

How to assess countries' renewable policy (Sub-theme 2)

CO22 Side Event on Climate change mitigation Policy Progression Indicator (C-PPI)
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Research subjects

- Study on assessment of countries' renewable policy and on legal aspect of evaluation of progress in mitigation measures.
 - Elaborate indicators to assess actions taken by each country for enhancing introduction of renewable energy (FY2015-17)
 - Consider how these indicators could be used for the implementation of the Paris Agreement and relevant legal issues (FY2016-17)

Method (1)

- Elaborate indicators to assess actions taken by each country for enhancing introduction of renewable energy (FY2015-17)
 - Make research on current status and progress made in renewable policy of major countries/regions: for FY2015, EU (UK, France, Germany), US, China, Japan.
 - Evaluate actions during 2005-2012 (in the past) and actions to be taken during 2012-2025 (in future).
 - Select the following 3 items which possibly reflect strength of actions.
 - (a) Target to be achieved (feature, level...)
 - (b) Measures to promote introduction of renewables, such as FIT, RPS, subsidies etc.
 - (c) Grid policy to make renewables further penetrate in the grid
 - Expansion of grid/ grid operation, etc.

Method (2)

- Consider how these indicators could be used for the implementation of the Paris Agreement and relevant legal issues (FY2016-17)
 - As starting point, analyze the Paris Agreement and relevant COP decisions to identify such opportunities.

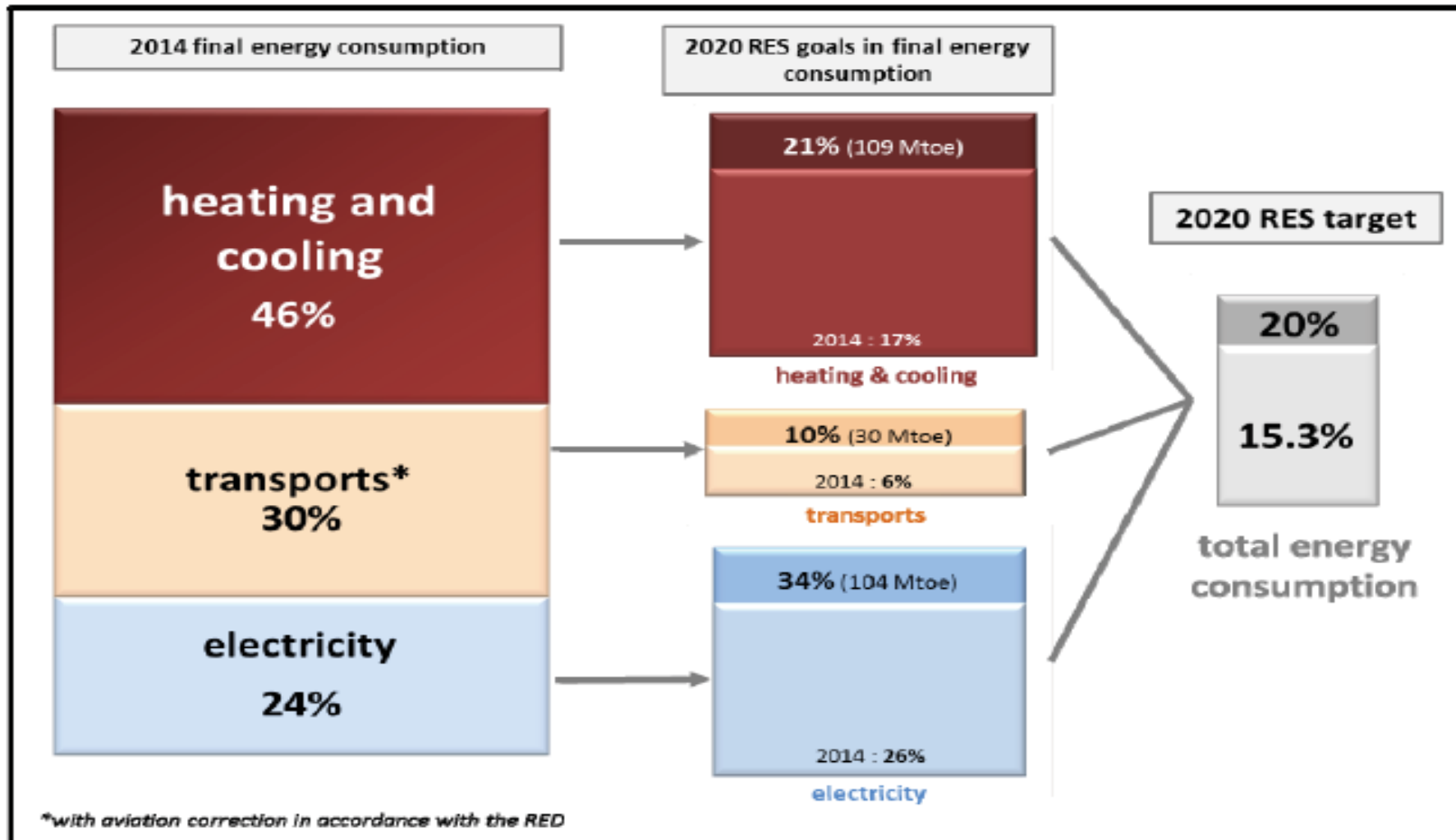
Possible function of indicators

- **Assessing the level of submitted NDC**
 - Cf. Ad Hoc Working Group on the Paris Agreement (APA) to develop further guidance on features of the NDCs (COP21 decision, para. 26)
 - Cf. APA to develop further guidance for the information to be provided (COP21 decision, para. 28)
- **Assessing progress in implementation of NDC**
 - Cf. APA to develop recommendations for modalities, procedures and guidelines for transparency (COP21 decision, para. 91)
- **Assessing potential for subsequent NDC**
 - Cf. Global stocktake (Art. 14 of the Paris Agreement) and 5 year cycle of ratchet up mechanism
- **Action indicator** (to assess the policies and specific measures taken) and **outcome indicator** (to capture the attainment)
 - Cf. Human Rights Indicators

EU : Target

- **2020 Renewable target** (provided for by Renewable energy directive (2009/28/EC))
 - At least 20% in final energy consumption (not only electricity but also heat and transport fuel) by 2020
 - RES E Directive provides for each member state's target.
 - As of 2013, share of renewables reached 15%.
 - Besides, RES E Directive (2009) also provides a **target in the field of transport: at least 10%** in final consumption.
 - As of 2013, share of renewables reached about 5.4%.
- **2030 renewable target** (2030 Climate and Energy Policy Framework, agreed in the European Council in October 2014)
 - At least 27% in final energy consumption in 2030.
 - Presupposing that **strengthening and operation of Grid network at the pan European level.**

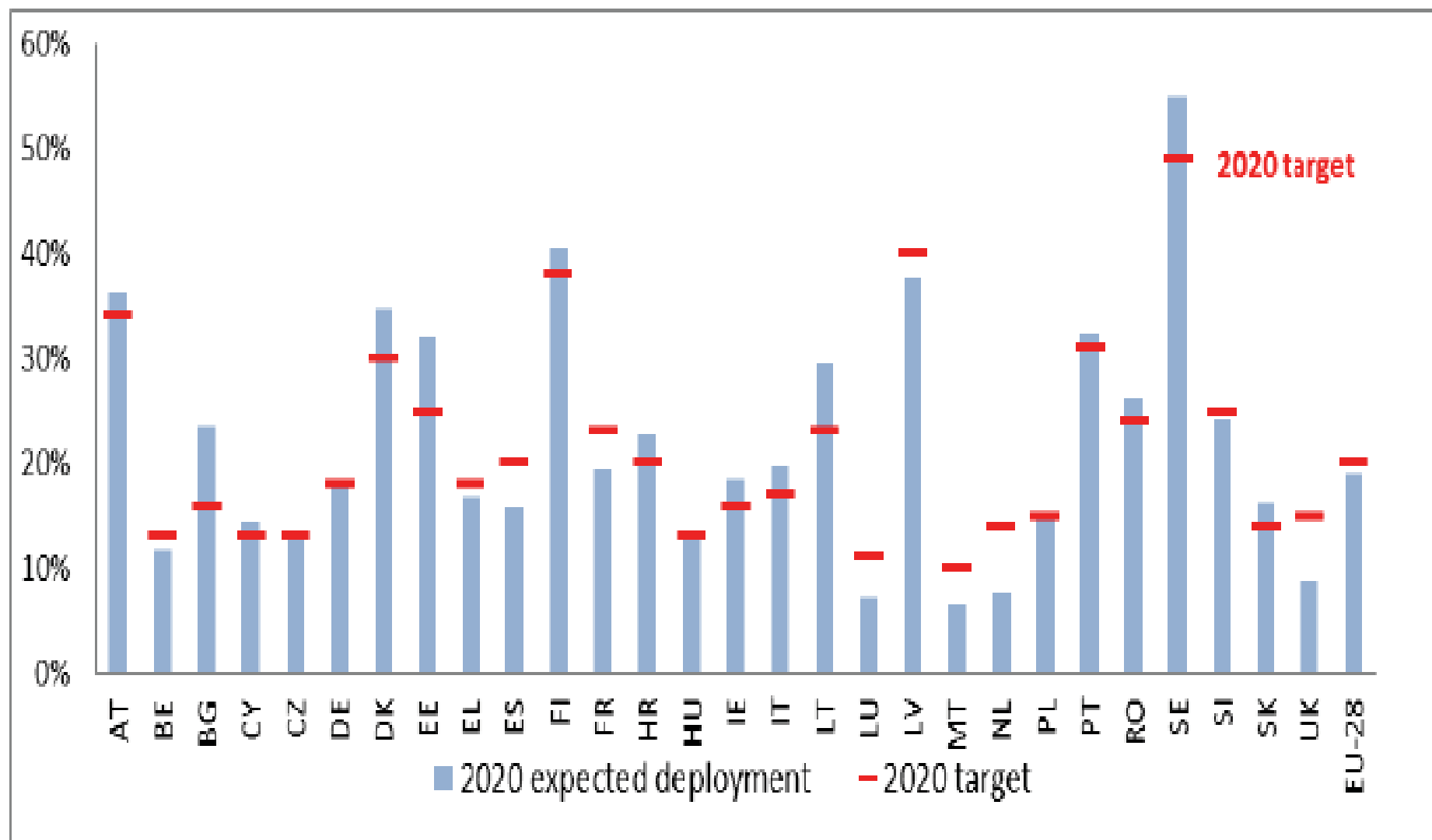
Structure of 2020 EU renewable target



EU Renewable target

	Ratio of renewable energy in final energy consumption in 2005	2020 renewable target	Level achieved in 2013	Renewable target beyond 2020
EU	8.7% (Eurostat)	At least 20%	15%	At least 27% in final energy consumption in 2030 (2030 Climate and Energy Policy Framework)
UK	1.3%	15%	5.1%	30-45% in final energy consumption in 2030 and 40-65% in total power generated in 2030 (Assumption by the Committee on Climate Change, 2016)
France	10.3%	23%	14.1%	32% in final energy consumption and 40% in total power generated in 2030 (Energy Transition Act 2015)
Germany	5.8%	18%	9.5%	60% in final energy consumption and 80% in total power generated in 2050. As indicative target, 40-45% of total power generated in 2025, and 55-60% in 2035 (EEG2014 (German Renewable Energy Act 2014))

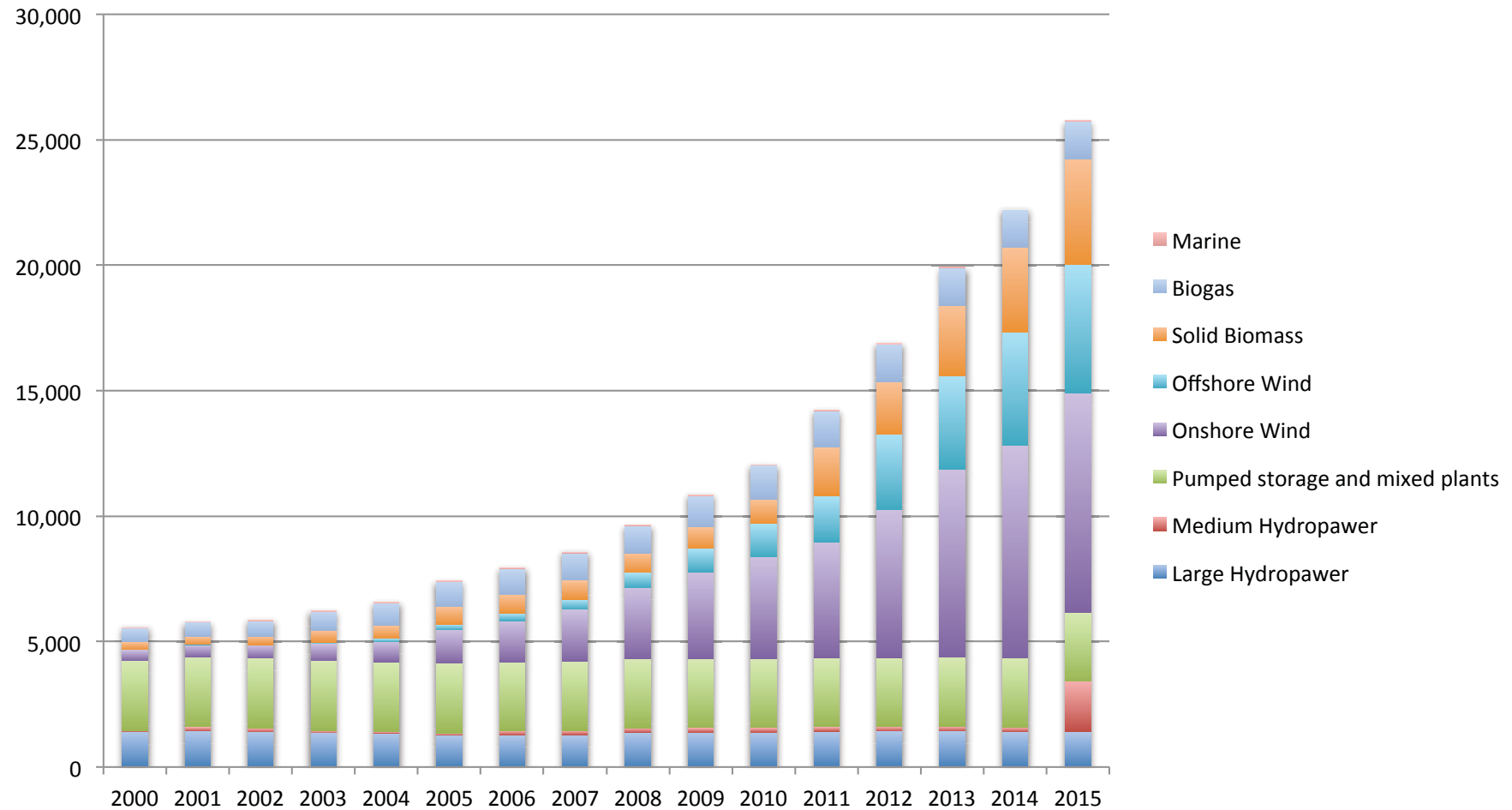
2020 RES target and prospect



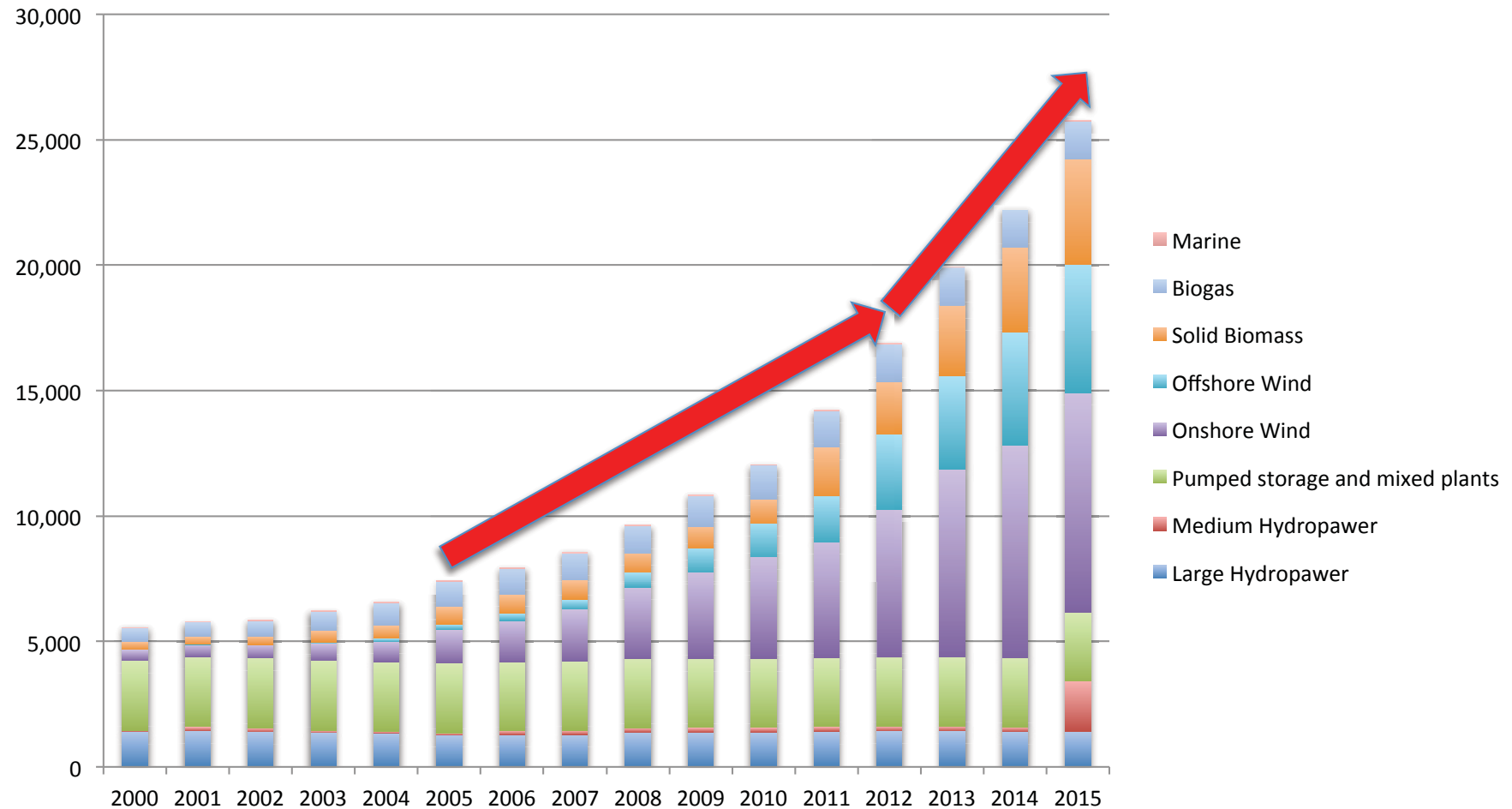
EU measures to promote introduction of renewable energy

- Target set at the EU level, but **measures for achieving its target are left to each member state.**
- Significant number of member states including the UK, France and Germany, have introduced **Feed-in Tariff scheme.**
 - Design of scheme varies from country to country.
 - Towards a more competitive and market based support scheme
 - EU regulation on state subsidies
 - Controlling the level of surcharge and level of penetration of renewables (ex. Germany).
- **Strengthening infrastructure for further introduction of renewables** (2030 Climate and Energy Policy Framework; Conclusions of European Council, 23/24 October 2014)
 - “Achieving a fully functioning and connected internal energy market”
 - Not only for promoting renewables but also for energy security
 - **European Commission will take urgent measures in order to ensure the achievement of a minimum target of 10% of existing electricity interconnections, as a matter of urgency,**
 - **no later than 2020 at least for Member States which have not yet attained a minimum level of integration in the internal energy market, which are the Baltic States, Portugal and Spain**
 - **The Commission will also report regularly to the European Council with the objective of arriving at a 15% target by 2030, as proposed by the Commission.**
 - The EU identified a number of priority corridors under its Trans-European Networks (TEN-E) strategy.

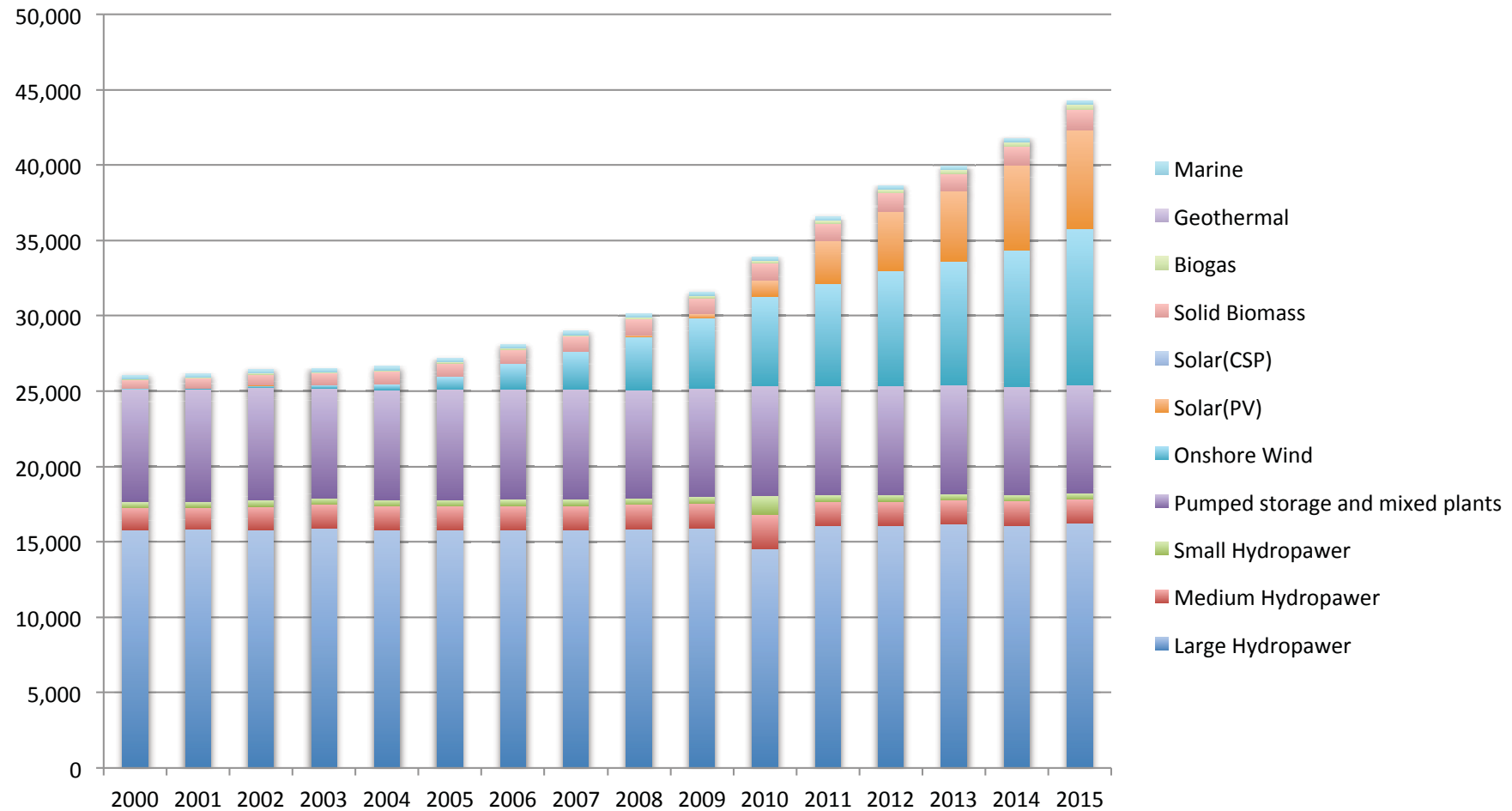
Renewable installation capacity: UK



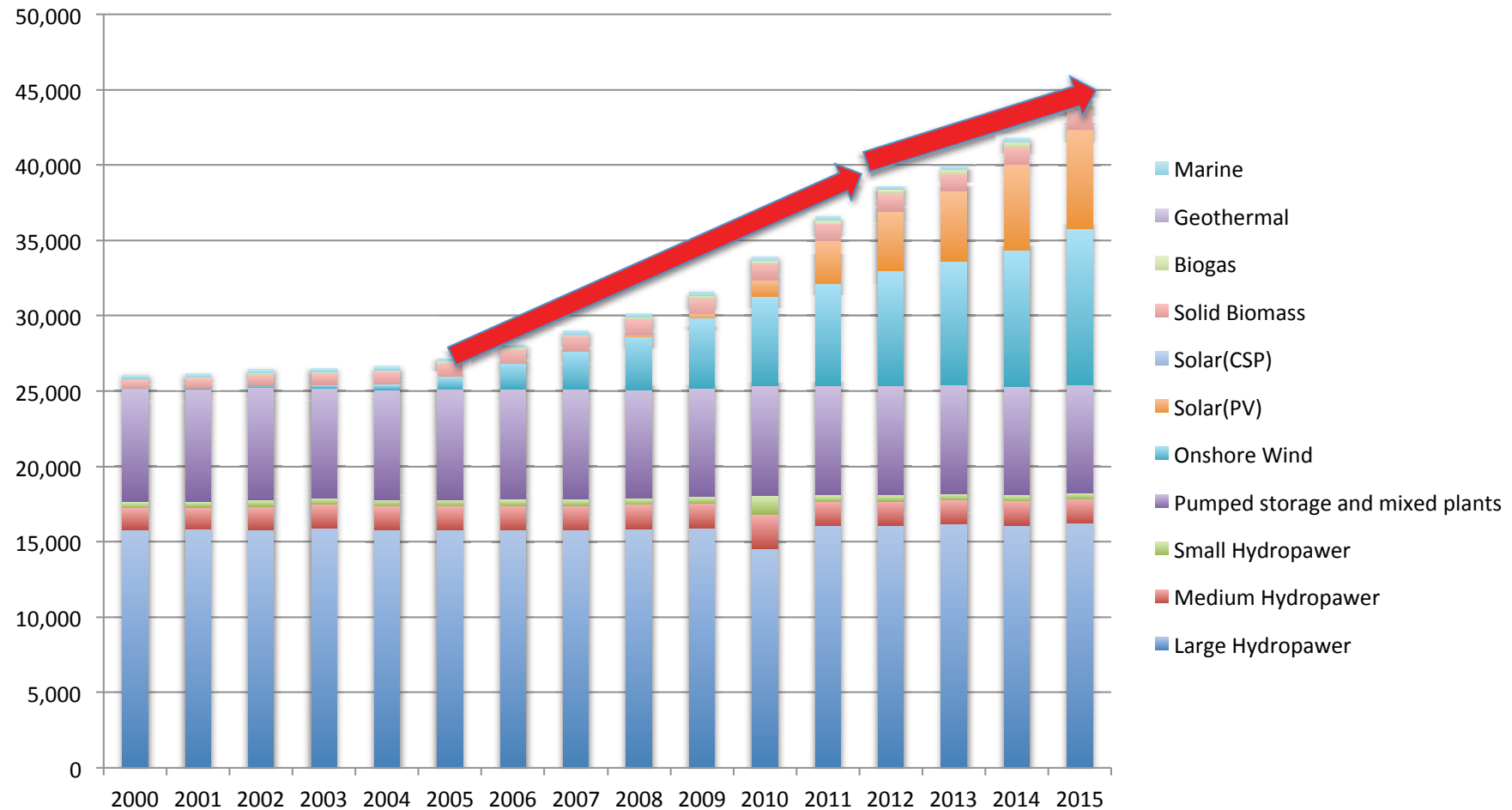
Renewable installation capacity: UK



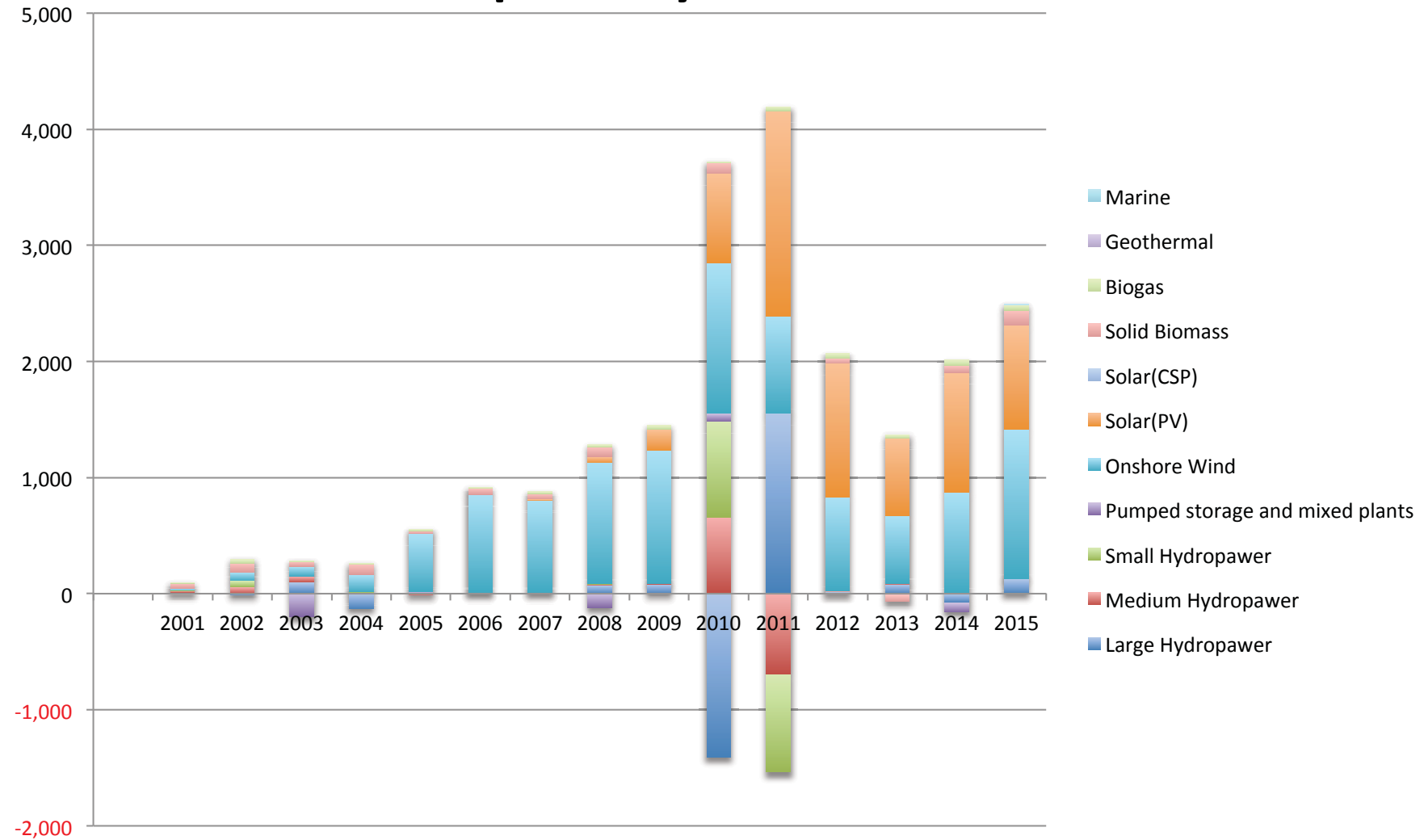
Renewable installation capacity: France



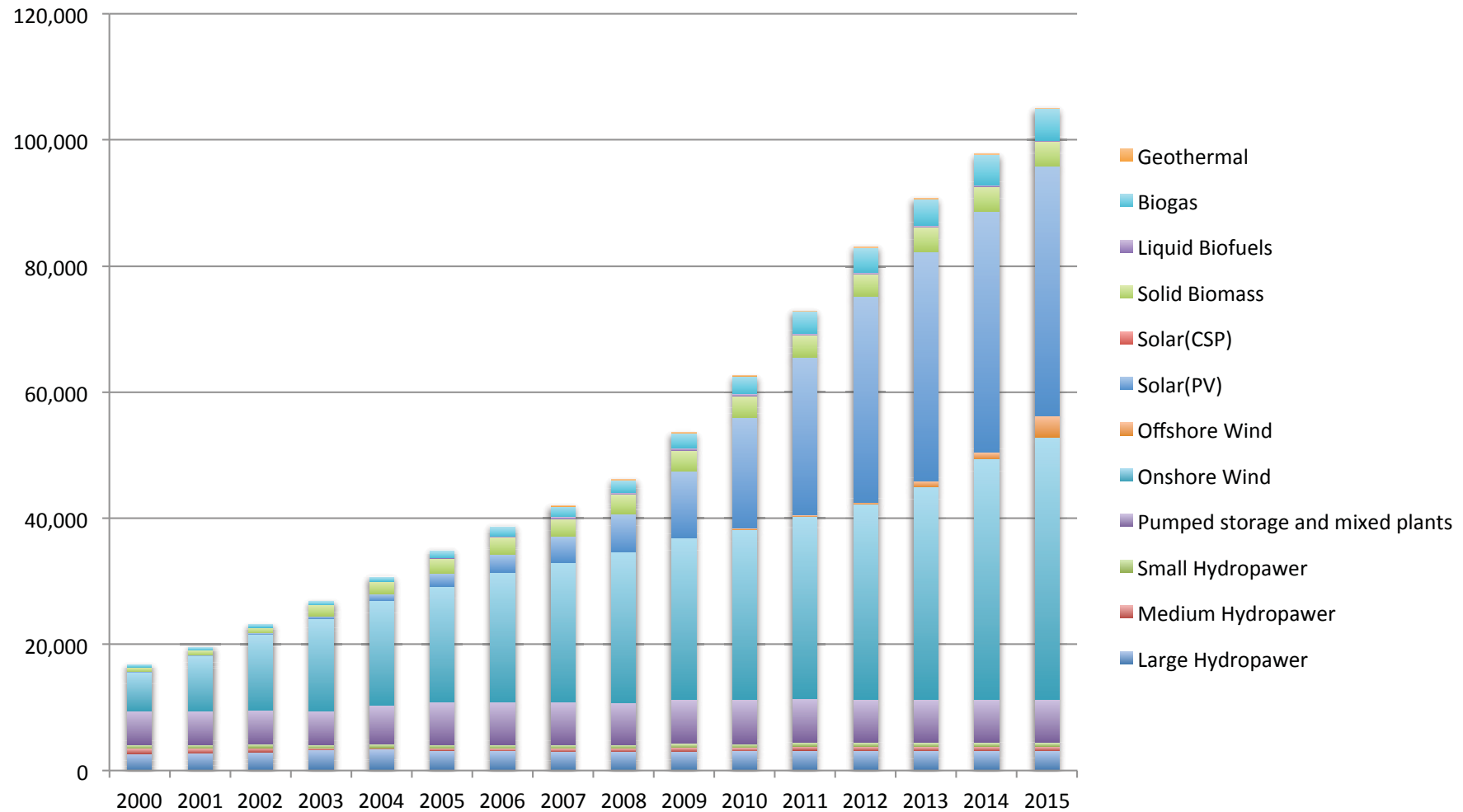
Renewable installation capacity: France



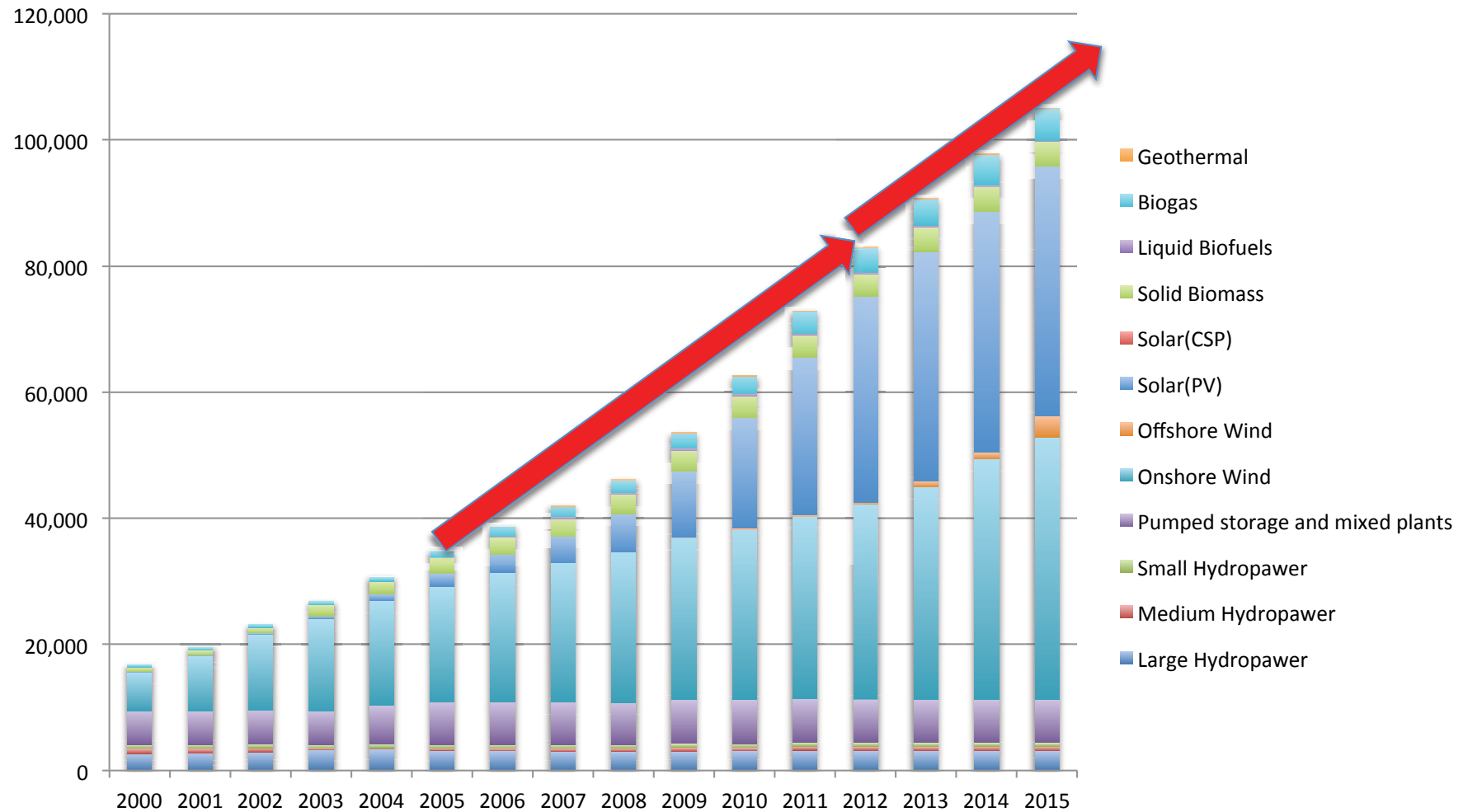
Additions of renewable installation capacity: France



Renewable installation capacity: Germany



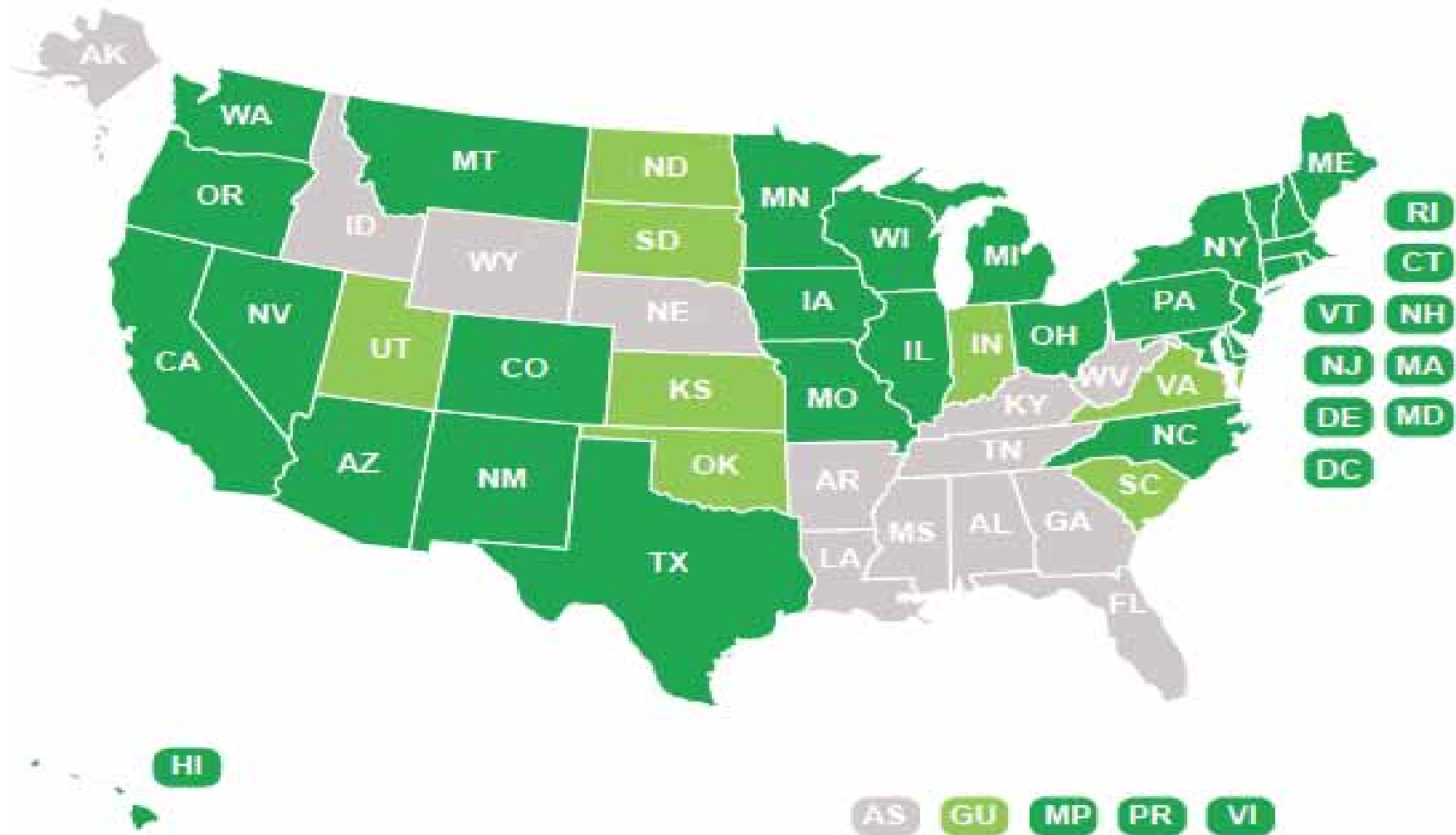
Renewable installation capacity: Germany



US renewable target and measures (1)

- “The President’s Climate Action Plan” provides for doubling share of renewable power generated by 2020 (about 26%) as the Federal target
- Measures at the Federal level: mainly tax exemption/ rebate for investment in renewable, subsidies
 - Promoting renewable energy is one of the candidate measures to be taken by States in the Clean Power Plan
- Measures taken mainly at the State level. Target and measures vary from State to State.
 - As of March 2016, 29 States and Washington D.C. introduced RPS (and renewable target), and 8 more States set renewable target.

Renewable target at the State level



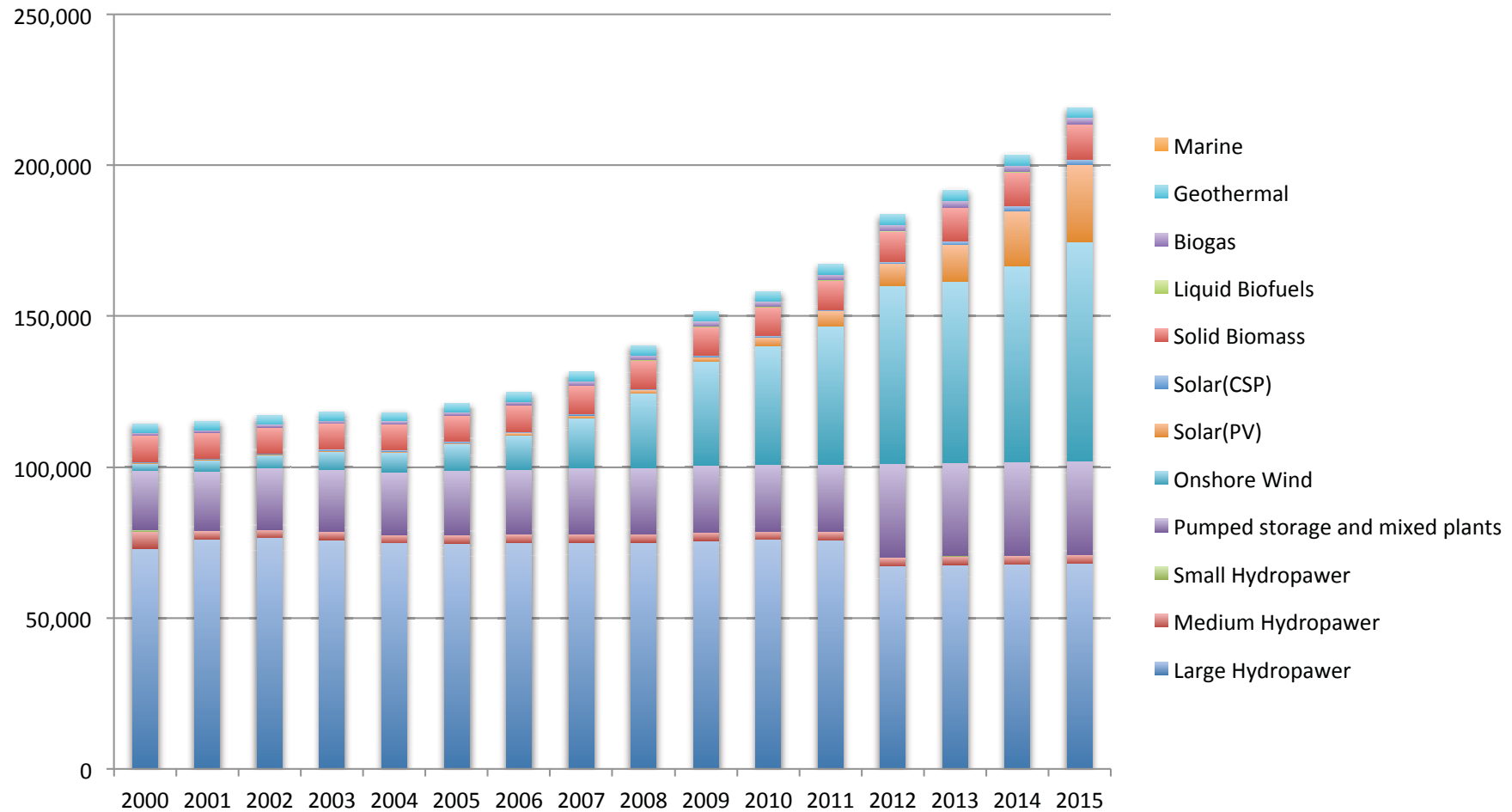
Source: Durkay, 2016.

Note: States in green introduced RPS; States in yellowish green set renewable target.

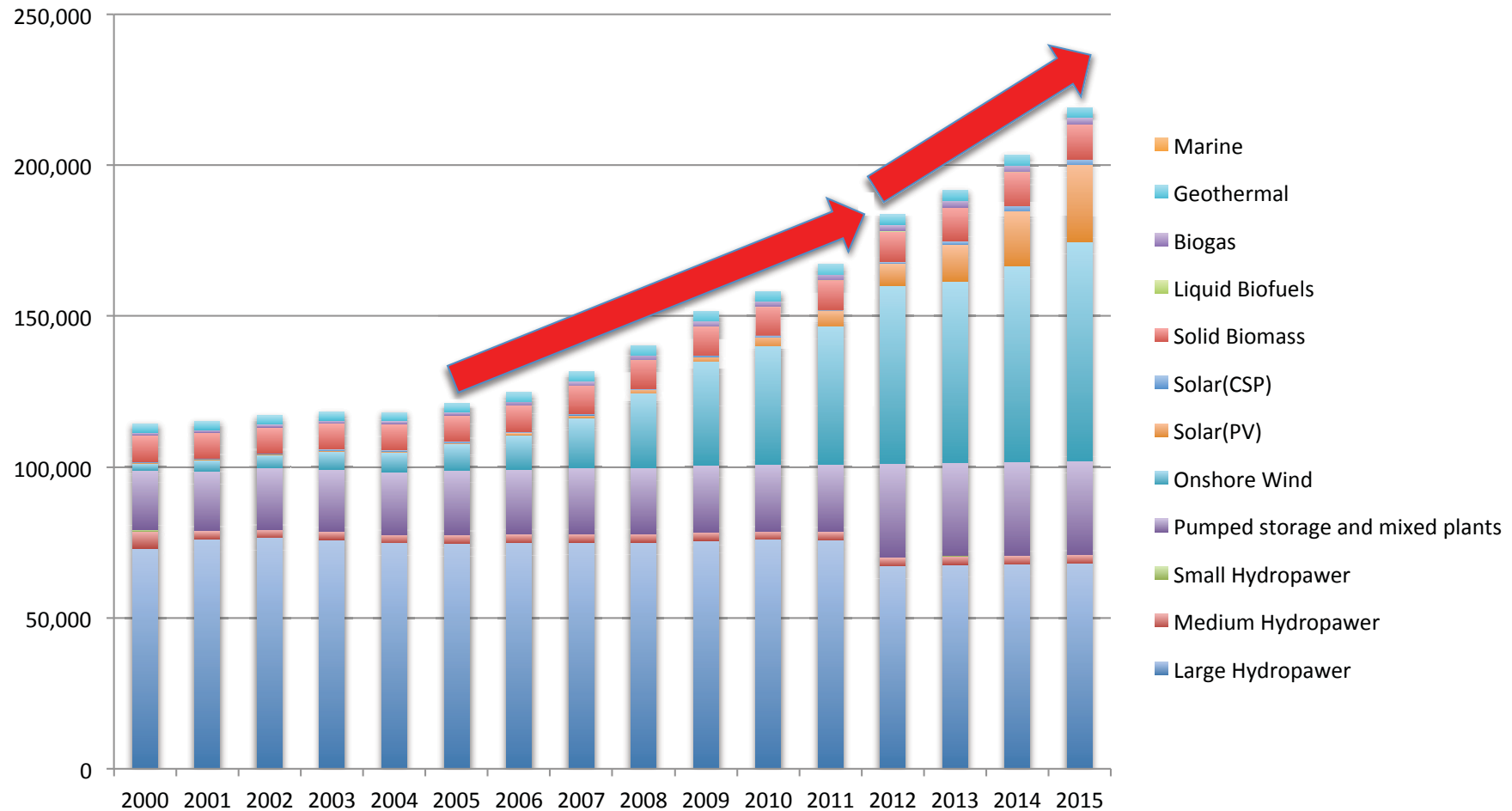
US renewable target and measures (2)

- Representative examples of actions by States
 - State of California
 - On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08 requiring that "...[a]ll retail sellers of electricity shall serve 33% of their load with renewable energy by 2020."
 - 2009 : Executive Order S-21-09 directed the California Air Resources Board, under its AB 32 authority, to enact regulations to achieve the goal of 33%.
 - 2011: Senate Bill X1-2 codifies 33% by 2020 RPS.
 - 2015 : 2015: Senate Bill 350 codifies 50% by 2030.
 - State of New York
 - 2004: 29% by 2015
 - In the process of setting a target of 50% by 2030
 - State of Hawaii
 - Started Hawaii Clean Energy Initiative in 2008
 - State government set 70% from renewable of power generated by 2030
 - 100% renewable by 2045 is codified
 - State of Texas
 - 5 Competitive RE Zone were designated as zone with large potential of wind power. Cost of grid is charged to power bill.

Renewable installation capacity: US



Renewable installation capacity: US



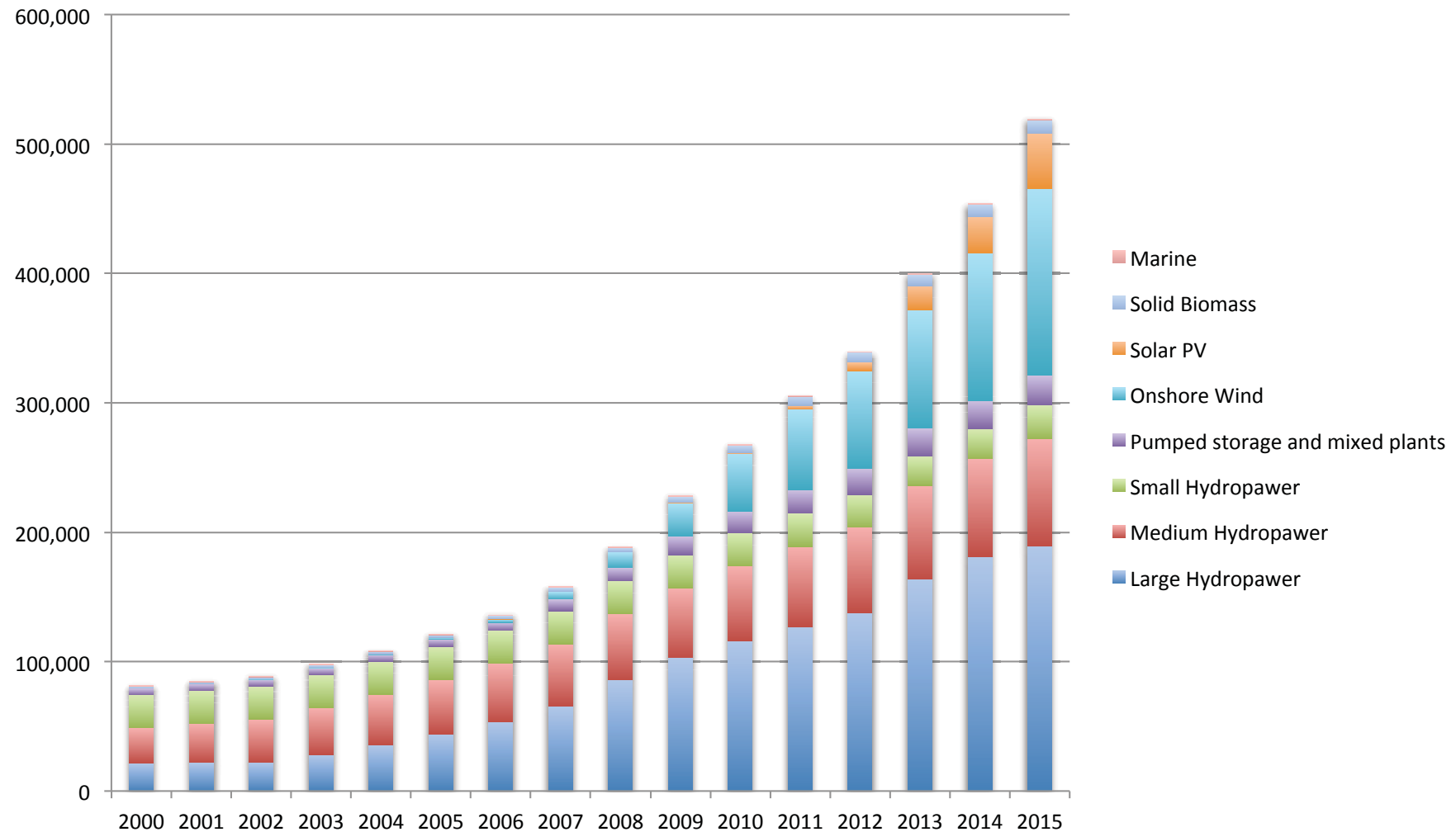
China: renewable target

- 2030 target (NDC)
 - Share of Non fossil fuel in primary energy consumption: from about 10% to 20%
 - No clear reference of ratio of renewable, but significant part is expected to come from renewable sources (cf. IRENA, 2014)
 - It is said that in 2012, China set a target to raise renewable share up to 20% by 2015.
 - Power installation capacity will expand from 968GW in 2010 to 1,786GW by 2020, renewable installation of which will expand from 250GW (about 26%) in 2010 to at least 600GW (33.6%) by 2020.
- 2050 scenario
 - Energy Research Institute, NDRC, China, 2015 consider a high penetration of renewables scenario.
 - 60% of final energy consumption in 2050, 86% of power generated will come from renewable sources.

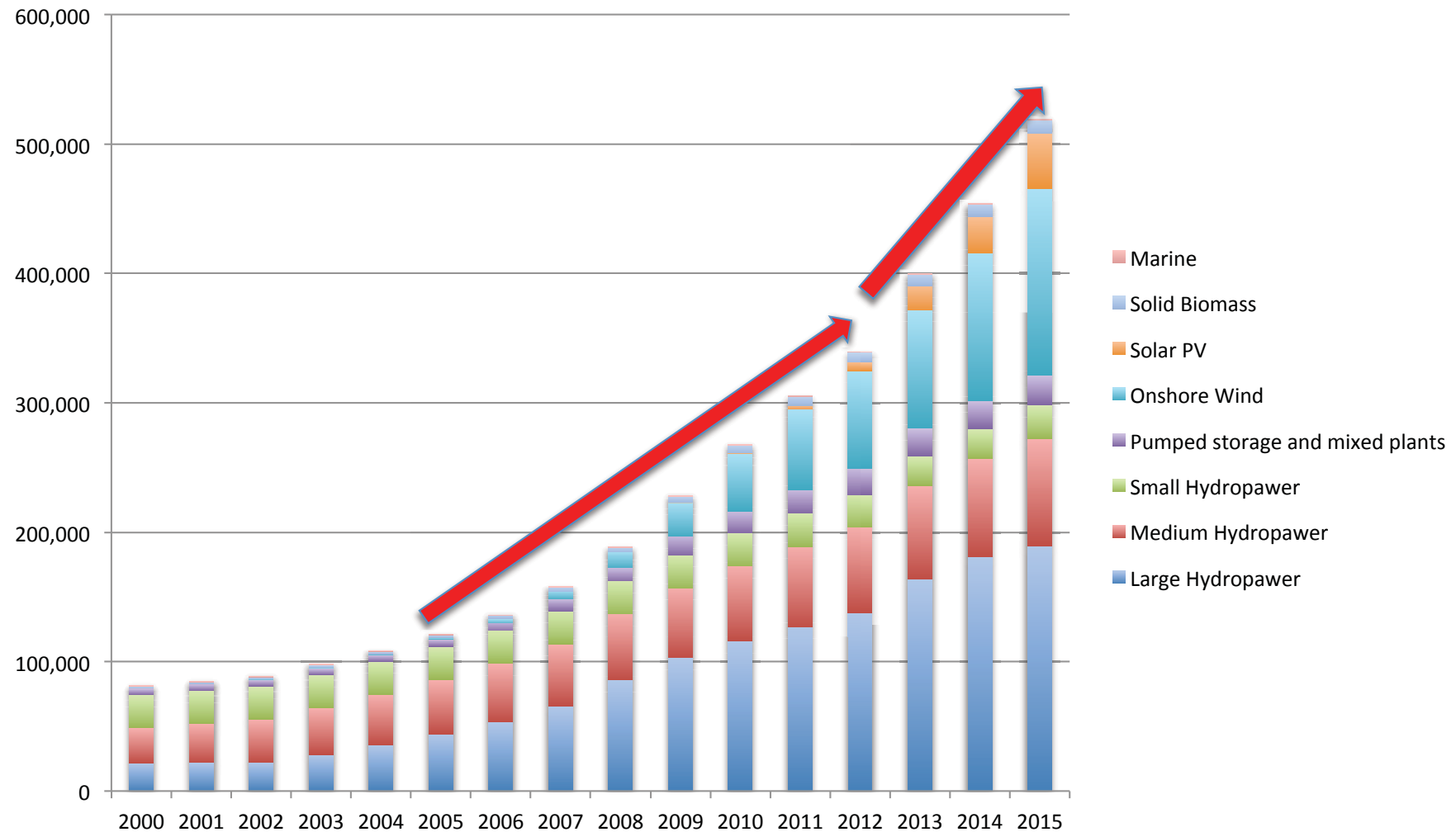
China: measures to promote renewables

- Introduction of FIT
- Subsidies by the Central government and local governments
 - Subsidies for installation
 - Subsidies for grid construction
- Considering RPS
- Grid network
 - Clarify the responsibility to construct, maintain and renovate the grid in line with renewable generation plan by Provinces and the Central Government on the part of grid operators (2006 Ordinance on renewable by NDRC)
 - Move towards an international grid connection between China (中国国家電網公司), Korea (KEPCO), Russian Grid (ROSSETI)、Softbank.

Renewable installation capacity: China



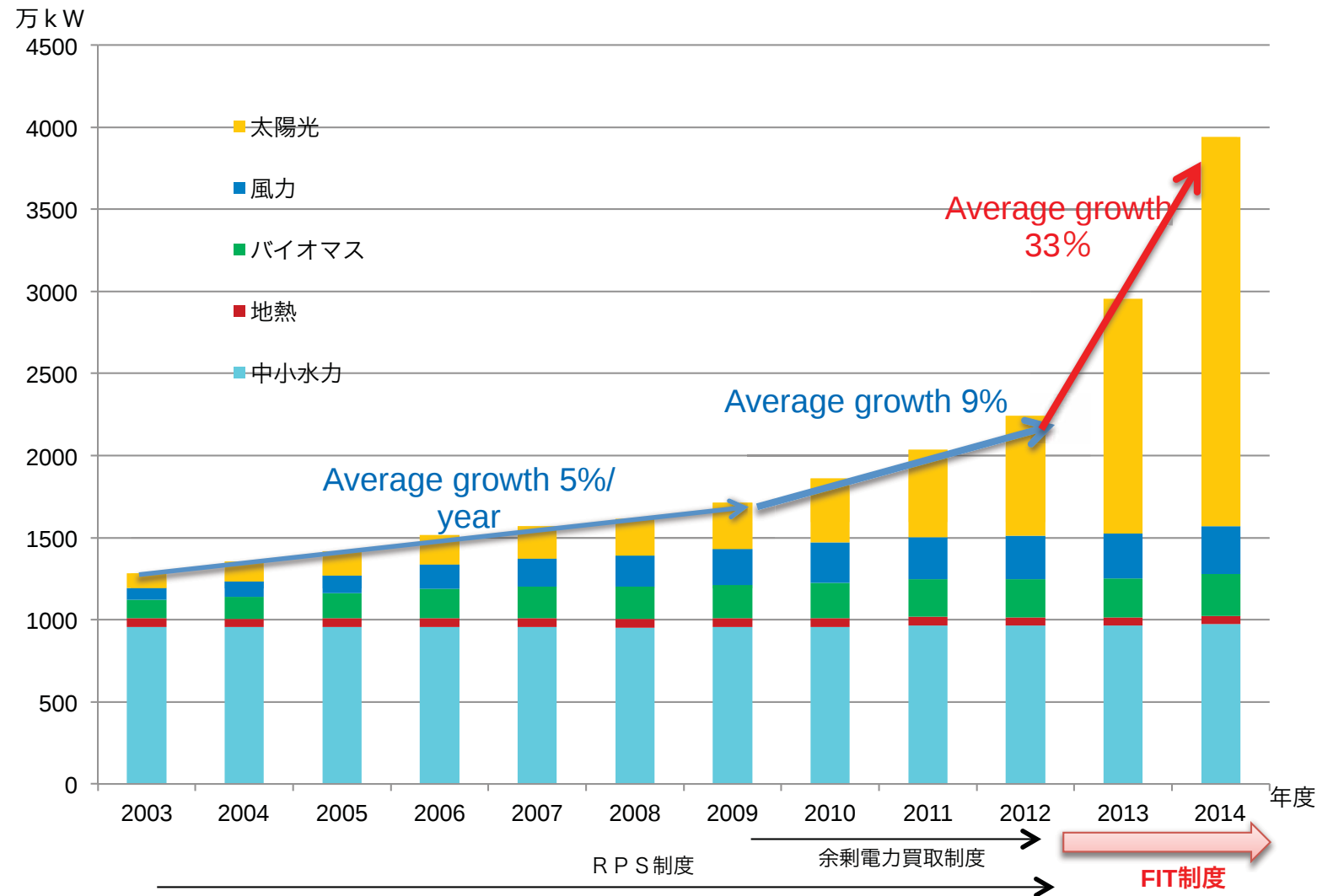
Renewable installation capacity: China



Japan: renewable target

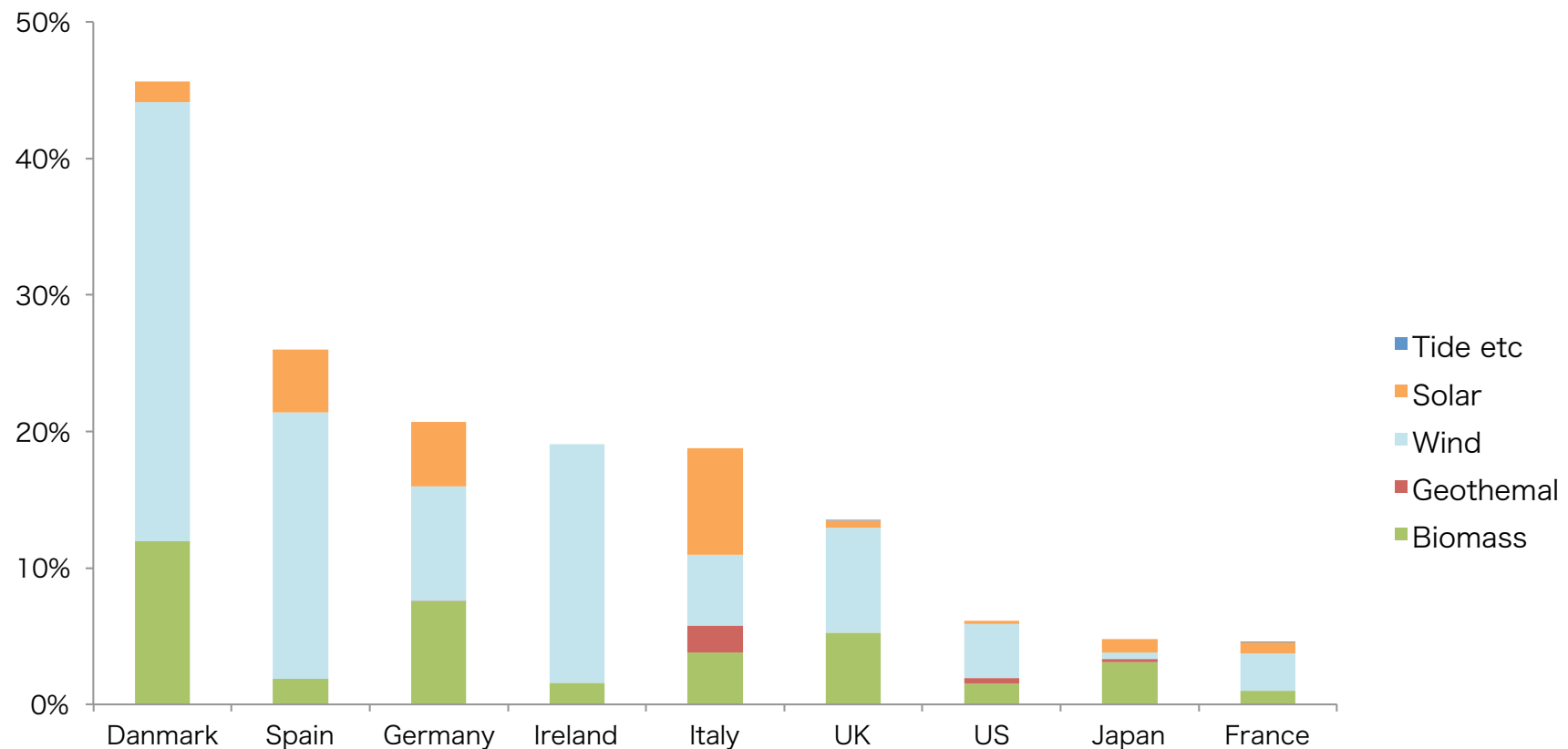
- By the introduction of FIT in 2012, RPS was set in place under the RPS act (2002).
 - In FY2014, 17.33GkWh (about 1.7% of power generated)
- Accelerated expansion of renewable energy under the Feed-in Tariff (FIT)
 - After 3.11, the Act on FIT was passed in Aug. 2011 and has been implemented from 1st July 2012.
 - Requires 10 Power companies to purchase all electricity from accredited renewable sources with the price determined by the independent committee, members of which are elected by Parliament (see Figure 1 of the draft).
 - “Introduction of renewable energy should be accelerated as far as possible for 3 years from 2013 on and should be aggressively promoted thereafter” (Strategic Energy Plan, 2014)
 - Under the FIT, share of renewable energy including large hydro has now increased from 8% (2010) to about 12% of power generated in 2015, which corresponds to about 3% of primary energy supply, but it is still low compared to other developed countries.
- Japanese energy policy has been mainly elaborated and implemented based on the “Strategic Energy Plan”, which the Basic Act on Energy Policy (2002) obliges the government to formulate.
 - Strategic Energy Plan is to be revised at least every 3 years and to be usually accompanied by the Long-term Energy Supply and Demand Outlook.
 - It is not really “target”.
 - Doubling renewable in 2030
 - No clear target for renewable other than electricity

Renewable installation capacity: Japan



(JPEA出荷統計、NEDOの風力発電設備実績統計、包蔵水力調査、地熱発電の現状と動向、RPS制度・固定価格買取制度認定実績等より資源エネルギー庁作成)

Share of renewables in Electricity Production (excluding hydro)(2013)



Sources: International Energy Agency, Renewables Information 2014 and Electricity Information 2014.

Assessment of actions (1)

	Candidate indicators	USA		China		Japan	
		2005-2012	2013-2025	2005-2012	2013-2025	2005-2012	2013-2025
Renewable energy	(1) Target setting	N(Y)	N(Y)	N	N(Y)	N	N(Y)
	(2) Measures to promote RE (FIT, RPS, etc.)	N(Y)	N(Y)	N(Y)	N(Y)	N(Y)	N(Y)
	(3) Grid	N(Y)	N(Y)	N	N(Y)	N	N
	Assessment	BC	B	C	BC	C	BC

Assessment of actions (2)

	Candidate indicators	EU		Germany		UK	
		2005-2012	2013-2025	2005-2012	2013-2025	2005-2012	2013-2025
Renewable energy	(1) Target setting	Y	Y	Y	Y	Y	Y
	(2) Measures to promote RE (FIT, RPS, etc.)	Y	Y	Y	Y	Y	N(Y)
	(3) Grid	N(Y)	Y	N(Y)	N(Y)	N(Y)	N(Y)
	Evaluation	AB	A	AB	AB	B	B

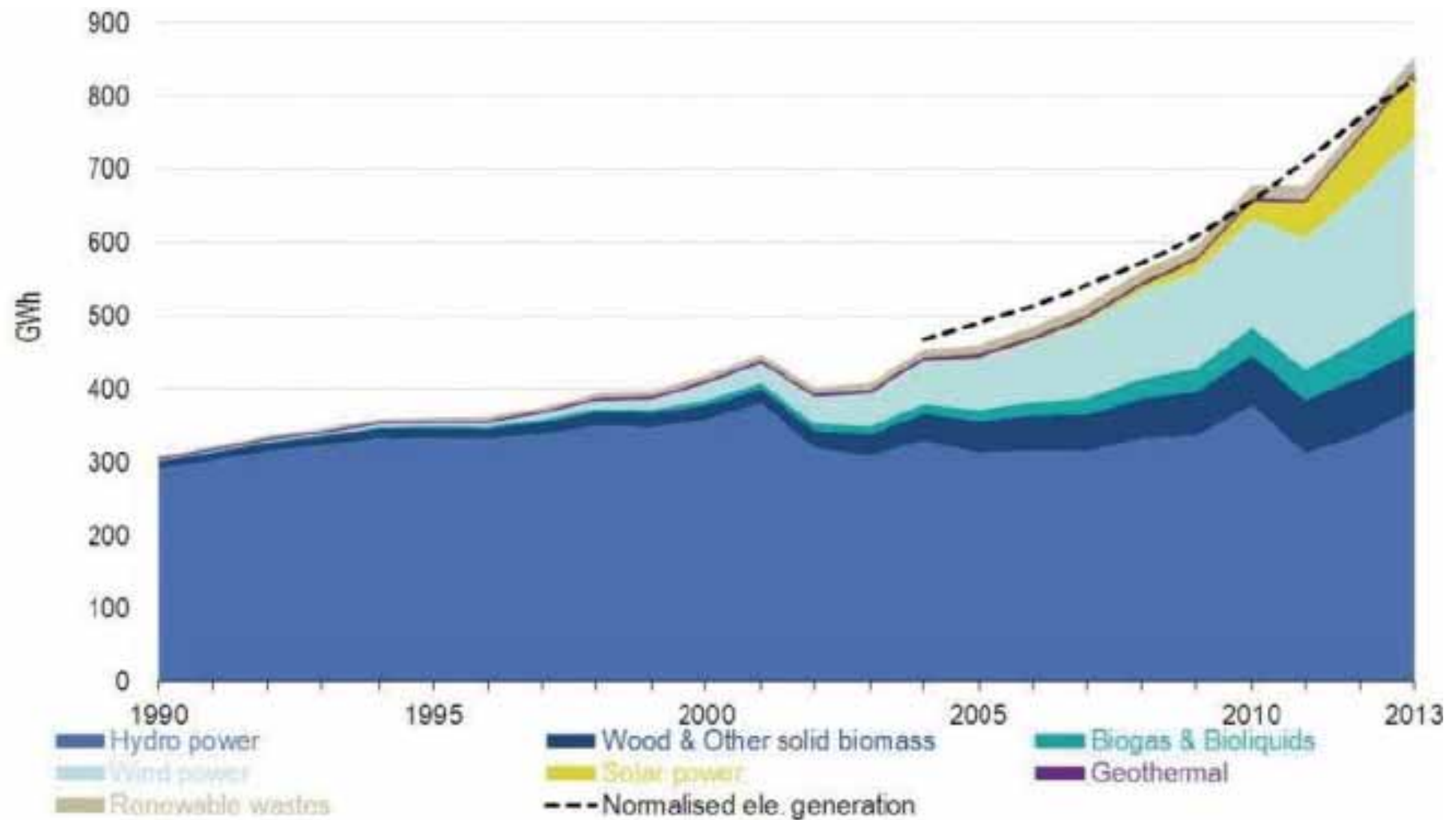
Some remarks (1)

- **Elaborating Indicators** for assessing country's renewable policy and **assessing it based on indicators** is a **valuable exercise for providing a new/multi-sided look at the status of the policy**.
 - Considering what would be appropriate indicator(s) is worthy for considering **what would be the action(s) which reflect/determine the strength/effectiveness of actions**.
 - From such perspective, we identify **3 actions for renewable policy**:
 - 1) Target setting
 - 2) Measures to promote RE (FIT, RPS, etc.), and
 - 3) grid policy.
 - Any other indicator(s)?
- **Assessment (rating)** is not to rank countries **rather to provide a basis for better understanding country's efforts and challenges, for enhancing transparency of actions and for facilitating dialogue between countries**.
- **Assessment (rating) may change**:
 - Because of **policy developments/changes**
 - Because more information becomes available.
- **Information on actions** is critical.
 - Without appropriate data/information, no appropriate assessment.
 - Important to have a **rule on information** to be provided by countries:
 - For negotiation on information of NDC and transparency of action.

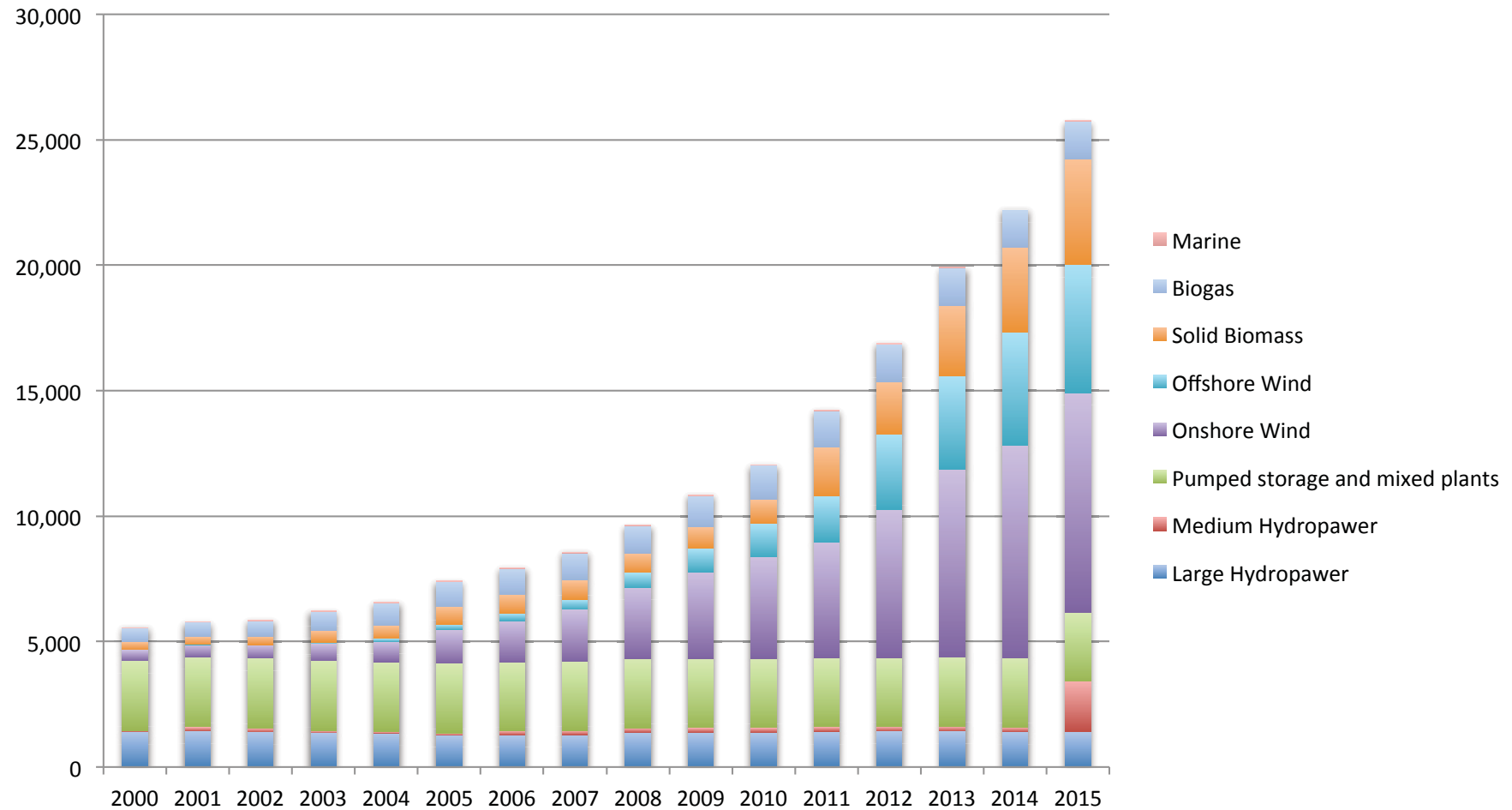
Some remarks (2)

- Difficulties and challenges
 - Margin of discretion to assess
 - Countries undertake a variety of actions at the various levels and their effectiveness varies depending on circumstances.
 - Putting the same rate (for instance, “N(Y)”) might not be because of the same reason.
 - Taking actions is not necessarily effective in achieving the outcome, and countries might achieve the expected outcome without significant actions.
 - If cost of renewable would become lower sufficiently enough to be competitive with other sources, introduction would be enhanced even without significant actions.
 - Some complementary tools/exercises could be useful.
 - Describing concrete actions and challenges in more details as complementary tool would enhance understanding and dialogue on them.
 - Assessment/ dialogue with experts on targeted country.
 - Linking with/ complementary use of some performance indicator(s)
 - Ex. Trends in capacity of renewable installation capacity

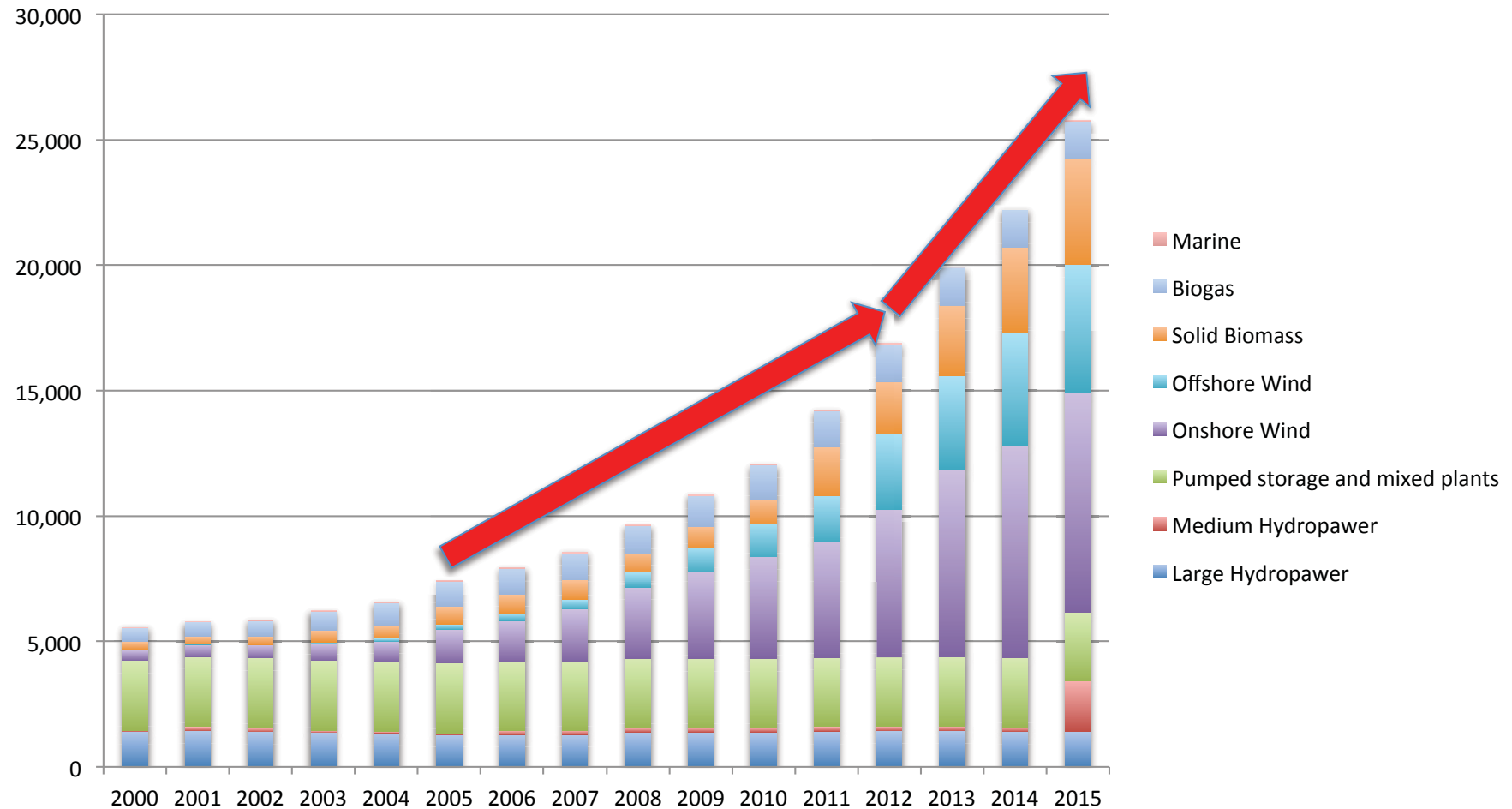
Trend of EU Renewable power generated



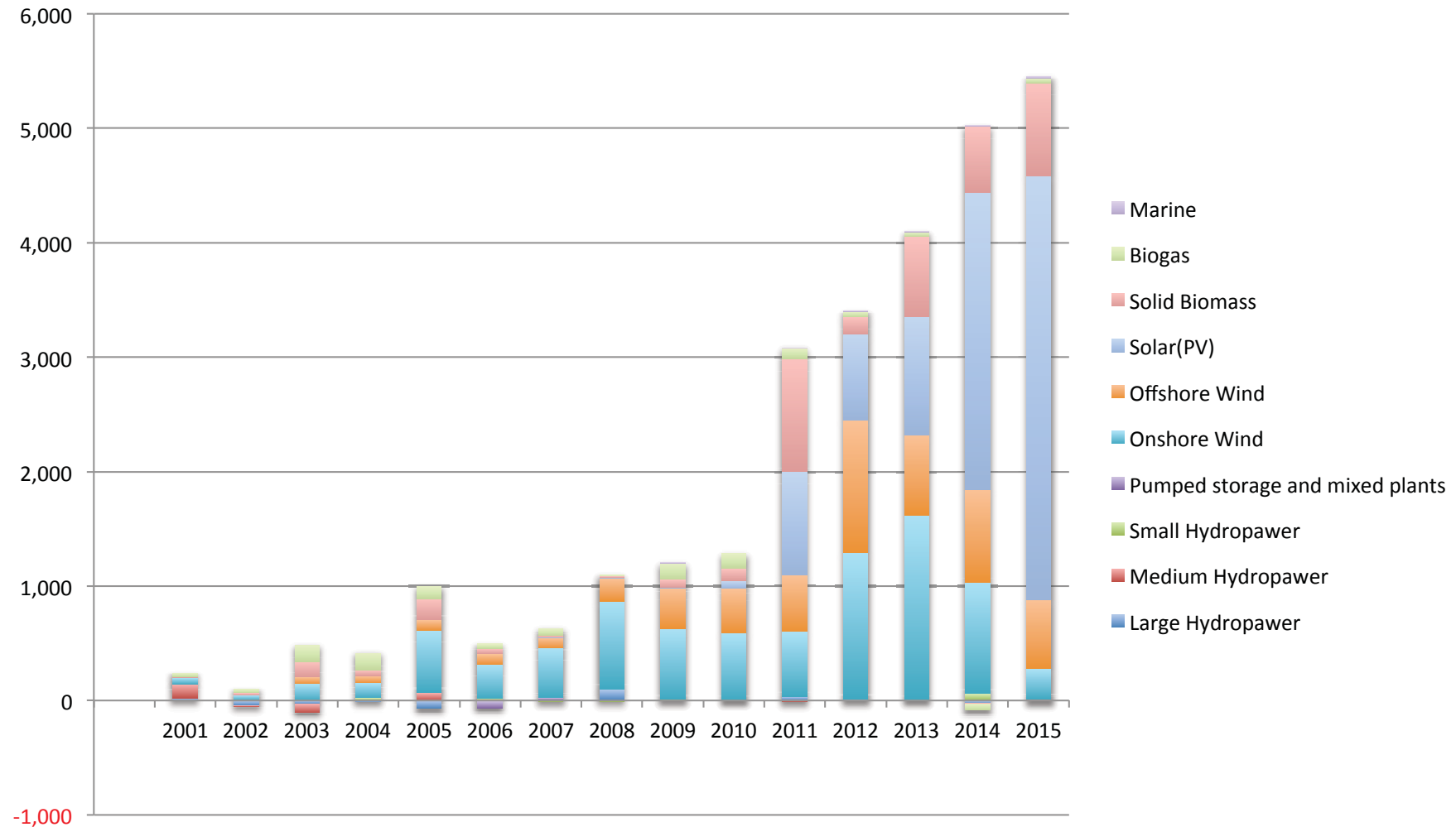
Renewable installation capacity: UK



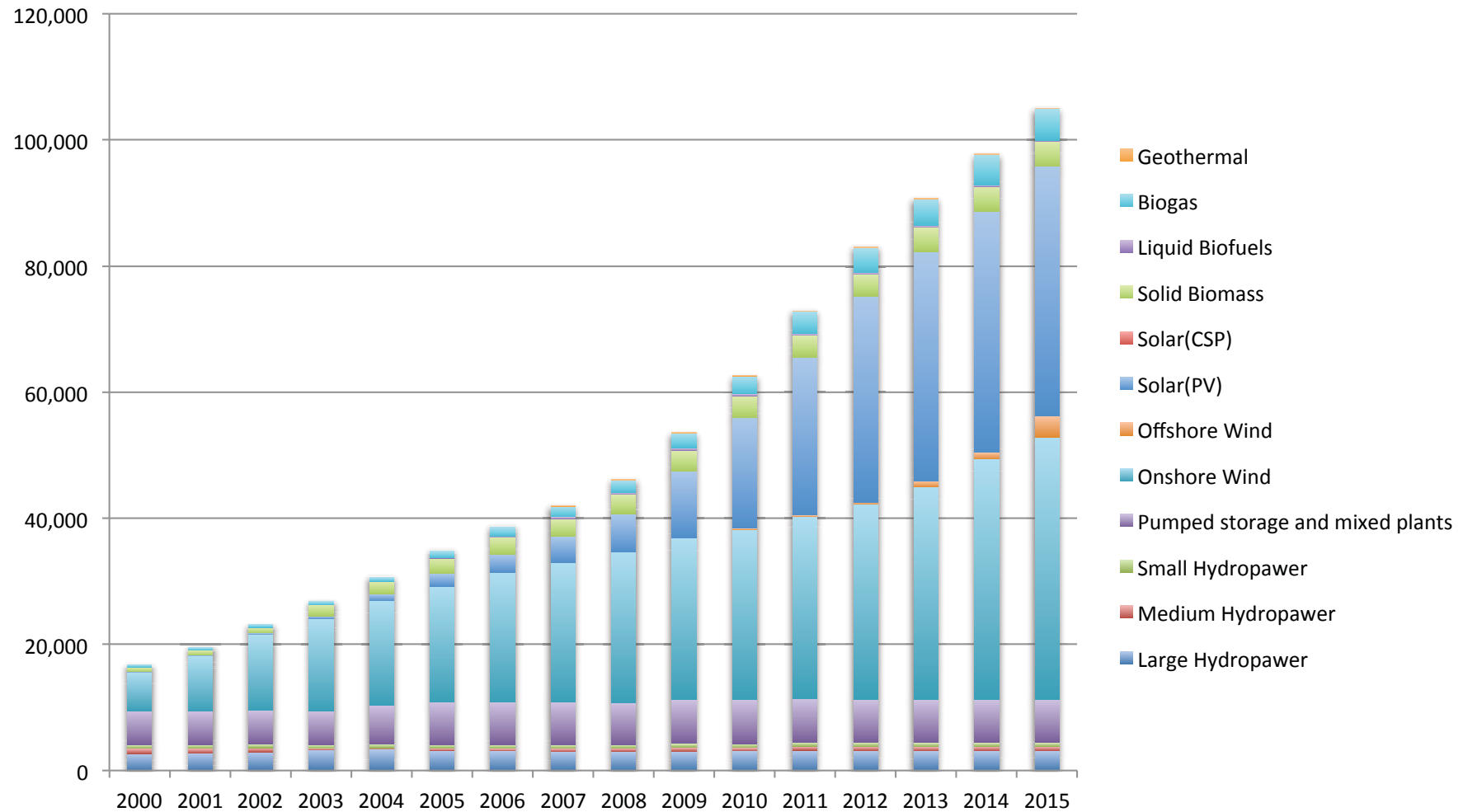
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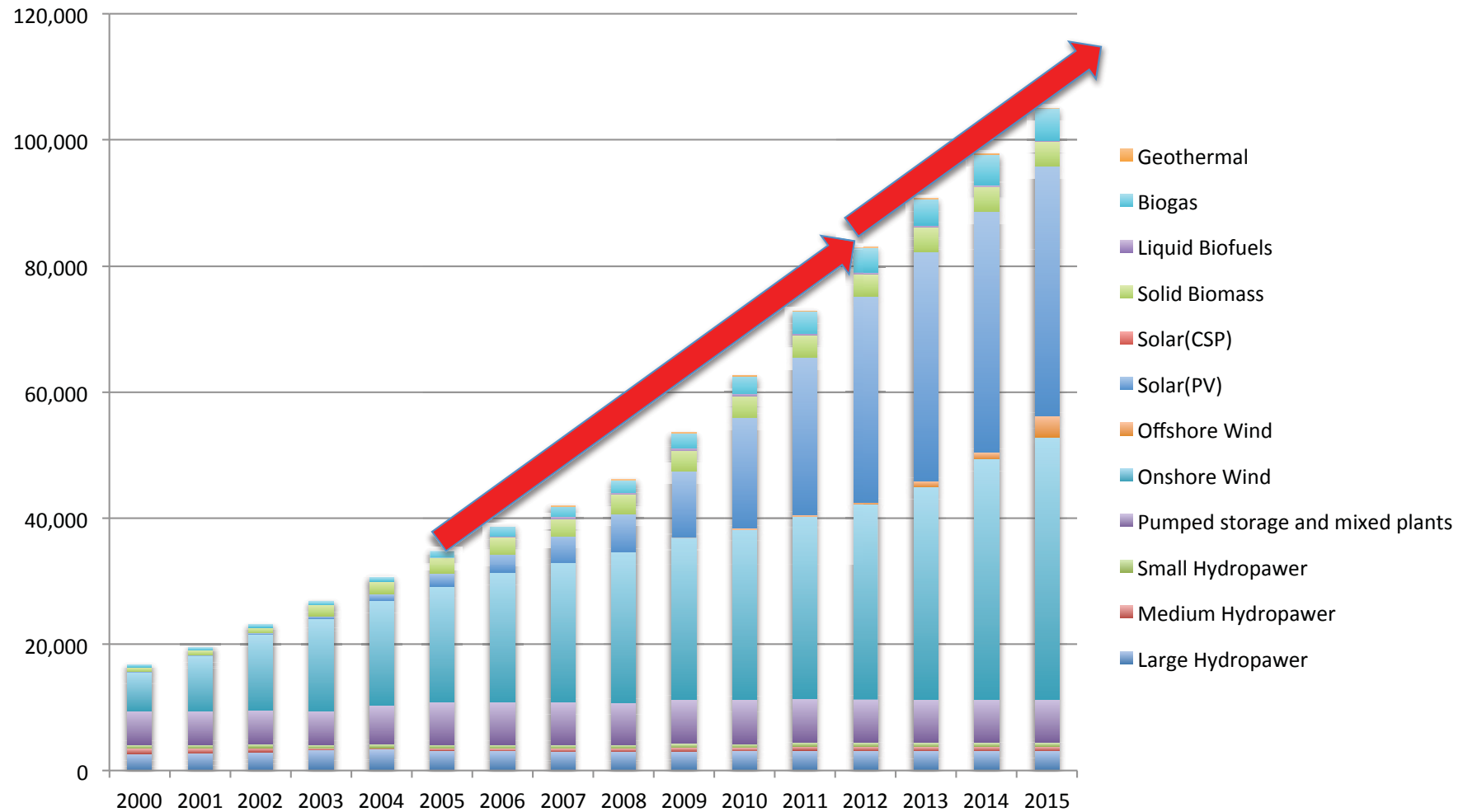
Additions of renewable installation capacity: UK



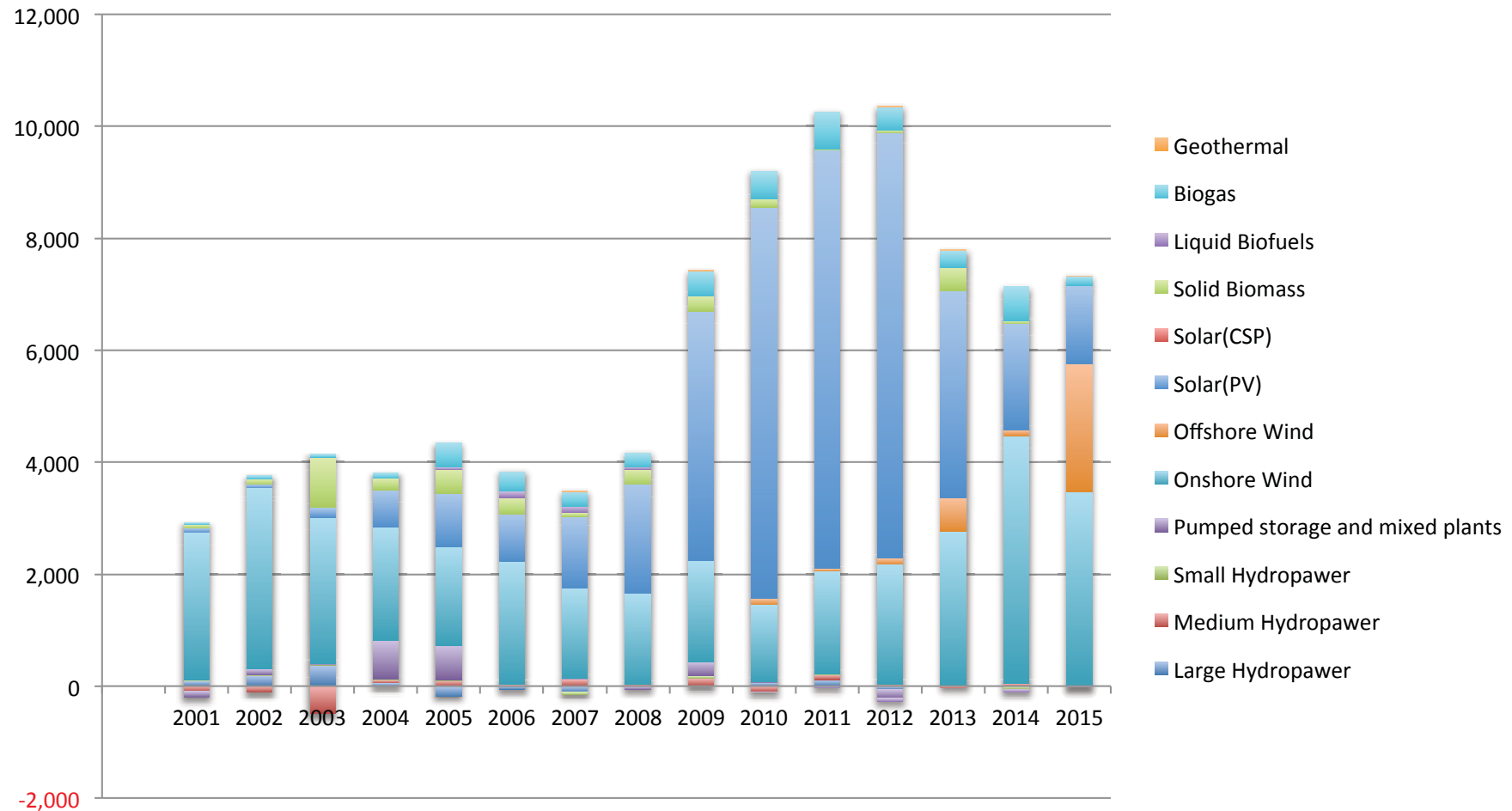
Renewable installation capacity: Germany



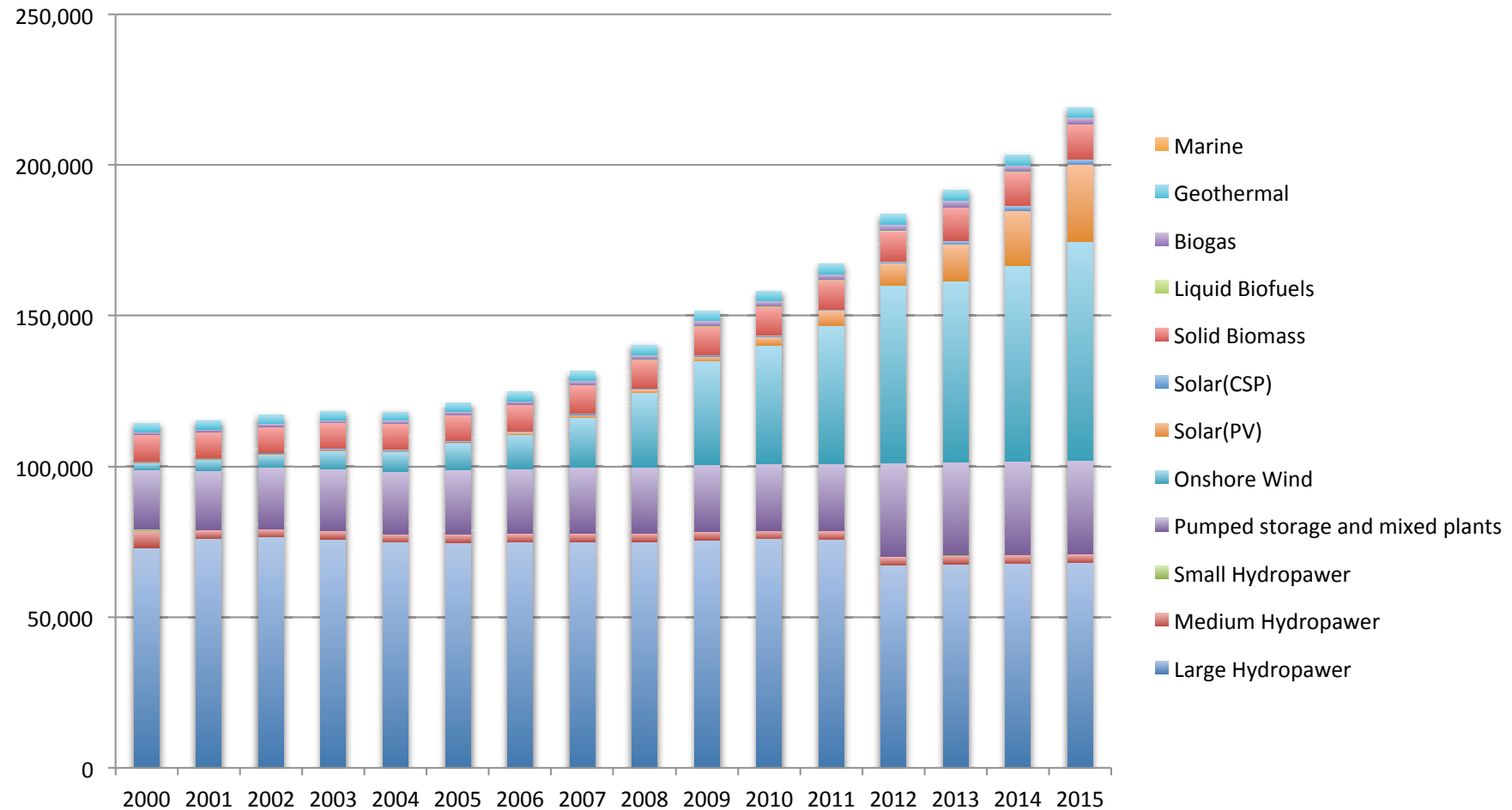
Renewable installation capacity: Germany



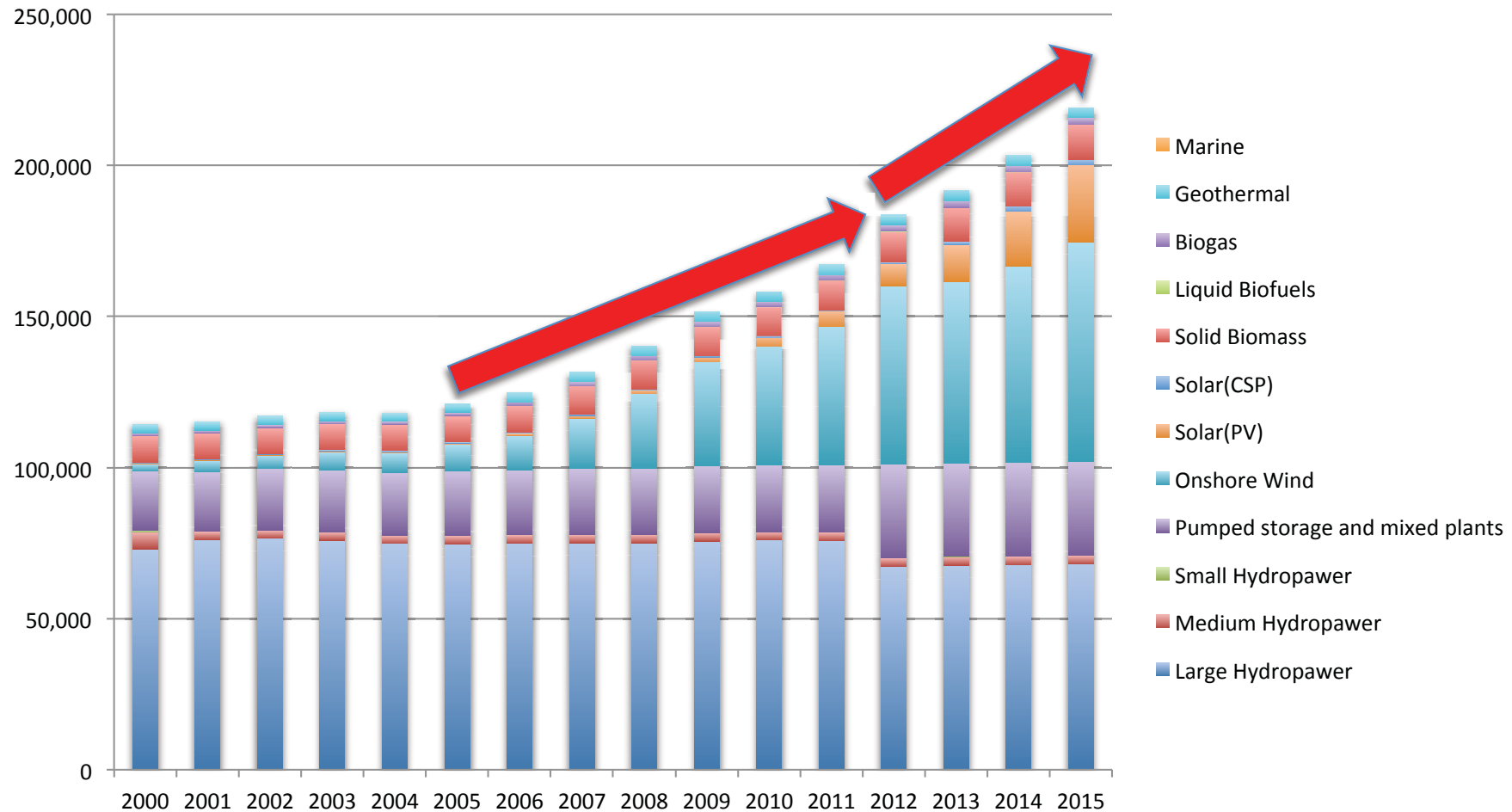
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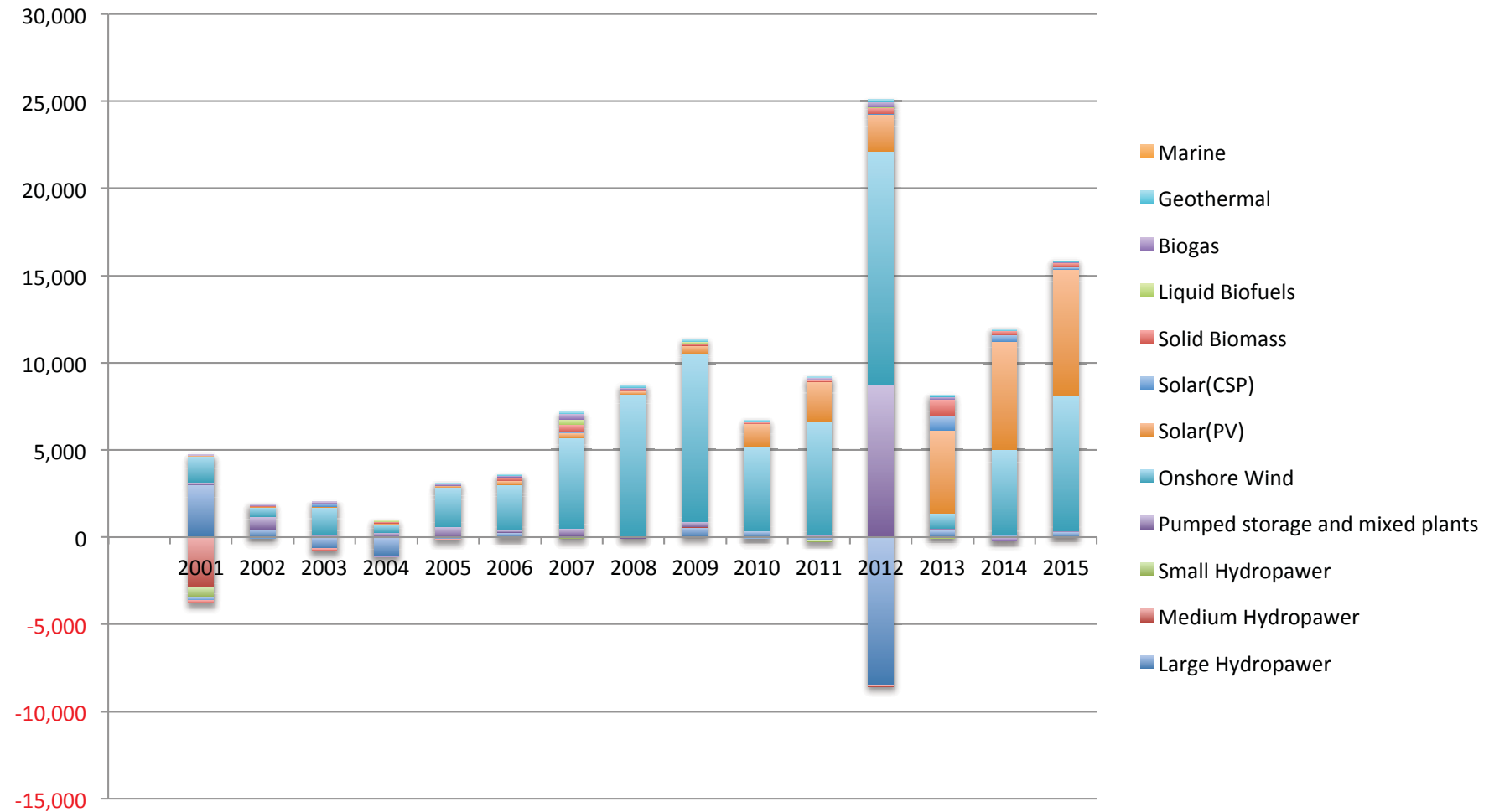
Renewable installation capacity: US



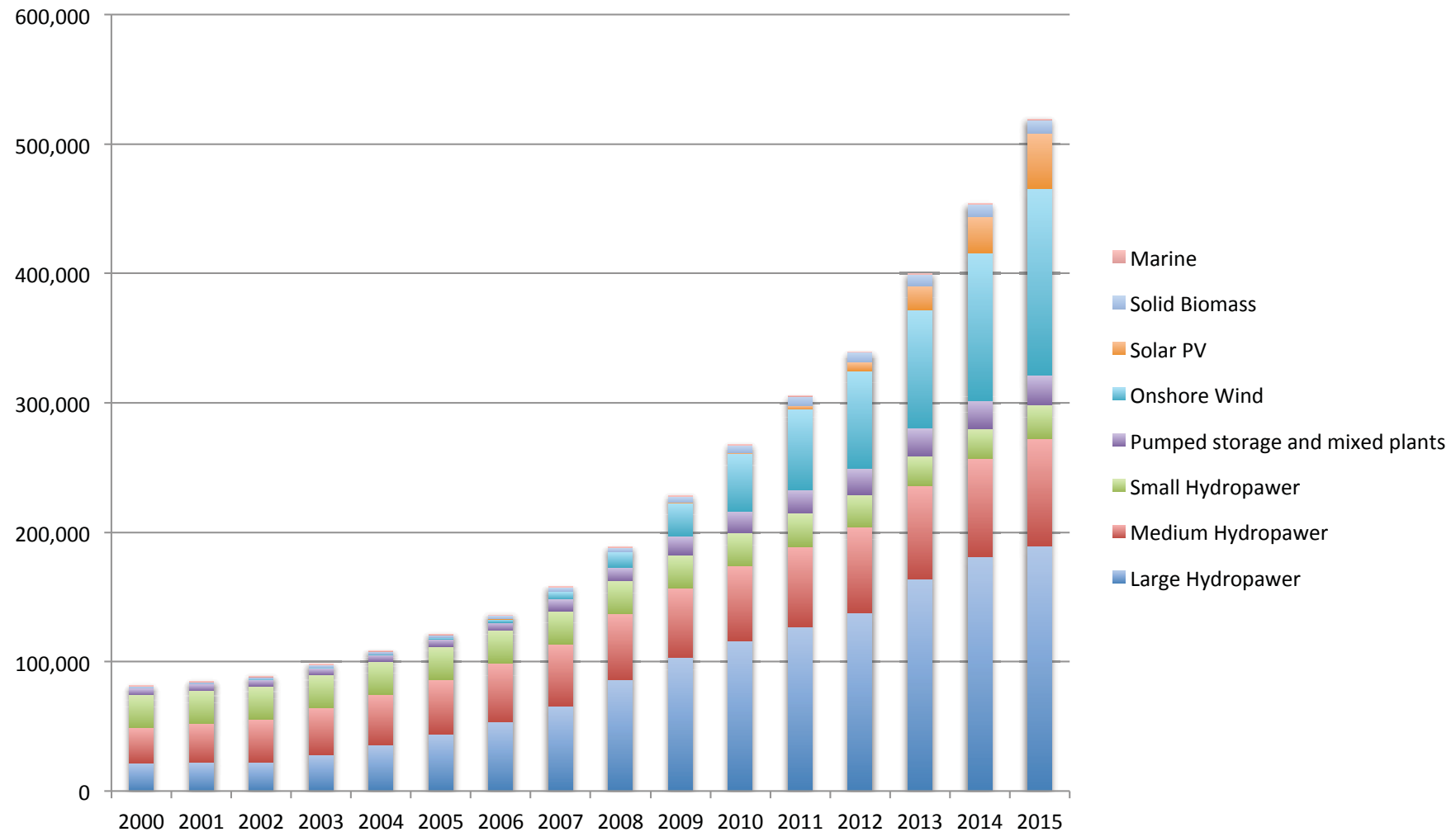
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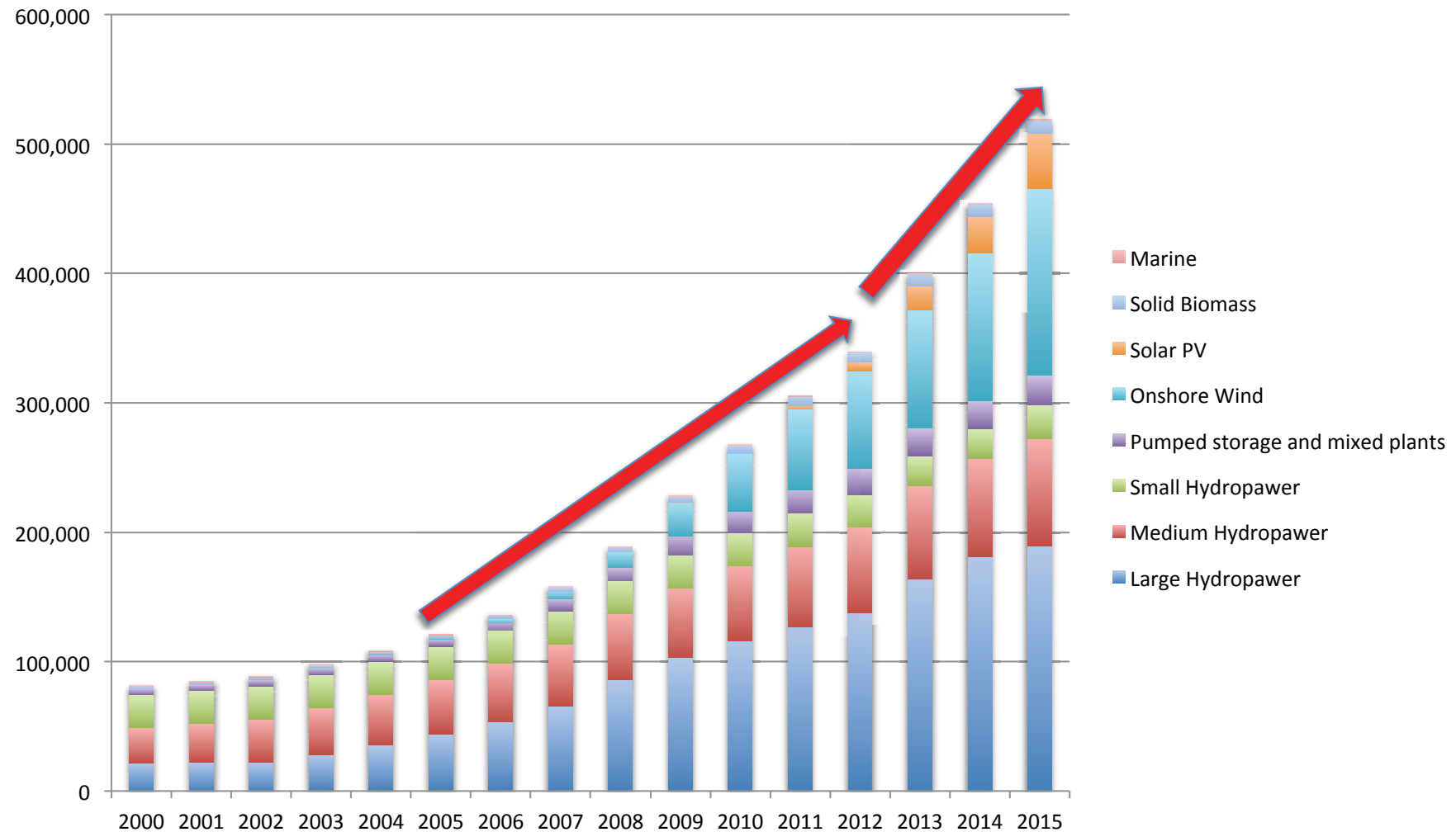
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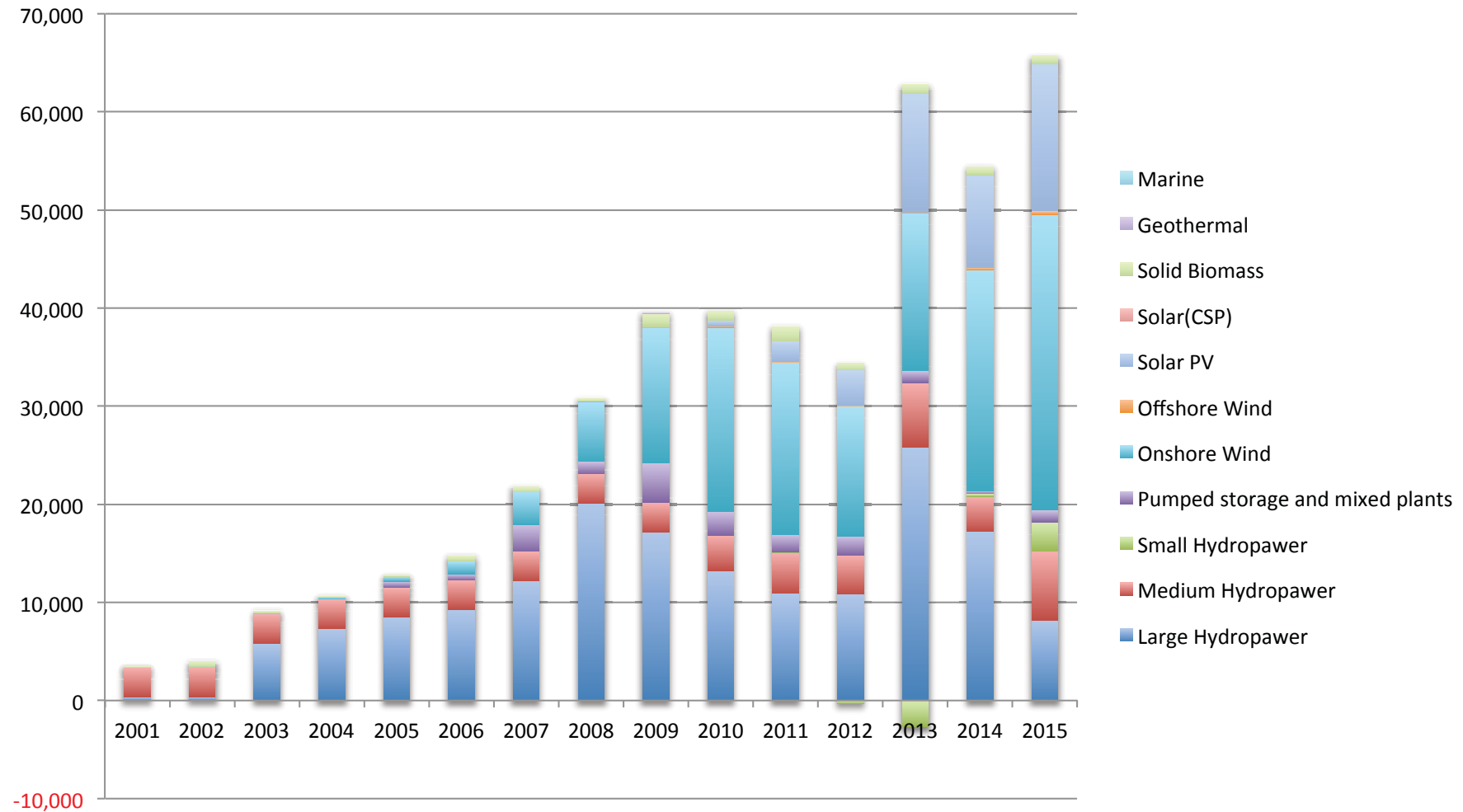
Renewable installation capacity: China



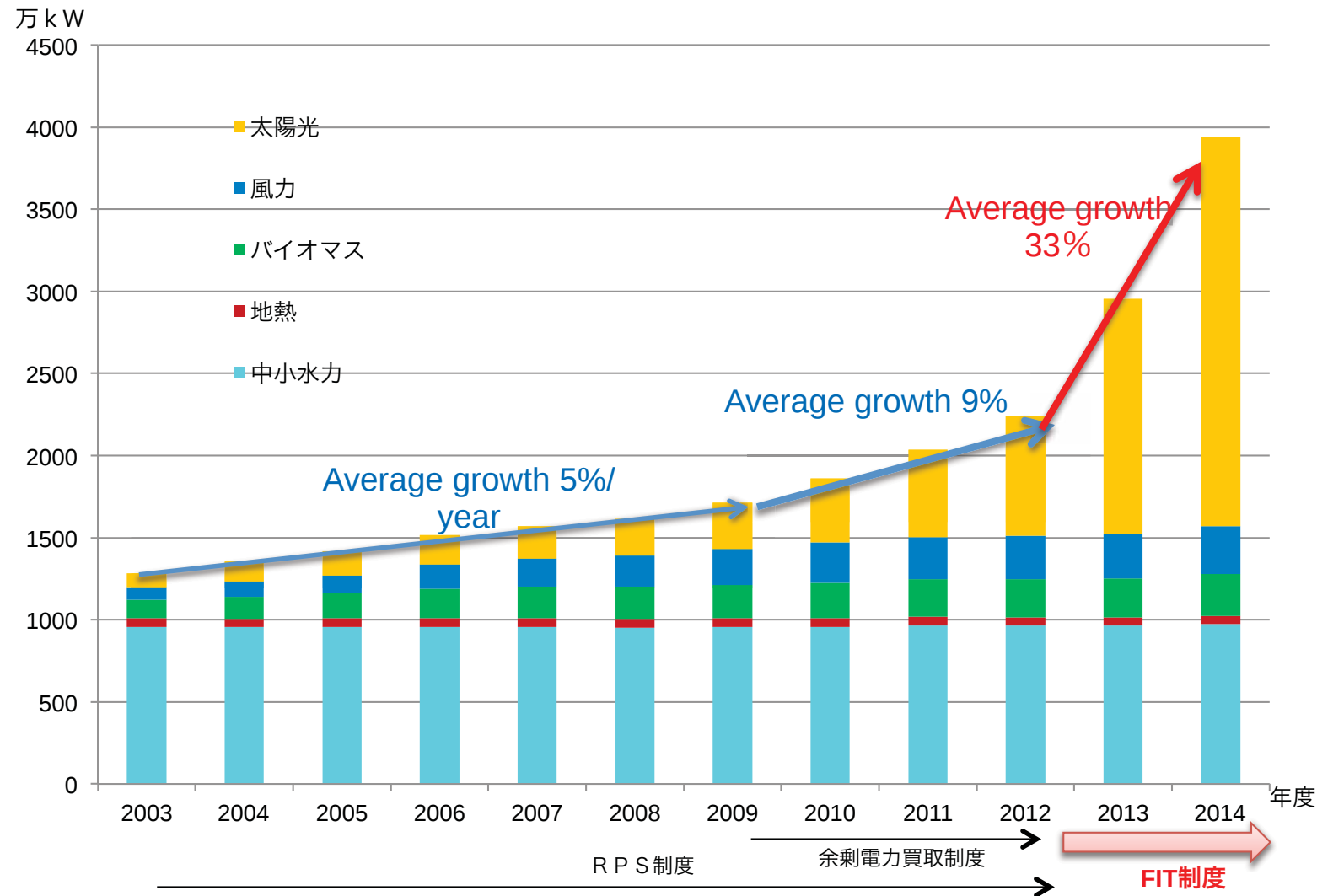
Renewable installation capacity: China



Additions of renewable installation capacity: China



Renewable installation capacity: Japan



(JPEA出荷統計、NEDOの風力発電設備実績統計、包蔵水力調査、地熱発電の現状と動向、RPS制度・固定価格買取制度認定実績等より資源エネルギー庁作成)