Contents

Abbreviations

1	Introduction	1
1.1	Key research questions	2
1.2	Research methodology	3
2	Wind power development in China	4
2.1	Contextual background of the development of wind energy technology worldwide	4
2.2	Development of the Chinese wind energy industry	8
2.2.1	Contextual background of wind energy development in China	8
2.2.2	Rapid development of the Chinese wind energy sector	8
2.2.3	Booming wind market at a transition point	10
2.3	The policy framework for wind energy innovation in China	12
3	The innovation path for Chinese wind energy development	15
3.1	The innovation path for core wind energy technology	15
3.1.1	Moving from a strategy of 'preferring lower prices' to one of 'preferring higher quality'	15
3.1.2	Moving from 'small turbine' to 'large turbine' technology	15
3.1.3	Moving from 'imported technology' to 'indigenous technology'	16
3.2	The innovation path for wind energy deployment	17
3.2.1	The shift from a centralised deployment pattern to a de-centralised pattern	17
3.2.2	The shift from a partial production chain to a whole production chain strategy	18
4	A description of specific cases of innovation	21
4.1	GoldWind 1.2 MW turbine technology development	21
4.1.1	Background information	21
4.1.2	Technological innovation event of the 1.2 MW wind turbine	21
4.1.3	Summary and conclusions	23
4.2	Jiuquan wind farm construction – a large-scale deployment project in China	23
4.2.1	Background information	23
4.2.2	The innovation path for deployment at the Jiuquan Wind Base	24
4.2.3	Technological difficulties at the Jiuquan Wind Base	24
4.2.4	Summary and conclusions	25
4.3	Hui Teng (HT) blade design and manufacture	25



4.3.1	Background information	25
4.3.2	Key elements of HT's technological innovation path	26
4.3.3	Summary and conclusions	28
5	Key elements of the formation of the Chinese wind energy innovation path	29
5.1	The role of foreign products and imported technology	29
5.1.1	Stage One: Foreign donated wind farms served to 'jump-start' the development of Chinese wind energy technology in the 1980s	29
5.1.2	Stage Two: Imported products and collaborative R&D advance the development of Chinese wind energy technology from the late 1990s to the early 2000s	29
5.1.3	Stage Three: Foreign firm acquisition improves the indigenous innovation capacity of the Chinese wind energy sector around 2008	30
5.2	The role of public policy	31
5.2.1	Long-term wind energy policy guarantees continuous technology innovation	31
5.2.2	Deployment policy influences formation of the technology innovation path	31
5.2.3	Assorted policy instruments jointly influence indigenous innovation	32
5.2.4	Administrative changes to influence the future of wind energy innovation	33
5.3	The role of economic development and internationalisation	33
5.3.1	Internationalisation as the main mechanism influencing the path of innovation	33
5.3.2	National economic paradigm influenced wind energy innovation path	34
Bibliog	raphy	35