

**Chinese direct investments and the European renewable
energy industry: new trends and expected impact**

Asian emerging economies in the post crisis era: growth
trajectories, challenges and perspectives
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Environmental issues and cooperation



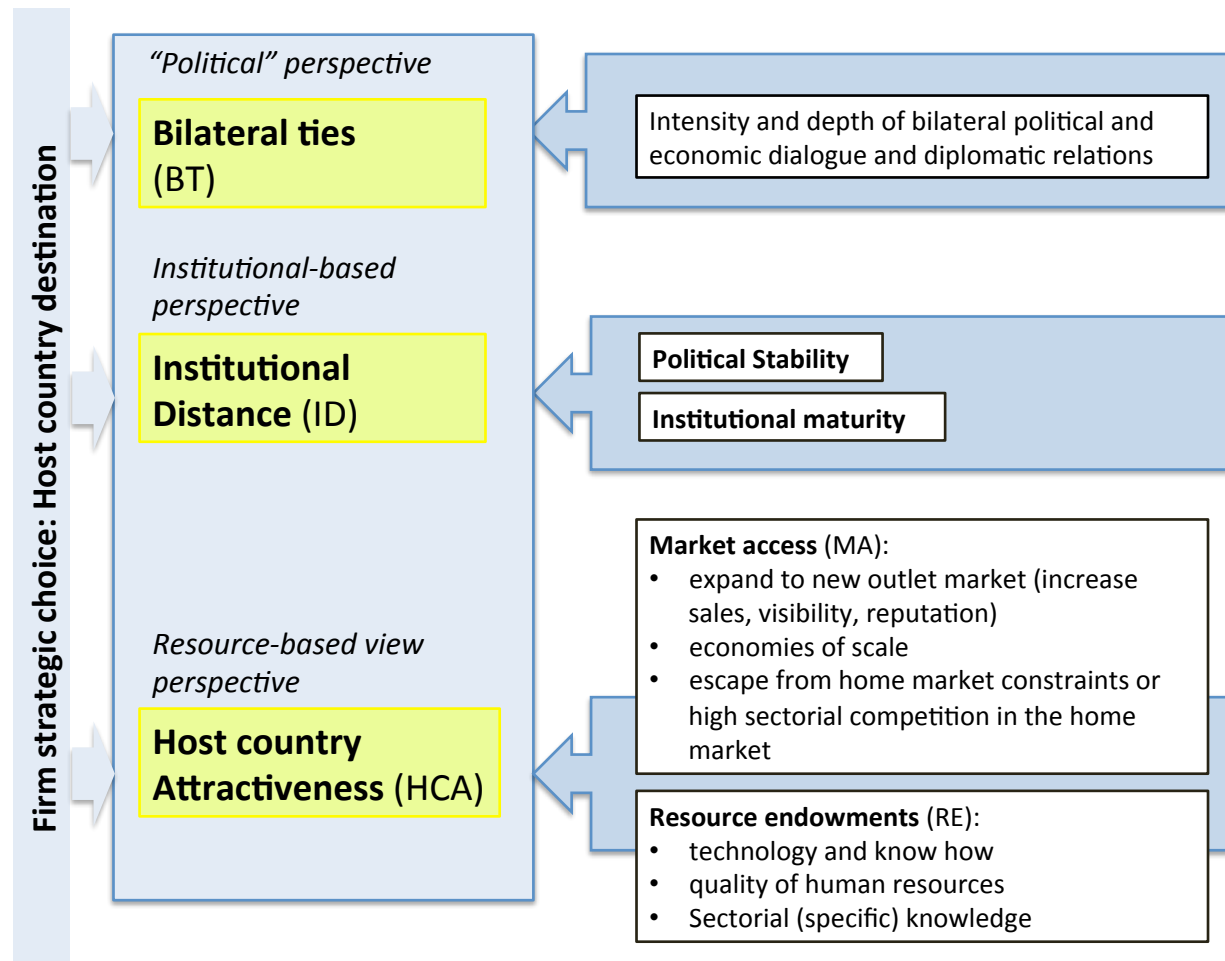
As a result of specific **industrial policy** measures, the green industry in China has been growing on size and competitiveness, also expanding abroad through **FDI** (see 12th Five-year plan and related sectoral plans).

The **China Goes global** strategy is supporting the rush for green expertise and technologies abroad.

European countries are among the preferential target destinations for Chinese investors in the green related industries.

The **economic diplomacy** efforts and **cooperation dialogue** developed so far with China on the environment issues has contributed to **strengthen** partnering opportunities.

Location choice



Methodology - Mofcom database of greenfield and non-greenfield Chinese investments abroad.

1. Map of *Where to Where*
2. Seven fixed-effects logit models

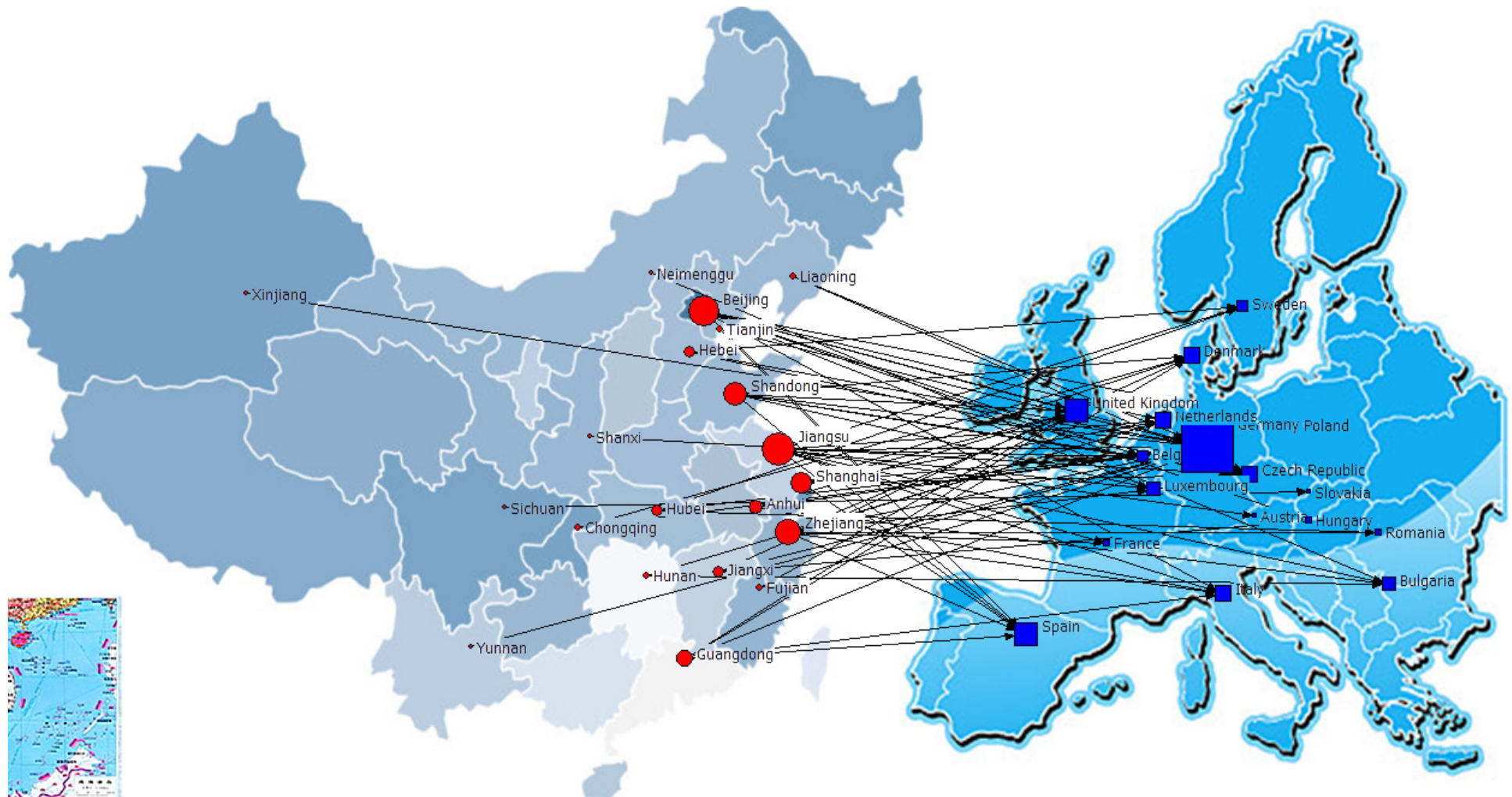
Research target: Chinese firms in the RE sector with foreign subsidiaries in EU by the end of 2013 (Greenfield and M&A)

Dataset: 202 location choices by 132 Chinese firms in renewable energy sector in the EU countries from 2004 to 2013

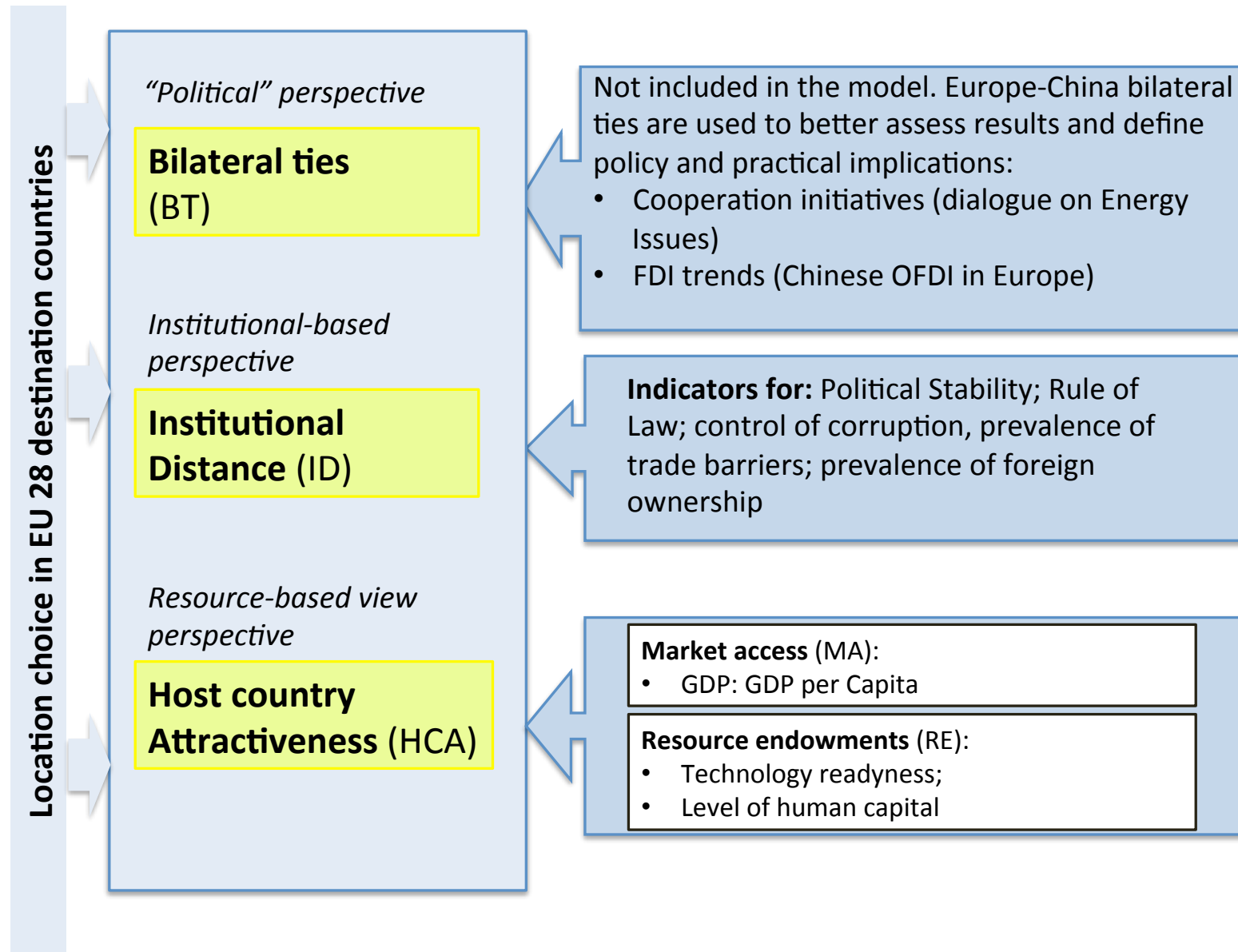
Country	N. of Chinese OFDI	Country	N. of Chinese OFDI
Austria	1	Luxembourg	19
Bulgaria	21	Romania	4
Belgium	2	Sweden	3
Poland	1	Slovakia	1
Denmark	4	Spain	9
Germany	88	Hungary	3
France	5	Italy	15
Netherlands	11	United Kingdom	10
Czech	5	Total	202

R&D, sales and services in EU host countries constitute
29%, 35% and 84% respectively

1- Where to where map



Theoretical framework and empirical test



Variables	Measurement	Data sources
Dependent variable		
Country chosen	1 = the choice of the country, 0 = otherwise	Ministry of Commerce
Independent variables		
Political stability	perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. Scoring from -2.5 (weak) to 2.5 (strong).	Worldwide Governance Indicators
Rule of law	perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Scoring from -2.5 (weak) to 2.5 (strong)	Worldwide Governance Indicators
Control of corruption	perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Scoring from -2.5 (weak) to 2.5 (strong).	Worldwide Governance Indicators
Prevalence of trade barriers	tariff and non-tariff barriers significantly reduce the ability of imported goods to compete in the domestic market. Scoring from 1 (strongly disagree) to 7 (strongly agree)	Global Competitiveness Report
Prevalence of foreign ownership	foreign ownership of companies in your country is limited or encouraged. Scoring from 1 (rare and limited) to 7 (prevalent and encouraged)	Global Competitiveness Report
Market size	log of GDP	World Bank
Market affluence	log of GDP per capita	World Bank
Technological readiness	agility with which an economy adopts existing technologies to enhance the productivity of its industries.	Global Competitiveness Report
Human capital	gross secondary education enrollment rate	World Bank
Control variables		
Firm size	log of number of employees	Firm's homepage or annual report
Firm age	number of years since the founding of the firm	Firm's homepage or annual report
Listed company	1 = listed company, 0 = otherwise	Firm's homepage
Ownership	1 = SOE, 0 = non-SOEs	Ministry of Commerce

Results



Variable	1	2	3	4	5	6	7	8	9
1 Political Stability	1.000								
2 Rule of Law	.527***	1.000							
3 Control of Corruption	.467***	.947***	1.000						
4 Prevalence of trade barriers	.715***	.649***	.546***	1.000					
5 Prevalence of foreign ownership	.554***	.628***	.579***	.849***	1.000				
6 GDP	-.189***	.450***	.393***	-.065***	-.087***	1.000			
7 GDP per capita	.454***	.895***	.864***	.591***	.476***	.525***	1.000		
8 Technological readiness	.450***	.941***	.933***	.590***	.568***	.405***	.874***	1.000	
9 Human capital	-.043***	.425***	.520***	-.027***	.018	.360	.405***	.458***	1.000

Empirical results

We examine the impact of host country factors on Chinese green OFDI in six fixed-effects logit models

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Firm size	-.0228*** (.0014)	.0057** (.0029)	-.0044* (.0028)	-.0140*** (.0027)	-.0021 (.0031)	.0016 (.0023)
Firm age	.0001 (.0005)	-.0000 (.0005)	.0000 (.0004)	.0001* (.0005)	.0000 (.0005)	-.0000 (.0003)
Listed company	.0253** (.0109)	-.0050 (.0085)	.0043 (.0090)	.0146 (.0108)	0.0019 (.0099)	-.0031 (.0064)
Ownership	-.0227*** (.0083)	0.0057 (.0076)	-.0045 (.0075)	-.0111*** (.0032)	-.0021 (.0085)	-.0004 (.0058)
Political Stability		.0105*** (.0015)				.0370*** (.0114)
Rule of Law		-.0142*** (.0094)				-.1041*** (.0217)
Control of Corruption		.0277*** (.0135)				.0563*** (.0140)
Prevalence of trade barriers		-.0167*** (.0054)				-.1004*** (.0194)
Prevalence of foreign ownership		.0261*** (.0096)				.0193* (.0115)
GDP			.0265*** (.0028)			.0116*** (.0030)
GDP per capita			.0263*** (.0027)			.0294*** (.0086)
Technological readiness				.0111*** (.0033)		.0347*** (.0121)
Human capital					-.0013*** (.0002)	-.0019*** (.0003)
Fixed effect of year	Done	Done	Done	Done	Done	Done
Fixed effect of firm	Done	Done	Done	Done	Done	Done
Pseudo R ²	.804	.823	.819	.806	.813	.838
LR chi ²	3173.7***	3297.0***	3270.9***	3186.0***	3224.6***	3397.1***

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parenthesis.

1. Politically stable environment can attract Chinese RE OFDI, which shows a different pattern compared to general Chinese OFDI (Kang & Jiang, 2011; Kolstad & Wiig, 2012; Ramasamy, *et al.* 2012).
2. Chinese RE OFDI tend to flow to countries with good control of corruption, with a policy of encouraging foreign ownership of companies, and low trade barriers. Rule of law has a negative impact on the choice.
3. Market size and market affluence are pulling factors for Chinese RE OFDI. Richer countries are preferred destinations.
4. Technological asset-seeking motivations drive Chinese OFDI
5. A higher level of human capital has a negative and significant influence on the investment location decisions

Empirical results

In our database we can aggregate data into three major overseas functions: manufacturing, R&D, sales and services.

Overseas subsidiaries with different functions respond differently to host country factors.

Variable	Manufacturing	R&D	Sales and services
Firm size	.0036 (.0045)	.0009 (.0030)	.0021 (.0025)
Firm age	-.0051 (.0143)	-.0000 (.0005)	-.0000 (.0003)
Listed company	-.0002 (.0006)	-.0044 (.0095)	-.0055 (.0070)
Ownership	.0032 (.0123)	.0018 (.0099)	-.0004 (.0061)
Political stability	.0343* (.0203)	.0325* (.0180)	.0402*** (.0115)
Rule of law	-.1341*** (.0412)	-.0501* (.0310)	-.0780*** (.0228)
Control of corruption	.0579** (.0276)	.0525*** (.0197)	.0435*** (.0146)
Prevalence of trade barriers	-.1377*** (.0349)	-.0482 (.0319)	-.0957*** (.0209)
Prevalence of foreign ownership	.0404* (.0216)	.0047 (.0187)	.0146 (.0120)
GDP	.0021 (.0054)	.0144*** (.0046)	.0139*** (.0034)
GDP per capita	.0290* (.0165)	.0259** (.0121)	.0261*** (.0094)
Technological readiness	.0550** (.0227)	.0005* (.0002)	.0257** (.0127)
Human capital	-.0013** (.0005)	-.0025*** (.0005)	-.0015*** (.0003)
Fixed effect of year	Done	Done	Done
Fixed effect of firm	Done	Done	Done
Pseudo R ²	.835	.843	.840
LR chi ²	970.1***	1208.0***	2876.2***

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parenthesis.

1. Sales/services subsidiaries are attracted by Countries with politically stable environment
2. Manufacturing subsidiaries are attracted by: good control of corruption, low trade barriers; encouraged foreign ownership; richer market. They are are more technological asset-seekers.
3. R&D subsidiaries are attracted by larger market and are the most non-human capital asset-seekers

Policy development and recent inputs provided by the Chinese Government confirm that the “going green” trends will increase in the near future.

There is a great potential for EU countries and firms to benefit from China’s need of green technology, resources and expertise.

At **policy level**, EU countries should try to play a more pro-active role and leverage Chinese willingness to invest in RE.

Attraction policies or cooperation initiatives should be more **effective** and **selective**, i.e. targeting specific geographical locations of investors in China

At **firm level**, European firms in the RE sector could take advantage of the growing Chinese interest in environmental technology and should actively try to promote partnership with Chinese firms.

Even **SMEs** could play a role. They could help and support Chinese investors - even in the light of barriers created by poor rule of law - offering services, consultancy, to explore the European market, or acting as sub-suppliers of goods and services in a very challenging arena for Chinese firms.