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210098

211100

40%

11

1/5

2014

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15AGL011

v 54v 2019/2

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2013 <sup>[1]</sup>

2012 <sup>[2]</sup>

Prius

2011 <sup>[3]</sup>

2017 <sup>[4]</sup>

2018 <sup>[5]</sup>

, ( %

2012 <sup>[1]</sup>

Ang 2009 <sup>[2]</sup>

2010 <sup>[3]</sup>

1.  
1

		1	
		R&D	
		R&D	
		R&D	%
		GDP	/
			/
			/
			/

$$G_k = \sum_{a=1}^n \sum_{b=1}^n |Z_{tk} - Z_{ak}| / 2n^2 \mu_k \quad 1$$

$$G_k = \sum_{a=1}^n \sum_{b=1}^n |Z_{tk} - Z_{ak}| / 2n^2 \mu_k$$

$$T_a = \sum_{k=1}^e Z_{ak} G_k \quad 2$$

[1] 2012 7

[2]Ang B., Emission, Research and Technology Transfer in China , Ecological Economics 2009 68 10 , pp.2658- 2665.

[3] v 2010

2.

LMDI

$$C_{it} = \prod_{j=1}^m C_{ijt} = \prod_{j=1}^m E_{ijt} \times K_j = \prod_{j=1}^m \frac{C_{ijt}}{E_{ijt}} \times \frac{E_{ijt}}{E_{jt}} \times \frac{E_{jt}}{Q_{jt}} \times Q_{jt} \quad 3$$

$C_{ijt} \quad i \quad j \quad t \quad E_{ijt} \quad i \quad j \quad t \quad C_{jt} \quad i \quad K_j \quad j$   
 $E_{it} \quad i \quad t \quad Q_{it} \quad i \quad t$   
 $\frac{C_{ijt}}{E_{ijt}} \quad \frac{E_{ijt}}{E_{jt}} \quad \frac{E_{jt}}{Q_{jt}} \quad \frac{C_{jt}}{Q_{jt}} = 3$

$$C_{it} = \prod_{i=1}^m C_{ijt} \times C_{jt} \times C_{it} \quad 4$$

$$C = C_{t+1} - C_t = C_t + C_{t+1} + C_{t+1} \quad 5$$

LMDI

$$C_{it} = \prod_{j=1}^m \frac{C_{ij}^{t+1} - C_{ij}^t}{\ln C_{ij}^{t+1} - \ln C_{ij}^t} \times \ln \frac{C_{ij}^{t+1}}{C_{ij}^t} \quad 6$$

$$C_{it} = \prod_{j=1}^m \frac{C_{ij}^{t+1} - C_{ij}^t}{\ln C_{ij}^{t+1} - \ln C_{ij}^t} \times \ln \frac{C_{ij}^{t+1}}{C_{ij}^t} \quad 7$$

$$C_{it} = \prod_{j=1}^m \frac{C_{ij}^{t+1} - C_{ij}^t}{\ln C_{ij}^{t+1} - \ln C_{ij}^t} \times \ln \frac{C_{ij}^{t+1}}{C_{ij}^t} \quad 8$$

$$C_{it} = \prod_{j=1}^m \frac{C_{ij}^{t+1} - C_{ij}^t}{\ln C_{ij}^{t+1} - \ln C_{ij}^t} \times \ln \frac{C_{ij}^{t+1}}{C_{ij}^t} \quad 9$$

IPCC

$$C_{it} = C_{i1997} + C_{it} - C_{i1997} \quad 10$$

$$C_{it} = C_{i1997} + C_{it} \quad 11$$

$$C_{it} = C_{i1997} + C_{it} \quad 12$$

3.

STIRPAT  $I = P^1 A^2 T^3 f$   
GDP

$$C = P^1 A^2 T^3 f \quad 13$$

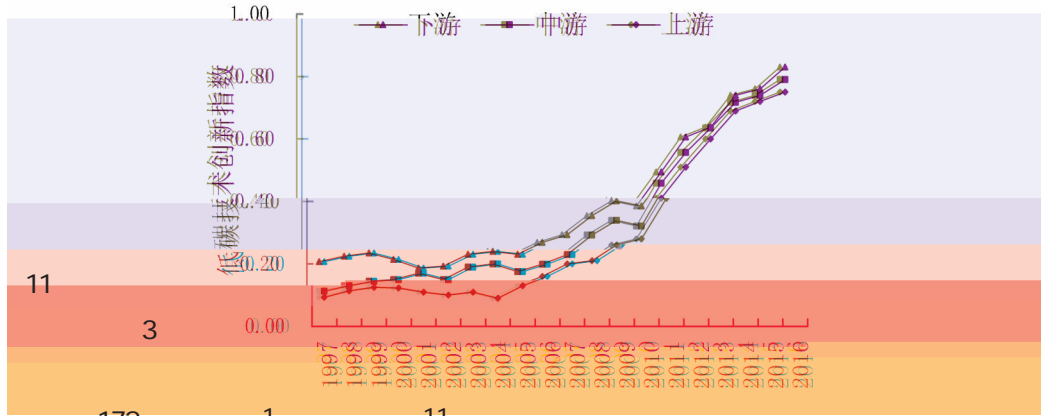
13

$$\ln C_{it} = \ln P_{it} + 2 \ln A_{it} + 3 \ln T_{it} + \ln f_{it} \quad 14$$

$f \quad i \quad t \quad C_{it} \quad i \quad T_{it} \quad i$



2.  
1  
3  
1997—2016  
11

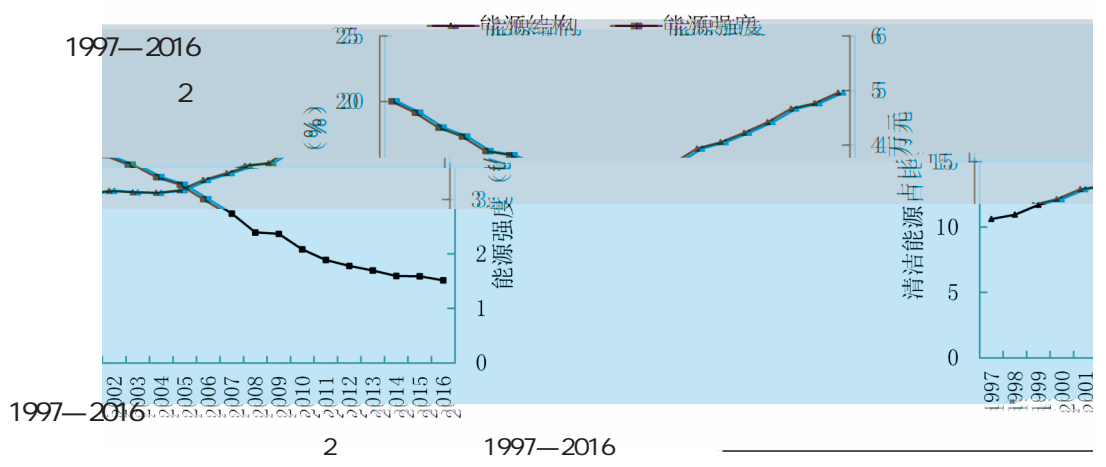


	1997- 2001	2002- 2006	2007- 2011	2012- 2016		%	%
	10899.780	13810.334	23264.027	26746.494	74720.635	6.05	28
	21495.989	32999.339	51684.620	60137.786	166317.734	3.40	
	16829.153	24293.338	35488.569	45398.795	122009.855	6.06	
	12274.694	23078.909	35932.780	38273.070	109559.454	6.00	
	21132.010	28667.284	45287.766	60757.967	155845.027	6.06	32
	10351.494	16052.977	25215.415	33894.820	85514.706	6.62	
	25281.116	34218.403	52787.382	59536.628	171823.528	4.77	
	17044.749	27134.121	45668.452	50987.942	140835.264	5.17	
	25168.540	33425.735	40867.742	43924.976	143386.994	3.45	40
	36840.948	62713.158	105042.939	137102.811	341699.856	7.56	
	23557.343	42917.723	68561.116	76949.823	211986.005	7.25	
	220875.816	339311.322	529800.808	633711.112	1723699.057	5.59	100

t  
40%

2.66% 0.28% 28% 32% 3.64% 3.49%

2  
2



4

4

t

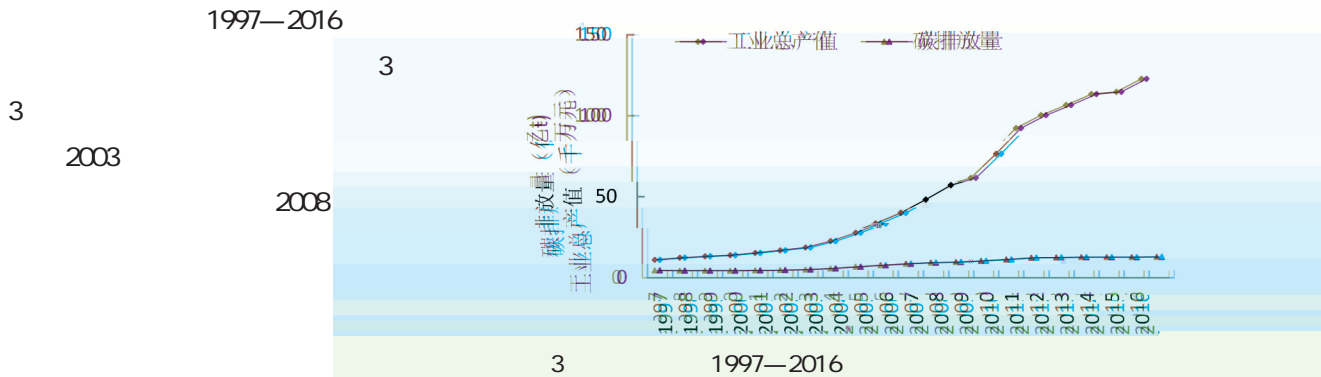
	C	C	C	C	C
1996	44 684.040	—	—	—	—
1997	42 580.052	- 2 103.988	- 123.150	- 7 255.934	5 275.096
1998	43 229.768	649.716	- 31.170	- 2 472.688	3 153.574
1999	42 592.455	- 637.313	- 277.042	- 2 776.196	2 415.924
2000	44 666.691	2 074.236	- 198.920	- 1 829.879	4 103.034
2001	45 864.291	1 197.600	26.815	- 2 406.156	3 576.942
2002	50 099.428	4 235.137	- 27.277	- 888.429	5 150.843
2003	57 623.136	7 523.708	2 167	- 349.179	7 870.721
2004	66 687.152	9 064.016	57.470	- 2 557.344	11 563.891
2005	77 229.523	10 542.371	32.276	- 1 361.565	11 871.660
2006	84 808.296	7 578.772	44.278	- 4 723.636	12 258.131
2007	93 252.095	8 443.800	30.755	- 8 100.747	16 513.792
2008	96 260.983	3 008.887	- 146.249	- 13 044.214	16 199.350
2009	102 539.744	6 278.761	- 99.470	- 3 728.291	10 106.522
2010	111 521.992	8 982.248	- 341.969	- 10 745.788	20 070.005
2011	122 409.012	10 887.021	69.327	- 10 722.137	21 539.830
2012	124 508.227	2 099.215	- 279.557	- 10 605.158	12 983.930
2013	128 525.339	4 017.112	- 696.604	- 8 258.377	12 972.093
2014	127 499.128	- 1 026.211	- 565.234	- 11 198.382	10 737.404
2015	129 981.117	2 481.989	- 691.758	- 9 171.253	12 345.000
2016	131 869.052	1 887.935	- 268.592	- 10 569.980	12 726.507

1997—2016

260.30%

155.98%

- 4.32%



1.

5

[1]

0.65~1.1

5

0.528

[1] 1 1

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0.802

0.792

-0.336

0.819

0.883

-0.234

-0.231

I , F