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# The China Question

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# OVERVIEW

## The China Question

Case Recap + Recommendation

Why China?

Assumptions

Phase 1

Phase 2

Next Steps

Questions

Appendix

# Case Recap + Recommendation

**Situation:** PS2 has an amazing opportunity to expand its innovative waste management services into China.

**Question:** How should PS2 best capitalize on this opportunity?

**Recommendation:** PS2 should enter China now and seize both the TPS and oil sludge opportunities in a phased implementation plan. Concurrently, PS2 should maintain operations in Canada but should not expand into Ontario.

Recommendation

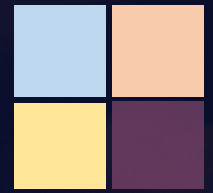
Why China?

Assumptions

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Why China?

# Why China?



- ★ GDP and middle class are rising at an impressive rate
- ★ Chinese government is investing US \$3 billion in soil remediation in five years
- ★ Large oil sludge and PCB market
- ★ Opportunity to develop derivative technologies



Declining market growth in Canada

Recommendation

Why China?

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# Assumptions



Chinese government supports venture



High ratio of oil to coal dependence



A year from now, NIES is still interested in a TPS demonstration



No expansion of BEV into PS2's Western Canadian market



Negligible natural disaster risk

Recommendation

Why China?

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Next Steps



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Phase 1

# Phase 1 : First Steps

## Enter into 50:50 joint venture with Nahai

### Negotiations

- ✓ Begin JV negotiations for Phase 1 and Phase 2
- ✓ Begin construction after negotiations

### Intellectual Property

- ✓ Obtain 30-year operating license
- ✓ Apply for Phase 2 patent

### Staffing

- ✓ Identify internal bilingual employees
- ✓ Identify bilingual Chinese Canadians for hire (4.3% of population)
- ✓ Identify bilingual Chinese locals for hire
- ✓ Develop an HR program for transferring employees

Recommendation

Why China?

Assumptions

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# Phase 1 : Porter's Five Forces

Threat of new competition	<b>High</b>	Weak patent laws, early stage of remediation, government relations
Threat of substitute products	<b>Low</b>	Already obtained exclusive waste management permit
Bargaining power of customers	<b>Low</b>	Superior clean technology that efficiently cleans oil sludge while aligning with Chinese government goals
Bargaining power of suppliers	<b>Low</b>	PS2's clean technology advantage will positively complement Nahai's waste operations
Intensity of competitive rivalry	<b>Low</b>	Have only local waste management permit, developing better technology with help of Nahai





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Phase 2

# Phase 2 : First Steps

## Begin NIES demonstration of TPS technology

### Negotiations + Staffing

- ✓ Negotiations with NIES regarding location of TPS demonstration
- ✓ 100% of TPS staff must come from Canada

### Construction

- ✓ Finished patent
- ✓ Construct TPS unit

### Mobilization

- ✓ Mobilize TPS unit to demonstration sites
- ✓ Negotiate with government about location of additional TPS units
- ✓ Supplement demonstration with PS2 promotions

Recommendation

Why China?

Assumptions

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# Phase 2 : Porter's Five Forces

Threat of new competition	<b>High</b>	Weak patent laws, early stage of remediation, government relations
Threat of substitute products	<b>Med</b>	Thermal Desorption Units (TDUs) in China are not sustainable or environmentally friendly
Bargaining power of customers	<b>Low</b>	Government will be largely dependent on TPS technology, will have high switching costs to alternatives
Bargaining power of suppliers	<b>Low</b>	NIES has no close substitutes to TPS, new regulations will make PS2 an important partner
Intensity of competitive rivalry	<b>Low</b>	Thermal Desorption Units (TDUs) in China will become less favorable, other competitors are showing no signs of clean technology innovation



## Project completion: Additional Added Value

- ✓ Derivative technology opportunity
- ✓ Chinese government relation expertise
- ✓ Opportunity to find cheaper ways to implement technology
- ✓ Operations services expansion



Recommendation

Why China?

Assumptions

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## Project Completion : Financials before 50:50

Year	2011E	2012E	2013-2019 E (per Year)	2019E
Revenue	2,666,666	11,083,333	26,000,000	26,000,000
Costs	4,833,334	8,316,666	13,000,000	12,500,000
Income (Loss)	<b>(2,166,668)</b>	2,766,667	13,000,000	13,500,000



## Project Completion : Financials after 50:50

Year	2011E	2012E	2013-2019 E (per Year)	2019E
Revenue	1,333,333	5,541,667	13,000,000	13,000,000
Costs*	2,500,000	4,337,499	6,750,000	6,250,000
Income (Loss)	<b>(1,166,667)</b>	1,204,168	6,250,000	6,750,000

\*Costs to MI Drilling Fluids Not Split

Recommendation

Why China?

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# Next Steps





# Next Steps

## Attractive Opportunities

- ✓ More profit
- ✓ Advances in technology
- ✓ Helping the environment
- ✓ Global company

## Need Immediate Attention

- Begin negotiations
- Get started on Chinese patent now
- Get started on staffing
- Complete JV process
- Acquire license for manufacturing
- Begin oil sludge facility construction

Recommendation

Why China?

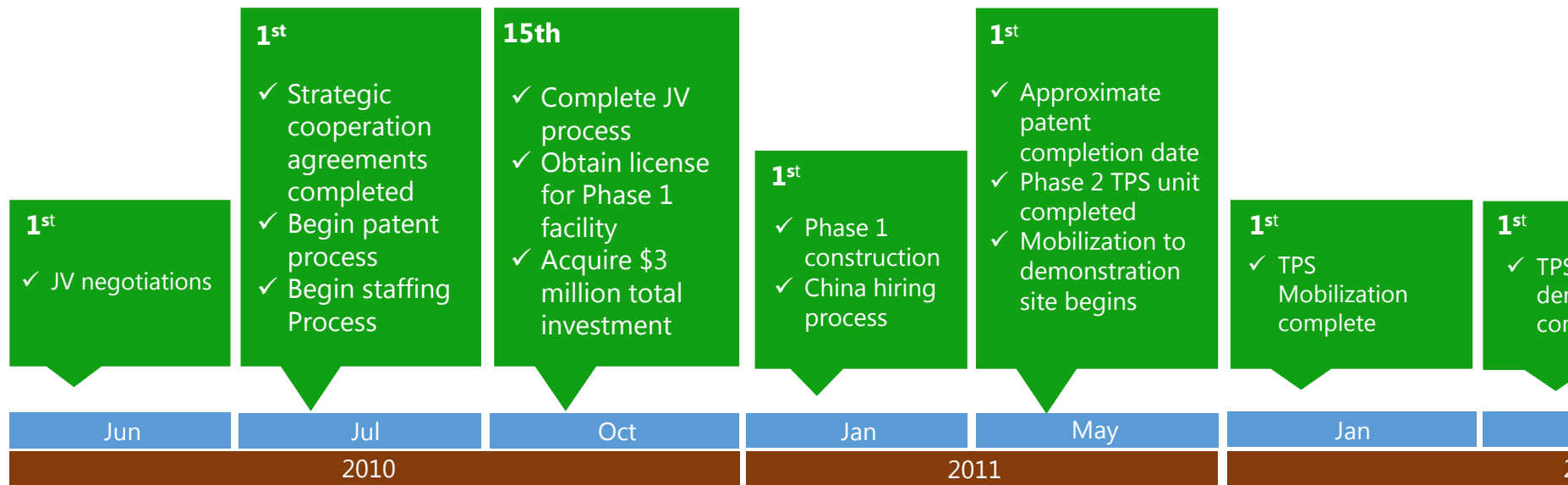
Assumptions

Phase 1

Phase 2

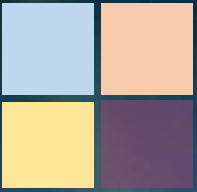
Next Steps

# Next Steps





Conclusion



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Questions?

# Appendix

## Intellectual Property

[Operating license](#)  
[Patents](#)  
[Chinese Patent Law](#)

## Natural Disaster + Geography

[Chinese geography](#)  
[Chinese economic zones](#)  
[Typhoon countermeasures](#)

## Financials

[Revenue before 50:50 split](#)  
[Cost before 50:50 split](#)  
[Cost after 50:50 split](#)  
[Revenue process dates](#)  
[JV 50:50 chart](#)  
[JV 50:50 breakdown](#)

## Economics

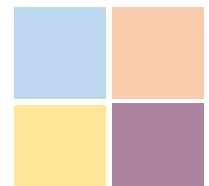
[CAD/CNY fluctuations](#)  
[Chinese energy consumption \[graph\]](#)  
[Chinese energy consumption \[pie\]](#)  
[Chinese regulations](#)

## Marketing + Strategy

[Growth opportunities](#)  
[Porters 5 Forces \[Phase 1\]](#)  
[Porters 5 Forces \[Phase 2\]](#)  
[TPS advantages](#)

## General + Administrative

[Staffing strategy](#)



# Appendix: Currency Fluctuation Canadian Dollar to Chinese Yuan

**CAD/CNY**

■ CAD/CNY=X

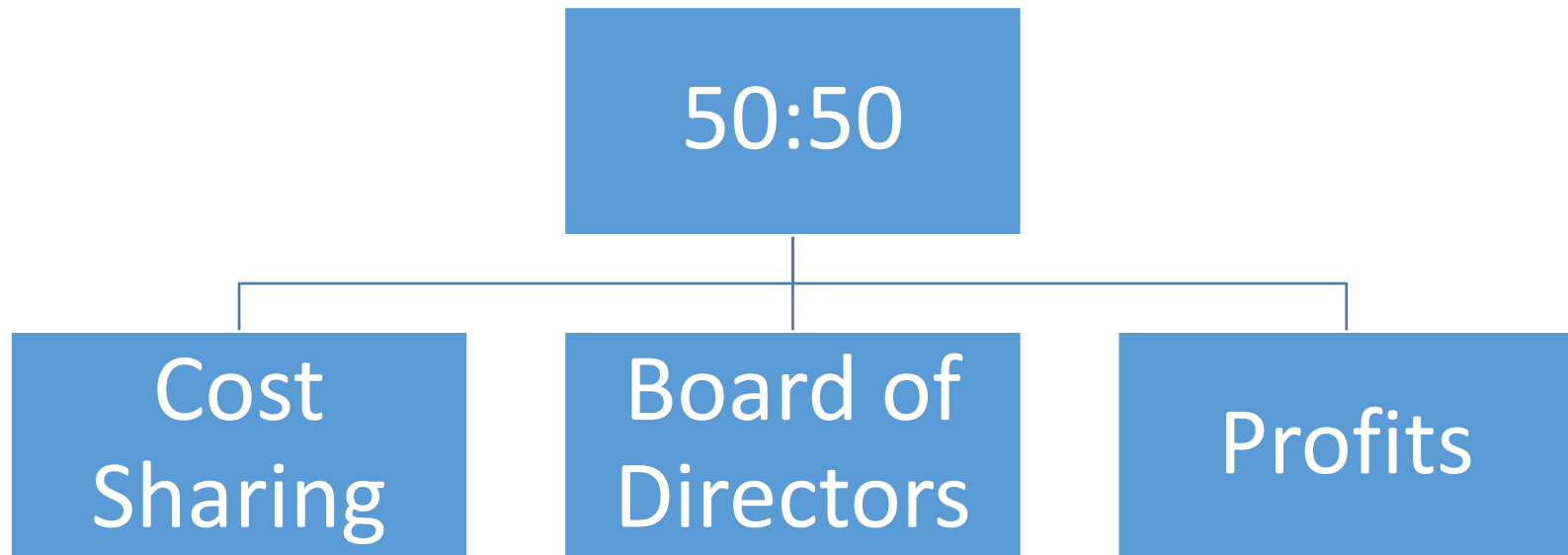
Nov 16, 2012



© Yahoo!



## Appendix: Phase 1 Joint Venture Structure



- ✓ Negotiate Contract for 30 years
- ✓ Complete JV Contract
- ✓ Acquire license to run manufacturing facility by October 15<sup>th</sup>, 2010

Financials



## Appendix: Patent and licensing process

- ✓ July 1<sup>st</sup>, 2010
- ✓ Exclusive waste management processing permit in Zhoushan (compensate for not yet having patent)
- ✓ Begin Design and Utility Model Patent Process – 18 months

- ✓ Begin licensing process immediately for JV with Zhoushan City Industrial and Commerce Administration Board





## Appendix: Staffing

PS2 Management

Bilingual Team

Hire new qualified  
engineers, TPS  
operators

Locals – Assistant  
Managers

Administrative

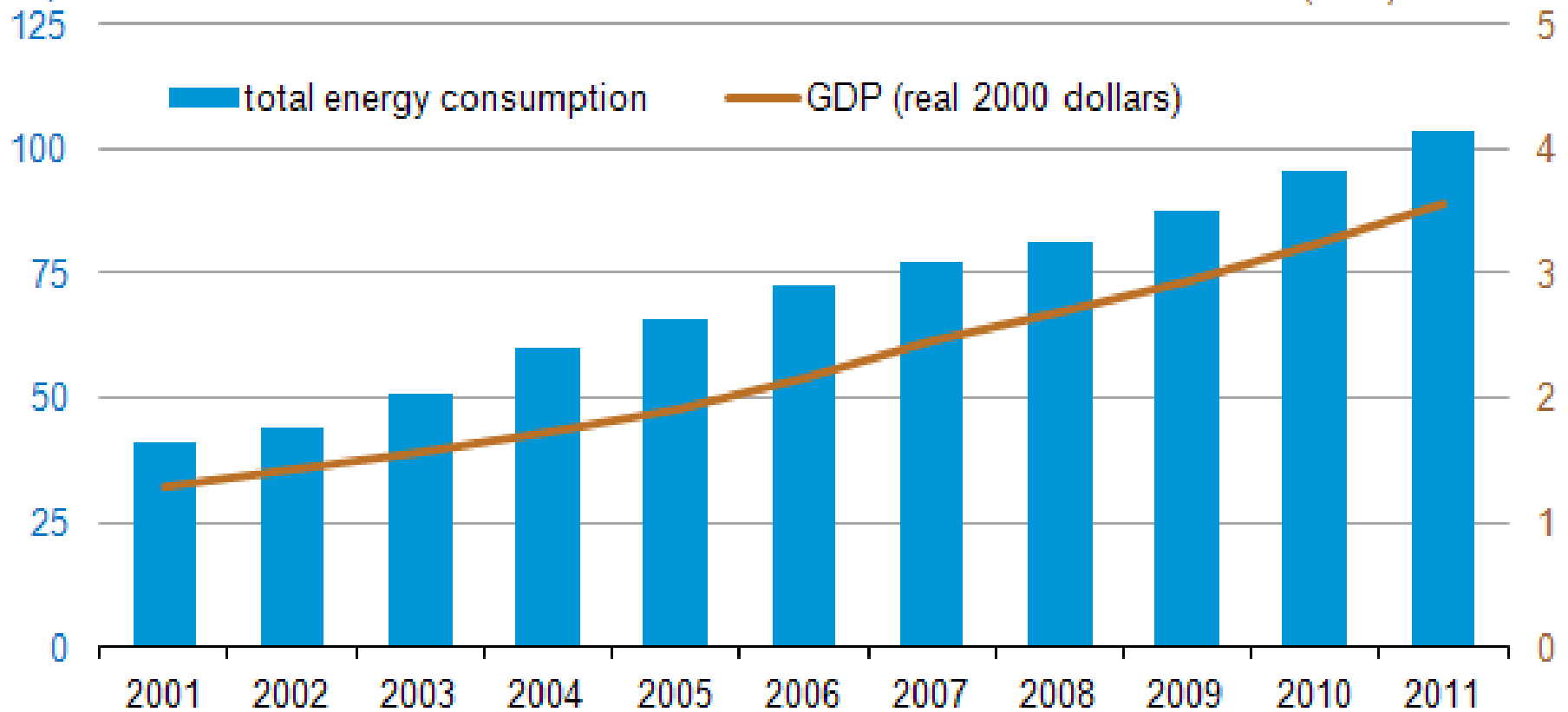


# Appendix: Chinese energy consumption

## China's economy drives increase in energy consumption

quadrillion British thermal units

trillion U.S. real (2000) dollars



## Appendix: TPS versus TPU

- ✓ Compared with TDU
  - TDU → capacity of treating **70 tons of soil a day**
  - Mobile TPS unit → capacity for 30,000 tons per year, or **82 tons per day**
- ✓ Other advantages
  - TPS Mobility → Numerous Small Sites
  - TDU Transportation costs
    - Soil to TDU
    - Desorbed POPs to incineration facility
- ✓ Laws / Regulations – Expected to ban import of waste containing POPs from province to province



## Appendix: Chinese patent law

### Are patents registered in Canada valid in China?

Patents are territorial rights, meaning that a ***patent in Canada has no effect in China***. To ensure that your innovations are protected in China, ***you will have to ensure you also file for an appropriate patent in China***.

### How do I file to protect my patent in China?

In China, patents are administered by the State Intellectual Property Office (SIPO). You can either file directly to SIPO in China, or through the Patent Cooperation Treaty method. In China, patents are granted on a first-to-file basis, which means that all else being equal, the party that files the patent first will obtain the patent. Granting of an invention patent can take 3-4 years, whereas ***design and utility model patents can take approximately 18 months***.

Source – The Canadian Trade Commissioner Service



## Appendix: JV 50:50 breakdown

“The 50:50 joint venture company will:

- establish a facility capable of processing 10,000 tons/year of oily sludge in Zhoushan with the capacity to expand to 100,000 tons/year;
- explore opportunities of applying the oily sludge treatment technology to other parts of China;
- further define and develop other technologies to complement the oily sludge treatment process;
- provide solutions and consulting services with respect to oil recovery issues; and
- share technical and market information concerning the waste management industry throughout China.”



# Appendix: Revenue process dates

Phase 1 Revenue Beginning May 1st 2011 – YE 2011	Phase 1 May 1 <sup>st</sup> , 2011, and on
<b>10,000 (regardless of capacity) tons x 400 = 4,000,000</b> - We expect to <b>RUN AT CAPACITY</b> due to Nahai's large oil storage facilities providing large supply	<b>Expanding factory to 30,000 ton/year capacity:</b> 30,000 x \$400 = \$12,000,000 / year
<b>8 months Work Completed in 2011, 8/12 of 4,000,000 = \$2,666,666</b>	
Phase 2 Revenue Before Nov 2012	Phase 2 Nov 2012 On
2,000-3,000 tons x \$700/ ton. 2,500 tons x 700 = <b>\$1,750,000</b> From <b>DEMONSTRATION</b>	<b>Running COMMERCIAL OPERATIONS following November 2012</b> between 10,000 and 30,000 tons / year. <b>20,000</b> x 700 = \$14,000,000 / year



# Appendix: 2011-2013 Revenues Before 50:50 Split

<b>2011</b> Phase 1: 8 months in first year, about 8/12 of 4,000,000 = 2,666,666	<b>Total 2011 revenue: 2,666,666</b>
<b>2012:</b> 4 months from original 10,000 tons from Phase 1: 4/12 x 4,000,000 = 1,333,333	
<b>2012:</b> 8 months of Phase 1 increased capacity in second year: 8/12 x 12,000,000 = 8,000,000	
<b>2012</b> Phase 2, demonstration revenue: 2,000-3,000 tons. 2,500 tons x 700 = \$1,750,000 from demonstration	
<b>2012</b> 1 December mobilization, no more revenue phase 2	<b>Total 2012 Revenue: 1,750,000 + 8,000,000 + 1,333,333 = 11,083,333</b>
<b>2013</b> on, not including expansion following 30,000 Phase 1: 12 months 30,000 x 400 = 12,000,000	
<b>2013</b> on: Running commercial operations following November 2012 between 10,000 and 30,000 tons / year. 20,000 x 700 = \$14,000,000	<b>2013 per year revenue, not predicting further expansion: 12,000,000 + 14,000,000 = 26,000,000</b>



# Appendix: 2011-2013 Costs Before 50:50 Split

<b>2011 Costs</b>	<b>Total: 4,833,334</b>
Sunk Cost: \$3,000,000	
\$100,000 for Factory to MI Drilling Fluids	
Payment of License Obligations to MI Drilling: $\$10 \times \frac{2}{3} \times 10,000 \text{ tons} = 66,667$	
COGS, using 2009 Revenue to COGS ratio of 2.8: $700/400 \times \frac{2}{3} \times 4,000,000 / 2.8 = 1,666,667$	
<b>2012 Costs:</b>	<b>Total: 8,316,666</b>
\$100,000 to MI Drilling Fluids for TPS Unit	
Factory Expansion Cost: \$1,000,000	
Increased Factory Operation Costs: \$500,000	
Payment of License Obligations to MI Drilling: $\$10 \times (2,500 \text{ (phase 2 Demonstration)} + \frac{8}{12} \times 30,000 + \frac{4}{12} \times 10,000) = \$258,333$	
COGS : $(\frac{4}{12} \times 4,000,000 \times \frac{7}{4} / 2.8) + (\frac{2}{3} \times 12,000,000 \times \frac{7}{4} / 2.8) + (1,750,000 / 2.8) = 833,333 + 5,000,000 + 625,000 = \$6,458,333$	
<b>2013 Costs - 2019:</b>	<b>Total: 13,000,000</b>
Payment of License Obligations to MI Drilling: $\$10 \times (30,000 + 20,000) = \$500,000$	
COGS : $(12,000,000 \times \frac{7}{4} / 2.8) + (14,000,000 / 2.8) = 7,500,000 + 5,000,000 = \$12,500,000$	
<b>2019 On:</b>	<b>Total: 12,500,000</b>





# Appendix: 2011-2013 Costs after 50:50 Split

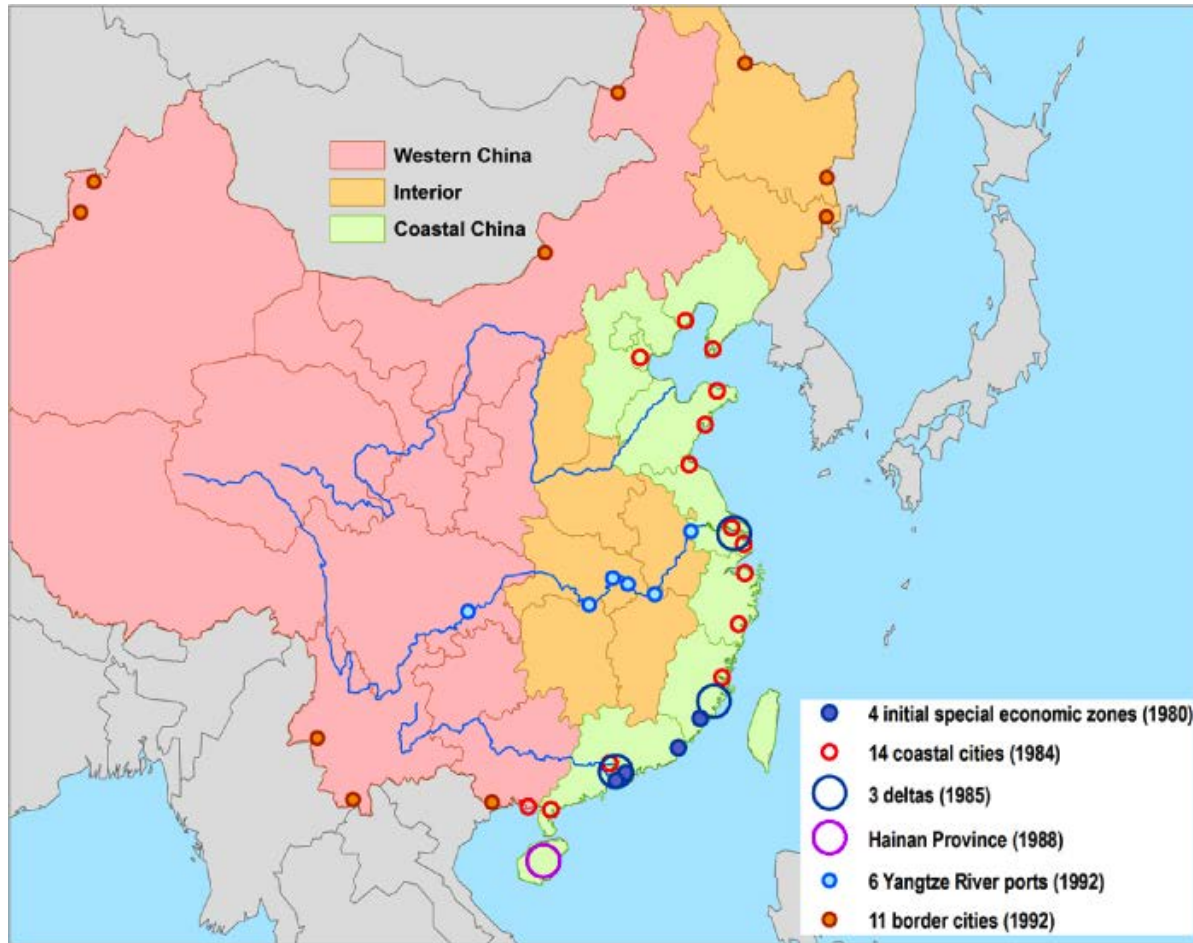
<b>2011 Costs</b>	<b>Total Before: 4,833,334</b>
Take Out MI Drilling License Obligation Costs of 166667	4,337,499
Half of 4,337,499, + 166,667	<b>Total After: 2,500,000</b>
<b>2012 Costs:</b>	<b>Total Before: 8,316,666</b>
Take Out MI Drilling License Obligation Costs of 358,333	7,958,333
Half 7,958,333, + 358,333	<b>Total After: 4,337,499</b>
<b>2013 Costs - 2019:</b>	<b>Total Before: 13,000,000</b>
Take Out MI Drilling License Obligation Costs of 500,000	12,500,000
Half 12,500,000, + 500,000	<b>Total After: 6,750,000</b>
<b>2019 On:</b>	<b>Total: 12,500,000</b>
Half 12,500,000	<b>Total After: 6,250,000</b>



# Appendix: Chinese geography

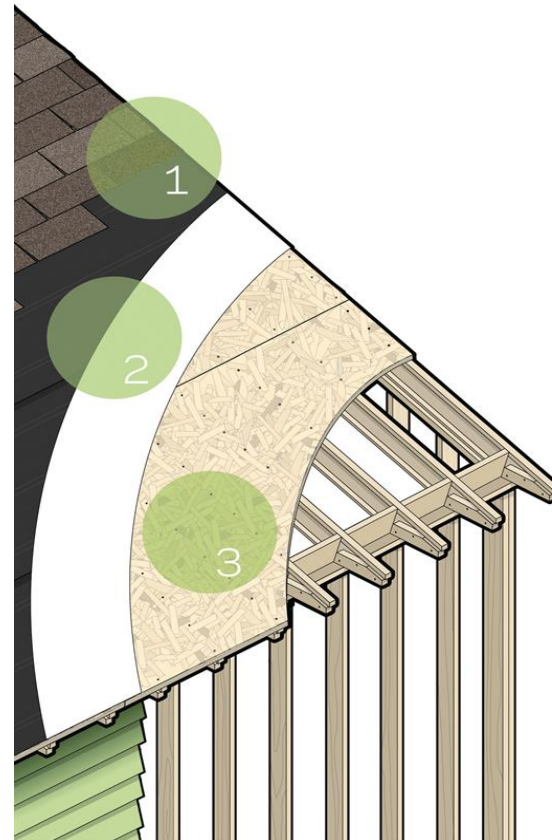


# Appendix: Chinese economic zones



## Appendix: Typhoon countermeasures

- ✓ Buildings fortified against wind and rain
- ✓ Fire prevention methods
- ✓ Technology already used by Nahai
- ✓ Insurance costs



## Appendix: Regulations

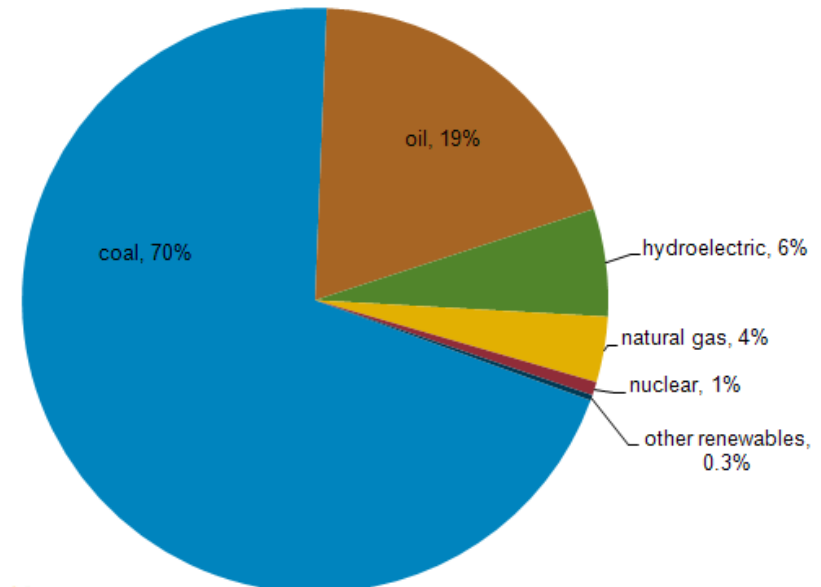
- ✓ **Stakeholders:**
  - ✓ State Energy Commission established in 2002 regulates power sector
  - ✓ Energy Ministry
  - ✓ National Development and Reform Commission
- ✓ **China moving toward a domestic carbon market**
  - ✓ New fuel surcharge tax
  - ✓ Carbon emissions trading
- ✓ **Massive energy demands in China**
  - ✓ Risk of energy shortage
  - ✓ Expectation of slow liberalization of energy sector
  - ✓ 2002 – ASEAN members signed Declaration of Conduct
  - ✓ No regulations to prevent China from expanding hydrocarbon development



## Appendix: Chinese demand for energy

- ✓ Enhanced transmission and distribution capacity
- ✓ Coal estimated to provide most of energy by 2030
- ✓ 2004 estimate – every 1% GDP increase equal to 1.5% increase in energy demand
- ✓ 2009 – China second largest net oil importer behind U.S.
  - ✓ 2011 – Net total oil imports reached 5.5 million bbl/d

Total energy consumption in China by type, 2009



 Source: U.S. Energy Information Administration, *International Statistics*



## Appendix: Growth opportunities

### ✓ **Oil sludge treatment technology:**

- ✓ Merger with a Chinese company unlikely
- ✓ Never acquire an incinerating plant because manufacturing equipment differs greatly with PS2's equipment

### ✓ **TPS technology**

- ✓ Expansion of TPS technology depends on its development
- ✓ Getting go-ahead to move to another province

