

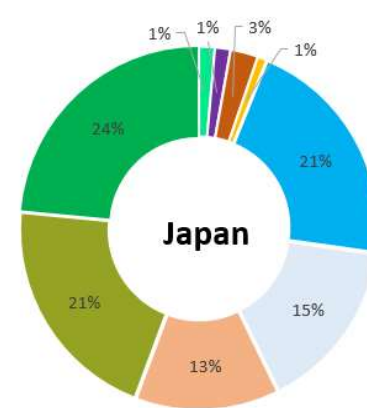
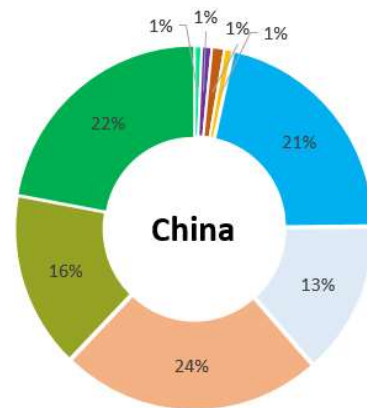
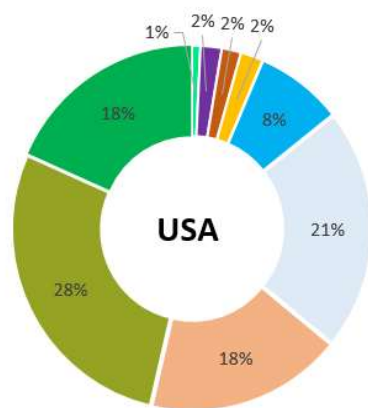
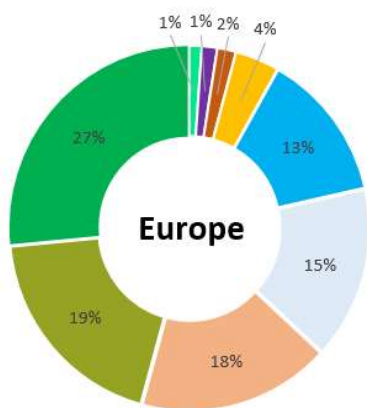
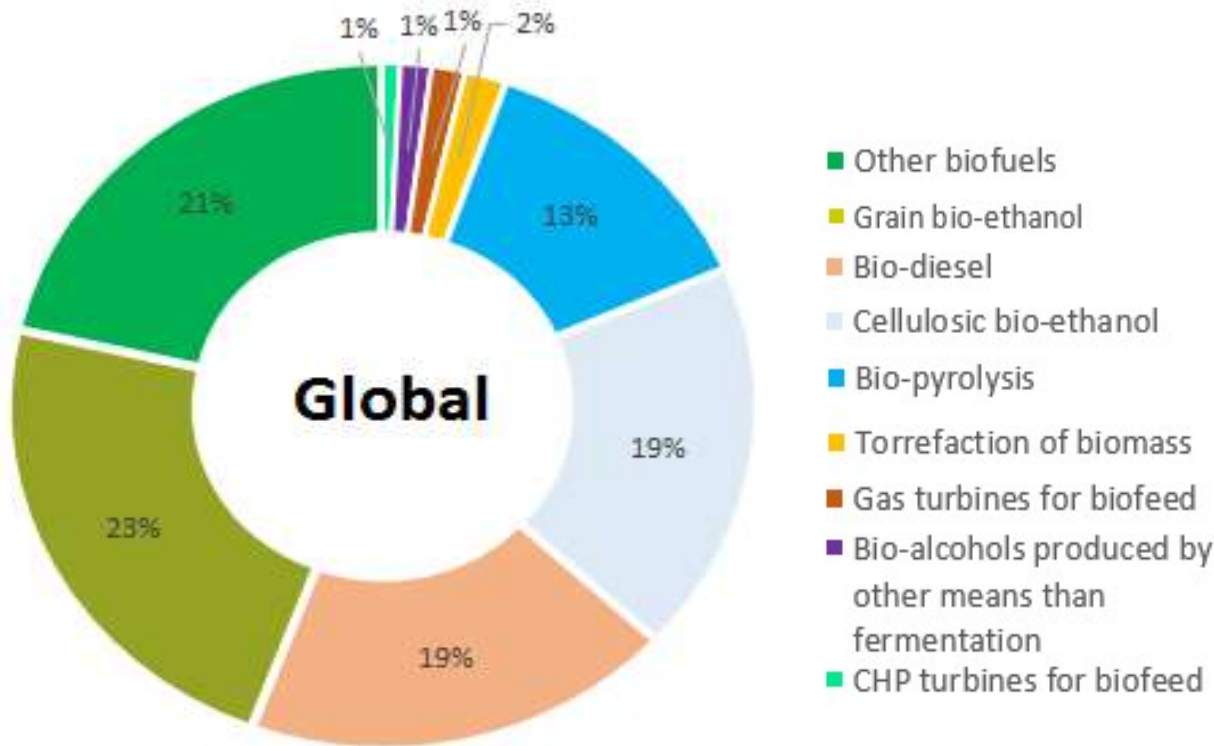


**INSPIRE:  
INSIGHTS ON  
BIOFUELS INNOVATION  
FROM IRENA'S  
PATENTS DATABASE**

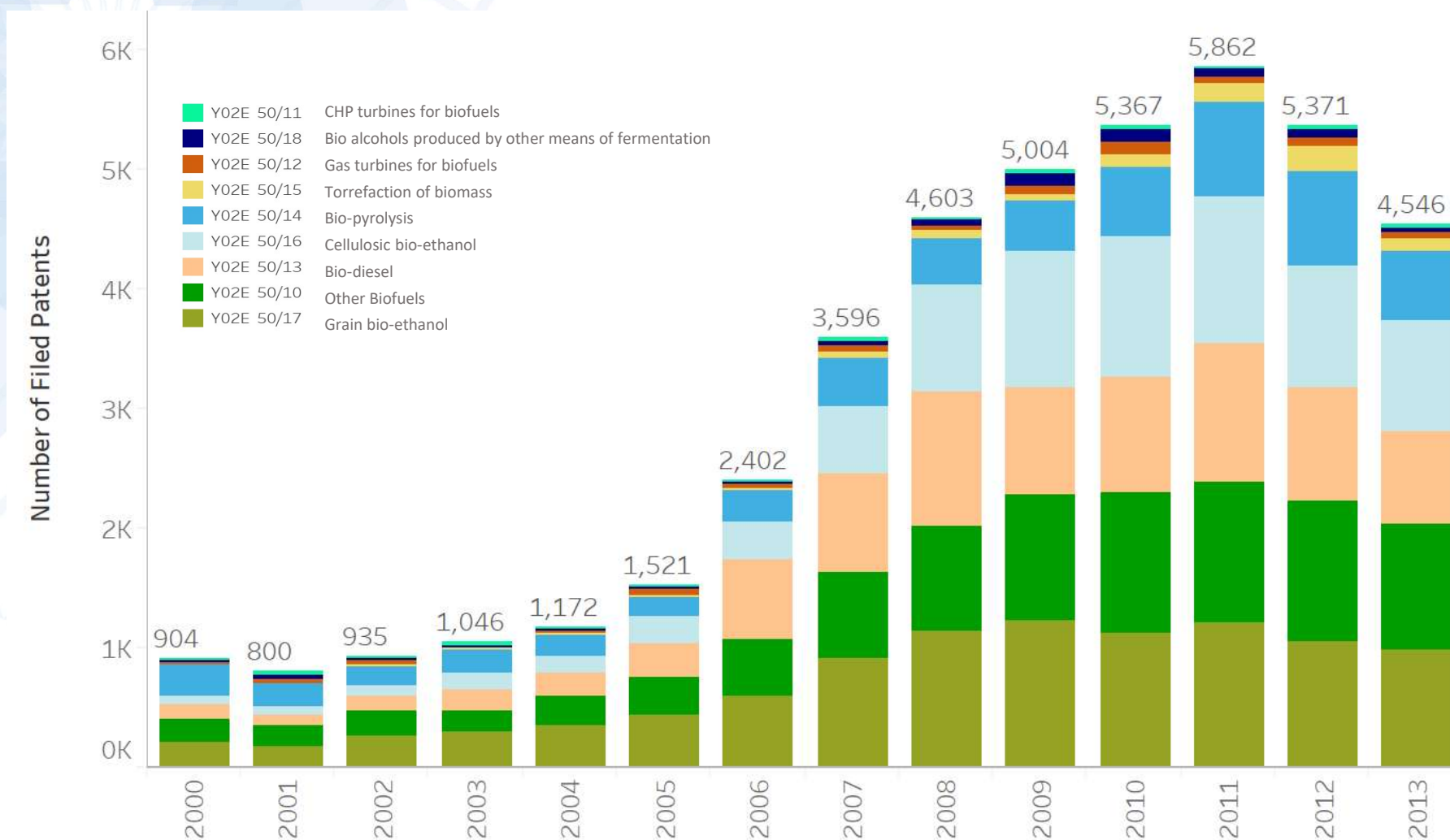
## Technology breakthroughs reflected in patent filings

- In 2015 liquid biofuels and biomethane accounted for just **4%** of in total renewable energy supplied. By 2050, the share of biofuels could nearly triple to **11%**
- More than **half a million patents** in renewable energy, **15%** are for bioenergy and **9%** specifically for biofuels
- The bulk of patents have been filed for **grain bio-ethanol, cellulosic bio-ethanol, bio-diesel, and bio-pyrolysis**

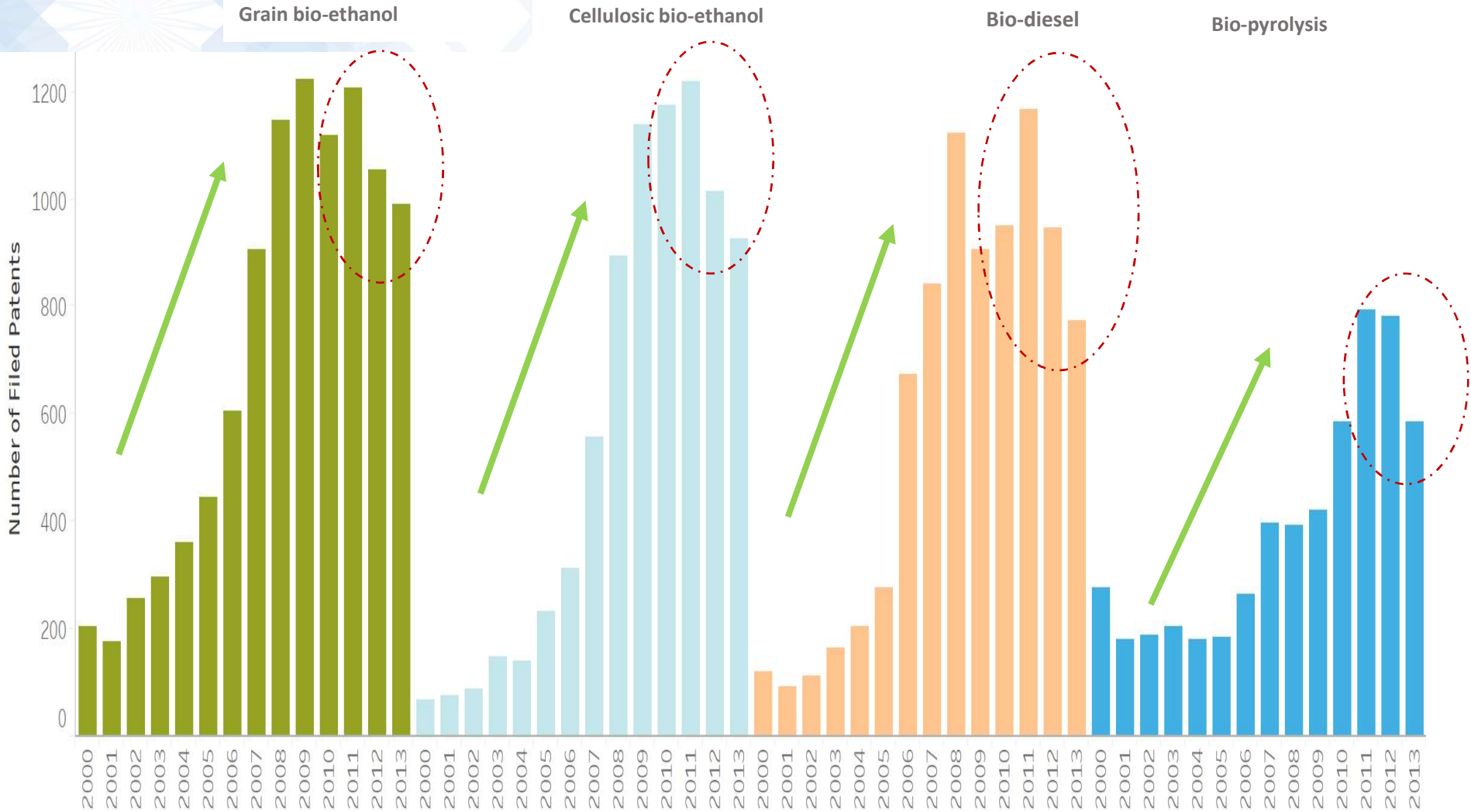
# Europe (EU-28), China, Japan and the United States are the front runners in biofuels patent activity



# Cellulosic bioethanol, biodiesel and grain bioethanol grew more than 10% per annum

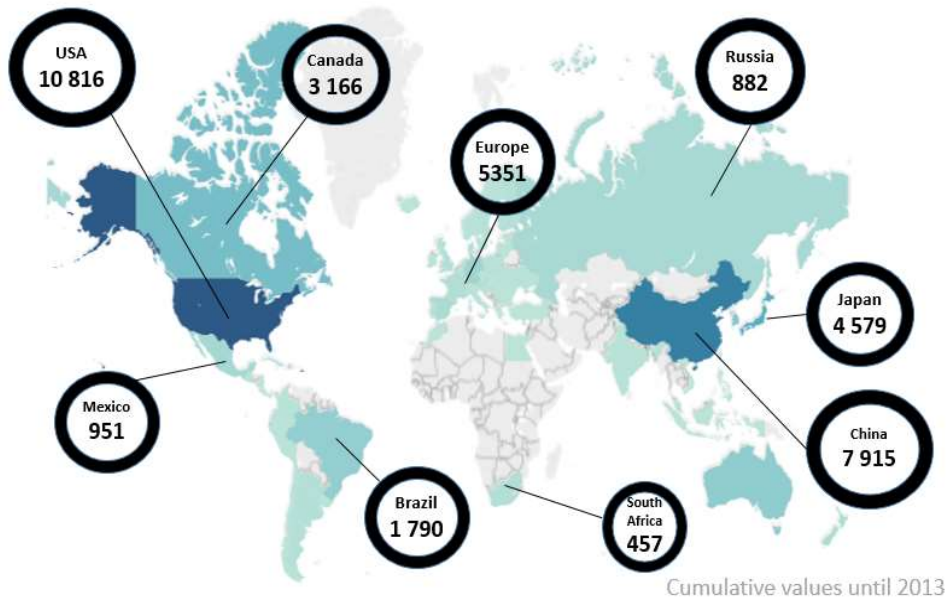


# Biofuel patent filings peaked in 2011, followed by a drop

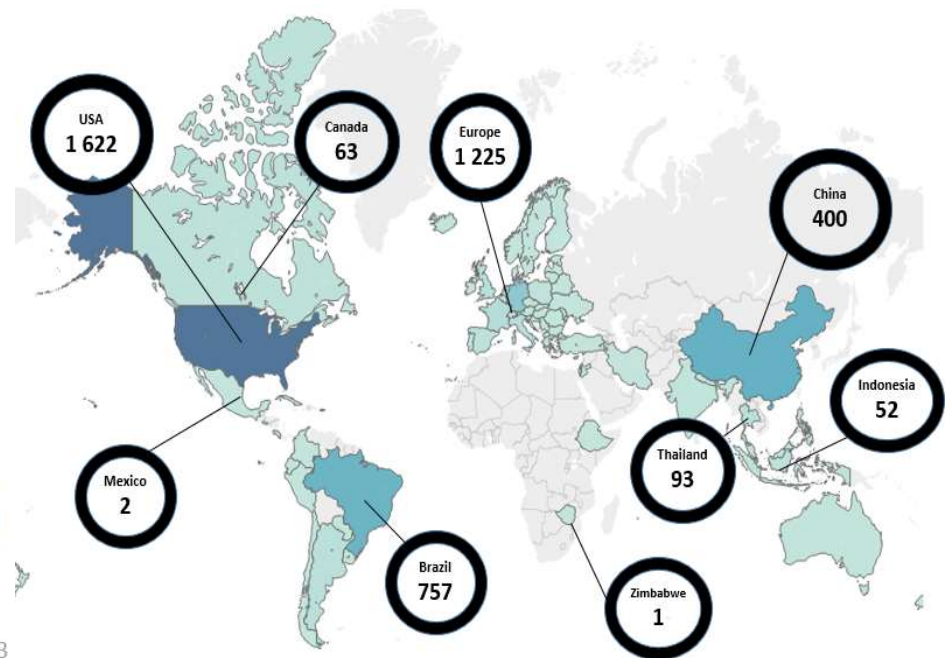


# Innovation and production do not always occur in the same place

## Patents



## Production (PJ)



### Interesting cases

- Japan and Russia
- Thailand and Indonesia



## Technology breakthroughs reflected in patent filings

- Patent and innovation activity is key to understanding technology development, it does not fully explain technology deployment
- Lag between technology development and deployment.  
E.g: cellulosic bio ethanol
- Paramount important for biofuels innovation to go beyond just technology RD&D to innovation in better business models and improved market regulation.

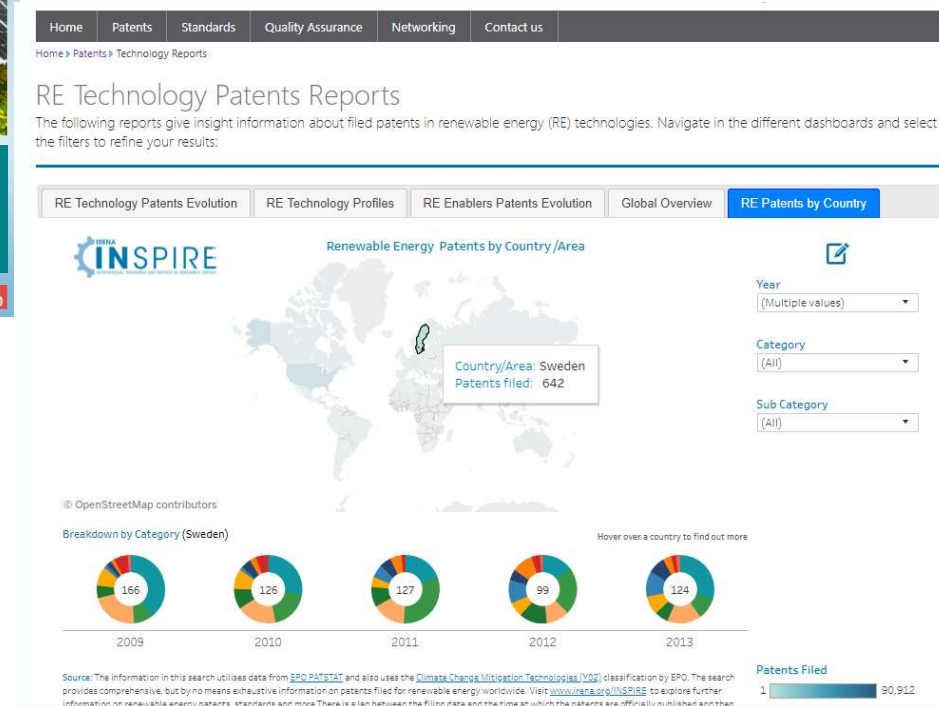
# Data and charts used have been gathered using the web tool INSPIRE



The screenshot shows the IRENA INSPIRE homepage. At the top, there is a navigation bar with links for Home, Patents, Standards, Networking, and Contact us. Below the navigation bar is a large banner image of solar panels with the text "EXPLORE INFORMATION ON PATENTS FOR RENEWABLE ENERGY". Underneath the banner are three colored boxes: a green box for "Interested in RE patents?", an orange box for "Learn about RE standards", and a teal box for "Networking and more". Each box contains a brief description and a "Read More" button. At the bottom, there is a copyright notice for 2014-2015 IRENA and social media icons for Facebook and YouTube.

**Get involved!** Some examples of IRENA collaboration with partners:

- Global patent data analysis
- Short policy briefs
- Provision of standards data for reports



The screenshot shows the "RE Technology Patents Reports" interface. It features a navigation bar with links for Home, Patents, Standards, Quality Assurance, Networking, and Contact us. Below the navigation bar is a heading "RE Technology Patents Reports" and a sub-heading "RE Patents by Country". The main content area includes a world map with a tooltip for Sweden showing "Country/Area: Sweden" and "Patents Filed: 642". To the right of the map are three dropdown menus for "Year", "Category", and "Sub Category". Below the map is a "Breakdown by Category (Sweden)" section with five donut charts for the years 2009, 2010, 2011, 2012, and 2013, showing the number of patents filed: 166, 126, 127, 99, and 124 respectively. At the bottom, there is a "Patents Filed" scale from 1 to 90,912 and a source note.

Find here a [video](#) showing how to use INSPIRE.

Access in: <http://inspire.irena.org>



# Overview of IRENA Innovation Work



Innovation Outlooks  
Forthcoming :Electric Vehicles  
& Thermal Storage



Innovation Landscape Report for  
the Power Sector Transformation

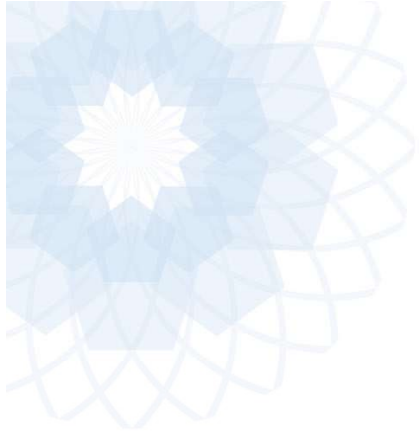
IRENA Innovation Week 2018

## IRENA Technology Briefs



Reports in innovation: energy transition, policy,  
IP, RD&D cooperation mechanisms





# Thank you

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