

Measurement and Performance Tracking  
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# Measuring China's CO2 reductions from mitigation target, policies and actions

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# Contents

- Mitigation Targets and Actions of China
- Measuring energy related CO<sub>2</sub> emissions of different scenarios
- Domestic MRV System
- Challenges
- Our Work

# Hierarchy of Plans/Targets Decomposition

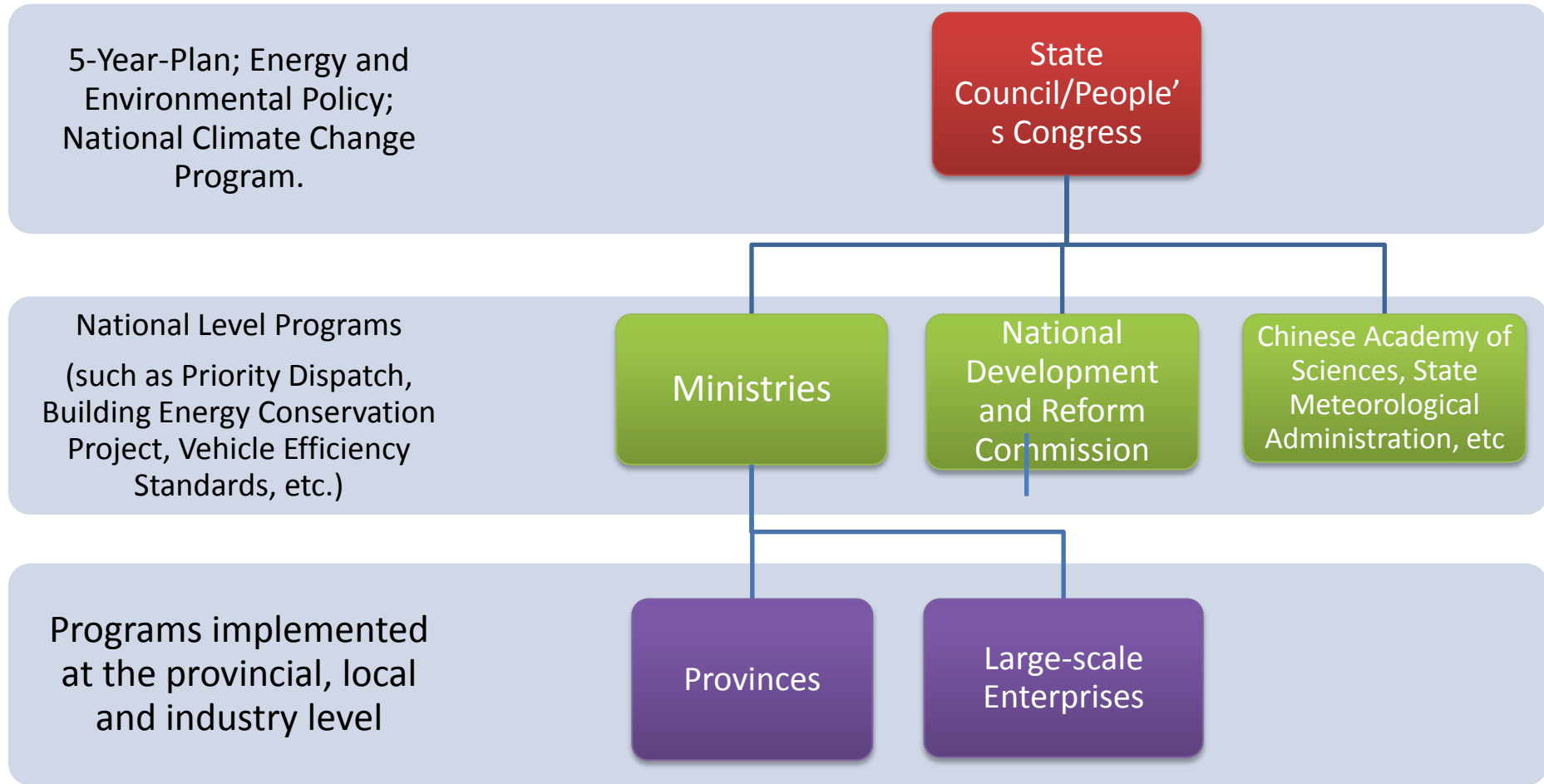


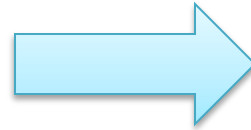
表 4.1 “十一五”规划期间，各省能耗削减目标

| 地区  | 2005 年基础数据 (吨标煤当量/千元) | 2010 年目标 (吨标煤当量/千元) | 削减比例 | 地区 | 2005 年基础数据 (吨标煤当量/千元) | 2010 年目标 (吨标煤当量/千元) | 削减比例 |
|-----|-----------------------|---------------------|------|----|-----------------------|---------------------|------|
| 全国  | 12.2                  |                     | 20   | 河南 | 13.8                  | 11.0                | 20   |
| 北京  | 8.0                   | 6.4                 | 20   | 湖北 | 15.1                  | 12.1                | 20   |
| 天津  | 11.1                  | 8.9                 | 20   | 湖南 | 14.0                  | 11.2                | 20   |
| 河北  | 19.6                  | 15.7                | 20   | 广东 | 7.9                   | 6.6                 | 16   |
| 山西  | 29.5                  | 22.1                | 25   | 广西 | 12.2                  | 10.4                | 15   |
| 内蒙古 | 24.8                  | 18.6                | 25   | 海南 | 9.2                   | 8.1                 | 12   |
| 辽宁  | 18.3                  | 14.6                | 20   | 重庆 | 14.2                  | 11.4                | 20   |
| 吉林  | 16.5                  | 11.6                | 30   | 四川 | 15.3                  | 12.2                | 20   |
| 黑龙江 | 14.6                  | 11.7                | 20   | 贵州 | 32.5                  | 26.0                | 20   |
| 上海  | 8.8                   | 7.0                 | 20   | 云南 | 17.3                  | 14.4                | 17   |
| 江苏  | 9.2                   | 7.4                 | 20   | 西藏 | 14.5                  | 12.8                | 12   |
| 浙江  | 9.0                   | 7.2                 | 20   | 陕西 | 14.8                  | 11.8                | 20   |
| 安徽  | 12.1                  | 9.7                 | 20   | 甘肃 | 22.6                  | 18.1                | 20   |
| 福建  | 9.4                   | 7.9                 | 16   | 青海 | 30.7                  | 25.5                | 17   |
| 江西  | 10.6                  | 8.5                 | 20   | 宁夏 | 41.4                  | 33.1                | 20   |
| 山东  | 12.8                  | 10.0                | 22   | 新疆 | 21.1                  | 16.9                | 20   |

数据来源：中国能源网

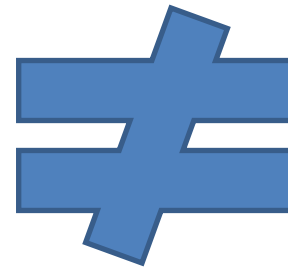
注：单位能源消耗基于 2005 年不变价格计算的 GDP。

Energy intensity target during 11 FYP



Policies and Measures:

- Ten Key Energy Conservation Project
- Top-1000 Energy-Consuming Enterprise
- Structural Adjustment/Small Plant Closures
- Building Energy Efficiency
- Appliance Standards



# Mitigation Policies and Measures during the 11th FYP (2006-2010): Energy Efficiency

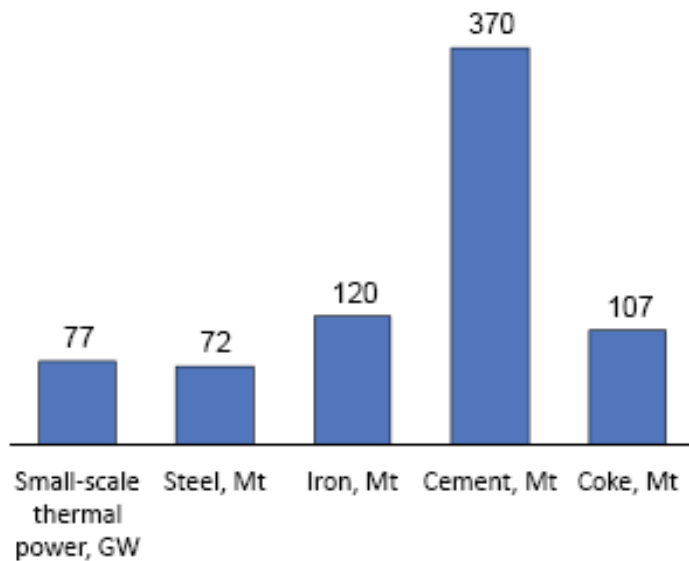


Fig. 1 Phasing out of backward production capacity

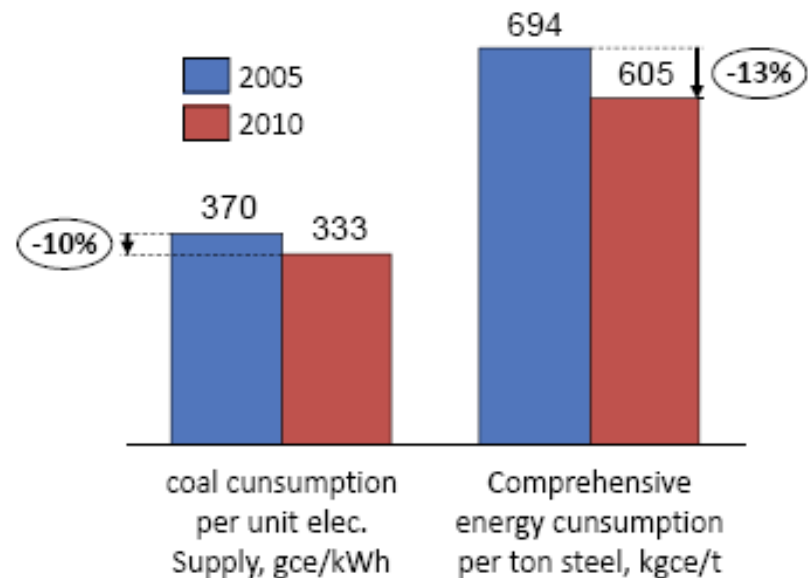


Fig. 2 Reducing per product energy consumption in major industries

# Mitigation Policies and Measures during the 11th FYP (2006-2010): Low Carbon Energy

| Item   | Applications  | 2005   | 2009   | 2010  |
|--|---|--------|--------|-------|
| Hydro power                                      | Power generation (GW)                                   | 117    | 196    | 216   |
|  | Small hydropower (GW)                                   | 38     | 60     | -     |
| Nuclear  | Power generation (GW)                                   | 6.9    | 9.1    | 10.8  |
| Wind power                                       | Power generation (GW)                                   | 1.26   | 25.8   | 31.07 |
| Solar energy                                     | PV Power generation (MW)                                | 70     | 300    | 800   |
|  | Solar thermal utilization (100 million m <sup>2</sup> ) | 0.8    | 1.45   | 1.68  |
|  | Solar house(10,000 m <sup>2</sup> )                     | 1514.4 | 1733.8 | -     |
|  | Solar oven (10,000 units)                               | 68.6   | 148.4  | -     |
| Biomass energy                                   | Power generation (MW)                                   | 2000   | 3240   | 5500  |
|  | Biomass ethanol(10,000 tonne)                           | 102    | 165    | 180   |
|  | Biodiesel(10,000 tonne)                                 | 5      | 50     | 50    |
| Methane  | 100 million cu.m  |        |        |       |
| Share of Non-fossil fuel in total energy use (%) |   | 6.7    | 7.7    | 8.5   |

# Objectives during the 12th FYP (1)

| Item   | 2010  | 2015   | Growth                    |
|--|-------|--------|---------------------------|
| GDP (Trillion Yuan)  | 39.8  | 55.8   | annual growth rate<br>7%  |
| The share of tertiary industry added value in GDP(%)           | 43    | 47     | 9.3%                      |
| The share of the expenditure on R&D in GDP (%)                 | 1.75  | 2.2    | 25.7%                     |
| Annual Per Capita Disposable Income of Urban Households (yuan) | 19109 | >26810 | >7% (annual growth rate)  |
| Annual Per Capita Net Income of Rural Households (yuan)        | 5919  | >8310  | >7% (annual growth rate)  |
| Population (million)   | 1341  | <1390  | 0.72%(annual growth rate) |
| The share of non-fossil energy in total primary energy use (%) | 8.5   | 11.4   |                           |
| Energy consumption per unit GDP(%)                             | 1.03  | 0.87   | -16%                      |
| Carbon emission per unit GDP (%)                               | 2.29  | 1.90   | -17%                      |
| Stock volume of Forest (100 million cu.m)                      | 137   | 143    | 4.4%                      |

# Objectives during the 12th FYP(2)

- Wind:
  - ✓ 100 GW capacity (grid connected, 5GW off shore) in 2015, electricity 190 Twh
- Solar:
  - ✓ PV: 21 GW in 2015; Solar heating: 400 million M<sup>2</sup>
- Hydro:
  - ✓ 210 GW capacity in 2010, generated 650 Twh, 260 GW in 2015, 330 GW in 2020
- Nuclear:
  - ✓ 10.8GW in 2010, 40GW by 2015, 80 GW by 2020
- Biomass
  - ✓ The biomass gas supply will reach 22 billion cubic meters; biomass briquette fuel 10 million tons; biomass ethanol 4 million tons; biodiesel 1 million tons.
  - ✓ Biomass Electricity: 13GW
  - ✓ The total utilization volume of various types of biomass energies will exceed 50 million tons of standard coal



# Major Mitigation Actions during 12th FYP

- Energy conservation and carbon reduction action for Tens of thousands of enterprise
- Energy conservation reconstruction project
  - CHP, motor system, optimization of energy system , waste heat and residual pressure utilization, boiler (kiln) transformation, conservation and alternative of oil, building energy efficiency, energy conservation in transport, green lighting, etc.
- Deployment of energy conservation products
  - high energy efficient appliances, automobile, motor, lighting products, etc.
- Demonstration project of energy-saving technology industrialization
- Promotion of Energy Management Contract

|  | <b>Result 1<br/>(Average GDP grow<br/>between<br/>2010-2020,<br/>6.5%)</b> | <b>Result 2<br/>(Average GDP<br/>grow<br/>between<br/>2010-2020,<br/>7%)</b> | <b>Result 3<br/>(Average<br/>GDP grow<br/>between<br/>2010-2020,<br/>7.5%)</b> | <b>3 Scenarios in<br/>the 2th<br/>National<br/>Communicatio<br/>ns</b> |
|--|--|--|--|--|
| Emissions of 2020, Gt<br>(Frozen 2010 intensity)   | 14.27  | 14.95  | 15.66  | 14.4<br>(Baseline)   |
| Emissions of 2020, Gt,<br>Frozen 2015 intensity<br>which is 17% reduction<br>compared with 2010) | 11.84  | 12.41  | 13   | 11.7(Policy<br>Scenario)   |
| Emissions of 2020, Gt<br>(45% intensity reduction<br>compared with 2005)                         | 9.81   | 10.29  | 10.78  | 9.9(Enhance<br>d Policy<br>Scenario)                                   |
| Reduction in 2020 (45%<br>target) compared with<br>frozen 2010 intensity, Gt                     | 4.46   | 4.66   | 4.88   | 4.5  |

# Domestic MRV system for mitigation actions in China: Current Status

- Improve MRV system for the implementation of energy conservation target: Statistics, monitoring and evaluation
- Establish MRV system for the implementation of carbon intensity target: early stage, statistics, accounting, monitoring and evaluation
  - based on energy system and at early stage

# Domestic MRV System for Energy Conservation Target

- **Target Decomposition** to the provinces: based on **Target Responsibility System**
- **Measure:**
  - National Bureau of Statistics
  - Provincial Bureau of Statistics
- **Report:**
  - **Bulletin** of the implementation of energy intensity target each year for each provinces issued by National Bureau of Statistics, National Development and Reform Commission and National Energy Administration
  - **Bulletin** of the implementation of energy intensity target each year for each city issued by provincial government
- **Verification:**
  - **Inspection team** approved and organized by NDRC to conduct on-site evaluation and spot check

# Target Decomposition

- Energy and carbon intensity target of 12<sup>th</sup> Five-Year Plan of all provinces—Target Responsibility System

| 地区  | 单位国内生产总值二氧化碳排放下降(%) | 备注：单位国内生产总值能源消耗下降(%) |
|-----|---------------------|----------------------|
| 北京  | 18                  | 17                   |
| 天津  | 19                  | 18                   |
| 河北  | 18                  | 17                   |
| 山西  | 17                  | 16                   |
| 内蒙古 | 16                  | 15                   |
| 辽宁  | 18                  | 17                   |
| 吉林  | 17                  | 16                   |
| 黑龙江 | 16                  | 16                   |
| 上海  | 19                  | 18                   |
| 江苏  | 19                  | 18                   |
| 浙江  | 19                  | 18                   |
| 安徽  | 17                  | 16                   |
| 福建  | 17.5                | 16                   |
| 江西  | 17                  | 16                   |
| 山东  | 18                  | 17                   |
| 河南  | 17                  | 16                   |
| 湖北  | 17                  | 16                   |
| 湖南  | 17                  | 16                   |
| 广东  | 19.5                | 18                   |
| 广西  | 16                  | 15                   |
| 海南  | 11                  | 10                   |
| 重庆  | 17                  | 16                   |
| 四川  | 17.5                | 16                   |
| 贵州  | 16                  | 15                   |
| 云南  | 16.5                | 15                   |
| 西藏  | 10                  | 10                   |
| 陕西  | 17                  | 16                   |
| 甘肃  | 16                  | 15                   |
| 青海  | 10                  | 10                   |
| 宁夏  | 16                  | 15                   |
| 新疆  | 11                  | 10                   |

- Sources:  
Government  
of China, 2012

Warning table for the implementation of energy intensity target of all provinces (January- May, 2012)

| 时 间   | 一 季 度 预 警 等 级 | 1-5 月 预 警 等 级 | “十二 五” 进 度 预 警 等 级 |
|-------|---------------|---------------|--------------------|
| 地 区   |               |               |                    |
| 北 京   | ●             | ●             | ●                  |
| 天 津   | ●             | ●             | ●                  |
| 河 北   | ●             | ●             | ●                  |
| 山 西   | ●             | ●             | ●                  |
| 内 蒙 古 | ●             | ●             | ●                  |
| 辽 宁   | ●             | ●             | ●                  |
| 吉 林   | ●             | ●             | ●                  |
| 黑 龙 江 | ●             | ●             | ●                  |
| 上 海   | ●             | ●             | ●                  |
| 江 苏   | ●             | ●             | ●                  |
| 浙 江   | ●             | ●             | ●                  |
| 安 徽   | ●             | ●             | ●                  |
| 福 建   | ●             | ●             | ●                  |
| 江 西   | ●             | ●             | ●                  |
| 山 东   | ●             | ●             | ●                  |
| 河 南   | ●             | ●             | ●                  |
| 湖 北   | ●             | ●             | ●                  |
| 湖 南   | ●             | ●             | ●                  |
| 广 东   | ●             | ●             | ●                  |
| 广 西   | ●             | ●             | ●                  |
| 海 南   | ●             | ●             | ●                  |
| 重 庆   | ●             | ●             | ●                  |
| 四 川   | ●             | ●             | ●                  |
| 贵 州   | ●             | ●             | ●                  |
| 云 南   | ●             | ●             | ●                  |
| 陕 西   | ●             | ●             | ●                  |
| 甘 肃   | ●             | ●             | ●                  |
| 青 海   | ●             | ●             | ●                  |
| 宁 夏   | ●             | ●             | ●                  |
| 新 疆   | ●             | ●             | ●                  |

## Case-MRV of Tens of Thousands Enterprises Energy Conservation and Emissions Reduction: Overview

- 17000 enterprises ( enterprises in industry with annual comprehensive energy consumption larger than 10000 tce and enterprises in commercial or other sectors with annual comprehensive energy consumption larger than 5000 tce)
- 60% of total energy consumption in China
- For example: Renmin University of China, energy conservation target during 12<sup>th</sup> FYP is 3359 tce.

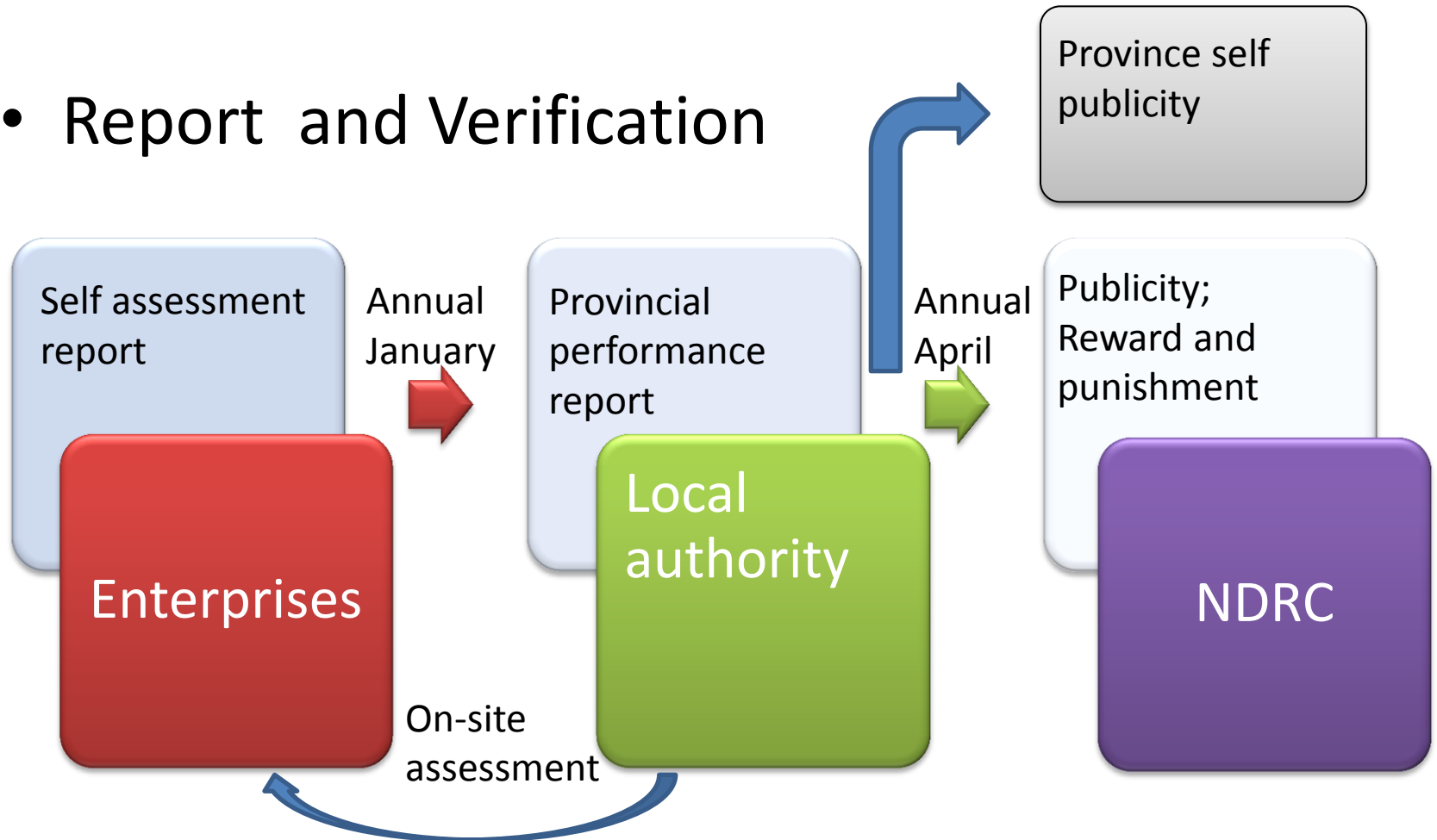
# Case-MRV of Tens of Thousands Enterprises Energy Conservation and Emissions Reduction: evaluation system and indicators

|   |   |
|---|---|
| <b>Energy conservation target (40)</b><br><b>(Achievement of 12<sup>th</sup> target each year )</b> | <b>100% achieved: 40; exceed 100%: 40 plus 1 per 10% exceeded, total no more than 42; less than 100%: 0;</b>  |
| <b>Energy conservation measures (60)</b>  |   |
| <b>Organization and Management( 6)</b>  | <b>Leading group: 2; specific management organization: 3; qualified human resources in enterprises:1.</b>   |
| <b>Energy conservation target responsibility(6)</b>   | <b>Decomposition of target to unit and person: 2; Assessment of energy conservation target: 2;Reward and punishment system: 2.</b>  |
| <b>Energy conservation management (25)</b>  | <b>Energy management system: 5; organize energy manager training and testing: 1; enhance energy statistical analysis: 2; implement energy status reporting system: 3; energy auditing: 2; set 12<sup>th</sup> target and plan: 2.</b><br><b>Energy efficiency benchmarking activity: 2; transport system improvement: 2; energy-saving incentive and restraint mechanism: 2; publicity and education: 1; transport vehicles fuel efficiency restriction: 2; energy-saving capability training and competition: 1.</b> |
| <b>Technological advances</b>   | <b>Specific funds for improving energy conservation technology: 3; new energy based transport vehicle plan: 2; Energy conservation R&amp;D: 4; green equipment and vehicles' share increase: 2; Closure of backward equipment: 4; using energy performance contracting: 1.</b>  |
| <b>Implementation of energy efficiency laws and regulations standards</b>                           | <b>Implementation of energy consumption norm: 2; Implementation of energy conservation design: 2; implement of energy assessment system: 4.</b>   |



# Case-MRV of Tens of Thousands Enterprises Energy Conservation and Emissions Reduction

- Report and Verification



# Problems and Challenges

- MRV system transfer from energy conservation to carbon emission control
- Consistency of national intensity target and target of all provinces (energy and carbon intensity)
- Consistency of relative target and absolute target

# Accounting of CO2 emissions

- The establishment of basic statistical system of greenhouse gas emissions based on the improvement of **energy statistical system**
- Strengthening of greenhouse gas **emissions accounting**
  - National level
  - Provincial level
  - Municipal level
  - Enterprise level

Work Program of the Control of GHGs Emissions during 12<sup>th</sup> FYP by NDRC, 2012

# WRI's GHG Protocol Standards are closely matching China's mitigation policy progress and requirement

## Current Available Standards of WRI

|  |  |
|--|--|
| Corporate Standard                       | Supporting National Emission Trade Pilot Scheme  |
|  | Supporting Tens of Thousands Enterprises Energy Conservation and Emissions Reduction, etc. |
| Product Standard                         | Supporting Certification of Low Carbon Products  |
| Project Standard                         | Supporting the Development and Financing of Low Carbon Projects                            |
| Corporate Value Chain (Scope 3) Standard | Supporting Corporate Social Responsibility and Corporate's Low Carbon Management           |

## Standards under Development of WRI

|                               |  |
|-------------------------------|--|
| Policies and Actions Standard | Supporting the Assessment and Performance Evaluation of Mitigation Policies                                    |
| Mitigation Goals Standard     | Supporting setting, decomposition and implementation of the target of 12 <sup>th</sup> Five Year Plan and 2020 |

# Current GHG emissions data of China

- Initial National Communication, data of 1994
- Second National Communication, released by the end of this year, data of 2005 (including data of 2008 for internal use)
- Provincial GHGs inventory in several pilot provinces (under development)
- Biennial Update Report (BUR) according to Cancun and Durban Agreement in the future
- **Can't support the domestic MRV of national carbon intensity target directly**

# Our Works

- Develop appropriate CO2 inventory method based on China's current energy statistics system and available data
- Translate carbon intensity target into absolute target based on frozen 2010 intensity baseline so as to establish the linkage of overall intensity target and specific mitigation actions
- Solve the inconsistent problems between national and provinces and find more appropriate approach to allocate national target to all provinces
- Develop a hybrid decomposition method(integration of regional and sectoral decomposition) to avoid double counting

Thank you for your attention!

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