In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
color = sns.color_palette()
sns.set_style('white')
import warnings
warnings.filterwarnings('ignore')
```

Read thermal, hydro, wind, solar and nuclear production data into dataframe

In [2]:
```
df1 = pd.read_csv('/Users/KUANGBixi/Downloads/UNdata_Export_Electricity - total thermal production.csv')
df2 = pd.read_csv('/Users/KUANGBixi/Downloads/UNdata_Export_Electricity - total hydro production.csv')
df3 = pd.read_csv('/Users/KUANGBixi/Downloads/UNdata_Export_Electricity - total wind production.csv')
df4 = pd.read_csv('/Users/KUANGBixi/Downloads/UNdata_Export_Electricity - total solar production.csv')
df5 = pd.read_csv('/Users/KUANGBixi/Downloads/UNdata_Export_Electricity - total nuclear production.csv')
df = df1.append([df2, df3, df4, df5], ignore_index=True)
```

In [3]:
```
df.head()
```

Out[3]:

	Country or Area	Commodity - Transaction	Year	Unit	Quantity	Quantity Footnotes
0	Afghanistan	Electricity - total thermal production	2017.0	Kilowatt-hours, million	168.3	1.0
1	Afghanistan	Electricity - total thermal production	2016.0	Kilowatt-hours, million	149.7	1.0
2	Afghanistan	Electricity - total thermal production	2015.0	Kilowatt-hours, million	144.2	1.0
3	Afghanistan	Electricity - total thermal production	2014.0	Kilowatt-hours, million	154.0	1.0
4	Afghanistan	Electricity - total thermal production	2013.0	Kilowatt-hours, million	218.4	1.0

Realize the basic information about the data

In [4]:
```
df.columns = ['country','commodity','year','unit','quantity','footnotes']
df.tail()
```

Out[4]:

	country	commodity	year	unit	quantity	footnotes
13788	USSR (former)	Electricity - total nuclear production	1990.0	Kilowatt-hours, million	212000.0	NaN
13789	Yugoslavia, SFR (former)	Electricity - total nuclear production	1991.0	Kilowatt-hours, million	4390.0	1.0
13790	Yugoslavia, SFR (former)	Electricity - total nuclear production	1990.0	Kilowatt-hours, million	4622.0	NaN
13791	fnSeqID	Footnote	NaN	NaN	NaN	NaN
13792	1	Estimate	NaN	NaN	NaN	NaN

In [5]:
```
df.isnull().sum()
```

Out[5]:
```
country          0
commodity        0
year            10
unit            10
quantity        10
footnotes    12389
dtype: int64
```

In [6]:
```
df.describe(include=['object'])
```

Out[6]:

	country	commodity	unit
count	13793	13793	13783
unique	244	7	1
top	United States	Electricity - total thermal production	Kilowatt-hours, million
freq	135	5982	13783

In [7]:
```
df.country.value_counts().head()
```

Out[7]:
```
United States    135
Spain            135
Mexico           135
Japan            135
Netherlands      134
Name: country, dtype: int64
```

In [8]:
```
df.commodity.value_counts().head()
```

Out[8]:
```
Electricity - total thermal production    5982
Electricity - total hydro production      4103
Electricity - total wind production       1609
Electricity - total solar production      1268
Electricity - total nuclear production     821
Name: commodity, dtype: int64
```

Determine top 6 countries wind power production

In [9]:
```
commodity_string = 'Electricity - total wind production'
df_wind = df[df.commodity.str.contains
                  (commodity_string)]
df_max = df_wind.groupby(pd.Grouper(key='country'))['quantity'].max
()
df_max = df_max.sort_values(ascending=False)
df_max = df_max[:6]
```

In [10]:
```
df_max = df[df.commodity.str.contains
            (commodity_string)].groupby(pd.Grouper(key='country'))[
'quantity'].max().sort_values(ascending=False)[:6]
range = np.arange(2000,2018)
dict_major = {}
for c in df_max.index.values:
    read_index = df_wind[df_wind.commodity.str.contains(commodity_s
tring) & df_wind.country.str.contains(c + '$')].year
    read_data = df_wind[df_wind.commodity.str.contains(commodity_st
ring) & df_wind.country.str.contains(c + '$')].quantity
    read_data.index=read_index
    prod = read_data.reindex(index=range,fill_value=0)
    dict_major.update({c:prod.values})
df_major = pd.DataFrame(dict_major)
df_major.index = range
df_major
```

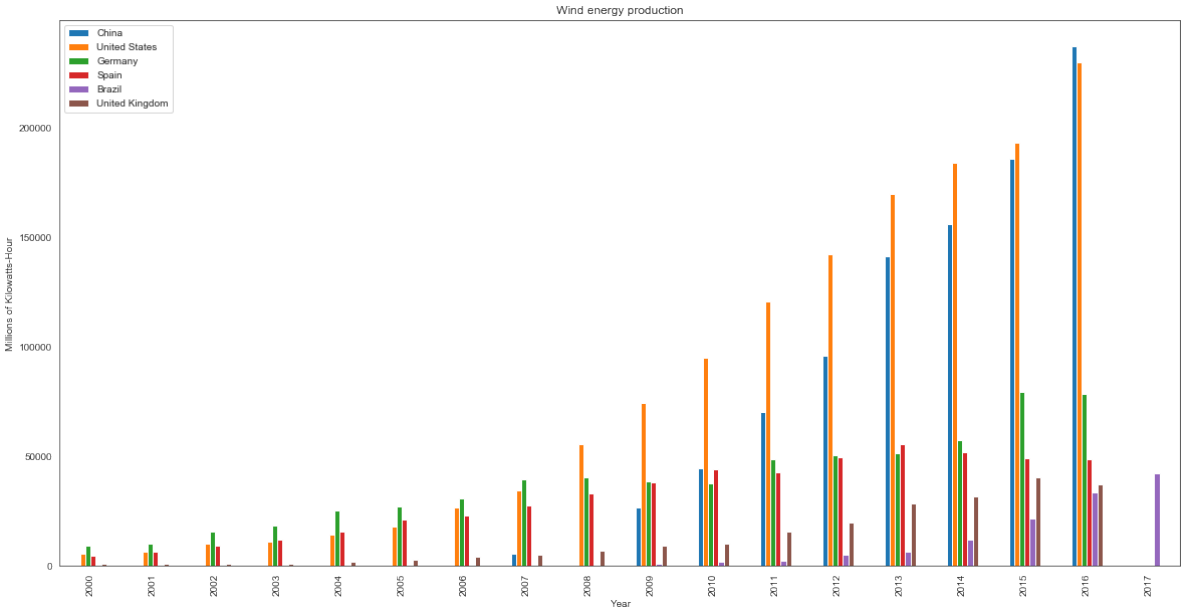
Out[10]:

	China	United States	Germany	Spain	Brazil	United Kingdom
2000	0.0	5650.0	9352.0	4727.0	0.0	947.0
2001	0.0	6806.0	10456.0	6759.0	0.0	965.0
2002	0.0	10459.0	15856.0	9342.0	0.0	1256.0
2003	0.0	11300.0	18713.0	12075.0	0.0	1285.0
2004	0.0	14291.0	25509.0	15700.0	0.0	1935.0
2005	0.0	17881.0	27229.0	21176.0	0.0	2904.0
2006	0.0	26676.0	30710.0	23297.0	0.0	4225.0
2007	5710.0	34603.0	39713.0	27568.0	645.0	5274.0
2008	0.0	55696.0	40574.0	32946.0	837.0	7122.0
2009	26900.0	74226.0	38647.0	38117.0	1238.0	9281.0
2010	44622.0	95148.0	37793.0	44271.0	2177.0	10286.0
2011	70331.0	120854.0	48883.0	42918.0	2705.0	15963.0
2012	95978.0	141922.0	50670.0	49472.0	5050.0	19847.0
2013	141197.0	169713.0	51708.0	55646.0	6579.0	28397.0
2014	156078.0	183892.0	57357.0	52013.0	12211.0	31959.0
2015	185766.0	192992.0	79206.0	49325.0	21626.0	40317.0
2016	237071.0	229471.0	78598.0	48906.0	33488.0	37367.0
2017	0.0	0.0	0.0	0.0	42373.0	0.0

Plot bar graphic to present the growth of wind Power Production for major countries

In [11]:
```
ax = df_major.plot(kind='bar', stacked=False,figsize=(20,10))
plt.title('Wind energy production')
plt.xlabel('Year')
plt.ylabel("Millions of Kilowatts-Hour")
```

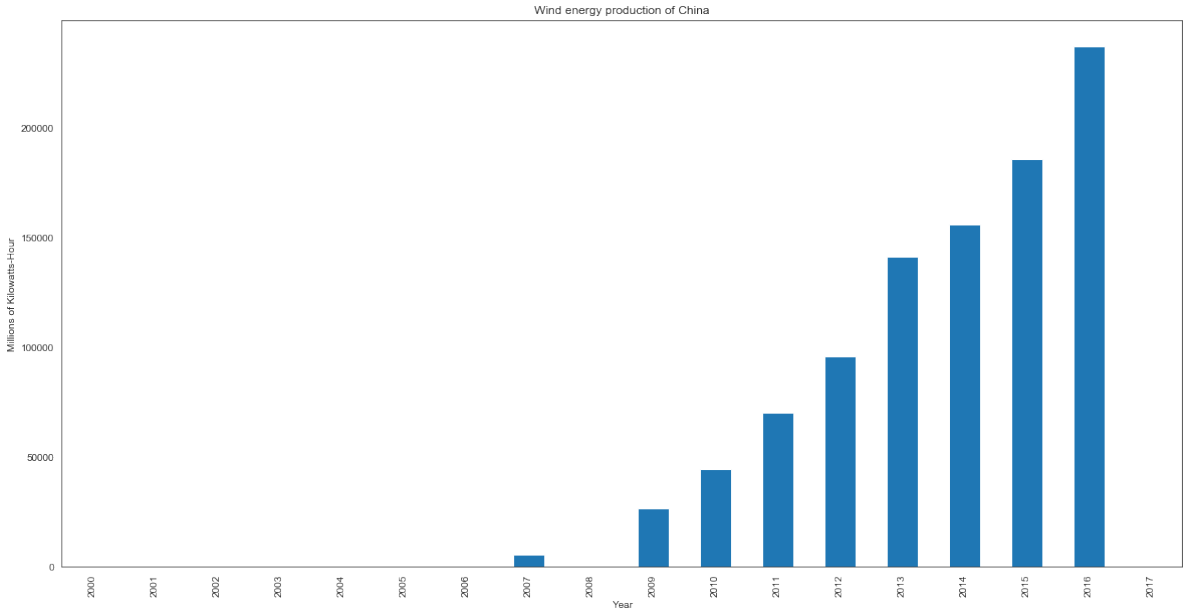
Out[11]: Text(0, 0.5, 'Millions of Kilowatts-Hour')



Plot bar graphic to describe the growth of wind Power Production in China after 2007

In [12]:
```
ax = df_major['China'].plot(kind='bar', stacked=False,figsize=(20,10))
plt.title('Wind energy production of China')
plt.xlabel('Year')
plt.ylabel("Millions of Kilowatts-Hour")
```

Out[12]:
```
Text(0, 0.5, 'Millions of Kilowatts-Hour')
```



Plot line graphic to describe the growth of wind Power Production for major countries

In [13]:
```
df_max
```

Out[13]:
```
country
China             237071.0
United States     229471.0
Germany            79206.0
Spain              55646.0
Brazil             42373.0
United Kingdom     40317.0
Name: quantity, dtype: float64
```

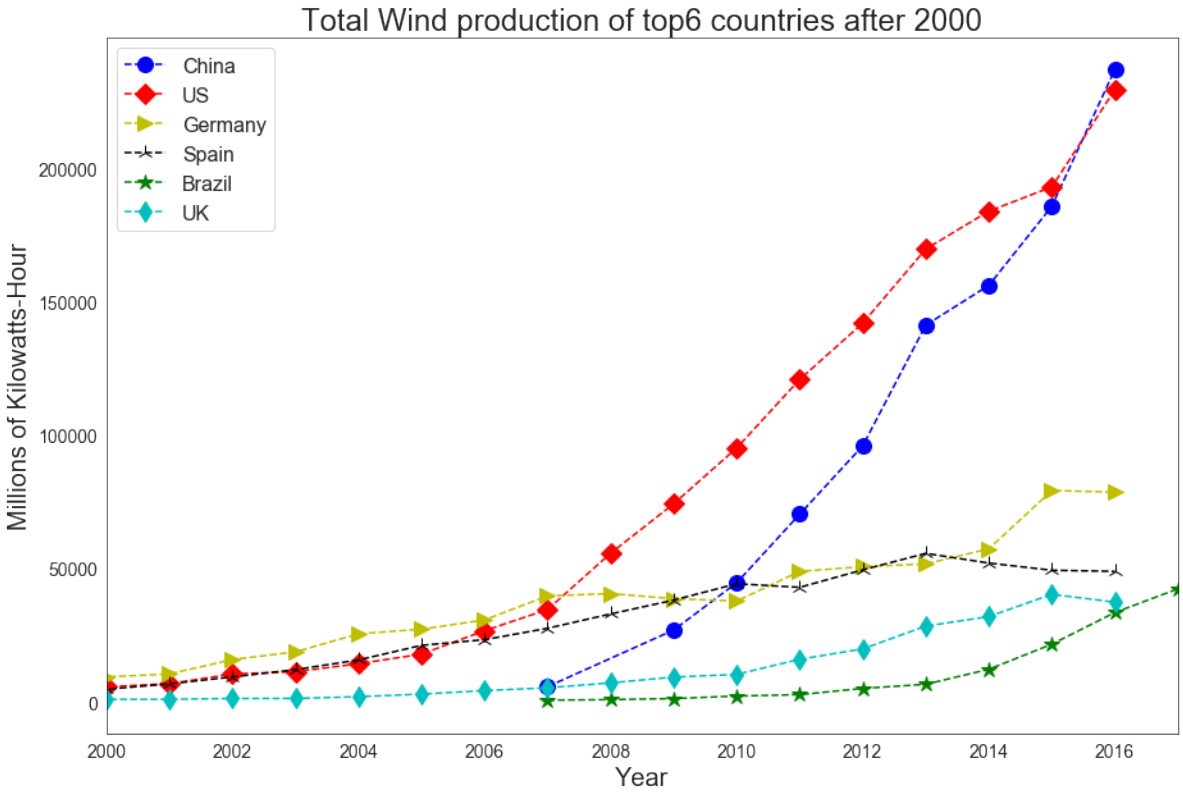
In [14]:
```
CHI = df[df.country.str.contains('China')].sort_values('year')
US = df[df.country.str.contains('United States')].sort_values('year')
GER = df[df.country.str.contains('Germany')].sort_values('year')
SP = df[df.country.str.contains('Spain')].sort_values('year')
BR= df[df.country.str.contains('Brazil')].sort_values('year')
UK = df[df.country.str.contains('United Kingdom')].sort_values('year')
```

In [15]:
```
CHI_Wind = CHI[CHI.commodity == 'Electricity - total wind productio
n'].sort_values('year')
US_Wind = US[US.commodity == 'Electricity - total wind production']
.sort_values('year')
GER_Wind = GER[GER.commodity == 'Electricity - total wind productio
n'].sort_values('year')
SP_Wind = SP[SP.commodity == 'Electricity - total wind production']
.sort_values('year')
BR_Wind = BR[BR.commodity == 'Electricity - total wind production']
.sort_values('year')
UK_Wind = UK[UK.commodity == 'Electricity - total wind production']
.sort_values('year')
```

In [16]:
```
GER_Wind.country = 'Germany'
```

In [17]:
```
y1 = CHI_Wind.quantity
x1 = CHI_Wind.year
y2 = US_Wind.quantity
x2 = US_Wind.year
y3 = GER_Wind.quantity
x3 = GER_Wind.year
x4 = SP_Wind.year
y4 = SP_Wind.quantity
x5 = BR_Wind.year
y5 = BR_Wind.quantity
x6 = UK_Wind.year
y6 = UK_Wind.quantity
```

In [18]:
```
plt.figure(figsize=(15,10))
plt.xticks(fontsize=14)
plt.yticks(fontsize=14)
plt.plot(x1,y1,'b',linestyle='dashed', marker='o',
         markersize=12, label='China')
plt.plot(x2,y2,'r',linestyle='dashed', marker='D',
         markersize=12, label="US")
plt.plot(x3,y3,'y',linestyle='dashed', marker='>',
         markersize=12,label="Germany")
plt.plot(x4,y4,'k',linestyle='dashed', marker='2',
         markersize=12,label="Spain")
plt.plot(x5,y5,'g',linestyle='dashed', marker='*',
         markersize=12,label="Brazil")
plt.plot(x6,y6,'c',linestyle='dashed', marker='d',
         markersize=12,label="UK")

plt.legend(fontsize=16)
plt.ylabel("Millions of Kilowatts-Hour",fontsize=20)
plt.xlabel('Year',fontsize=20)
plt.title('Total Wind production of top6 countries after 2000',font
size=24)
plt.xlim(2000, 2017)
plt.show()
```



Utilize plotly to plot wind Power Production in different countries on world map

In [19]:
```
df_wind_top6 = CHI_Wind.append([CHI_Wind, US_Wind, GER_Wind, SP_Win
d, BR_Wind, UK_Wind], ignore_index=True)
df_wind_top6.tail()
```

Out[19]:

	country	commodity	year	unit	quantity	footnotes
132	United Kingdom	Electricity - total wind production	2012.0	Kilowatt-hours, million	19847.0	NaN
133	United Kingdom	Electricity - total wind production	2013.0	Kilowatt-hours, million	28397.0	NaN
134	United Kingdom	Electricity - total wind production	2014.0	Kilowatt-hours, million	31959.0	NaN
135	United Kingdom	Electricity - total wind production	2015.0	Kilowatt-hours, million	40317.0	NaN
136	United Kingdom	Electricity - total wind production	2016.0	Kilowatt-hours, million	37367.0	NaN

In [20]:
```
code = {'Brazil': 'BRA',
 'China': 'CHN',
 'Germany': 'DEU',
 'Spain': 'ESP',
 'United Kingdom': 'GBR',
 'United States': 'USA'}
```

In [21]:
```
df_code = pd.DataFrame(df_wind_top6.country.transform(lambda x: cod
e[x]))
df_wind_top6['code'] = df_code
df_wind_top6
```

Out[21]:

	country	commodity	year	unit	quantity	footnotes	code
0	China	Electricity - total wind production	2007.0	Kilowatt-hours, million	5710.0	NaN	CHN
1	China	Electricity - total wind production	2009.0	Kilowatt-hours, million	26900.0	NaN	CHN
2	China	Electricity - total wind production	2010.0	Kilowatt-hours, million	44622.0	NaN	CHN
3	China	Electricity - total wind production	2011.0	Kilowatt-hours, million	70331.0	NaN	CHN
4	China	Electricity - total wind production	2012.0	Kilowatt-hours, million	95978.0	NaN	CHN
5	China	Electricity - total wind production	2013.0	Kilowatt-hours, million	141197.0	NaN	CHN
6	China	Electricity - total wind production	2014.0	Kilowatt-hours, million	156078.0	NaN	CHN
7	China	Electricity - total wind production	2015.0	Kilowatt-hours, million	185766.0	NaN	CHN

8	China	Electricity - total wind production	2016.0	Kilowatt-hours, million	237071.0	NaN	CHN
9	China	Electricity - total wind production	2007.0	Kilowatt-hours, million	5710.0	NaN	CHN
10	China	Electricity - total wind production	2009.0	Kilowatt-hours, million	26900.0	NaN	CHN
11	China	Electricity - total wind production	2010.0	Kilowatt-hours, million	44622.0	NaN	CHN
12	China	Electricity - total wind production	2011.0	Kilowatt-hours, million	70331.0	NaN	CHN
13	China	Electricity - total wind production	2012.0	Kilowatt-hours, million	95978.0	NaN	CHN
14	China	Electricity - total wind production	2013.0	Kilowatt-hours, million	141197.0	NaN	CHN
15	China	Electricity - total wind production	2014.0	Kilowatt-hours, million	156078.0	NaN	CHN
16	China	Electricity - total wind production	2015.0	Kilowatt-hours, million	185766.0	NaN	CHN
17	China	Electricity - total wind production	2016.0	Kilowatt-hours, million	237071.0	NaN	CHN
18	United States	Electricity - total wind production	1990.0	Kilowatt-hours, million	3066.0	NaN	USA
19	United States	Electricity - total wind production	1991.0	Kilowatt-hours, million	3051.0	NaN	USA
20	United States	Electricity - total wind production	1992.0	Kilowatt-hours, million	2917.0	NaN	USA
21	United States	Electricity - total wind production	1993.0	Kilowatt-hours, million	3053.0	NaN	USA
22	United States	Electricity - total wind production	1994.0	Kilowatt-hours, million	3483.0	NaN	USA
23	United States	Electricity - total wind production	1995.0	Kilowatt-hours, million	3196.0	NaN	USA
24	United States	Electricity - total wind production	1996.0	Kilowatt-hours, million	3410.0	NaN	USA
25	United States	Electricity - total wind production	1997.0	Kilowatt-hours, million	3254.0	NaN	USA
26	United States	Electricity - total wind production	1998.0	Kilowatt-hours, million	3018.0	NaN	USA
27	United States	Electricity - total wind production	1999.0	Kilowatt-hours, million	4802.0	NaN	USA
28	United States	Electricity - total wind production	2000.0	Kilowatt-hours, million	5650.0	NaN	USA
29	United States	Electricity - total wind production	2001.0	Kilowatt-hours, million	6806.0	NaN	USA
...	...	...	...	...	...	...	...

107	Brazil	Electricity - total wind production	2015.0	Kilowatt-hours, million	21626.0	NaN	BRA
108	Brazil	Electricity - total wind production	2016.0	Kilowatt-hours, million	33488.0	NaN	BRA
109	Brazil	Electricity - total wind production	2017.0	Kilowatt-hours, million	42373.0	NaN	BRA
110	United Kingdom	Electricity - total wind production	1990.0	Kilowatt-hours, million	9.0	NaN	GBR
111	United Kingdom	Electricity - total wind production	1991.0	Kilowatt-hours, million	11.0	NaN	GBR
112	United Kingdom	Electricity - total wind production	1992.0	Kilowatt-hours, million	40.0	NaN	GBR
113	United Kingdom	Electricity - total wind production	1993.0	Kilowatt-hours, million	218.0	NaN	GBR
114	United Kingdom	Electricity - total wind production	1994.0	Kilowatt-hours, million	342.0	NaN	GBR
115	United Kingdom	Electricity - total wind production	1995.0	Kilowatt-hours, million	391.0	NaN	GBR
116	United Kingdom	Electricity - total wind production	1996.0	Kilowatt-hours, million	488.0	NaN	GBR
117	United Kingdom	Electricity - total wind production	1997.0	Kilowatt-hours, million	667.0	NaN	GBR
118	United Kingdom	Electricity - total wind production	1998.0	Kilowatt-hours, million	877.0	NaN	GBR
119	United Kingdom	Electricity - total wind production	1999.0	Kilowatt-hours, million	850.0	NaN	GBR
120	United Kingdom	Electricity - total wind production	2000.0	Kilowatt-hours, million	947.0	NaN	GBR
121	United Kingdom	Electricity - total wind production	2001.0	Kilowatt-hours, million	965.0	NaN	GBR
122	United Kingdom	Electricity - total wind production	2002.0	Kilowatt-hours, million	1256.0	NaN	GBR
123	United Kingdom	Electricity - total wind production	2003.0	Kilowatt-hours, million	1285.0	NaN	GBR
124	United Kingdom	Electricity - total wind production	2004.0	Kilowatt-hours, million	1935.0	NaN	GBR
125	United Kingdom	Electricity - total wind production	2005.0	Kilowatt-hours, million	2904.0	NaN	GBR
126	United Kingdom	Electricity - total wind production	2006.0	Kilowatt-hours, million	4225.0	NaN	GBR
127	United Kingdom	Electricity - total wind production	2007.0	Kilowatt-hours, million	5274.0	NaN	GBR
128	United Kingdom	Electricity - total wind production	2008.0	Kilowatt-hours, million	7122.0	NaN	GBR
129	United Kingdom	Electricity - total wind production	2009.0	Kilowatt-hours, million	9281.0	NaN	GBR

130	United Kingdom	Electricity - total wind production	2010.0	Kilowatt-hours, million	10286.0	NaN	GBR
131	United Kingdom	Electricity - total wind production	2011.0	Kilowatt-hours, million	15963.0	NaN	GBR
132	United Kingdom	Electricity - total wind production	2012.0	Kilowatt-hours, million	19847.0	NaN	GBR
133	United Kingdom	Electricity - total wind production	2013.0	Kilowatt-hours, million	28397.0	NaN	GBR
134	United Kingdom	Electricity - total wind production	2014.0	Kilowatt-hours, million	31959.0	NaN	GBR
135	United Kingdom	Electricity - total wind production	2015.0	Kilowatt-hours, million	40317.0	NaN	GBR
136	United Kingdom	Electricity - total wind production	2016.0	Kilowatt-hours, million	37367.0	NaN	GBR

137 rows × 7 columns

In [22]:
```
df_wind_top6_2016 = df_wind_top6[df_wind_top6.year == 2016].sort_values(ascending=False,by='quantity')[:]
df_wind_top6_2016
```

Out[22]:

	country	commodity	year	unit	quantity	footnotes	code
8	China	Electricity - total wind production	2016.0	Kilowatt-hours, million	237071.0	NaN	CHN
17	China	Electricity - total wind production	2016.0	Kilowatt-hours, million	237071.0	NaN	CHN
44	United States	Electricity - total wind production	2016.0	Kilowatt-hours, million	229471.0	NaN	USA
71	Germany	Electricity - total wind production	2016.0	Kilowatt-hours, million	78598.0	NaN	DEU
98	Spain	Electricity - total wind production	2016.0	Kilowatt-hours, million	48906.0	NaN	ESP
136	United Kingdom	Electricity - total wind production	2016.0	Kilowatt-hours, million	37367.0	NaN	GBR
108	Brazil	Electricity - total wind production	2016.0	Kilowatt-hours, million	33488.0	NaN	BRA

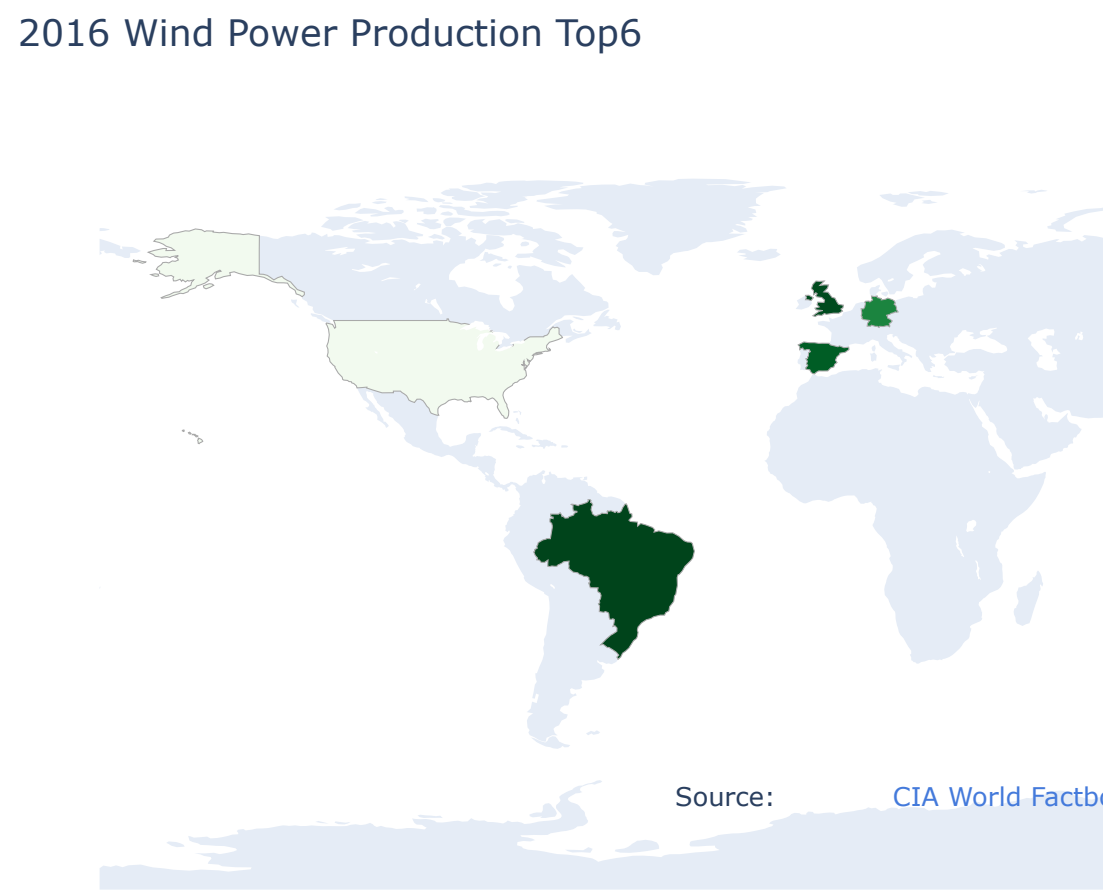
In [23]:
```
df_wind_top6_2016.drop(index=[8], inplace=True)
df_wind_top6_2016
```

Out[23]:

	country	commodity	year	unit	quantity	footnotes	code
17	China	Electricity - total wind production	2016.0	Kilowatt-hours, million	237071.0	NaN	CHN
44	United States	Electricity - total wind production	2016.0	Kilowatt-hours, million	229471.0	NaN	USA
71	Germany	Electricity - total wind production	2016.0	Kilowatt-hours, million	78598.0	NaN	DEU
98	Spain	Electricity - total wind production	2016.0	Kilowatt-hours, million	48906.0	NaN	ESP
136	United Kingdom	Electricity - total wind production	2016.0	Kilowatt-hours, million	37367.0	NaN	GBR
108	Brazil	Electricity - total wind production	2016.0	Kilowatt-hours, million	33488.0	NaN	BRA

Plot wind Power Production in top 6 countries for 2016 on world map

In [24]:
```
# this code based on example code at: https://plot.ly/python/choropleth-maps/
import plotly.graph_objects as go

fig = go.Figure(data=go.Choropleth(
    locations = df_wind_top6_2016['code'],
    z = df_wind_top6_2016['quantity'],
    text = df_wind_top6_2016['country'],
    colorscale = 'Greens',
    autocolorscale=False,
    reversescale=True,
    marker_line_color='darkgray',
    marker_line_width=0.5,
    colorbar_tickprefix = '',
    colorbar_title = 'Wind Power<br>Millions of Kilowatts-Hour',
))

fig.update_layout(
    title_text='2016 Wind Power Production Top6',
    geo=dict(
        showframe=False,
        showcoastlines=False,
        projection_type='equirectangular'
    ),
    annotations = [dict(
        x=0.55,
        y=0.1,
        xref='paper',
        yref='paper',
        text='Source: <a href="https://www.cia.gov/library/publications/the-world-factbook/fields/2195.html">\
            CIA World Factbook</a>',
        showarrow = False
    )]
)

fig.show()
```



Compare Main Power Generation Types in China

In [25]:
```
CHI_thermal = CHI[CHI.commodity == 'Electricity - total thermal production'].sort_values('year')
CHI_hydro = CHI[CHI.commodity == 'Electricity - total hydro production'].sort_values('year')
CHI_nuclear = CHI[CHI.commodity == 'Electricity - total nuclear production'].sort_values('year')
CHI_solar = CHI[CHI.commodity == 'Electricity - total solar production'].sort_values('year')
```

In [26]:
```
CHI_thermal.head()
```

Out[26]:

	country	commodity	year	unit	quantity	footnotes
1116	China	Electricity - total thermal production	1990.0	Kilowatt-hours, million	494480.0	NaN
1144	China, Hong Kong SAR	Electricity - total thermal production	1990.0	Kilowatt-hours, million	28960.0	NaN
1172	China, Macao SAR	Electricity - total thermal production	1990.0	Kilowatt-hours, million	790.0	NaN
1143	China, Hong Kong SAR	Electricity - total thermal production	1991.0	Kilowatt-hours, million	31889.0	NaN
1115	China	Electricity - total thermal production	1991.0	Kilowatt-hours, million	552460.0	NaN

In [27]:
```
CHI_thermal = CHI_thermal[~ CHI_thermal['country'].str.contains('SAR')]
CHI_thermal.head()
```

Out[27]:

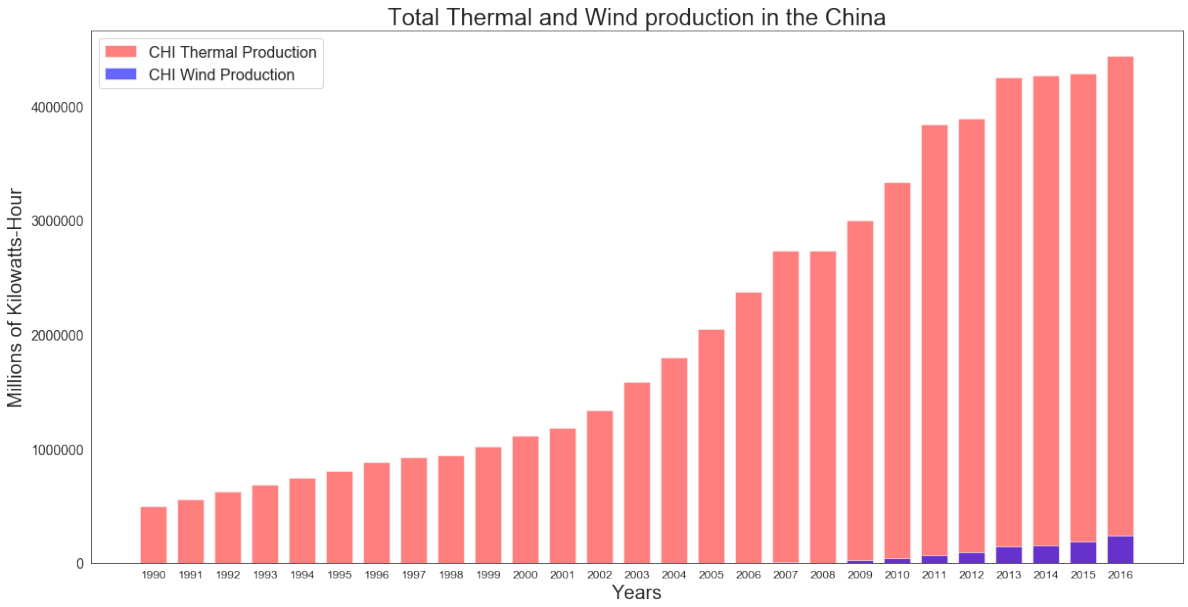
	country	commodity	year	unit	quantity	footnotes
1116	China	Electricity - total thermal production	1990.0	Kilowatt-hours, million	494480.0	NaN
1115	China	Electricity - total thermal production	1991.0	Kilowatt-hours, million	552460.0	NaN
1114	China	Electricity - total thermal production	1992.0	Kilowatt-hours, million	621470.0	NaN
1113	China	Electricity - total thermal production	1993.0	Kilowatt-hours, million	685153.0	NaN
1112	China	Electricity - total thermal production	1994.0	Kilowatt-hours, million	745927.0	NaN

In [28]:
```
print(CHI_thermal.shape)
print(CHI_hydro.shape)
print(CHI_nuclear.shape)
print(CHI_solar.shape)
print(CHI_Wind.shape)
```

```
(27, 6)
(27, 6)
(25, 6)
(6, 6)
(9, 6)
```

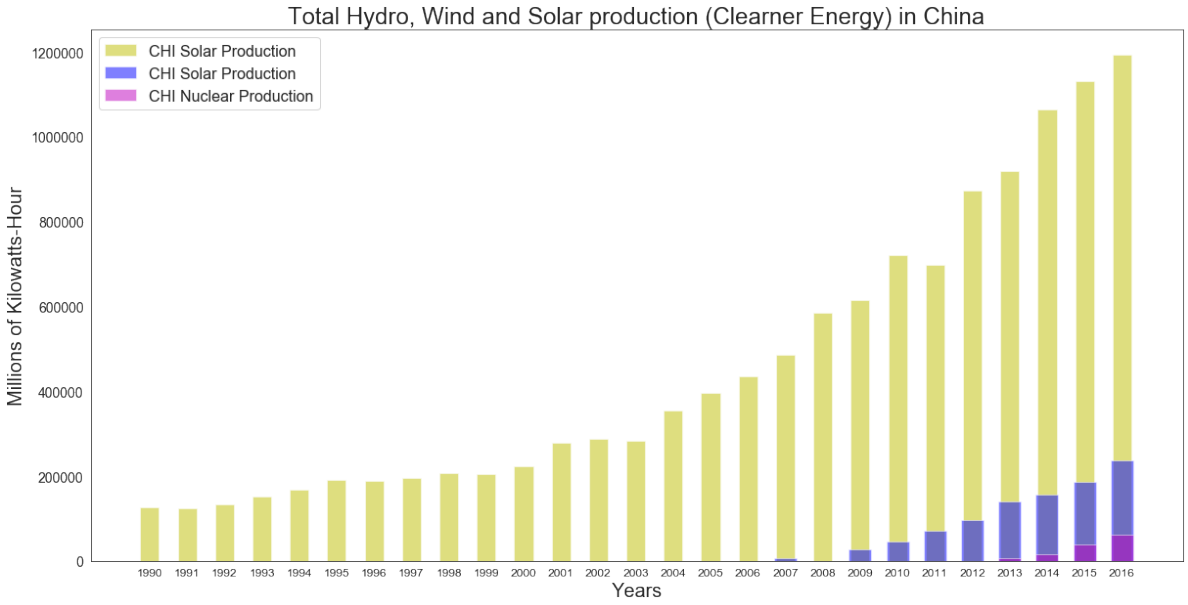
Wind vs. Thermal production

In [29]:
```
bar_width =.7
plt.figure(figsize=(20,10))
plt.xticks(fontsize=12)
plt.yticks(fontsize=14)
plt.bar(CHI_thermal['year'], CHI_thermal['quantity'],bar_width, col
or='r',capstyle= 'projecting', label='CHI Thermal Production', alph
a=0.5)
plt.bar(CHI_Wind['year'], CHI_Wind['quantity'],bar_width, color='b'
, label='CHI Wind Production', alpha=0.6)

plt.legend(fontsize=16)
plt.xlabel('Years', fontsize=20)
plt.ylabel('Millions of Kilowatts-Hour', fontsize=20)
plt.title('Total Thermal and Wind production in the China', fontsiz
e=24)
plt.xticks(CHI_thermal['year'])
plt.show()
```



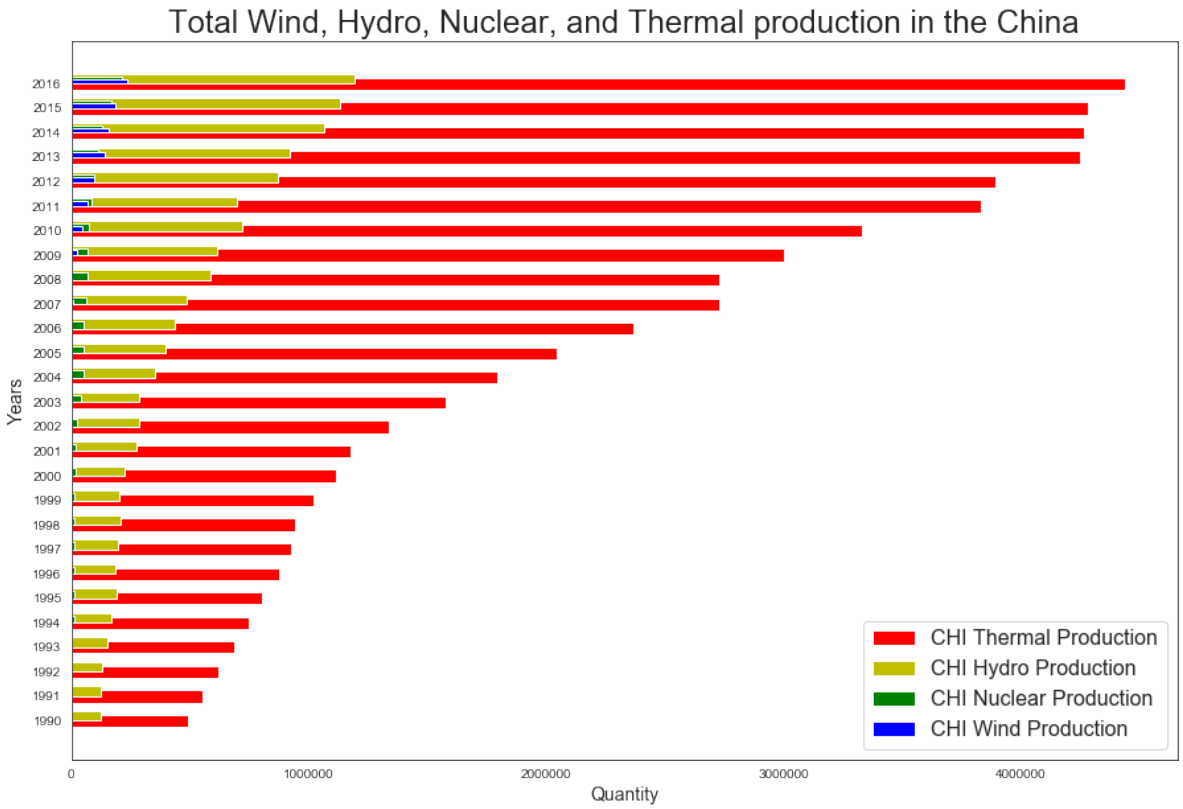
Main Types of Clearner Energy (Hydro, Wind, Solar) Comparision in China

In [30]:
```
bar_width =.6
plt.figure(figsize=(20,10))
plt.xticks(fontsize=12)
plt.yticks(fontsize=14)

plt.bar(CHI_hydro['year'], CHI_hydro['quantity'],bar_width - .1, co
lor='y', label='CHI Solar Production', alpha=0.5)
plt.bar(CHI_Wind['year'], CHI_Wind['quantity'],bar_width, color='b'
, label='CHI Solar Production', alpha=0.5)
plt.bar(CHI_solar['year'], CHI_solar['quantity'],bar_width, color='
m', label='CHI Nuclear Production', alpha=0.5)

plt.legend(fontsize=16)
plt.xlabel('Years', fontsize=20)
plt.ylabel('Millions of Kilowatts-Hour', fontsize=20)
plt.title('Total Hydro, Wind and Solar production (Clearner Energy)
in China', fontsize=24)
plt.xticks(CHI_thermal['year'])
plt.show()
```



Top 4 Power Generation Types in China

In [31]:
```
bar_height =0.5
plt.figure(figsize=(15,10))
plt.barh(CHI_thermal['year'], CHI_thermal['quantity'], height = bar
_height, color='r', label='CHI Thermal Production')
plt.barh(CHI_hydro['year'], CHI_hydro['quantity'], align ='edge', h
eight=bar_height-.1, color='y', label='CHI Hydro Production')
plt.barh(CHI_nuclear['year'], CHI_nuclear['quantity'], align ='edge
', height=bar_height-.2, color='g', label='CHI Nuclear Production')
plt.barh(CHI_Wind['year'], CHI_Wind['quantity'], align ='edge', hei
ght=bar_height-.3, color='b', label='CHI Wind Production')


plt.yticks(CHI_thermal['year'])
plt.legend(fontsize=16)
plt.ylabel('Years', fontsize=14)
plt.xlabel('Quantity', fontsize=14)
plt.title('Total Wind, Hydro, Nuclear, and Thermal production in th
e China', fontsize=24)
plt.xlim()
plt.show()
```



In [ ]: