



China renewable power

Inevitable RPS and GC move, but limited short-term impacts

	Ticker	Rec	Mkt cap		Price	PT	Up/ dn (%)	EPS growth (%)		PER (x)		PBR (x)	
			(US\$m)	Ccy				2017E	2018E	2017E	2018E	2017E	2018E
Longyuan Power	916 HK	Buy	6,026	HKD	5.84	7.51	+29%	15%	15%	10.5	9.2	1.0	0.9
Huaneng Renewables	958 HK	BUY	3,514	HKD	2.59	3.22	+24%	6%	18%	7.8	6.7	1.0	0.9
GCL New Energy	451 HK	BUY	869	HKD	0.36	0.53	+49%	438%	41%	8.1	5.7	1.3	1.0
Datang Renewables	1798 HK	NR	728	HKD	0.78	-	-	174%	36%	9.0	6.6	0.4	0.4

Source: Bloomberg, Company data, CSCI estimates; price as of 24 May 2017

- The voluntary trading of Green Certificate (GC) will start in Jul-2017, which, in our view, will have limited impacts on wind and solar operators due to a lack of compulsory buyers.
- In our view, both Renewable portfolio standards (RPS) and GC are necessary and feasible policies during the 13th FYP to promote for a healthy long-term development of the renewable power sector.
- We continue to prefer wind power plays to solar plays, given the formers' intact growth outlook as well as historical-trough valuations, and the latters' extensive exposure to the risks of extended subsidy delay.

Market concerns overdone, GC not a substitute of FIT. Recently, there have been rising market concerns regarding the upcoming GC mechanism, given the suspicion that the GC launch would negatively affect the operating return on existing renewable power projects due to notable tariff discounts and also lead to account receivable write-off among solar and wind power operators. We acknowledge such possibilities, but think it is too early to draw such a conclusion. Moreover, we expect GC to be the supplements to renewable energy funds, instead of replacing projects' granted FIT.

We expect GC trading to be thin in near term, hence limited impacts. While the voluntary GC trading would commence on 1st July 2017, we expect trading volume to be thin in the near term due to the lack of compulsory buyers, and we find uncertain GC pricing as renewable operators would balance project IRR, given earlier cash inflow vs. tariff discounts, and could merely forego the GC option. Wind projects included in the 7th batch of subsidy catalogue are most likely to participate as they can afford the least expensive GCs (avg. subsidy of Rmb0.22/kWh vs. Rmb0.57-0.68/kWh for solar), which also help accelerate the process of the 7th batch of catalogue, in our view.

RPS and GC are sensible policy moves during the 13th FYP. Firstly, RPS would be the effective measure to improve renewable power dispatch and consumption, which is top priority given China's persistent curtailments. Secondly, institutional bottlenecks of implementing RPS are resolving owing to the new rounds of power sector reforms since 2015, especially a marketised tariff setting for inter-provincial transactions. However, it is currently difficult to enforce binding obligations against any of the potential compulsory buyers, which have witnessed long-existed disputes and are also subject to the progress of power reforms. Lastly, GC could help relive the amassing burdens of renewable fund deficits, by transferring some subsidy responsibility from the central government to the compulsory buyers.

We continued to prefer wind power to solar power plays. We reiterate BUY on LYP and HNR given their growth outlook coupled with historical-low valuations, and as we see limited short-term impacts from the GC launch. Meanwhile, we have turned more cautious on solar operators due to their higher risks of extended subsidy delay (massive uncovered capacity, fund deficits).

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GC and RPS are sensible polices

Operation of GC to commence in Jul-2017

In Feb-2017, NDRC, MoF and NEA jointly released *The Notice on Trial Operation of Green Certificate Issuance and Voluntary Trading of Renewable Power* (关于试行可再生能源绿色电力证书核发和自愿认购交易制度的通知), key terms are summarized below:

1Green Certificate = 1MWh non-hydro renewable power generation. As suggested in the notice, the regulator would assign 1 Green Certificate (a unique electric credential) for each 1MWh of power generation from qualified onshore wind projects and ground-mounted solar projects. China National Renewable Energy Center (CNREC) would be the regulator and in-charge of the qualification, issuance, trading and settlement of GCs.

Projects are eligible only after inclusion into subsidy catalogues. As application for GCs is only open for onshore wind power and ground-mounted solar power projects at the current stage, offshore wind power, DG solar power or biomass projects are excluded. Furthermore, the onshore wind power and ground-mounted solar power projects would only qualify after their inclusion into the subsidy catalogues (consistent with GC's price setting requirements as the renewable subsidy of each project is confirmed and sequentially settled only after the project's inclusion into the catalogue).

GC price set by negotiation/bidding and capped by subsidy amount. The unit price of power generation under GCs cannot exceed their respective subsidies of the renewable projects (feed-in-tariff = benchmark thermal tariff + renewable subsidy). The price of the GCs could be set either by negotiation or competitive bidding, and GCs can only be sold once within its validity period as resale is prohibited; once GCs are sold, the corresponding amount of power generation would no longer be entitled to receive the renewable subsidies from the central government.

Voluntary trading to start in Jul-2017, with buyers the largest uncertainty. Voluntary trading would commence on 1st July 2017, with enterprises, public institutions and natural citizens all being encouraged to participate (yet we find very limited incentives for them to buy GCs). Compulsory trading is suggested to start in 2018 with the launch of renewable quota assessments, and the targeted entity for assessment would be determined later subject to the progress of market reforms.

Impacts on renewable power operators

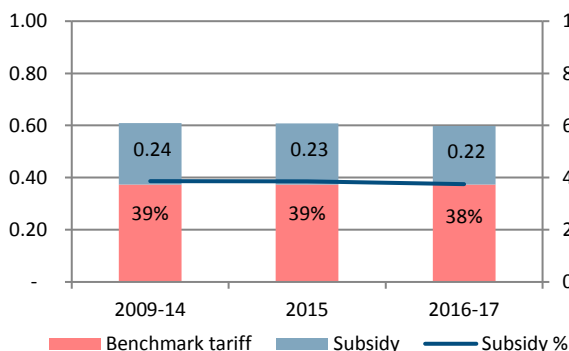
Accelerated process of the 7th batch of subsidy catalogue. As wind and solar projects are permitted to register for GCs for their power output only after inclusion into the subsidy catalogues, we view the commencement of GC trading on Jul-2017 would accelerate the process of the 7th batch of subsidy catalogue, which was open for application in Mar-2017 with submission deadline on 30-Jun. Also, given that eligible projects for the 7th batch must connect to the grid by end of Mar-2016, we estimate the 7th batch catalogue would roughly consist of 34GW wind projects and 17GW solar projects. Meanwhile, beyond the 7th batch, which is currently in process, and based on the grid-connected capacity as of end of Mar-2017, there are still 51GW of uncovered capacities that have been connected to the grid after Mar-2016, and the composition mix is reversed to c.30% wind power and c.70% solar power (*details see figure 3*).

To recall, the first five batches of subsidy catalogue were approved during 2012 to 2014, covering projects connected to grid by Aug-2013 (74GW wind + 6GW solar projects). Since then, there was an over-two-year gap before the launch of the 6th batch of subsidy catalogue, which was open for application in Jan-2016 and approved in Sep-2016 and covers projects connected to the grid during Sep-2013 to Feb-2015 (32GW wind + 20GW solar).

Value accretive to project IRR given trade-off between cash flow and tariff. In contrast to enlarging amount of projects eligible to offer GC for trading, the demand remains ambiguous on potential buyers, especially the compulsory buyers. Accordingly, the market suspect insufficient demand to result in significant discounts to projects' existing subsidy, thus negatively affecting projects' return. We acknowledge such possibility, but think it is too early to draw such a conclusion. On the one hand, with a strong enforcement of RPS, it is likely to induce adequate demand to keep GC pricing on par with projects' subsidy, which would improve projects' cash inflow without bearing tariff discounts. On the other hand, even if GC trades at a discount, the project operators could improve project IRR by balancing between earlier cash collection and tariff discount, or they could merely forego the GC option.

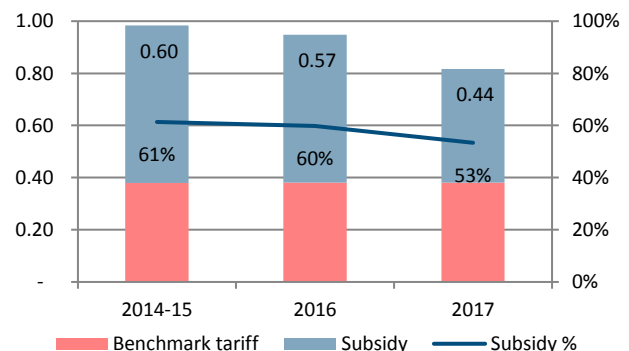
Buyers bias towards GC of wind power and more recent projects. Taking into account that the amount of GC granted is measured by power generation volume while wind and solar projects receive different subsidy per kWh (subject to their grid-connection time and geographical location), we expect wind power projects and more recent projects would make up a large part of the GC trade, such as wind projects included in the coming 7th batch of subsidy catalogue, at least at the early phase. Based on the provincial average, renewable subsidy constitutes approximately 40% of wind power feed-in-tariff with the amount in the range of Rmb0.22-0.24/kWh. Meanwhile, the subsidy constitutes 61-53% of the solar power feed-in-tariff with the amount notably falling from Rmb0.60/kWh for 2014-15 to Rmb0.44/kWh for 2017.

Figure 1: Wind Feed-in-Tariffs (Rmb/kWh, incl. VAT)



Source: NDRC, CSCI Research Estimates

Figure 2: Solar Feed-in-Tariffs (Rmb/kWh, incl. VAT)



Source: NDRC, CSCI Research Estimates

GC is the consequent advance for renewable developments

In our view, GC is the necessary and consequent advance of renewable developments in China, that is, GC together with the Renewable portfolio standards (RPS) would be an effective measure in improving renewable power dispatch and consumption, and if implemented smoothly, GC would serve as a key complement in reducing the persistent deficits in renewable subsidy funds (we don't view it as substitute of the subsidy funds). However, currently, the key component, the compulsory buyers, is still missing.

RPS under discussion for decades and executions expected in the 13th FYP. After analysing the development roadmap of renewable policies in China, we believe RPS and GC are the essential and achievable prospects during the 13th FYP, for the following reasons (and detailed development timeline see figure 4 in appendix):

- **RPS is crucial to ensure efficient utilization of renewable power**, which is in urgent need given the persistent renewable curtailments since 2010. During the last two five-year periods, feed-in-tariff scheme played the major role in renewable power developments; it has largely helped reduce uncertainties in pricing and assessing potential projects, thus triggering robust investments and resulting in surging wind and solar power installations. Meanwhile, however, dispatch and consumption of renewable power were laggard resulting in the prominent curtailments. As a result,

for the 13th FYP, the policy focus has switched from growing capacity to efficient utilization, and RPS is expected to replace FiT as the renewable policy focus which has been adopted in Europe and the US for years.

- Institutional bottlenecks of implementing RPS are being resolved** as a result of the ongoing marketisation reforms in the power sector, as RPS requires transparent tariff setting in coordinating inter-provincial transactions (which is also one of the main reasons why RPS was not adopted in the early stage of renewable developments in China). A new round of power sector reforms was launched in 2015 and more recently, NDRC called on grid companies and provincial DRCs to launch the assessment of transmission tariffs of cross-provincial transmission lines as well as transmission within regional grids, and planned the nation-wide verification to be accomplished in 2017-18.
- GC would help relieve government's expenditure burden** by transferring some of its subsidy responsibilities to the compulsory buyers. According to news reports, the deficits in Renewable Energy Fund reached c.Rmb60bn as at end-2016 and have been expanding given the massive existing capacities as well as further installations. According to our estimates, based on the current renewable fund surcharge of RMB0.019/kWh, renewable fund collection would be about Rmb65-75bn this year, subject to power demand and the collection rate; and though it should cover the annual subsidy demand from projects included in the 1st-6th batches, but notably it would fall short of demand from the other operating projects, let alone other subsidised projects and delayed subsidy payables.

Figure 3: Estimated annual subsidy requirements on existing projects

	Solar	Wind	Total	Solar %	Wind %
Grid-connected capacity (GW)					
Mar-15 (1)	33.1	101.1	134.2	25%	75%
Dec-15	42.8	129.3	172.1	25%	75%
Mar-16 (2)	50.3	134.7	185.0	27%	73%
Dec-16	77.4	148.7	226.1	34%	66%
Mar-17 (3)	84.6	151.4	236.0	36%	64%
Subsidy catalogue coverage (GW)					
1st-5th batches	6.4	73.9	80.3	8%	92%
6th batch	19.5	31.7	51.2	38%	62%
7th batch est. (2)-(1)	17.2	33.6	50.8	34%	66%
Remaining est. (3)-(2)	34.3	16.7	51.0	67%	33%
Estimated avg. subsidy (Rmb/kWh)					
1st-5th batches	0.68	0.24			
6th batch	0.60	0.23			
7th batch and remaining	0.57	0.22			
Annual subsidy requirements (Rmb mn)					
1st-5th batches	4,787	31,925	36,712	13%	87%
6th batch	12,870	13,124	25,994	50%	50%
7th batch and remaining	32,291	19,919	52,209	62%	38%

Source: NEA, CEC, CSCI Research Estimates

Note: assume avg. utilization of 1,100 and 1,800 for solar and wind

Binding RPS needed to define compulsory buyers and to induce GC demand. The decisive factor for smooth execution of GC trading is sufficient demand, either by setting consumption targets for compulsory buyers or stimulating corporate and public institutions (i.e. by tax benefits). Considering the former, there have been long-existed back-and-forth disputes, for example, the Trial Measures in 2014 and the Assessment System for Power Group in 2016 received strong resistance from the local governments and power groups, and subsequently both measures were voided. Provincial governments, grid companies, power distributors, and thermal power operators are the potential compulsory buyers but it is currently difficult to enforce the binding obligation against any of the four parties.

Appendix

Figure 4: Key developments of RPS and Green Certificate in China

Year	Authority	Key developments
2003	Central government	The central government started discussion on the development roadmap of renewable power in China, with 3 types of policies under consideration, namely RPS, feed-in-tariff, and bidding system. RPS set clear and compulsory targets, but it required more transparent tariff setting in coordinating inter-provincial transactions; feed-in-tariff set a straight-forward tariff scheme, which largely eliminated project risks for developers, but incurred higher government expenditure.
2004	NDRC	The NDRC launched initial rounds of concession bidding for wind power projects to kick off the renewable developments while the disputes over RPS and feed-in-tariff continued, underpinning the introduction of Renewable Energy Law.
2005	State Council	Renewable Energy Law (可再生能源法) was released, codifying a legal framework for developing renewable energy, and with drafted RPS removed, feed-in-tariff was confirmed as the supportive policy; feed-in-tariff largely helped reduce uncertainties in pricing and assessing potential projects, thus triggering robust investments at the early stage of development, which was also the common practice back then among the leading European markets.
2009	NDRC, State Council	The fixed-rate FiT scheme for wind power was introduced (关于完善风力发电上网电价政策的通知), and Renewable Energy Law was amended to confirm the implementation of a full-amount dispatch for renewable power generation and the establishment of renewable energy fund. Sequentially, wind power in China took off; during the 12 th FYP, China took the global lead in terms of both annual installation and total installed capacity in 2010; wind power became the 3 rd largest source of electricity in China in 2012, and wind capacity achieved a 34% CAGR from 2011-15.
2012	NDRC, NEA	"12 th FYP for Renewable Power Development" (可再生能源发展“十二五”规划) was released, RPS was back in sight and stated in the national documents for the first time; a basic framework of RPS was codified, stating assessment target to be the local government, grid companies and power generators. And then during 2012-13, NEA and CNREC conducted surveys on detailed provincial consumption targets.
2014	NDRC, NEA	"Trial Management Measures on Renewable Portfolio Standards" (可再生能源电力配额管理办法(试行)) was finalised (a draft version was completed in 2011) and approved by the NDRC, setting out provincial targets of renewable power consumption by 2015/2017/2020; however, it failed to receive approval from the State Council due to strong objections from several local governments, according to news reports.
2015	State Council, NDRC	A new round of power sector reform was launched in 2002 with the framework document "Several Opinions On Further Deepening the Reform of the Electric Power System" ("policy No.9", 关于进一步深化电力体制改革的若干意见) and a series of supporting policies; the marketisation reforms in tariff setting, power trading market and opening-up of planned generation are resolving institutional bottlenecks of implementing RPS which requires transparent tariff setting in coordinating inter-provincial transactions.
2016	NEA	In Feb, NEA released the "Guiding Opinions on Establishing Renewable Portfolio Standards" (关于建立可再生能源开发利用目标引导制度的指导意见), setting out targets for minimum consumption of non-hydro renewable power for each province (ranging from 5-13%, 9% on national average) and power generators (9%) by 2020. But compared with the 2014 version, while the consumption targets remain largely unchanged, the assessment mechanism is omitted, resulting in limited binding power.
	NEA	In Apr, NEA released the "Exposure Draft for Establishing RPS Assessment System for Coal-fired Power Group" (关于征求建立燃煤火电机组非水可再生能源发电配额考核制度有关要求通知意见的函), which required thermal power generators to have non-hydro renewable generation of at least 15% of their thermal power generation by 2020. During Jun to Aug-2016, CEC, several power groups and industry associations conducted designated investigation and repulsed the suggested assessment.
2017	NDRC	In Jan, "13 th FYP for Renewable Power Development" (可再生能源发展“十三五”规划) was released; it reiterated the establishment of RPS and deepening of power reforms. Moreover, it put forward the establishment of Green Certificate trading system, targets power generators and distributors to utilize GC to fulfil their renewable development quota, and expects GC to relieve government's expenditure burden from renewable developments.
	NDRC, MoF, NEA	In Feb, NDRC, MoF and NEA jointly released "The Notice on Trial Operation of Green Certificate Issuance and Voluntary Trading of Renewable Power" (关于试行可再生能源绿色电力证书核发和自愿认购交易制度的通知); voluntary trading would commence on 1st July 2017, with enterprises, public institutions and natural citizens all being encouraged to participate. Compulsory trading is suggested to start in 2018 with the launch of renewable quota assessments, but the targeted entity for assessment would be determined later subject to the progress of market reforms.

Source: News, NDRC, NEA, CSC Research

Figure 5: Provincial non-hydro capacity and power consumption, 2016 and 2020 target

	2016 Grid-connected capacity (GW)					Capacity allocation (%)			Non-hydro consumption (%)			
	Total	Wind	Solar	Wind %	Solar %	Total	Wind	Solar	2016	YoY ppt	2020	vs. target
Eastern China Power Network												
Shanghai	23.7	0.7	0.4	3.0%	1.5%	1.4%	0.5%	0.5%	2.0%	0.4%	5.0%	3.0%
Jiangsu	101.6	5.6	5.5	5.5%	5.4%	6.2%	3.8%	7.1%	4.2%	0.9%	7.0%	2.8%
Zhejiang	83.3	1.2	3.4	1.4%	4.1%	5.1%	0.8%	4.4%	3.6%	1.2%	7.0%	3.4%
Anhui	57.3	1.8	3.5	3.1%	6.0%	3.5%	1.2%	4.5%	6.1%	2.2%	7.0%	0.9%
Fujian	52.1	2.1	0.3	4.1%	0.5%	3.2%	1.4%	0.3%	3.7%	0.3%	7.0%	3.3%
Sub-total	318.0	11.4	12.9	3.6%	4.1%	19.3%	7.7%	16.7%	4.0%	1.0%		
Central China Power Network												
Jiangxi	28.7	1.1	2.3	3.8%	8.0%	1.7%	0.7%	2.9%	3.8%	1.6%	5.0%	1.2%
Henan	72.2	1.0	2.8	1.4%	3.9%	4.4%	0.7%	3.7%	4.4%	2.1%	7.0%	2.6%
Hubei	67.5	2.0	1.9	3.0%	2.8%	4.1%	1.4%	2.4%	4.7%	1.0%	7.0%	2.3%
Hunan	41.2	2.2	0.3	5.3%	0.7%	2.5%	1.5%	0.4%	4.1%	1.3%	7.0%	2.9%
Chongqin	20.6	0.3	0.0	1.4%	0.0%	1.3%	0.2%	0.0%	1.6%	0.2%	5.0%	3.4%
Sichuan	91.1	1.3	1.0	1.4%	1.1%	5.5%	0.8%	1.2%	2.3%	0.9%	5.0%	2.7%
Tibet	2.3	0.0	0.3	0.4%	14.1%	0.1%	0.0%	0.4%	10.1%	1.9%	13.0%	2.9%
Sub-total	323.5	7.8	8.6	2.4%	2.7%	19.7%	5.3%	11.1%	3.7%	1.3%		
Southern China Power Network												
Guangdong	104.5	2.7	1.6	2.6%	1.5%	6.4%	1.8%	2.0%	1.9%	0.1%	7.0%	5.1%
Guangxi	41.5	0.7	0.2	1.6%	0.4%	2.5%	0.5%	0.2%	1.3%	0.3%	5.0%	3.7%
Hainan	7.5	0.3	0.3	4.1%	4.5%	0.5%	0.2%	0.4%	4.5%	0.5%	10.0%	5.5%
Guizhou	55.1	3.6	0.5	6.6%	0.8%	3.3%	2.4%	0.6%	4.6%	2.6%	5.0%	0.4%
Yunnan	84.4	7.4	2.1	8.7%	2.5%	5.1%	5.0%	2.7%	12.5%	7.4%	10.0%	-2.5%
Sub-total	293.0	14.7	4.6	5.0%	1.6%	17.8%	9.9%	6.0%	3.8%	1.5%		
Northern China Power Network												
Beijing	11.0	0.2	0.2	1.7%	2.2%	0.7%	0.1%	0.3%	9.0%	1.4%	10.0%	1.0%
Tianjin	14.7	0.3	0.6	2.0%	4.1%	0.9%	0.2%	0.8%	9.0%	1.4%	10.0%	1.0%
Hebei	63.2	11.9	4.4	18.8%	7.0%	3.8%	8.0%	5.7%	9.0%	1.4%	10.0%	1.0%
Shanxi	76.4	7.7	3.0	10.1%	3.9%	4.6%	5.2%	3.8%	10.0%	3.0%	10.0%	0.0%
Shandong	109.4	8.4	4.6	7.7%	4.2%	6.6%	5.6%	5.9%	5.6%	-0.4%	10.0%	4.4%
Inner Mongolia	110.4	25.6	6.4	23.2%	5.8%	6.7%	17.2%	8.2%	15.3%	3.3%	13.0%	-2.3%
Sub-total	385.2	54.0	19.2	14.0%	5.0%	23.4%	36.3%	24.7%	9.0%	1.1%		
Northeast China Power Network												
Liaoning	46.0	7.0	0.5	15.1%	1.1%	2.8%	4.7%	0.7%	8.6%	0.9%	13.0%	4.4%
Jilin	27.2	5.1	0.6	18.6%	2.1%	1.7%	3.4%	0.7%	13.7%	1.5%	13.0%	-0.7%
Heilongjiang	27.8	5.6	0.2	20.2%	0.6%	1.7%	3.8%	0.2%	12.4%	1.3%	13.0%	0.6%
Sub-total	101.0	17.6	1.3	17.4%	1.2%	6.1%	11.8%	1.6%	10.5%	1.1%		
Northwest China Power Network												
Shaanxi	39.0	2.5	3.3	6.4%	8.6%	2.4%	1.7%	4.3%	3.8%	1.1%	10.0%	6.2%
Gansu	48.3	12.8	6.9	26.5%	14.2%	2.9%	8.6%	8.9%	12.5%	1.1%	13.0%	0.5%
Qinghai	23.4	0.7	6.8	2.9%	29.1%	1.4%	0.5%	8.8%	18.3%	4.8%	10.0%	-8.3%
Ningxia	36.7	9.4	5.3	25.6%	14.3%	2.2%	6.3%	6.8%	19.1%	5.7%	13.0%	-6.1%
Xinjiang	77.5	17.8	8.6	22.9%	11.1%	4.7%	11.9%	11.1%	11.1%	0.6%	13.0%	1.9%
Sub-total	224.9	43.1	30.9	19.2%	13.7%	13.7%	29.0%	39.9%	11.7%	2.0%		
National	1,645.7	148.7	77.4	9.0%	4.7%				6.3%	1.3%	9.0%	2.7%

Source: NEA CEC, CSCI Research



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Company Rating Definition

The Benchmark: Hong Kong Hang Seng Index; Time Horizon: 12 months

Buy	12-month absolute total return: $\geq 10\%$
Hold	12-month absolute total return: $> -10\%$ but $< 10\%$
Sell	12-month absolute total return: $\leq -10\%$

Disclosure of Interests

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