# CLEAN ENERGY PATENT

# GROWTH INDEX (CEPGI)

## Third Quarter 2014 Results

**Presented by the Cleantech Group -**

**Heslin Rothenberg Farley & Mesiti P.C.**

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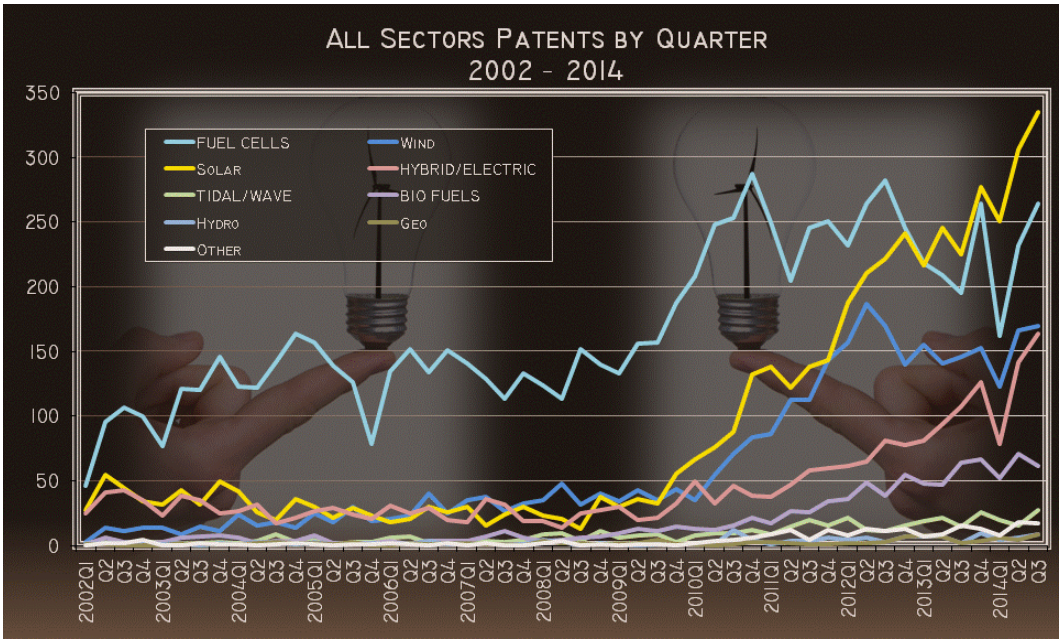
The CLEAN ENERGY PATENT GROWTH INDEX (CEPGI), published quarterly by the CLEANTECH GROUP at Heslin Rothenberg Farley & Mesiti P.C, provides an indication of the trend of innovative activity in the Clean Energy sector. Results from the third quarter of 2014 reveal the CEPGI to have a value of 1040 granted U.S. patents, which is the highest total for any quarter on record, breaking the 1000 barrier and being 100 more than the second quarter of this year. The third quarter was also 283 more than the same quarter the year before. The clean energy patent crown stayed in the same hands for the first time in several quarters as Toyota retained Top Dog status. Solar patents were again on top, leading the other technology sectors in the third quarter for the sixth quarter in a row. Runner up Fuel Cells trailed by over 70 patents.

The granting of patents by the United States Patent and Trademark Office (PTO) is often cited as a measure of the inventive activity and evidence of the effectiveness of research & development investments. Patents are considered to be such an indicator, because to be awarded a patent, it requires not only the efforts of inventors to develop new and non-obvious innovations but also successful handling by patent counsel to shepherd a patent application through the PTO. Thus, the granting of a patent is an indicator that efforts at innovation have been successful and that an innovation had enough perceived value to justify the time and expense in procuring the patent.

The CEPGI (shown below quarterly) tracks the granting of U.S. patents for the following sub-components: Solar, Wind, Hybrid/Electric Vehicles, Fuel Cells, Hydroelectric, Tidal/Wave, Geothermal, Biomass/Biofuels and Other Clean Renewable Energy.

Solar patents (335) recorded a new high, up 29 over the previous record set in the second quarter, along with being up 110 over the third quarter of 2013. Fuel Cells (264) jumped 32 patents over the second quarter and were up 69 over the year before, but trailed Solar patents by over 70 patents in the third quarter. Wind patents rose four patents to 170 and were up 24 compared to the same period in 2013.



Hybrid/Electric Vehicles (HEV) trailed Wind patents by only 6, marking the closest that these technology sectors have come to each other since 2009 and likely foreshadowing a change in the clean energy patent rankings. HEV patents were up 56 compared to the third quarter of 2013 while Wind patents were up 24 relative to the same period. Tidal patents had a relatively large jump from 16 to 28 in the second to third quarters while being up 13 over this quarter in 2013.

Biofuel/Biomass patents were the only technology sector to take a hit in the third quarter, dropping nine compared to the second quarter while being down two relative to this quarter the year before. Geothermal patents (9) were up four and Hydroelectric patents (9) up three compared to the second quarter with Hydroelectric patents and Geothermal both up seven compared to the same quarter a year prior.

Retaining the quarterly clean energy patent crown was Toyota, after several quarters of trading the crown quarterly with GM. Toyota had more Fuel Cell patents (38) than it had clean energy patents in total in the second quarter, along with leading all other contenders in this technology. There were also 15 HEV patents and one patent in Biofuels/Biomass for the Japanese automaker. GM trailed in Fuel Cells (24) and in Hybrid/Electric Vehicle patents (12) compared to its Japanese rival. Honda was four clean energy patents behind GM at 32 - with 18 Fuel Cell patents, 13 in Hybrid/Electric Vehicles and one in Solar technologies. As has become the custom, most of the top clean energy patent grantees for the third quarter were automakers at 6 of the top 11, plus Mitsubishi (most Mitsubishi clean energy patents aren't related to the auto industry).

Siemens led in Wind patents with 25 and even had one patent in HEV along with one in Other clean energy technologies. Hyundai took fifth place and had 11 Fuel Cell patents and 16 in HEV's. Samsung was next and led all others with five Solar patents and collected 20 Fuel Cell patents and one other clean energy patent. Vestas was next, trailing Siemens by five in Wind patents to arrive at 20 in this technology. Nissan and Ford were next, not surprisingly having granted patents in Fuel Cells (10, 1) and HEV's (8, 14).

GE and Mitsubishi tied Ford with 15 granted clean energy patents but each had patents in all the major technologies. In Fuel Cells it was GE with one and Mitsubishi with three while in Wind both had eight patents. In Hybrid/Electric Vehicle technology GE had two patents and its Japanese rival one. GE doubled Mitsubishi's solar patents at four to two.

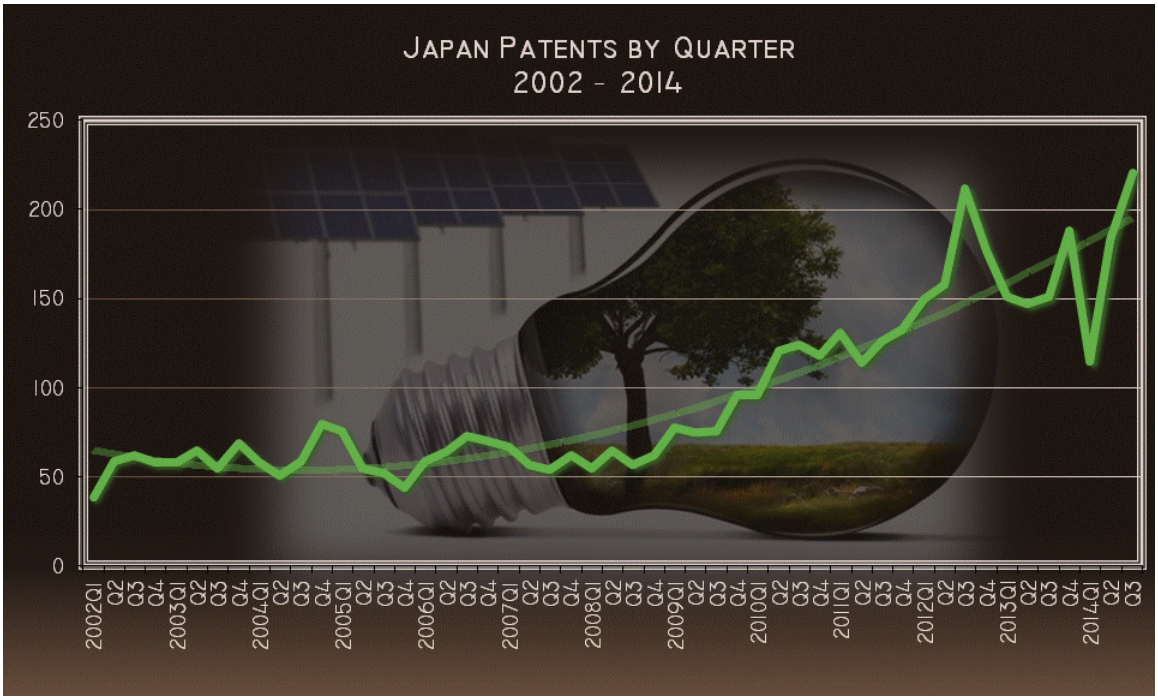
As in the first and second quarter, despite there being more Solar patents granted than the other technologies, among the top Clean Energy patent grantees, the number of Fuel Cell patents (116) in this subset far exceeded those in the other technologies. In fact, Solar patents (12) placed fourth behind Hybrid/Electric Vehicles (82) and Wind (61).

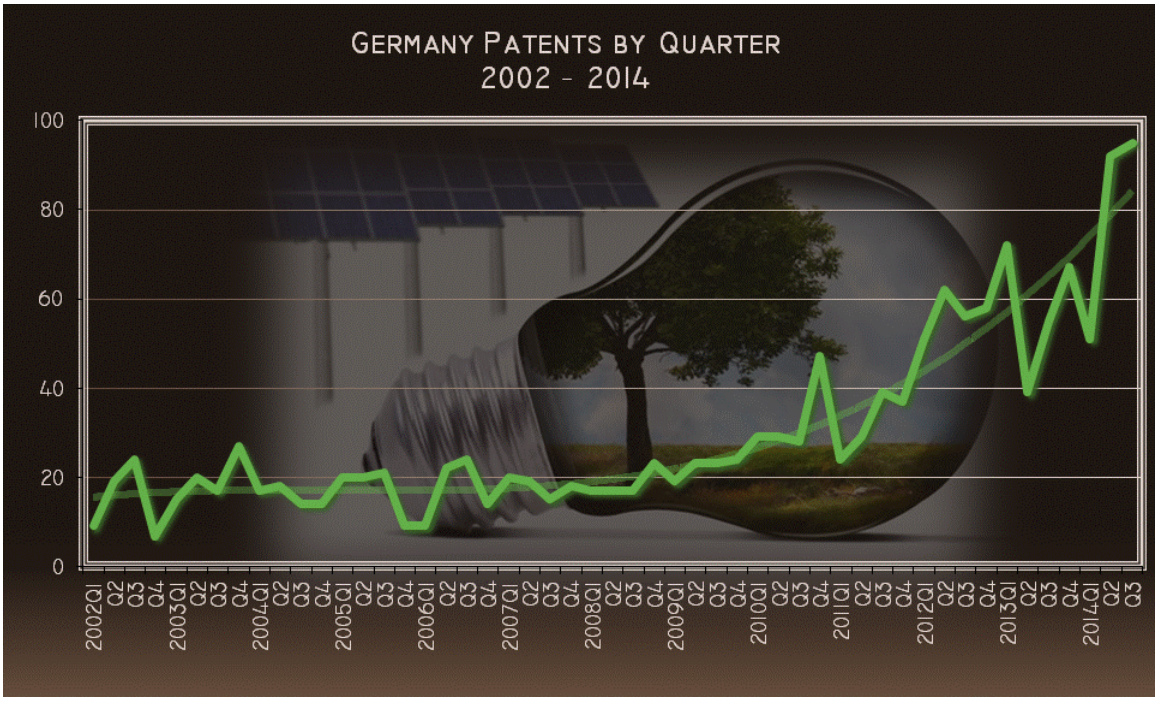
Geographically, Japan again led non-U.S. holders of U.S. Clean Energy patents and individual U.S. states, as depicted below in the geographic charts, to take the quarterly geographical Clean Energy patent crown. The perennial leader was up 38 compared to the second quarter at 221 and up 70 over the year before. Runner up California trailed over 100 at 102 and up only 4 compared to the second quarter. Germany and Korea were, for the second consecutive quarter, only two granted clean energy patents from one another at 95 to 93, respectively. Germany had climbed three versus the second quarter

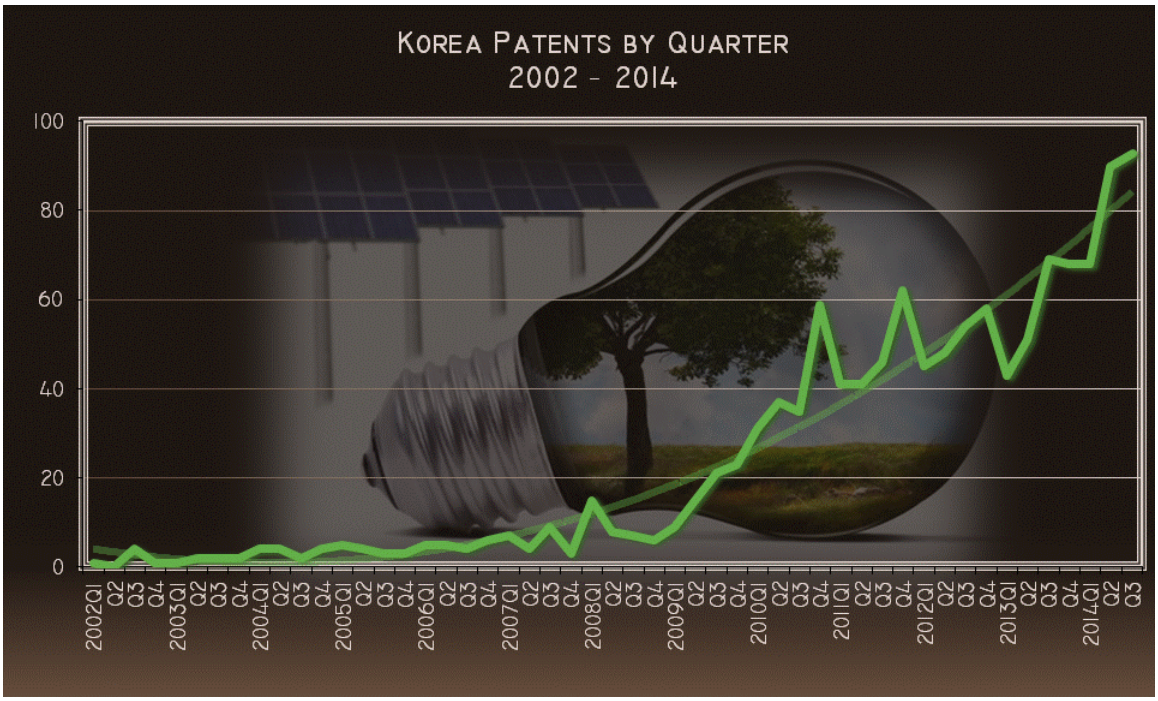
and 40 compared to the same time period a year earlier. Korea was up three and 24 in the same comparison.

Again trailing Korea, but narrowing the gap to 31 patents versus 45 the previous quarter, was Michigan in fifth place. Michigan was up 7 compared to the second quarter and one over the same period a year ago. Taiwan and Denmark tied at 35 while New York fell behind, but trailed by only two patents compared to these two. Taiwan was down three compared to the second quarter and up four compared to the third quarter of 2013. Denmark was up 5 and 20 in the same manner. New York was up two and one compared to the second quarter and the third quarter of last year. France (28) and Texas (25) rounded out the top ten clean energy patent grantees for the third quarter. Ohio (22), Arizona (17), Canada (17) and China (16) were not far behind.

Of the clean energy patents granted in the second quarter, 411 were owned by US entities while 629 were owned by those outside the US. The advantage owned by the international patent grantees rose by 52 compared to the second quarter.




GERMANY PATENTS BY QUARTER
2002 - 2014
100
80
60
40
20
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
2008Q1 Q2 Q3 Q4
2009Q1 Q2 Q3 Q4
2010Q1 Q2 Q3 Q4
2011Q1 Q2 Q3 Q4
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3


KOREA PATENTS BY QUARTER
2002 - 2014
100
80
60
40
20
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
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2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
2008Q1 Q2 Q3 Q4
2009Q1 Q2 Q3 Q4
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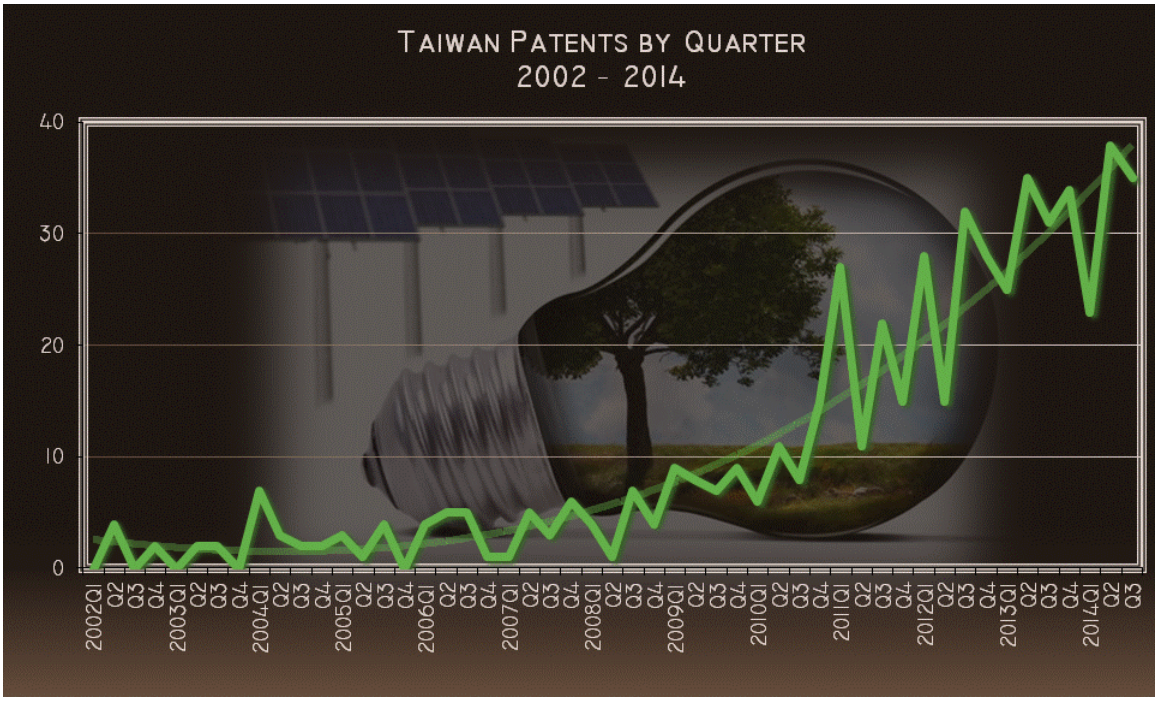
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3


TAIWAN PATENTS BY QUARTER
2002 - 2014
40
30
20
10
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
2008Q1 Q2 Q3 Q4
2009Q1 Q2 Q3 Q4
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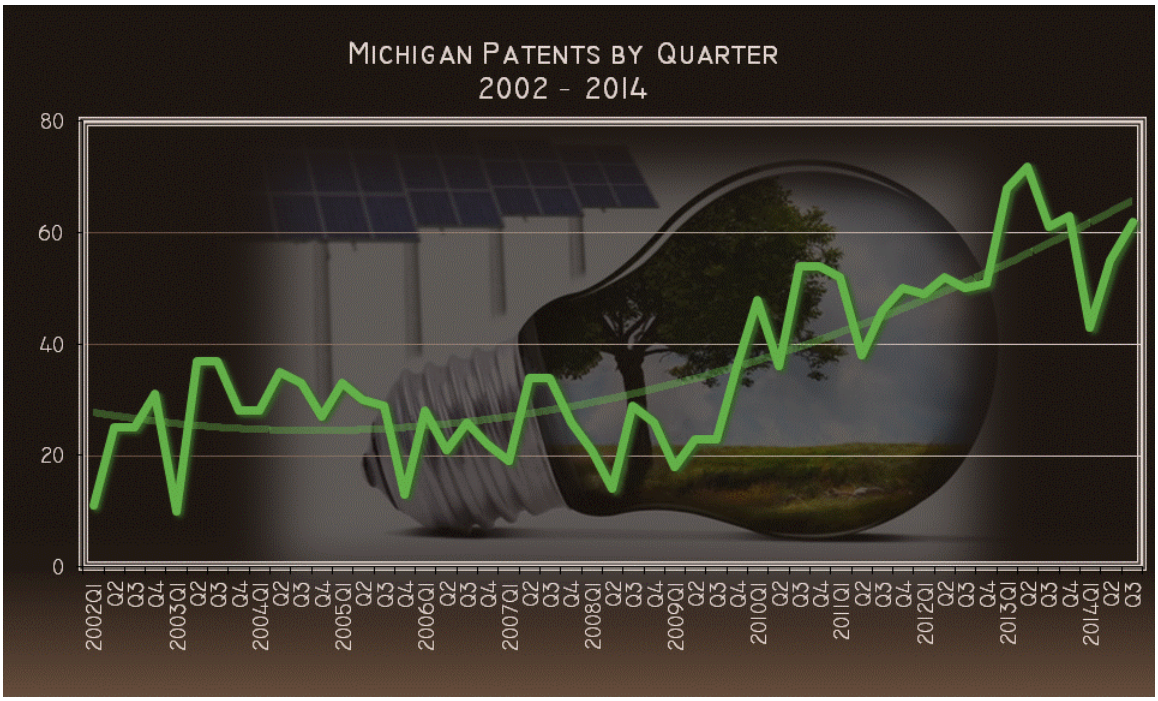
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3


MICHIGAN PATENTS BY QUARTER
2002 - 2014
80
60
40
20
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
2008Q1 Q2 Q3 Q4
2009Q1 Q2 Q3 Q4
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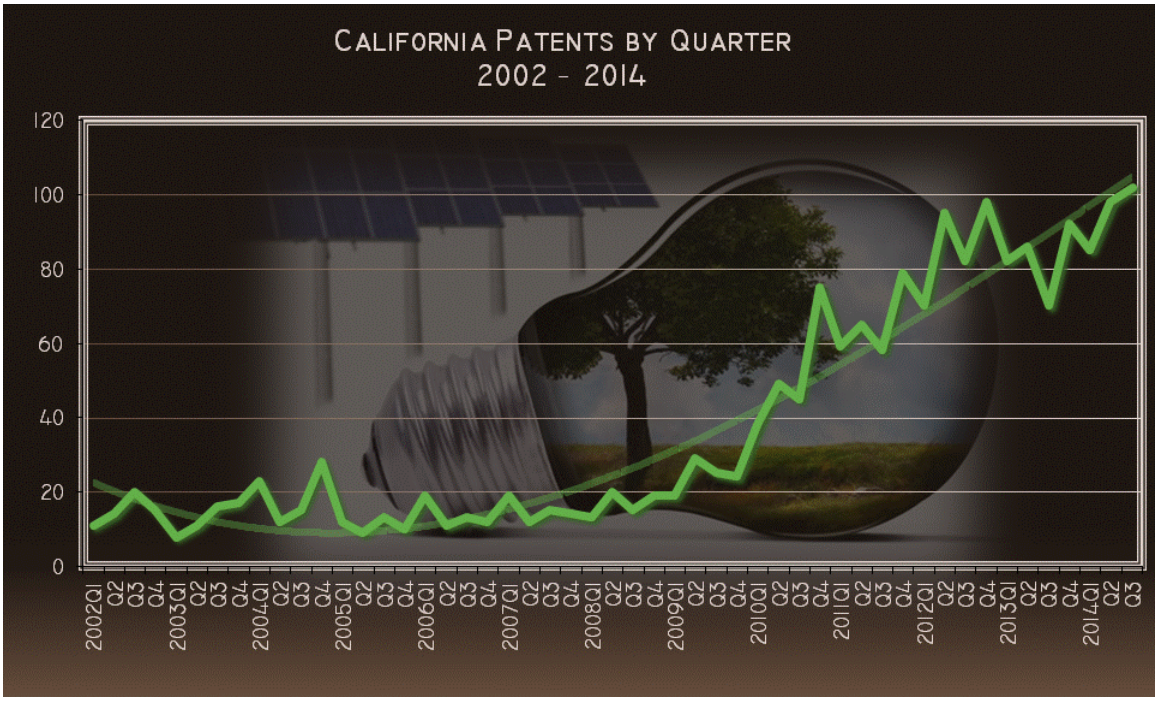
2011Q1 Q2 Q3 Q4
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3


California Patents by Quarter
2002 - 2014
120
100
80
60
40
20
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
2008Q1 Q2 Q3 Q4
2009Q1 Q2 Q3 Q4
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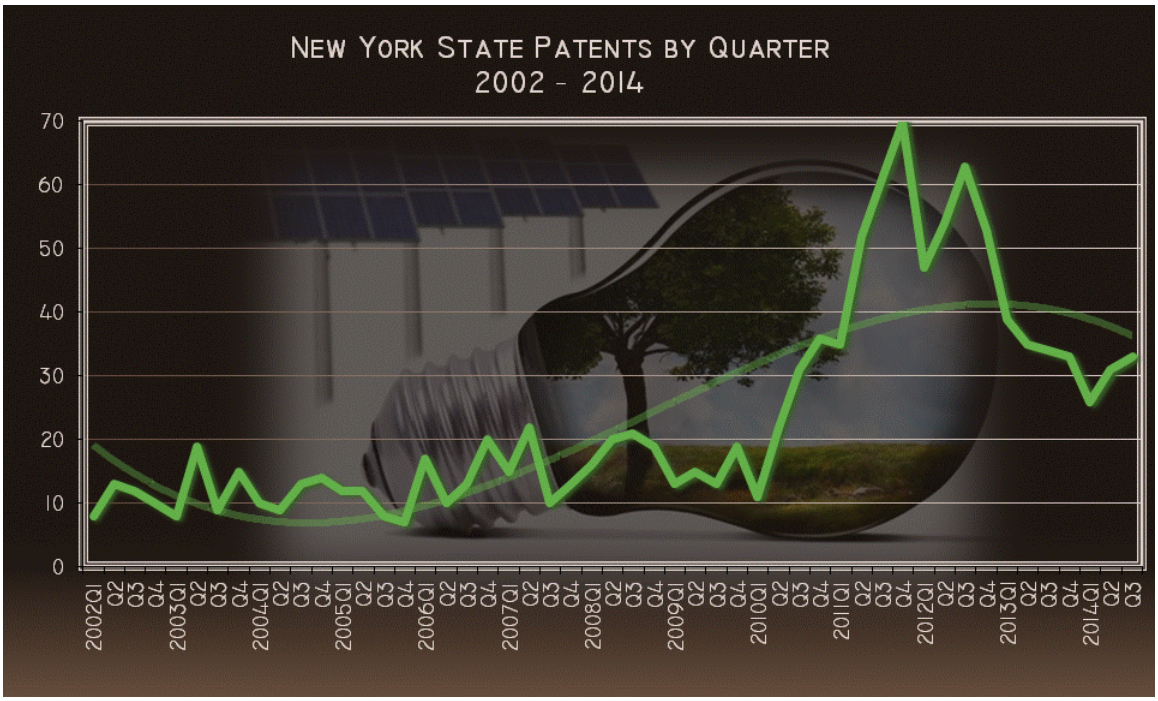
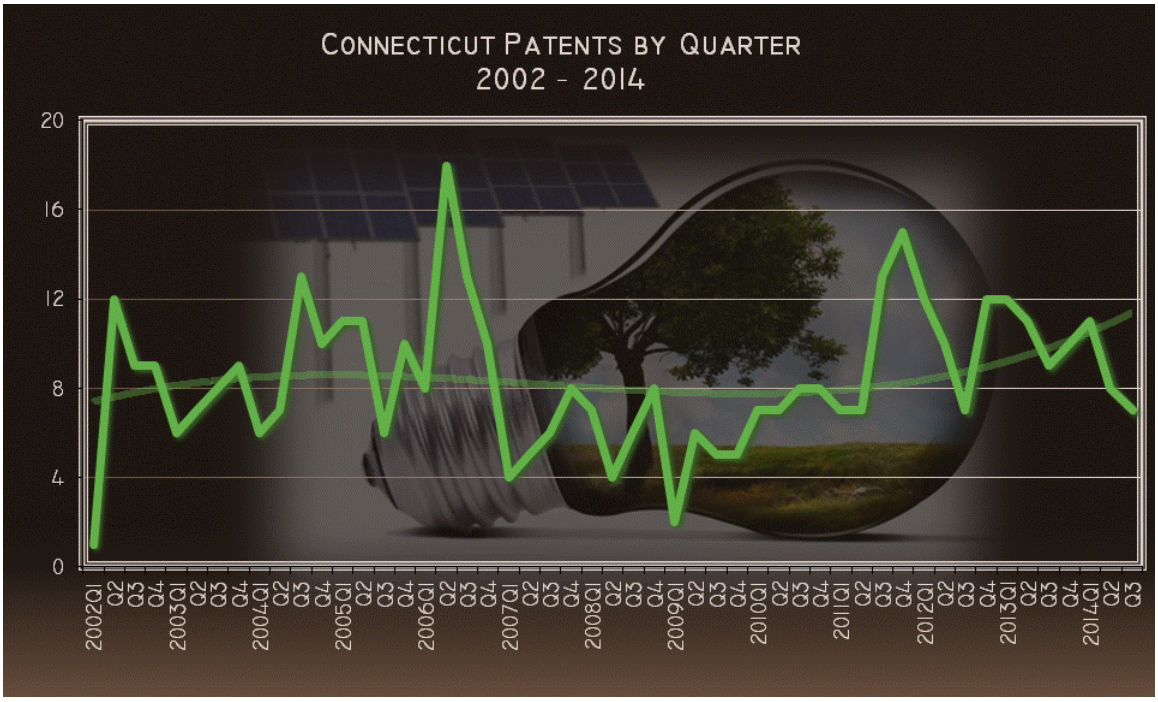
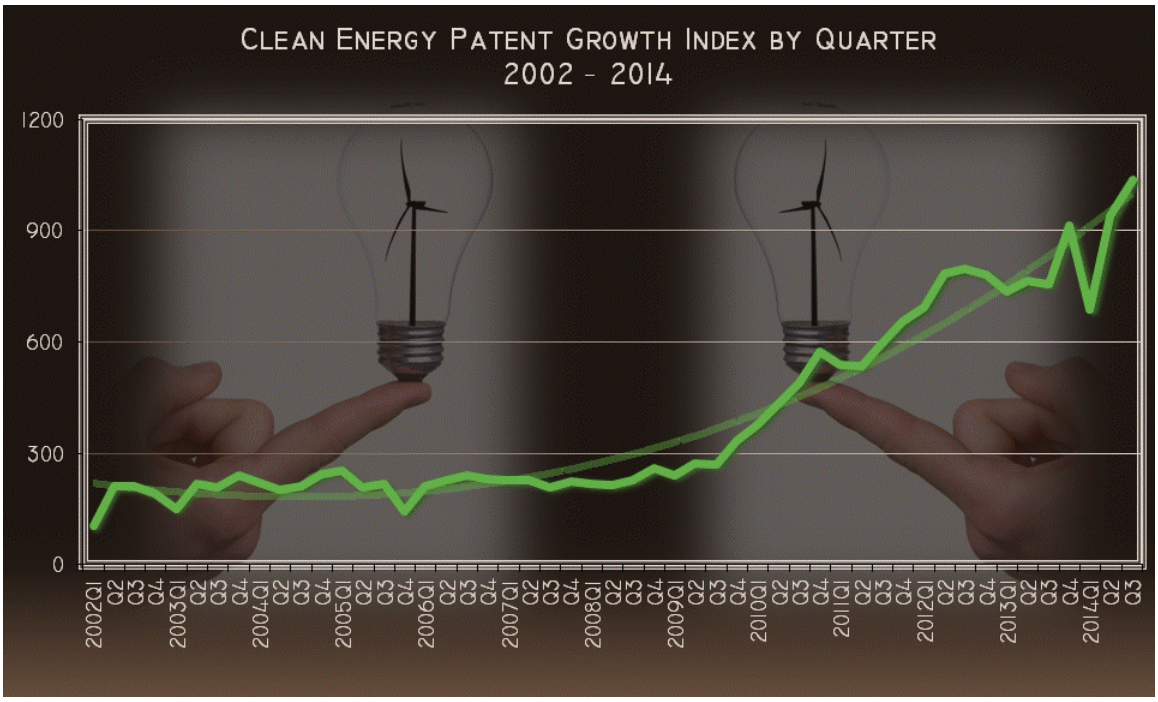
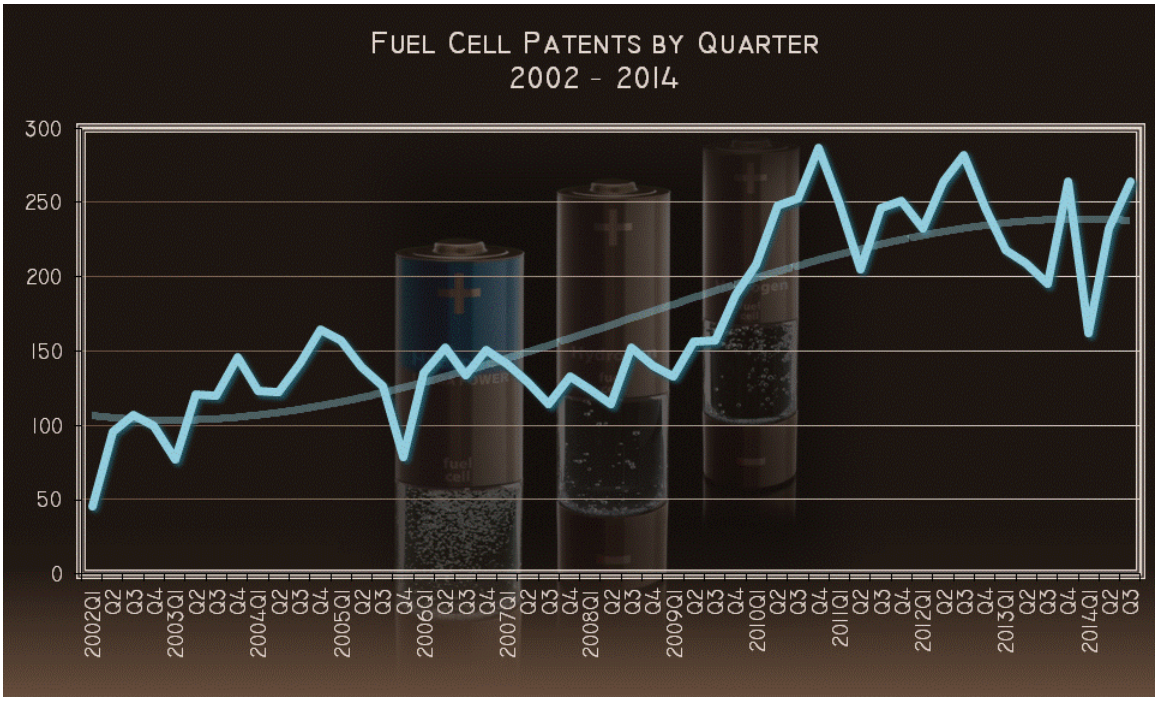
2011Q1 Q2 Q3 Q4
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3

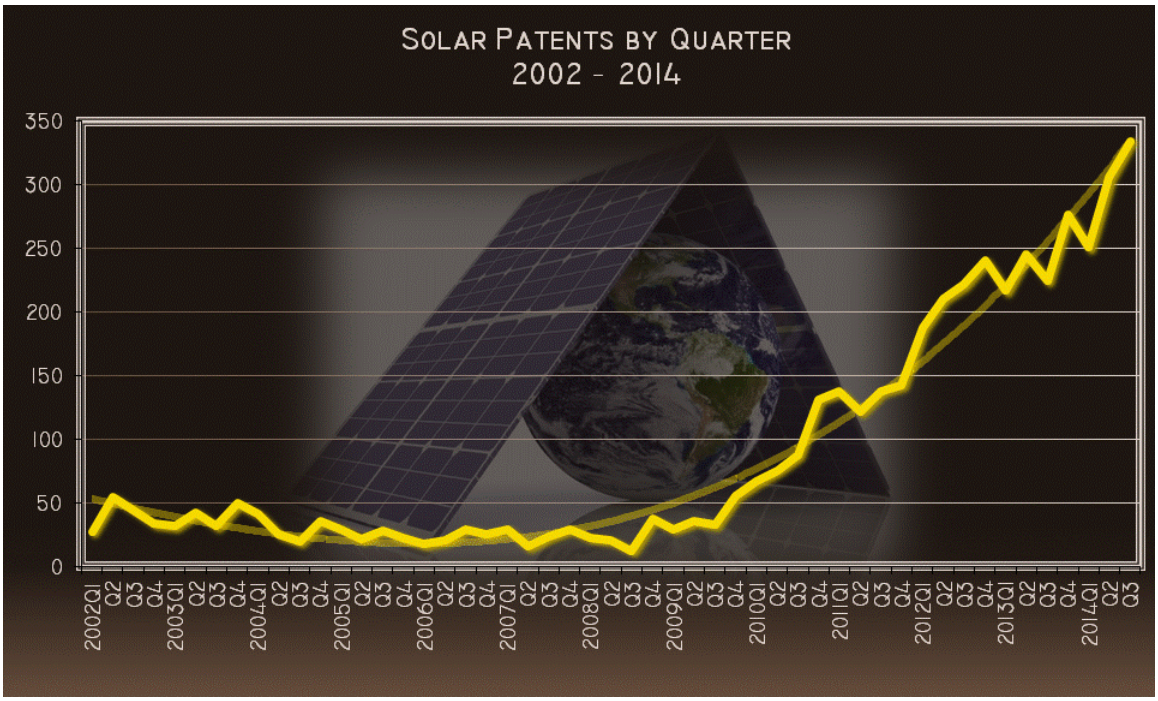

New York State Patents by Quarter
2002 - 2014
70
60
50
40
30
20
10
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
2008Q1 Q2 Q3 Q4
2009Q1 Q2 Q3 Q4
2010Q1 Q2 Q3 Q4
2011Q1 Q2 Q3 Q4
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3

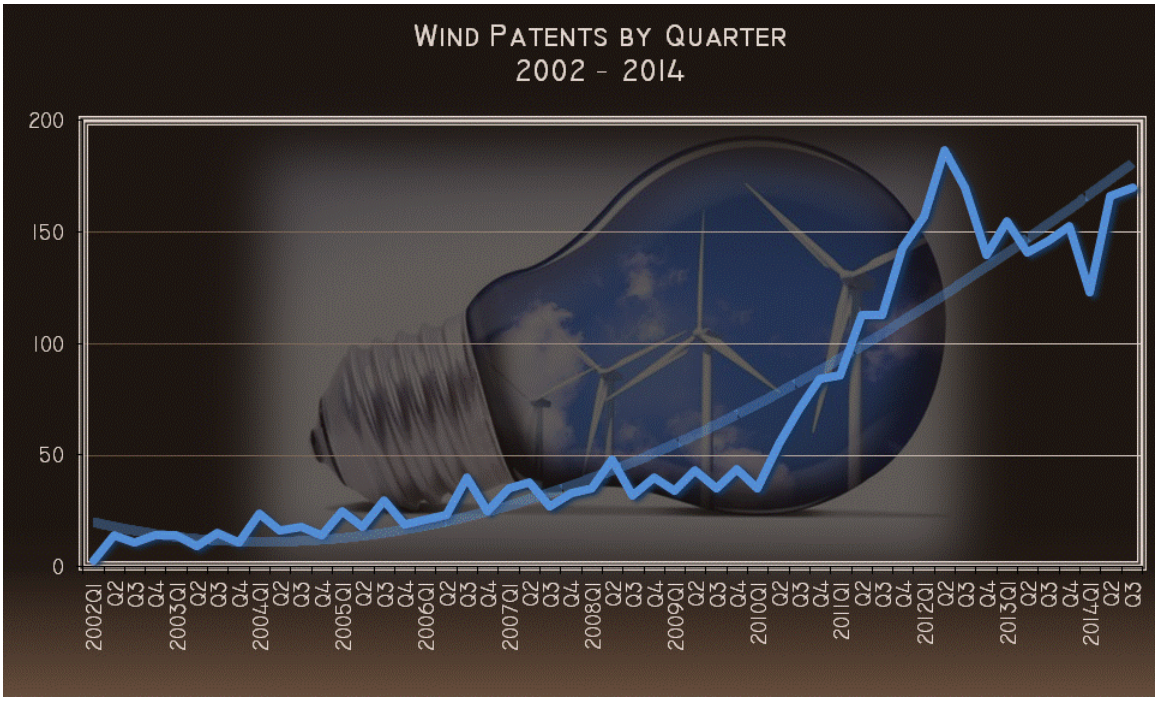



Trend lines by quarter through the third quarter of 2014 for the CEPGI and for each of the CEPGI components are depicted below:




Fuel Cell Patents by Quarter
2002 - 2014
300
250
200
150
100
50
0
2002Q1
Q2
Q3
Q4
2003Q1
2004Q1
2005Q1
2006Q1
2007Q1
2008Q1
2009Q1
2010Q1
2011Q1
2012Q1
2013Q1
2014Q1


Solar Patents by Quarter
2002 - 2014
350
300
250
200
150
100
50
0
2002Q1
Q2
Q3
Q4
2003Q1
2004Q1
2005Q1
2006Q1
2007Q1
2008Q1
2009Q1
2010Q1
2011Q1
2012Q1
2013Q1
2014Q1


Wind Patents by Quarter
2002 - 2014
200
150
100
50
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
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2009Q1 Q2 Q3 Q4
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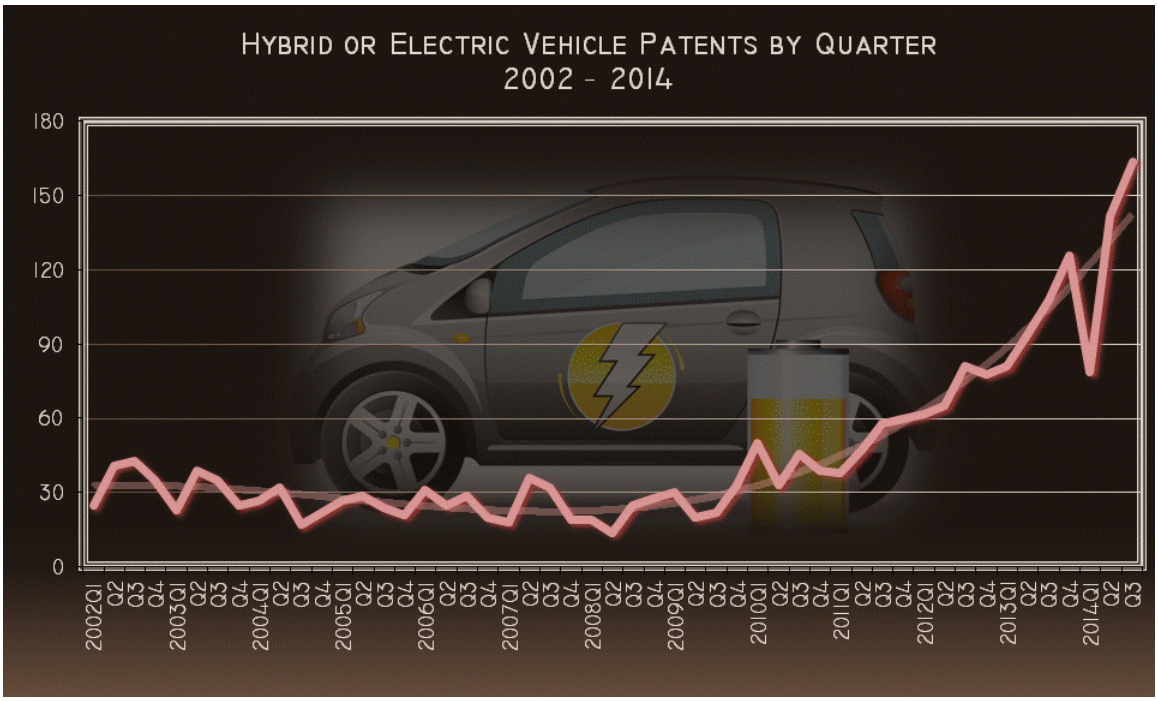
2011Q1 Q2 Q3 Q4
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3


Hybrid or Electric Vehicle Patents by Quarter
2002 - 2014
180
150
120
90
60
30
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
2008Q1 Q2 Q3 Q4
2009Q1 Q2 Q3 Q4
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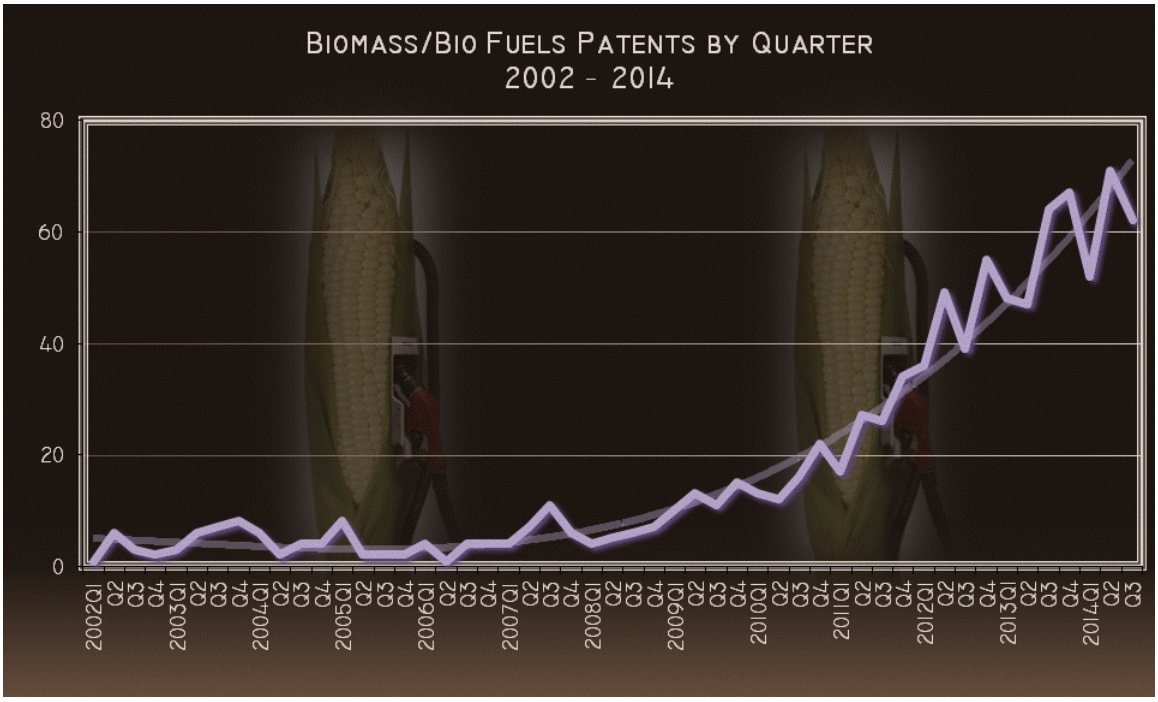
2011Q1 Q2 Q3 Q4
2012Q1 Q2 Q3 Q4
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3


Biomass/Bio Fuels Patents by Quarter
2002 - 2014
80
60
40
20
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
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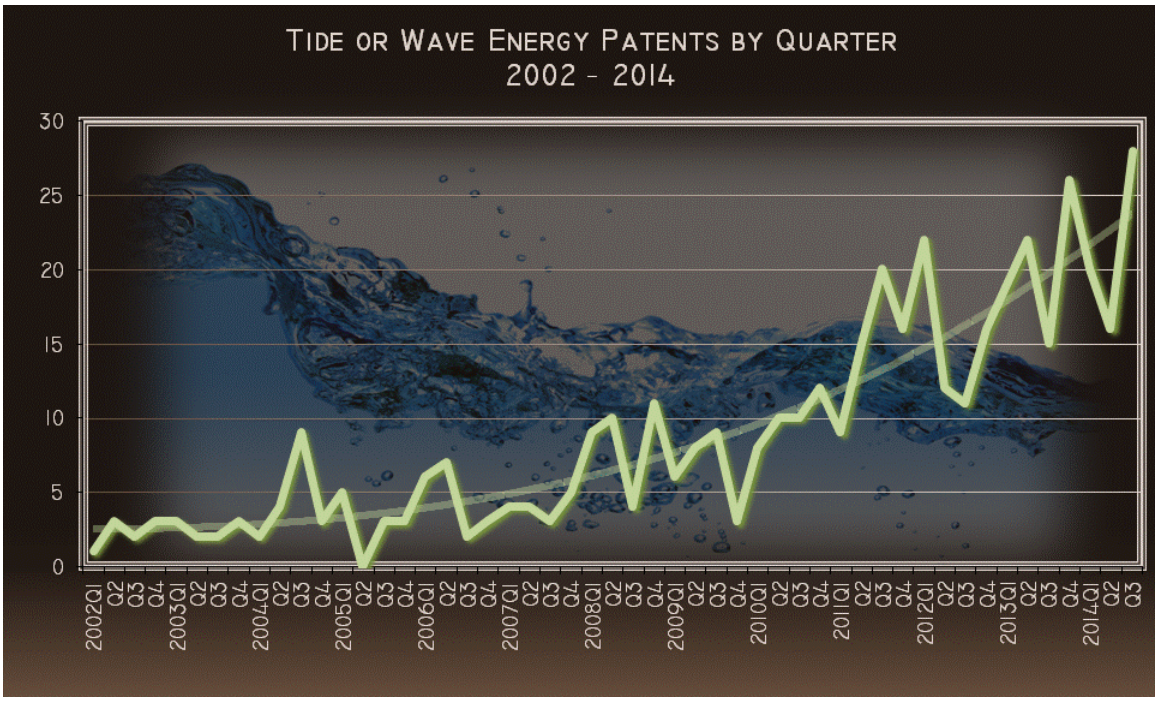
2014Q1 Q2 Q3


Tide or Wave Energy Patents by Quarter
2002 - 2014
30
25
20
15
10
5
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
2007Q1 Q2 Q3 Q4
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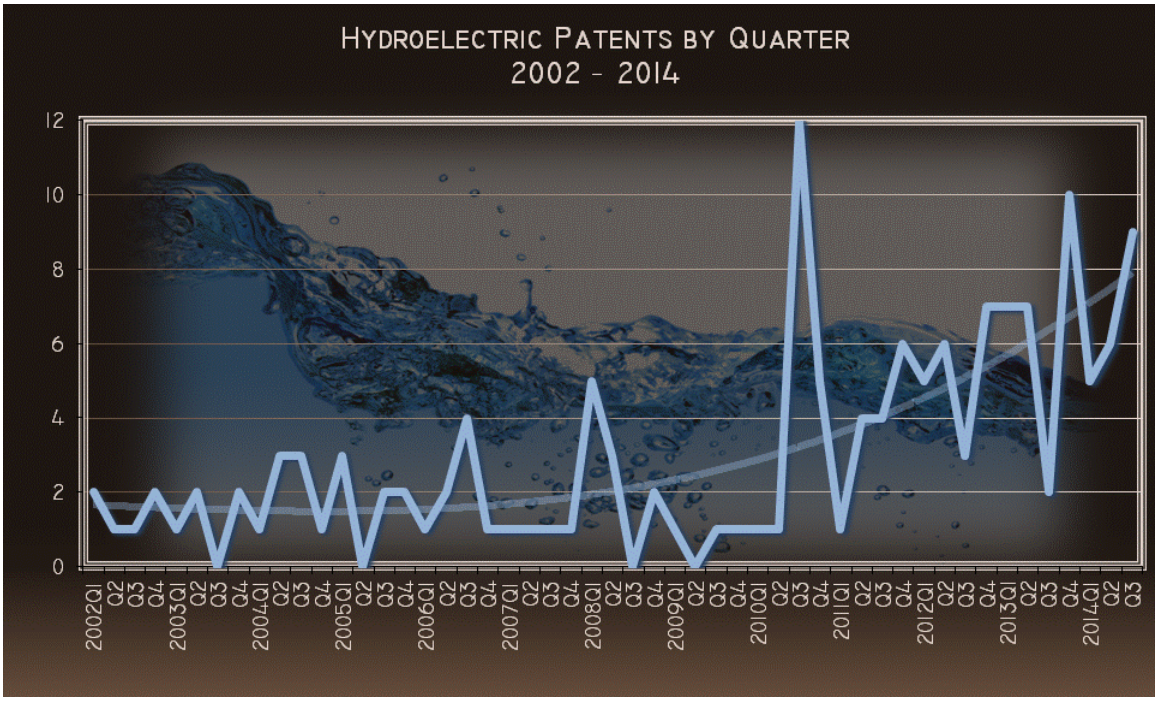
Hydroelectric Patents by Quarter
2002 - 2014
12
10
8
6
4
2
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
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2005Q1 Q2 Q3 Q4
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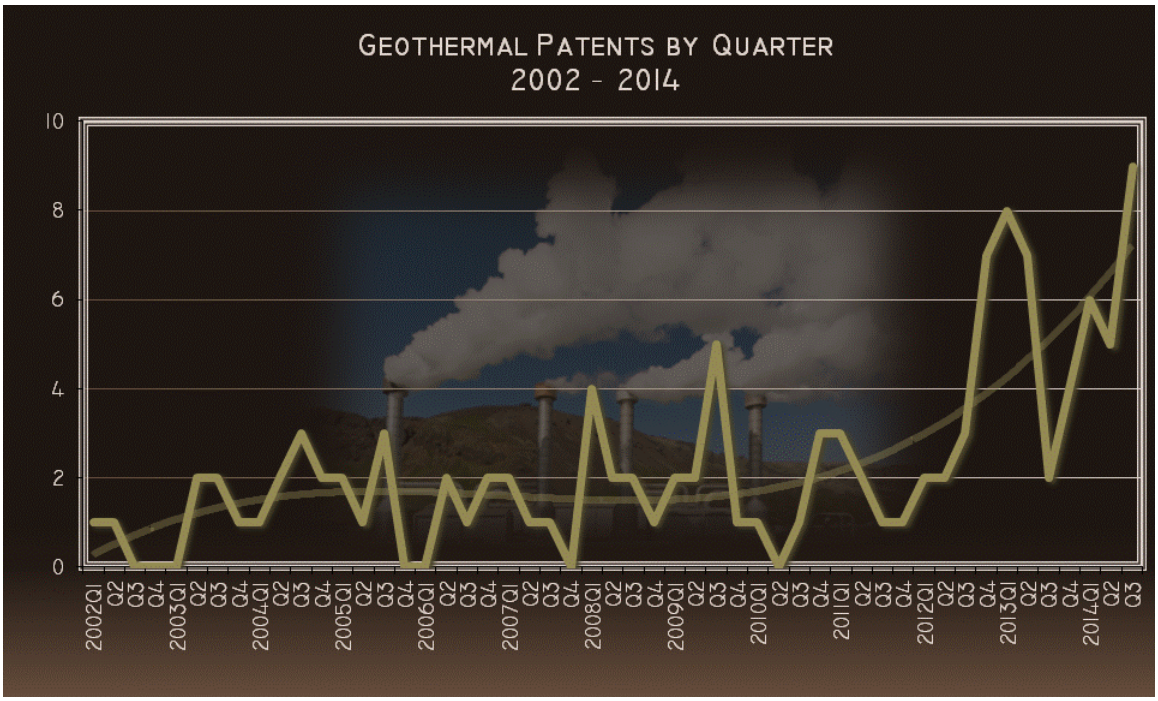
2014Q1 Q2 Q3


Geothermal Patents by Quarter
2002 - 2014
10
8
6
4
2
0
2002Q1 Q2 Q3 Q4
2003Q1 Q2 Q3 Q4
2004Q1 Q2 Q3 Q4
2005Q1 Q2 Q3 Q4
2006Q1 Q2 Q3 Q4
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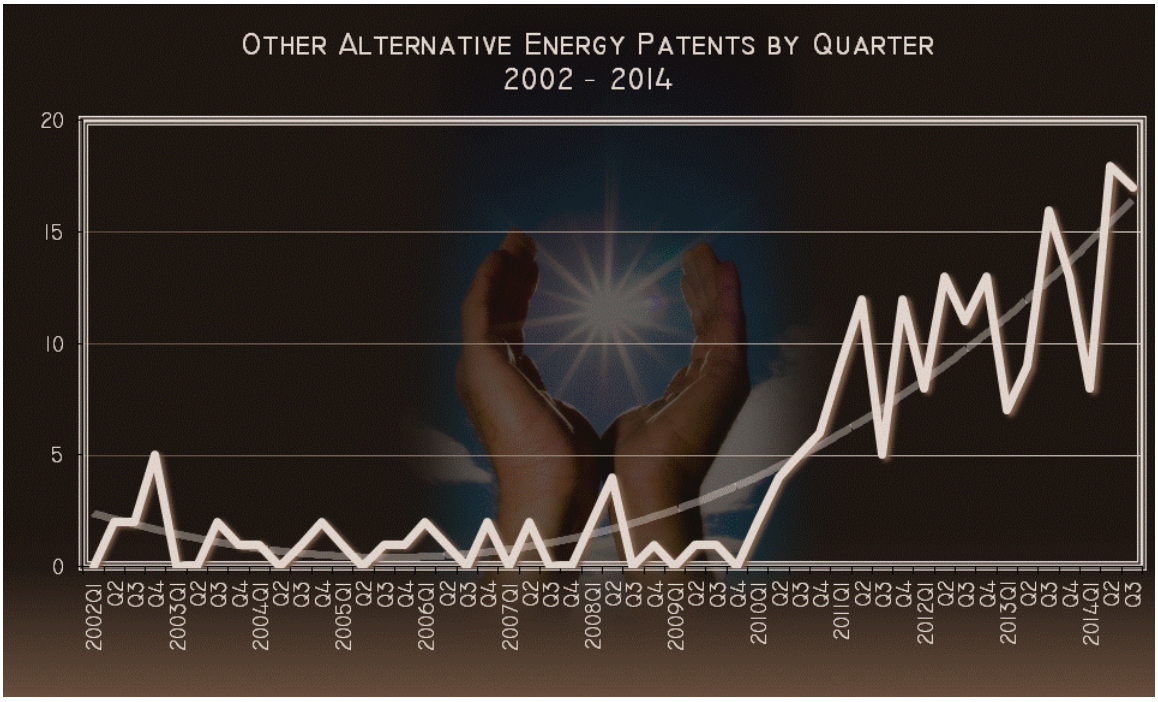
2013Q1 Q2 Q3 Q4
2014Q1 Q2 Q3


Other Alternative Energy Patents by Quarter
2002 - 2014
20
15
10
5
0
2002Q1
Q2
Q3
Q4
2003Q1
Q2
Q3
Q4
2004Q1
Q2
Q3
Q4
2005Q1
Q2
Q3
Q4
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Q3
Q4
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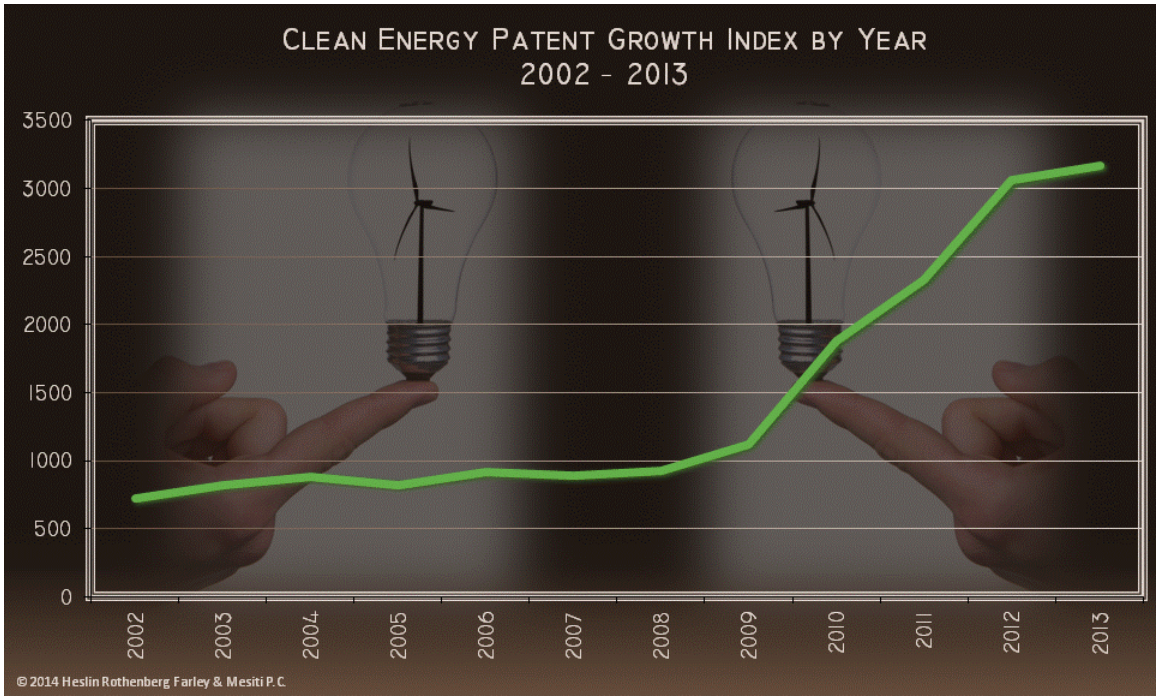
2013Q1
Q2
Q3
Q4
2014Q1
Q2
Q3

CEPGI yearly totals through 2013 are depicted below:

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