
45.3.2	ICT (w/o Cyber, AI, Big Data) Market Dynamics .....	376
45.3.3	ICT (w/o Cyber, AI, Big Data) Market Share.....	376
<b>46</b>	<b>Low Carbon Fuels Manufacturing Plants Market – 2022-2030.....</b>	<b>377</b>
46.1	CEO Takeaway.....	377
46.1.1	Summary .....	377
46.2	USA Low Carbon Fuels Manufacturing Plants Market – 2020-2030.....	383
46.2.1	Low Carbon Fuels Manufacturing Plants Market Size .....	383
46.2.2	Low Carbon Fuels Manufacturing Plants Market Dynamics.....	384
46.2.3	Low Carbon Fuels Manufacturing Plants Market Share .....	384

<b>47</b>	<b>Marine Power Systems Market – 2022-2030 .....</b>	<b>385</b>
47.1	CEO Takeaway .....	385
47.1.1	Summary .....	385
47.1.2	Marine Tidal Power technologies .....	386
47.1.3	Marine Current Power Generation.....	387
47.1.4	Marine Osmotic Power Generation .....	387
47.1.5	Ocean Thermal Energy .....	388
47.1.6	Marine Wave Power .....	388
47.2	Key Vendors .....	389
47.3	USA Marine Power Market – 2020-2030 .....	390
47.3.1	Marine Power Market Size .....	390
47.3.2	Marine Power Market Dynamics.....	390
47.3.3	Marine Power Market Share.....	391
<b>48</b>	<b>Methane Abatement Market – 2022-2030 .....</b>	<b>392</b>
48.1	CEO Takeaway.....	392
48.1.1	Summary .....	392
48.1.2	Methane Sources .....	394
48.1.3	COP26 Methane Pledge.....	395
48.1.4	Methane Mitigation .....	395
48.1.5	GHG Abatement Cost Forecast - 2030.....	397
48.2	Key Vendors .....	398
48.3	USA Methane Abatement Market – 2020-2030 .....	400
48.3.1	Methane Abatement Market Size .....	400
48.3.2	Methane Abatement Market Dynamics.....	401
48.3.3	Methane Abatement Market Share.....	401
<b>49</b>	<b>Nuclear Energy Plants (&gt; 1 GW) Market – 2022-2030 .....</b>	<b>402</b>
49.1	CEO Takeaway.....	402
49.1.1	Summary .....	402
49.1.2	Facts and Figures.....	403
49.1.3	Installed Base of Power Reactors - 2021 .....	404
49.2	Key Vendors .....	404
49.3	USA Nuclear Energy Plants > 1 GW Market – 2020-2030.....	405
49.3.1	Nuclear Energy Plants > 1 GW Market Size.....	405
49.3.2	Nuclear Energy Plants > 1 GW Market Dynamics .....	405
49.3.3	Nuclear Energy Plants > 1 GW Market Share .....	406
<b>50</b>	<b>Offshore Wind Power Market – 2022-2030.....</b>	<b>407</b>
50.1	CEO Takeaway.....	407
50.1.1	Summary .....	407
50.1.2	Floating offshore wind power market.....	412
50.1.3	The Proliferation of Offshore Wind Power Farms by Geography.....	413
50.1.4	Operational Cost .....	414



50.1.5	Cost trends .....	414
50.2	Key Vendors .....	415
50.3	USA Offshore Wind Power Market – 2020-2030 .....	415
50.3.1	Offshore Wind Power Market Size .....	415
50.3.2	Offshore Wind Power Market Dynamics.....	416
50.3.3	Offshore Wind Power Market Share .....	416
<b>51</b>	<b>Onshore Wind Power Market – 2022-2030 .....</b>	<b>417</b>
51.1	CEO Takeaway.....	417
51.1.1	Summary .....	417
51.1.2	Onshore Wind LCOE Outlook .....	419
51.1.3	Onshore Wind Power Disadvantages.....	419
51.1.4	Key Vendors.....	419
51.2	USA Onshore Wind Power Market – 2020-2030 .....	421
51.2.1	Onshore Wind Power Market Size .....	421
51.2.2	Onshore Wind Power Market Dynamics.....	421
51.2.3	Onshore Wind Power Market Share .....	422
<b>52</b>	<b>Other BEVs Market – 2022-2030 .....</b>	<b>423</b>
52.1	CEO Takeaway.....	423
52.1.1	Summary .....	423
52.2	Key Vendors .....	429
52.3	USA Other BEVs Market – 2020-2030.....	431
52.3.1	Other BEVs Market Size.....	431
52.3.2	Other BEVs Market Dynamics.....	432
52.3.3	Other BEVs Market Share .....	432
<b>53</b>	<b>Other Energy Storage Modalities Market – 2022-2030 .....</b>	<b>433</b>
53.1	USA Other Energy Storage Modalities Market – 2020-2030.....	433
53.1.1	Other Energy Storage Modalities Market Size.....	433
53.1.2	Other Energy Storage Modalities Market Dynamics .....	433
53.1.3	Other Energy Storage Modalities Market Share .....	434
<b>54</b>	<b>Other USA Climate Change Mitigation Markets – 2022-2030 .....</b>	<b>435</b>
54.1	Other USA Climate Change Mitigation Markets – 2020- 2030.....	435
54.1.1	Other USA Climate Change Mitigation Markets Size .....	435
54.1.2	Other USA Climate Change Mitigation Markets Dynamics.....	436
54.1.3	Other USA Climate Change Mitigation Markets Share .....	436
<b>55</b>	<b>Other Renewable Energy Market – 2022-2030.....</b>	<b>437</b>
55.1	USA Other Renewable Energy Market – 2020-2030 .....	437
55.1.1	Other Renewable Energy Market Size .....	437
55.1.2	Other Renewable Energy Market Dynamics.....	437
55.1.3	Other Renewable Energy Market Share.....	438

<b>56</b>	<b>Passenger BEV Cars Market – 2022-2030.....</b>	<b>439</b>
56.1	CEO Takeaway.....	439
56.1.1	Summary.....	439
56.1.2	Electric Cars vs. ICE Car Materials.....	447
56.1.3	Phasing Out Of Passenger ICE Cars.....	448
56.1.4	COVID-19 Effects.....	448
56.2	Key Vendors.....	449
56.3	USA Passenger BEV Cars Market – 2020-2030.....	450
56.3.1	Passenger BEV Cars Market Size.....	450
56.3.2	Passenger BEV Cars Market Dynamics.....	451
56.3.3	Passenger BEV Cars Market Share.....	451
<b>57</b>	<b>Passive Green Buildings Market – 2022-2030.....</b>	<b>452</b>
57.1	CEO Takeaway.....	452
57.1.1	Summary.....	452
57.1.2	Buildings GHG Emission & Energy Consumption.....	455
57.2	Key Vendors.....	456
57.3	USA Passive Green Buildings Market – 2020-2030.....	457
57.3.1	Passive Green Buildings Market Size.....	457
57.3.2	Passive Green Buildings Market Dynamics.....	457
57.3.3	Passive Green Buildings Market Share.....	457
<b>58</b>	<b>Precision Agriculture Market – 2022-2030.....</b>	<b>458</b>
58.1	CEO Takeaway.....	458
58.1.1	Summary.....	458
58.2	Precision Agriculture Challenges.....	461
58.3	Precision Agriculture Technologies.....	462
58.3.1	Remote Sensing.....	463
58.3.2	Genetic Engineering.....	463
58.3.3	Agricultural Robots.....	463
58.3.4	Drones.....	463
58.3.5	Vertical Cultivating.....	464
58.3.6	Data.....	464
58.3.7	Connected Water.....	464
58.3.8	Electric Fish.....	464
58.3.9	Connected Cows.....	464
58.3.10	Farm Management Systems.....	465
58.4	Key Vendors.....	465
58.5	USA Precision Agriculture Market – 2020-2030.....	465
58.5.1	Precision Agriculture Market Size.....	465
58.5.2	Precision Agriculture Market Dynamics.....	465
58.5.3	Precision Agriculture Market Share.....	465
<b>59</b>	<b>Precision Irrigation Market – 2022-2030.....</b>	<b>467</b>
59.1	CEO Takeaway.....	467



59.1.1	Summary .....	467
59.1.2	Drip Irrigation.....	467
59.1.3	Variable Rate Irrigation.....	468
59.1.4	GPS Technology .....	468
59.1.5	Monitoring and Automation.....	469
59.1.6	Challenges & Opportunities.....	469
59.2	Key Vendors .....	470
59.3	USA Precision Irrigation Market – 2020-2030.....	470
59.3.1	Precision Irrigation Market Size.....	470
59.3.2	Precision Irrigation Market Dynamics .....	471
59.3.3	Precision Irrigation Market Share .....	471
<b>60</b>	<b>Reforestation Market – 2022-2030.....</b>	<b>472</b>
60.1	CEO Takeaway.....	472
60.1.1	Summary.....	472
60.1.2	Reforestation Management .....	476
60.1.3	Reforestation for Climate Change Mitigation .....	477
60.1.4	Reforestation Strategies .....	477
60.1.5	Empress Trees .....	478
60.1.6	Finanancing Deforestation.....	479
60.1.7	Megacities Forestation .....	479
60.1.8	Example: China Reforestation.....	480
60.2	Key Vendors .....	480
60.3	USA Reforestation Market – 2020-2030 .....	482
60.3.1	Reforestation Market Size .....	482
60.3.2	Reforestation Market Dynamics .....	483
60.3.3	Reforestation Market Share.....	483
<b>61</b>	<b>Regenerative Agriculture Market – 2022-2030 .....</b>	<b>484</b>
61.1	CEO Takeaway.....	484
61.1.1	Summary.....	484
61.2	USA Regenerative Agriculture Market – 2020-2030 .....	487
61.2.1	Regenerative Agriculture Market Size .....	487
61.2.2	Regenerative Agriculture Market Dynamics .....	488
61.2.3	Regenerative Agriculture Market Share.....	488
<b>62</b>	<b>Rooftop Solar PV Market – 2022-2030 .....</b>	<b>489</b>
62.1	CEO Takeaway.....	489
62.1.1	Summary .....	489
62.1.2	Solar Rooftop Technology .....	490
62.1.3	Solar Rooftop System Economics .....	491
62.1.4	Adoption Of Rooftop PV .....	491
62.2	USA Rooftop Solar PV Market – 2020-2030.....	491
62.2.1	Rooftop Solar PV Market Size.....	491
62.2.2	Rooftop Solar PV Market Dynamics .....	492

62.2.3	Rooftop Solar PV Market Share .....	492
<b>63</b>	<b>Small Nuclear Reactors Market – 2022-2030 .....</b>	<b>493</b>
63.1	CEO Takeaway .....	493
63.1.1	Summary .....	493
63.1.2	Advantages of SMRs.....	494
63.1.3	SMR Challenges .....	495
63.2	Key Vendors .....	495
63.3	USA Small Nuclear Reactors Market – 2020-2030 .....	496
63.3.1	Small Nuclear Reactors Market Size .....	496
63.3.2	Small Nuclear Reactors Market Dynamics .....	496
63.3.3	Small Nuclear Reactors Market Share .....	497
<b>64</b>	<b>Solar PV (Utility Scale) Market – 2022-2030.....</b>	<b>498</b>
64.1	CEO Takeaway .....	498
64.1.1	Summary .....	498
64.1.2	Market Outlook .....	502
64.2	Key Vendors .....	503
64.3	USA Solar PV (Utility Scale) Market – 2020-2030 .....	504
64.3.1	Solar PV (Utility Scale) Market Size .....	504
64.3.2	Solar PV (Utility Scale) Market Dynamics.....	505
64.3.3	Solar PV (Utility Scale) Market Share.....	505
<b>65</b>	<b>Thermal Energy Storage Market – 2022-2030.....</b>	<b>506</b>
65.1	CEO Takeaway .....	506
65.1.1	Summary .....	506
65.1.2	Thermal Energy Storage Advantages.....	509
65.1.3	Molten Salt Storage Technology .....	510
65.1.4	Key Vendors.....	510
65.2	USA Thermal Energy Storage Market – 2020-2030.....	511
65.2.1	Thermal Energy Storage Market Size.....	511
65.2.2	Thermal Energy Storage Market Dynamics.....	511
65.2.3	Thermal Energy Storage Market Share .....	512
<b>66</b>	<b>Two &amp; Three-Wheeler BEVs Market – 2022-2030 .....</b>	<b>513</b>
66.1	CEO Takeaway .....	513
66.1.1	Summary .....	513
66.2	USA Two & Three-Wheeler BEVs Market – 2020-2030.....	514
66.2.1	Two & Three-Wheeler BEVs Market Size.....	514
66.2.2	Two & Three-Wheeler BEVs Market Dynamics.....	515
66.2.3	Two & Three-Wheeler BEVs Market Share .....	515
<b>67</b>	<b>Waste to Energy Plants Market – 2022-2030 .....</b>	<b>516</b>
67.1	CEO Takeaway .....	516
67.1.1	Summary .....	516
67.1.2	Facts & Figures .....	517
67.1.3	Waste to Energy Economy .....	518

67.2	USA Waste to Energy Plants Market – 2020-2030 .....	519
67.2.1	Waste to Energy Plants Market Size .....	519
67.2.2	Waste to Energy Plants Market Dynamics .....	519
67.2.3	Waste to Energy Plants Market Share.....	520
<b>68</b>	<b>Water Redeemable (Water Reclamation) Systems Market – 2022-2030 .....</b>	<b>521</b>
68.1	CEO Takeaway.....	521
68.1.1	Summary.....	521
68.1.2	Sewage Treatment Plants .....	524
68.1.3	Example: Water Reclamation in China.....	525
68.2	Key Vendors .....	526
68.3	USA Water Redeemable Systems Market – 2020-2030 .....	527
68.3.1	Water Redeemable Systems Market Size .....	527
68.3.2	Water Redeemable Systems Market Dynamics .....	527
68.3.3	Water Redeemable Systems Market Share .....	528
<b>69</b>	<b>Weather Monitoring, Modeling &amp; Forecasting Market – 2022- 2030 .....</b>	<b>529</b>
69.1	CEO Takeaway.....	529
69.1.1	Summary.....	529
69.1.2	AI and Machine Learning To Predict Weather Events .....	530
69.2	Key Vendors .....	532
69.3	USA Weather Monitoring, Modeling & Forecasting Market – 2020-2030.....	532
69.3.1	Weather Monitoring, Modeling & Forecasting Market Size .....	532
69.3.2	Weather Monitoring, Modeling & Forecasting Market Dynamics.....	533
69.3.3	Weather Monitoring, Modeling & Forecasting Market Share.....	533
<b>70</b>	<b>Wildfire Mitigation Market – 2022-2030.....</b>	<b>534</b>
70.1	CEO Takeaway.....	534
70.1.1	Summary.....	534
70.1.2	Carbon Emissions .....	535
70.2	Key Vendors .....	536
70.3	USA Wildfire Mitigation Market – 2020-2030 .....	537
70.3.1	Wildfire Mitigation Market Size .....	537
70.3.2	Wildfire Mitigation Market Dynamics .....	537
70.3.3	Wildfire Mitigation Market Share.....	537
	<b>MARKET BY SECTOR.....</b>	<b>538</b>
<b>71</b>	<b>The U.S. Climate Change Mitigation &amp; Adaptation Market by Sector – 2022-2030 .....</b>	<b>538</b>
71.1	Sectors’ Structure .....	538

71.2	Market Size.....	540
71.3	Market Share .....	543
<b>REVENUE SOURCE MARKETS.....</b>		<b>544</b>
<b>72</b>	<b>USA Climate Change Mitigation Market by Revenue Source – 2020-2030 .....</b>	<b>544</b>
72.1	USA Market – 2020-2030 .....	544
72.2	USA Climate Change Mitigation Market Dynamics – 2020- 2030.....	545
72.3	USA Climate Change Mitigation Market Share – 2020-2030 .....	546
<b>APPENDICES.....</b>		<b>554</b>
<b>73</b>	<b>Appendix A: Glossary .....</b>	<b>554</b>
<b>74</b>	<b>Appendix B: Abbreviations.....</b>	<b>572</b>
<b>75</b>	<b>Research Methodology .....</b>	<b>577</b>
75.1	Report Structure.....	577
75.2	Methodology .....	577
75.3	For Whom is this Report? .....	578
<b>76</b>	<b>Disclaimer and Copyright .....</b>	<b>579</b>

## List of Tables

Table 1 - Electricity Production by Country – 2020 .....	51
Table 2 - Energy & Electricity and Per Capita Consumption by Country / Region .....	52
Table 3 - Renewable vs. Fossil Fuels Heating Efficiency Cost [\$ Cent / KWh] – 2020 & 2030 F.....	60
Table 4 - USA Climate Change Mitigation Market by Technology [\$B] – 2022-2030.....	65
Table 5 - USA Climate Change Mitigation Market by Sector [\$B] – 2022- 2030.....	67
Table 6 - USA Climate Change Mitigation Market by Revenue [\$B] – 2020- 2030.....	68
Table 7 - USA Climate Change Mitigation Market by Region [\$B] – 2022- 2030.....	68
Table 8 - USA Climate Change Mitigation Market by Country [\$B] – 2020- 2030.....	70
Table 9 - USA Climate Change Mitigation Technology Products & Services [\$B] Markets – 2022-2030.....	93
Table 10 - USA Climate Change Mitigation Markets Annual Growth Rates [%] – 2022-2030 .....	94
Table 11 - USA Climate Change Mitigation Products & Services Markets Shares [%] – 2022-2030 .....	96
Table 12 – USA Air Sourced Heat Pumps Market Size [\$B] - 2022-2030.....	107
Table 13 – USA Air Sourced Heat Pumps Market Dynamics [%] - 2022- 2030.....	107
Table 14 - USA Climate Change Mitigation Market, Air Sourced Heat Pumps Market Share [%] - 2022-2030.....	107
Table 15 – USA Big Data & AI Market Size [\$B] - 2022-2030.....	112
Table 16 – USA Big Data & AI Market Dynamics [%] - 2022-2030 .....	113
Table 17 - USA Climate Change Mitigation Market, Big Data & AI Market Share [%] - 2022-2030.....	113
Table 18 - Energy Production from Solid Biofuels and Renewable Waste (MW) by Ten Leading Countries .....	116
Table 19 – USA Bioenergy Market Size [\$B] - 2022-2030 .....	129
Table 20 – USA Bioenergy Market Dynamics [%] - 2022-2030 .....	129
Table 21 - USA Climate Change Mitigation Market, Bioenergy Market Share [%] - 2022-2030.....	129
Table 22 – USA Biological Carbon Capture & Sequestration Market Size [\$B] - 2022-2030 .....	134
Table 23 – USA Biological Carbon Capture & Sequestration Market Dynamics [%] - 2022-2030.....	135
Table 24 - USA Climate Change Mitigation Market, Biological Carbon Capture & Sequestration Market Share [%] - 2022-2030.....	135

*USA Climate Change Mitigation Market & Technologies - 2022-2030 -  
With Corona & COP26 Impacts*

Table 25 – USA Bioremediation Market Size [\$B] - 2022-2030 .....	145
Table 26 – USA Bioremediation Market Dynamics [%] - 2022-2030.....	145
Table 27 - USA Climate Change Mitigation Market, Bioremediation Market Share [%] - 2022-2030.....	145
Table 28 – USA Carbon Capture & Storage Market Size [\$B] - 2022-2030.....	151
Table 29 – USA Carbon Capture & Storage Market Dynamics [%] - 2022- 2030.....	151
Table 30 - USA Climate Change Mitigation Market, Carbon Capture & Storage Market Share [%] - 2022-2030 .....	152
Table 31 – USA Carbon Capture & Utilization Market Size [\$B] - 2022-2030...	160
Table 32 – USA Carbon Capture & Utilization Market Dynamics [%] - 2022- 2030.....	160
Table 33 - USA Climate Change Mitigation Market, Carbon Capture & Utilization Market Share [%] - 2022-2030 .....	160
Table 34 – USA Climate Adapted Agriculture Market Size [\$B] - 2022-2030....	168
Table 35 – USA Climate Adapted Agriculture Market Dynamics [%] - 2022- 2030.....	168
Table 36 - USA Climate Change Mitigation Market, Climate Adapted Agriculture Market Share [%] - 2022-2030.....	168
Table 37 – USA Climate Adapted Water Infrastructure Market Size [\$B] - 2022-2030.....	186
Table 38 – USA Climate Adapted Water Infrastructure Market Dynamics [%] - 2022-2030 .....	186
Table 39 - USA Climate Change Mitigation Market, Climate Adapted Water Infrastructure Market Share [%] - 2022-2030.....	187
Table 40 – USA Compressed-Air Storage Market Size [\$B] - 2022-2030.....	192
Table 41 – USA Compressed-Air Storage Market Dynamics [%] - 2022- 2030.....	193
Table 42 - USA Climate Change Mitigation Market, Compressed-Air Storage Market Share [%] - 2022-2030 .....	193
Table 43 – USA Concentrating Solar Power (CSP) Market Size [\$B] - 2022- 2030.....	198
Table 44 – USA Concentrating Solar Power (CSP) Market Dynamics [%] - 2022-2030.....	199
Table 45 - USA Warming Mitigation Market, Concentrating Solar Power (CSP) Market Share [%] - 2022-2030 .....	199
Table 46 – USA Cybersecurity Market Size [\$B] - 2022-2030 .....	204
Table 47 – USA Cybersecurity Market Dynamics [%] - 2022-2030.....	204
Table 48 - USA Climate Change Mitigation Market, Cybersecurity Market Share [%] - 2022-2030.....	204
Table 49 – USA Desalination Plants Market Size [\$B] - 2022-2030.....	215
Table 50 – USA Desalination Plants Market Dynamics [%] - 2022-2030 .....	216
Table 51 - USA Climate Change Mitigation Market, Desalination Plants Market Share [%] - 2022-2030.....	216



*USA Climate Change Mitigation Market & Technologies - 2022-2030 -  
With Corona & COP26 Impacts*

Table 52 – Cost (Euro/MWh) of Domestic Heating in France .....	220
Table 53 - Cost (Euro/MW) of District Heating in France .....	221
Table 54 – USA Direct Geothermal Heating & Cooling Market Size [\$B] - 2022-2030.....	221
Table 55 – USA Direct Geothermal Heating & Cooling Market Dynamics [%] - 2022-2030 .....	222
Table 56 - USA Climate Change Mitigation Market, Direct Geothermal Heating & Cooling Market Share [%] - 2022-2030 .....	222
Table 57 – USA Direct Solar Water Heating Market Size [\$B] - 2022-2030.....	227
Table 58 – USA Direct Solar Water Heating Market Dynamics [%] - 2022- 2030.....	228
Table 59 - USA Climate Change Mitigation Market, Direct Solar Water Heating Market Share [%] - 2022-2030.....	228
Table 60 – USA Electric Buses Market Size [\$B] - 2022-2030 .....	234
Table 61 – USA Electric Buses Market Dynamics [%] - 2022-2030 .....	234
Table 62 - USA Climate Change Mitigation Market, Electric Buses Market Share [%] - 2022-2030.....	234
Table 63 – USA Energy-Efficient Air Conditioning & Refrigeration (ACR) Market Size [\$B] - 2022-2030 .....	241
Table 64 – USA Energy-Efficient Air Conditioning & Refrigeration (ACR) Market Dynamics [%] - 2022-2030.....	241
Table 65 - USA Climate Change Mitigation Market, Energy-Efficient Air Conditioning & Refrigeration (ACR) Market Share [%] - 2022- 2030.....	242
Table 66 – USA Energy-Efficient Electric Appliances (w/o ACR) Market Size [\$B] - 2022-2030 .....	247
Table 67 – USA Energy-Efficient Electric Appliances (w/o ACR) Market Dynamics [%] - 2022-2030.....	248
Table 68 - USA Climate Change Mitigation Market, Energy-Efficient Electric Appliances (w/o ACR) Market Share [%] - 2022-2030.....	248
Table 69 – USA EV Charging Systems Market Size [\$B] - 2022-2030 .....	257
Table 70 – USA EV Charging Systems Market Dynamics [%] - 2022-2030.....	258
Table 71 - USA Climate Change Mitigation Market, EV Charging Systems Market Share [%] - 2022-2030.....	258
Table 72 – USA Extreme Weather Public Warning Systems Market Size [\$B] - 2022-2030 .....	267
Table 73 – USA Extreme Weather Public Warning Systems Market Dynamics [%] - 2022-2030.....	268
Table 74 - USA Climate Change Mitigation Market, Extreme Weather Public Warning Systems Market Share [%] - 2022-2030 .....	268
Table 75 – USA Floods Control Market Size [\$B] - 2022-2030.....	274
Table 76 – USA Floods Control Market Dynamics [%] - 2022-2030 .....	275
Table 77 - USA Climate Change Mitigation Market, Floods Control Market Share [%] - 2022-2030.....	275

*USA Climate Change Mitigation Market & Technologies - 2022-2030 -  
With Corona & COP26 Impacts*

Table 78 – USA Freight BEVs Market Size [\$B] - 2022-2030 .....	278
Table 79 – USA Freight BEVs Market Dynamics [%] - 2022-2030.....	279
Table 80 - USA Climate Change Mitigation Market, Freight BEVs Market Share [%] - 2022-2030.....	279
Table 81 – USA GHG Emission Tracking Market Size [\$B] - 2022-2030.....	286
Table 82 – USA GHG Emission Tracking Market Dynamics [%] - 2022- 2030.....	287
Table 83 - USA Climate Change Mitigation Market, GHG Emission Tracking Market Share [%] - 2022-2030 .....	287
Table 84 – USA Geothermal Power Generation Market Size [\$B] - 2022- 2030.....	295
Table 85 – USA Geothermal Power Generation Market Dynamics [%] - 2022-2030.....	295
Table 86 - USA Climate Change Mitigation Market, Geothermal Power Generation Market Share [%] - 2022-2030 .....	296
Table 87 – USA Green Cement Market Size [\$B] - 2022-2030.....	303
Table 88 – USA Green Cement Market Dynamics [%] - 2022-2030 .....	303
Table 89 - USA Climate Change Mitigation Market, Green Cement Market Share [%] - 2022-2030.....	304
Table 90 - Color Codes by Hydrogen Manufacturing Process .....	307
Table 91 - Comparative Table for Fossil Derived Hydrogen Production Pathways .....	309
Table 92 – USA Green Hydrogen Production Market Size [\$B] - 2022-2030....	313
Table 93 – USA Green Hydrogen Production Market Dynamics [%] - 2022- 2030.....	313
Table 94 - USA Climate Change Mitigation Market, Green Hydrogen Production Market Share [%] - 2022-2030.....	313
Table 95 – USA Green Steel Market Size [\$B] - 2022-2030 .....	317
Table 96 – USA Green Steel Market Dynamics [%] - 2022-2030 .....	318
Table 97 - USA Climate Change Mitigation Market, Green Steel Market Share [%] - 2022-2030.....	318
Table 98 – USA Grid Modernization Market Size [\$B] - 2022-2030 .....	326
Table 99 – USA Grid Modernization Market Dynamics [%] - 2022-2030 .....	327
Table 100 - USA Climate Change Mitigation Market, Grid Modernization Market Share [%] - 2022-2030.....	327
Table 101 – USA Grid-Scale Battery Storage Market Size [\$B] - 2022-2030 ...	334
Table 102 – USA Grid-Scale Battery Storage Market Dynamics [%] - 2022- 2030.....	335
Table 103 - USA Climate Change Mitigation Market, Grid-Scale Battery Storage Market Share [%] - 2022-2030 .....	335
Table 104 – USA Hydroelectric Energy Storage Market Size [\$B] - 2022- 2030.....	341
Table 105 – USA Hydroelectric Energy Storage Market Dynamics [%] - 2022-2030.....	342



*USA Climate Change Mitigation Market & Technologies - 2022-2030 -  
With Corona & COP26 Impacts*

Table 106 - USA Climate Change Mitigation Market, Hydroelectric Energy Storage Market Share [%] - 2022-2030 .....	342
Table 107 – USA Hydroelectric Power Market Size [\$B] - 2022-2030 .....	348
Table 108 – USA Hydroelectric Power Market Dynamics [%] - 2022-2030.....	348
Table 109 - USA Climate Change Mitigation Market, Hydroelectric Power Market Share [%] - 2022-2030.....	349
Table 110 – USA Hydrogen Vehicles Market Size [\$B] - 2022-2030 .....	358
Table 111 – USA Hydrogen Vehicles Market Dynamics [%] - 2022-2030.....	359
Table 112 - USA Climate Change Mitigation Market, Hydrogen Vehicles Market Share [%] - 2022-2030.....	359
Table 113 - Electrolyzer Technologies Comparison.....	360
Table 114 - Hydrogen Color Codes of Hydrogen Manufacturing .....	363
Table 115 - Types of Electrolysers.....	364
Table 116 – USA Hydrogen Electrolyzers Market Size [\$B] - 2022-2030 .....	365
Table 117 – USA Hydrogen Electrolyzers Market Dynamics [%] - 2022-2030.....	365
Table 118 - USA Climate Change Mitigation Market, Hydrogen Electrolyzers Market Share [%] - 2022-2030 .....	366
Table 119 – USA Hydrogen Fueling Infrastructure Market Size [\$B] - 2022-2030.....	371
Table 120 – USA Hydrogen Fueling Infrastructure Market Dynamics [%] - 2022-2030.....	371
Table 121 - USA Climate Change Mitigation Market, Hydrogen Fueling Infrastructure Market Share [%] - 2022-2030.....	372
Table 122 – USA ICT (w/o Cyber, AI, Big Data) Market Size [\$B] - 2022-2030.....	375
Table 123 – USA ICT (w/o Cyber, AI, Big Data) Market Dynamics [%] - 2022-2030.....	376
Table 124 - USA Climate Change Mitigation Market, ICT (w/o Cyber, AI, Big Data) Market Share [%] - 2022-2030.....	376
Table 125 - Cost Assumptions Under 2 Innovation Scenarios.....	378
Table 126 – USA Low Carbon Fuels Manufacturing Plants Market Size [\$B] - 2022-2030 .....	383
Table 127 – USA Low Carbon Fuels Manufacturing Plants Market Dynamics [%] - 2022-2030.....	384
Table 128 - USA Climate Change Mitigation Market, Low Carbon Fuels Manufacturing Plants Market Share [%] - 2022-2030 .....	384
Table 129 – USA Marine Power Market Size [\$B] - 2022-2030 .....	390
Table 130 – USA Marine Power Market Dynamics [%] - 2022-2030.....	390
Table 131 - USA Climate Change Mitigation Market, Marine Power Market Share [%] - 2022-2030.....	391
Table 132 – USA Methane Abatement Market Size [\$B] - 2022-2030 .....	400
Table 133 – USA Methane Abatement Market Dynamics [%] - 2022-2030 .....	401

*USA Climate Change Mitigation Market & Technologies - 2022-2030 -  
With Corona & COP26 Impacts*

Table 134 - USA Climate Change Mitigation Market, Methane Abatement Market Share [%] - 2022-2030.....	401
Table 135 – USA Nuclear Energy Plants > 1 GW Market Size [\$B] - 2022- 2030.....	405
Table 136 – USA Nuclear Energy Plants > 1 GW Market Dynamics [%] - 2022-2030.....	405
Table 137 - USA Climate Change Mitigation Market, Nuclear Energy Plants > 1 GW Market Share [%] - 2022-2030.....	406
Table 138 – USA Offshore Wind Power Market Size [\$B] - 2022-2030 .....	415
Table 139– USA Offshore Wind Power Market Dynamics [%] - 2022-2030.....	416
Table 140 - USA Climate Change Mitigation Market, Offshore Wind Power Market Share [%] - 2022-2030.....	416
Table 141 – USA Onshore Wind Power Market Size [\$B] - 2022-2030 .....	421
Table 142 – USA Onshore Wind Power Market Dynamics [%] - 2022-2030.....	421
Table 143 - USA Climate Change Mitigation Market, Onshore Wind Power Market Share [%] - 2022-2030.....	422
Table 144 – USA Other BEVs Market Size [\$B] - 2022-2030 .....	431
Table 145 – USA Other BEVs Market Dynamics [%] - 2022-2030.....	432
Table 146 - USA Climate Change Mitigation Market, Other BEVs Market Share [%] - 2022-2030.....	432
Table 147 – USA Other Energy Storage Modalities Market Size [\$B] - 2022-2030.....	433
Table 148 – USA Other Energy Storage Modalities Market Dynamics [%] - 2022-2030.....	433
Table 149 - USA Climate Change Mitigation Market, Other Energy Storage Modalities Market Share [%] - 2022-2030.....	434
Table 150 –Other USA Climate Change Mitigation Markets Size [\$B] - 2022-2030.....	435
Table 151 – USA Other USA Climate Change Mitigation Markets Market Dynamics [%] - 2022-2030.....	436
Table 152 - USA Climate Change Mitigation Market, Other USA Climate Change Mitigation Markets Market Share [%] - 2022-2030 .....	436
Table 153 – USA Other Renewable Energy Market Size [\$B] - 2022-2030 .....	437
Table 154 – USA Other Renewable Energy Market Dynamics [%] - 2022- 2030.....	437
Table 155 - USA Climate Change Mitigation Market, Other Renewable Energy Market Share [%] - 2022-2030.....	438
Table 156 – USA Passenger BEV Cars Market Size [\$B] - 2022-2030 .....	450
Table 157 – USA Passenger BEV Cars Market Dynamics [%] - 2022-2030.....	451
Table 158 - USA Climate Change Mitigation Market, Passenger BEV Cars Market Share [%] - 2022-2030.....	451
Table 159 – USA Passive Green Buildings Market Size [\$B] - 2022-2030 .....	457
Table 160 – USA Passive Green Buildings Market Dynamics [%] - 2022- 2030.....	457

*USA Climate Change Mitigation Market & Technologies - 2022-2030 -  
With Corona & COP26 Impacts*

Table 161 - USA Climate Change Mitigation Market, Passive Green Buildings Market Share [%] - 2022-2030 .....	457
Table 162 – USA Precision Agriculture Market Size [\$B] - 2022-2030 .....	465
Table 163 – USA Precision Agriculture Market Dynamics [%] - 2022-2030.....	465
Table 164 - USA Climate Change Mitigation Market, Precision Agriculture Market Share [%] - 2022-2030.....	466
Table 165 – USA Precision Irrigation Market Size [\$B] - 2022-2030.....	470
Table 166 – USA Precision Irrigation Market Dynamics [%] - 2022-2030 .....	471
Table 167 - USA Climate Change Mitigation Market, Precision Irrigation Market Share [%] - 2022-2030.....	471
Table 168 – USA Reforestation Market Size [\$B] - 2022-2030.....	482
Table 169 – USA Reforestation Market Dynamics [%] - 2022-2030 .....	483
Table 170 - USA Climate Change Mitigation Market, Reforestation Market Share [%] - 2022-2030.....	483
Table 171 – USA Regenerative Agriculture Market Size [\$B] - 2022-2030.....	487
Table 172 – USA Regenerative Agriculture Market Dynamics [%] - 2022-2030.....	488
Table 173 - USA Climate Change Mitigation Market, Regenerative Agriculture Market Share [%] - 2022-2030.....	488
Table 174 – USA Rooftop Solar PV Market Size [\$B] - 2022-2030.....	491
Table 175 – USA Rooftop Solar PV Market Dynamics [%] - 2022-2030 .....	492
Table 176 - USA Climate Change Mitigation Market, Rooftop Solar PV Market Share [%] - 2022-2030.....	492
Table 177 – USA Small Nuclear Reactors Market Size [\$B] - 2022-2030.....	496
Table 178 – USA Small Nuclear Reactors Market Dynamics [%] - 2022-2030.....	496
Table 179 - USA Climate Change Mitigation Market, Small Nuclear Reactors Market Share [%] - 2022-2030.....	497
Table 180 – USA Solar PV (Utility Scale) Market Size [\$B] - 2022-2030 .....	504
Table 181 – USA Solar PV (Utility Scale) Market Dynamics [%] - 2022-2030.....	505
Table 182 - USA Climate Change Mitigation Market, Solar PV (Utility Scale) Market Share [%] - 2022-2030.....	505
Table 183 – USA Thermal Energy Storage Market Size [\$B] - 2022-2030 .....	511
Table 184 – USA Thermal Energy Storage Market Dynamics [%] - 2022-2030.....	511
Table 185 - USA Climate Change Mitigation Market, Thermal Energy Storage Market Share [%] - 2022-2030 .....	512
Table 186 – USA Two & Three-Wheeler BEVs Market Size [\$B] - 2022-2030.....	514
Table 187 – USA Two & Three-Wheeler BEVs Market Dynamics [%] - 2022-2030.....	515
Table 188 - USA Climate Change Mitigation Market, Two & Three-Wheeler BEVs Market Share [%] - 2022-2030 .....	515

*USA Climate Change Mitigation Market & Technologies - 2022-2030 -  
With Corona & COP26 Impacts*

Table 189 – USA Waste to Energy Plants Market Size [\$B] - 2022-2030.....	519
Table 190 – USA Waste to Energy Plants Market Dynamics [%] - 2022-2030.....	519
Table 191 - USA Climate Change Mitigation Market, Waste to Energy Plants Market Share [%] - 2022-2030.....	520
Table 192 – USA Water Redeemable Systems Market Size [\$B] - 2022-2030.....	527
Table 193 – USA Water Redeemable Systems Market Dynamics [%] - 2022-2030.....	527
Table 194 - USA Climate Change Mitigation Market, Water Redeemable Systems Market Share [%] - 2022-2030.....	528
Table 195 – USA Weather Monitoring, Modeling & Forecasting Market Size [\$B] - 2022-2030.....	532
Table 196 – USA Weather Monitoring, Modeling & Forecasting Market Dynamics [%] - 2022-2030.....	533
Table 197 - USA Climate Change Mitigation Market, Weather Monitoring, Modeling & Forecasting Market Share [%] - 2022-2030.....	533
Table 198 – USA Wildfire Mitigation Market Size [\$B] - 2022-2030.....	537
Table 199 – USA Wildfire Mitigation Market Dynamics [%] - 2022-2030.....	537
Table 200 - USA Climate Change Mitigation Market, Wildfire Mitigation Market Share [%] - 2022-2030.....	537
Table 201 - Climate Change Mitigation & Adaptation Market by Sector [\$B] – 2022-2030.....	540
Table 202 - USA Climate Change Mitigation Market Size [\$M] by Revenue Source – 2020-2030.....	544
Table 203 - USA Climate Change Mitigation Market AGRs [%] by Revenue Source – 2020-2030.....	545

## List of Figures

Figure 1 - COP26 Pledges & Targets Based GHG Emission [GTn] Forecast to 2030.....	48
Figure 2 - USA Warming 2010-2020 by GHG Source.....	49
Figure 3 - Renewable Energy Generation By Technology & By User.....	51
Figure 4 - Greenhouse Gas Emissions [%] by Sector.....	52
Figure 5 - Climate Change Causes and Effects.....	53
Figure 6- USA Energy demand (left) & GHS Emission (Right) By Sector – 2020.....	54
Figure 7 - GHG Emission per GWh of Energy Production - 2020.....	55
Figure 8 – Average USA Levelized cost [\$/MWh] of Electricity By Energy Technology – 2020.....	55
Figure 9 - Renewable Electricity Generation by Technology and Region.....	56
Figure 10 - USA Electricity Consumption by Energy Source – 1985-2020.....	56
Figure 11 - Levelized Cost [\$/MWh] of Energy, by Source – 2008-2020.....	56
Figure 12 - Renewable, Nuclear & Fossil Energy Prices [\$/MWh] & Installed Capacity – 2010-2019.....	57
Figure 13 - USA Warming vs. Number of Climate-Related Disasters - 1970-2032.....	59
Figure 14 - Energy Storage: Duration Time and Rated Power by Modality.....	59
Figure 15 - Renewable Generation Capacity By Region.....	60
Figure 16 - Leading Renewable Energy Capacity [GW] by Country - 2020.....	60
Figure 17 - Negative Emissions Role in Achieving NetZero.....	61
Figure 18 – USA GHG Emission Reduction [%] by Technology - 2030.....	66
Figure 19 - USA Electricity Generation [000 TWh] by Source - 2010- 2040.....	67
Figure 20 - USA Climate Change Mitigation Market by Region [\$B] – 2022-2030.....	76
Figure 21 - Air Source Heat Pump: Winter & Summer Operation.....	105
Figure 22 - Air Source Heat Pump, Heating Cycle.....	106
Figure 23 - Air to Air Heat Pump.....	107
Figure 24 - Air to Water Heat Pump.....	108
Figure 25 - Performance Standards For residential AC and Heat Pumps.....	113
Figure 26 – USA Air Sourced Heat Pumps Market Size [\$B] - 2022-2030.....	114
Figure 27 - Tackling Climate Change with Machine Learning.....	115
Figure 28 - Types of Big Data Analytics.....	116
Figure 29 - Data Mining Process.....	117
Figure 30 – USA Big Data & AI Market Size [\$B] - 2022-2030.....	119
Figure 31 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	122
Figure 32 - Bioenergy Thermo-Chemical Process.....	126
Figure 33 - Bioenergy Bio-Chemical Process.....	127
Figure 34 – USA Bioenergy Market Size [\$B] - 2022-2030.....	136
Figure 35 - Bioenergy with Carbon Capture & Sequestration.....	137



Figure 36 – Microalgae Based Biological Carbon Capture .....	137
Figure 37- Marine Bacteria Carbon Sequestration.....	138
Figure 38 - Microalgae Carbon Biological Capture & Utilization Footprint .....	139
Figure 39 – USA Biological Carbon Capture & Sequestration Market Size [\$B] - 2022-2030 .....	142
Figure 40 - Bioremediation Strategies.....	143
Figure 41 - Operation of Bio Slurping.....	144
Figure 42 - Permeable Reactive Barriers.....	145
Figure 43 - Bioventing System.....	145
Figure 44 - Typical Biosparging System .....	146
Figure 45 – USA Bioremediation Market Size [\$B] - 2022-2030 .....	152
Figure 46 - The CCS Process.....	153
Figure 47 - Carbon Capture and Storage Value Chain .....	153
Figure 48 – USA Carbon Capture & Storage Market Size [\$B] - 2022-2030.....	158
Figure 49 - CCU Applications Roadmap .....	160
Figure 50 – Carbon Capture & Utilization and Removal Cycle. ....	161
Figure 51 - Carbon Capture & Utilization Removal Pathways.....	161
Figure 52 - CCU Potential and Cost Of Various Sub-Pathways Outlook - 2050.....	163
Figure 53 – USA Carbon Capture & Utilization Market Size [\$B] - 2022- 2030.....	167
Figure 54 - Greenhouse Gas Emissions from Agriculture .....	168
Figure 55 - Agriculture GHG Emissions .....	169
Figure 56 - The EU 2030 Targets for Substantial Food Production .....	170
Figure 57 - The Main Greenhouse Gas Emission Sources, Removals and Processes In Managed Ecosystems.....	171
Figure 58 – USA Climate Adapted Agriculture Market Size [\$B] - 2022- 2030.....	175
Figure 59 - USA Water Stress Map.....	177
Figure 60 - USA Water Extraction and Consumption by End User– 1900- 2025.....	179
Figure 61 - Water Supply Adaptation Strategy.....	180
Figure 62 - Potential Drought Adaptation Measures .....	182
Figure 63 –USA Urban Population Facing Water Scarcity 2019-2050.....	183
Figure 64 - Climate Change Impact on Water Supply.....	184
Figure 65 - Adapting Water Management to Climate Change .....	185
Figure 66 - Metrics for Decision Making .....	186
Figure 67 – USA Climate Adapted Water Infrastructure Market Size [\$B] - 2022-2030.....	193
Figure 68 - System Power Rating and Discharge Times of Energy Storage Technologies .....	196
Figure 69 - Compressed-Air Energy Storage System .....	197
Figure 70 - A Small Scale Compressed Air Storage System .....	197
Figure 71 – USA Compressed-Air Storage Market Size [\$B] - 2022-2030.....	199

Figure 72 - USA Average Levelized Cost of Energy Generation [\$/MWh] Concentrating Solar Power vs. Other Electric Power Sources - Q-4 2021.....	201
Figure 73 - Concentrating Solar Power System Layout and Costs .....	202
Figure 74 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	203
Figure 75 – USA Concentrating Solar Power (CSP) Market Size [\$B] - 2022-2030.....	205
Figure 76 - Electricity Distribution Infrastructure .....	207
Figure 77 - Power Grids Cybersecurity Infrastructure.....	208
Figure 78 – USA Cybersecurity Market Size [\$B] - 2022-2030 .....	211
Figure 79 - Desalination Capacity By [%] by Region - 2020 .....	213
Figure 80 - Reverse Osmosis Process .....	214
Figure 81 - Reverse Osmosis Desalination Process.....	215
Figure 82 – USA Desalination Plants Market Size [\$B] - 2022-2030 .....	222
Figure 83 - Applications of Direct Utilization of Geothermal Energy.....	225
Figure 84 – Closed (Left) & Open (Right) loop Geothermal Heat Pumps .....	226
Figure 85 - EU Areas Suitable for Geothermal Networks & Actual Geothermal Installed Capacity.....	227
Figure 86 – USA Direct Geothermal Heating & Cooling Market Size [\$B] - 2022-2030.....	228
Figure 87 - Residential Direct Solar Water Heating System .....	230
Figure 88 - Total Installed Solar Heating Area by Region - 2020.....	231
Figure 89 - Direct Solar Water Heating System Elements .....	231
Figure 90 - Direct Solar Heating Capacity [KW/1000 citizens] in 10 Leading Countries - 2020 .....	232
Figure 91 - USA Solar Thermal Capacity [TWh] and Energy [TWh] – 2000- 2022.....	233
Figure 92 - Distribution of Solar Thermal Systems for Newly Installed Water Collector by Region - 2020 .....	233
Figure 93 – USA Direct Solar Water Heating Market Size [\$B] - 2022-2030 ....	234
Figure 94 - E-Bus Charging Technologies.....	236
Figure 95 - Enabling E-Bus Adoption Factors.....	239
Figure 96 – USA Electric Buses Market Size [\$B] - 2022-2030 .....	241
Figure 97 - Performance Standards For residential AC and Heat Pumps.....	244
Figure 98 - Thermoelectric Effect.....	245
Figure 99 - Magtor Linear Motor Oscillator Drive .....	247
Figure 100 – USA Energy-Efficient Air Conditioning & Refrigeration (ACR) Market Size [\$B] - 2022-2030 .....	248
Figure 101 - Energy Consumption By End-Use (Excludes Transport, Energy Losses in Production or Transmission And Non- Motive Power Industrial Energy Uses) .....	252
Figure 102 – USA Energy-Efficient Electric Appliances (w/o ACR) Market Size [\$B] - 2022-2030 .....	254

Figure 103 - Electric Passengers vs. Plug in Chargers.....	257
Figure 104 - Charging Times to Provide 100 km of Passenger EV Vehicle Driving.....	258
Figure 105 - US Passengers EV Charging Infrastructure - 2015-2040 .....	259
Figure 106 – USA EV Charging Systems Market Size [\$B] - 2022-2030 .....	264
Figure 107 - Sweden Public Alarm Infrastructure Evolution .....	266
Figure 108 - The UN Risk Based Public Warning Evolution -1960-2020 .....	267
Figure 109 - Public Warning System Architecture.....	268
Figure 110 - The Israeli Public (Location Based) Alarm System Poster.....	269
Figure 111 - Mobile Alarm System.....	271
Figure 112 - Cell Broadcast .....	272
Figure 113 - Geo Fenced Alarm System.....	273
Figure 114 - Fixed WIFI Alarm System .....	274
Figure 115 – USA Extreme Weather Public Warning Systems Market Size [\$B] - 2022-2030 .....	274
Figure 116 - An Integrated Flood Protection .....	276
Figure 117 - Storm Surge Flooding.....	277
Figure 118 - Provisional Flood Barriers.....	278
Figure 119 - Tidal Flood Barrier .....	279
Figure 120 – USA Floods Control Market Size [\$B] - 2022-2030.....	281
Figure 121 – USA Freight BEVs Market Size [\$B] - 2022-2030.....	285
Figure 122 – Greenhouse Gas Emissions [%] By Sector.....	287
Figure 123 - GHG Emission Tracking Technologies .....	288
Figure 124 - CO2 Emissions [GTn] by Geography – 1960-2020.....	290
Figure 125 – MethaneSAT Performance .....	292
Figure 126 - Methane Surveillance Technologies. Frequency-Range vs. Resolution.....	292
Figure 127 – USA GHG Emission Tracking Market Size [\$B] - 2022-2030.....	293
Figure 128 - USA Average Levelized Cost of Energy Generation [\$/MWh] Geothermal vs. Other Electric Power Sources - Q-4 2021.....	295
Figure 129 - Geothermal Electricity Generation Technologies .....	296
Figure 130 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	296
Figure 131 - Enhanced Geothermal Systems .....	297
Figure 132 - Geothermal Power Generation .....	298
Figure 133 - Map of 64 EGS Projects Around the World - 2020 .....	300
Figure 134 – USA Geothermal Power Generation Market Size [\$B] - 2022- 2030.....	302
Figure 135 - Cement Manufacturing Energy Use and GHG Emissions .....	304
Figure 136 - Cement Production Outlook by Region - 2020-2050 .....	305
Figure 137 - Decarbonization Actions to Net-Zero Cement & Concrete Industry.....	306
Figure 138 - Cement Demand Forecast per Region - 2020-2060.....	307
Figure 139 - Low Carbon Levels Across the Lifecycle of Cement.....	309



Figure 140 – USA Green Cement Market Size [\$B] - 2022-2030.....	310
Figure 141 - Hydrogen Consumption [M. Ton/Annum] by Country - 2020 .....	312
Figure 142 – Green Hydrogen Value Chain.....	313
Figure 143 - Future “Hydrogen Economy” Infrastructure .....	318
Figure 144 – USA Green Hydrogen Production Market Size [\$B] - 2022- 2030.....	320
Figure 145 - Green Steel Production Using CCS & CCU.....	321
Figure 146 - Crude Steel Production Market Share [%] by country 2020.....	321
Figure 147 - Green Steel Manufacturing Process.....	322
Figure 148 - Means and Methods to Reduce Carbon in the Steel Industry.....	323
Figure 149 – USA Green Steel Market Size [\$B] - 2022-2030.....	324
Figure 150 - Diagram of a Conventional Electric Power System.....	326
Figure 151 - Modern Grid Architecture .....	327
Figure 152 - Climate Change Effects on the Electricity Grid.....	328
Figure 153 - Smart Grid Architecture .....	329
Figure 154 -Smart Grid Priorities .....	332
Figure 155 – USA Grid Modernization Market Size [\$B] - 2022-2030.....	333
Figure 156 - System Power Rating and Discharge Times of Energy Storage Technologies .....	335
Figure 157 - Grid Battery Storage Infrastructure.....	336
Figure 158 – Next Generation Battery Storage Goals.....	337
Figure 159 - Grid-Scale Battery Storage System.....	337
Figure 160 – USA Grid-Scale Battery Storage Market Size [\$B] - 2022- 2030.....	342
Figure 161 - Pumped Storage Hydropower Site .....	343
Figure 162 - Pumped Hydro Energy Storage, Power Rating and Discharge Times Vs. Other Energy Storage Technologies.....	344
Figure 163 - Pumped Hydro Energy Storage System Layout .....	345
Figure 164 – USA Hydroelectric Energy Storage Market Size [\$B] - 2022- 2030.....	348
Figure 165 - Hydropower Installed Capacity by Country.....	350
Figure 166 - USA Average Levelized Cost of Energy Generation [\$/MWh] Hydropower vs. Other Electric Power Sources - Q-4 2021 .....	351
Figure 167 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	351
Figure 168 - Hydropower Generation [TW h] by Region -1965-2020.....	352
Figure 169- A Hydropower Plant.....	354
Figure 170 – USA Hydroelectric Power Market Size [\$B] - 2022-2030 .....	355
Figure 171 - Fuel Cell Passenger Vehicle Elements.....	357
Figure 172 - Hydrogen Pickup Truck .....	357
Figure 173 - Hydrogen Truck Layout .....	358
Figure 174 - Toyota Hydrogen Truck .....	358
Figure 175 - EV Truck vs. Hydrogen Long Haul Truck Performance Outlook 2025 & 2030 .....	359

Figure 176 - Yamaha Motor Hydrogen Engine Prototype - 2021 .....	360
Figure 177 - Yamaha Hydrogen Engine.....	361
Figure 178 - Total Cost of Ownership of SUVs in the US, 2030 .....	363
Figure 179 – USA Hydrogen Vehicles Market Size [\$B] - 2022-2030.....	365
Figure 180 - Hydrogen Electrolyzer Electro-Chemistry .....	368
Figure 181 - Description of Several Electrolysers Source: K. Malladi Et.Al.....	368
Figure 182 - Electrolyzer Manufacturing [GW] Capacity 2021-2024 .....	370
Figure 183 - Future Hydrogen Economy Infrastructure.....	371
Figure 184 – USA Hydrogen Electrolyzers Market Size [\$B] - 2022-2030.....	372
Figure 185 - Honda Home Filling Station.....	374
Figure 186 -Transport Fuel Hydrogen Production Routes .....	375
Figure 187 - Hydrogen Fueling System Architecture .....	376
Figure 188 - Hydrogen Fueling Station .....	376
Figure 189 - Hydrogen Fueling HySTAT.....	377
Figure 190 – USA Hydrogen Fueling Infrastructure Market Size [\$B] - 2022- 2030.....	378
Figure 191 – USA ICT (w/o Cyber, AI, Big Data) Market Size [\$B] - 2022- 2030.....	382
Figure 192 - Distribution of Synthetic Fuels and Advanced Biofuels Costs.....	384
Figure 193 - Impact of Innovation on the Energy System .....	387
Figure 194 - Simplified Value Chain for Low Carbon Fuels .....	388
Figure 195 - GVA and Jobs in the Low Carbon Fuels Industry to 2050 .....	389
Figure 196 – USA Low Carbon Fuels Manufacturing Plants Market Size [\$B] - 2022-2030 .....	390
Figure 197 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	392
Figure 198 - Ocean thermal energy Conversion System (Right) and Oscillating Water Column System (Left) .....	393
Figure 199 - Wave Power System .....	396
Figure 200 – USA Marine Power Market Size [\$B] - 2022-2030.....	397
Figure 201 - Ultra Emitting Methane Events 2019-2020 .....	399
Figure 202 - Methane Emission Sources (Left) & 1990-2050 Emissions (Right).....	400
Figure 203 – 2020-2030 Human Caused Methane Emissions and Identified Mitigation Potential by Sectors.....	401
Figure 204 - Emissions Abatement and Negative Emissions Infrastructure.....	404
Figure 205 - USA GHG Abatement Cost Beyond BAU- 2030.....	405
Figure 206 – USA Methane Abatement Market Size [\$B] - 2022-2030.....	407
Figure 207 - USA Average Levelized Cost of Energy Generation [\$MWh] Nuclear Energy Plants vs. Other Electric Power Sources - Q-4 2021.....	409
Figure 208 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	410

Figure 209 – USA Nuclear Energy Plants > 1 GW Market Size [\$B] - 2022-2030.....	412
Figure 210 - USA Average Levelized Cost of Energy Generation [\$/MWh] Offshore Wind vs. Other Electric Power Sources - Q-4 2021 .....	414
Figure 211 - Wind Turbine Power and Size 1985-2030 .....	415
Figure 212 - USA LCOEs from Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	415
Figure 213 - U.S. DOE Offshore Wind Energy 2030 Goals .....	418
Figure 214- USA Installed Base Power [MW] of Offshore Wind Power to 2020.....	418
Figure 215 – Annual 2001-2021 Additional Offshore Wind Installed Capacity [GW] China vs. the Rest of World .....	419
Figure 216 – USA Offshore Wind Power Market Size [\$B] - 2022-2030 .....	423
Figure 217 - Onshore Wind Turbines LCOE, Size, Capacity & Impacts – 2030.....	424
Figure 218 - USA Average Levelized Cost of Energy Generation [\$/MWh] Onshore Wind Power vs. Other Electric Power Sources - Q-4 2021.....	425
Figure 219 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	425
Figure 220 – USA Onshore Wind Power Market Size [\$B] - 2022-2030 .....	428
Figure 221 - BNSF Battery-Electric Locomotive.....	430
Figure 222 - Airbus’ E-Fan Electric Plane .....	433
Figure 223 - A Cut Away View of the HE HMMWV .....	434
Figure 224 - A cut-away view of the HEMITT .....	435
Figure 225 – USA Other BEVs Market Size [\$B] - 2022-2030 .....	438
Figure 226 – USA Other Energy Storage Modalities Market Size [\$B] - 2022-2030.....	440
Figure 227 – Other USA Climate Change Mitigation Markets Size [\$B] - 2022-2030.....	442
Figure 228 – USA Other Renewable Energy Market Size [\$B] - 2022-2030 .....	444
Figure 229 – USA Passenger Cars Sales [Million/ Annum] by Technology – 2018-2035.....	446
Figure 230 - 100% Phase Out of ICE Countries .....	448
Figure 231 - EVs vs. Renewables vs. Electrification Timeline - 2020-2050 .....	449
Figure 232 - EPA Rang [Mile] for 2020-Model Battery Passenger EV .....	451
Figure 233 - US Passengers BEV & Plug-in Sales [Units] - 2015-2025.....	452
Figure 234 – Electric Cars vs. ICE Car Materials by % of the Total Weight .....	454
Figure 235 – USA Passenger BEV Cars Market Size [\$B] - 2022-2030 .....	457
Figure 236 - Passive House Design.....	459
Figure 237 - GHG Abatement for The Building Sector.....	463
Figure 238 – USA Passive Green Buildings Market Size [\$B] - 2022-2030 .....	464
Figure 239 – Components of a Precision Agriculture System.....	465
Figure 240 – Precision Agriculture Technologies.....	466

Figure 241 - Precision Agriculture Stakeholders .....	467
Figure 242 – USA Precision Agriculture Market Size [\$B] - 2022-2030 .....	472
Figure 243 - Precision Irrigation System .....	474
Figure 244 – USA Precision Irrigation Market Size [\$B] - 2022-2030 .....	477
Figure 245 - Annual Loss of Forest Cover – 2000-2020 .....	480
Figure 246 - Forest Transition Model.....	481
Figure 247 – USA Reforestation Market Size [\$B] - 2022-2030.....	489
Figure 248 – USA Regenerative Agriculture Market Size [\$B] - 2022-2030.....	494
Figure 249 - USA Average Levelized Cost of Energy Generation [\$/MWh] Rooftop Solar vs. Other Electric Power Sources - Q-4 2021 .....	496
Figure 250 – USA Rooftop Solar PV Market Size [\$B] - 2022-2030 .....	499
Figure 251 - USA Average Levelized Cost of Energy Generation [\$/MWh] Small Nuclear Reactors vs. Other Electric Power Sources - Q- 4 2021.....	500
Figure 252 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	501
Figure 253 – USA Small Nuclear Reactors Market Size [\$B] - 2022-2030 .....	503
Figure 254 - Installed Base of Solar PV by Country.....	505
Figure 255 - USA Average Levelized Cost of Energy Generation [\$/MWh] Solar PV vs. Other Electric Power Sources - Q-4 2021 .....	506
Figure 256 - USA LCOEs From Newly Commissioned, Utility-Scale Renewable Power Generation Technologies, 2010-2020.....	507
Figure 257 - Ground Mounted Solar PV System.....	508
Figure 258 -The DOE Solar PV Deployment [GW] Outlook 2020-2050 .....	509
Figure 259 – USA Solar PV (Utility Scale) Market Size [\$B] - 2022-2030.....	511
Figure 260 - System Power Rating and Discharge Times Of Energy Storage Technologies .....	513
Figure 261 - Thermal Energy Storage (TES) System Layout.....	514
Figure 262 – Residential Thermal Energy Storage .....	515
Figure 263 – USA Thermal Energy Storage Market Size [\$B] - 2022-2030 .....	518
Figure 264 - Three E-Wheelers.....	520
Figure 265 – USA Two & Three-Wheeler BEVs Market Size [\$B] - 2022- 2030.....	521
Figure 266 - Waste Management Process.....	523
Figure 267 - UN Projection of the USA Waste [M Ton/Annum] Quantity – 1950-2050.....	524
Figure 268 – USA Waste to Energy Plants Market Size [\$B] - 2022-2030.....	526
Figure 269 - Recycled Water Infrastructure .....	528
Figure 270 - Overview of Integrated Regional Water Management Planning and Climate Change .....	529
Figure 271 - Sewage Treatment Infrastructure Elements .....	530
Figure 272 - A Sewage Treatment Plant.....	532
Figure 273 – USA Water Redeemable Systems Market Size [\$B] - 2022- 2030.....	534

Figure 274 – USA Weather Monitoring, Modeling & Forecasting Market Size [\$B] - 2022-2030 .....	539
Figure 275 - The U.S. Wildfires Facts .....	542
Figure 276 – USA Wildfire Mitigation Market Size [\$B] - 2022-2030.....	544
Figure 277 - Cumulative 2022-2030 USA Climate Change Mitigation & Adaptation Market by Sector [\$T] .....	549
Figure 278 – USA Climate Change Mitigation & Adaptation Market Share by Sector [%] – 2022-2030 .....	550
Figure 279 - USA Climate Change Mitigation Market Size [\$M] by Revenue Source – 2020-2030 .....	552
Figure 280 - USA Climate Change Mitigation Market Share [%] by Revenue Source – 2020-2030 .....	553