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# VERIFICATION REPORT

## 核查报告

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本核查针对

格林美(武汉)城市矿产循环产业园开发有限公司  
2016 年度温室气体盘查报告书

REPORT No.: 00009-2016-GLM-TR




TIANRUN XINNENG

北京天润新能投资有限公司

# VERIFICATION REPORT 核查报告

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| Date of first issue:<br>2017年06月21日  | Project No.:         |
| Approved by:<br>侯春风  | Organisational unit: |
| Client:<br>格林美(武汉)城市矿产循环产业园开发有限公司  | Client ref.:         |
| <b>Reporter Name 盘查报告方名称:</b> 格林美(武汉)城市矿产循环产业园开发有限公司<br><b>Country 国别:</b> 中国<br><br><b>核查的组织边界 Organizational Boundary of Verification:</b><br><input type="checkbox"/> 财务管理控制 Financial Management Control <input checked="" type="checkbox"/> 运行管理控制 Operational Management Control <input type="checkbox"/> 股权持分 Equity Share<br><br><b>接受核查的温室气体盘查报告书涵盖的时间边界 Reporting Period of Emission Report Verified:</b> 2016年1月1日至2016年12月31日<br><br><b>基准年 Baseline Year (if specified):</b> 2016<br><br><b>直接温室气体排放总量 Total Direct Emissions:</b> 143.76 tonnes CO <sub>2</sub> e<br><b>能源间接温室气体排放总量 Total Energy Indirect Emissions:</b> 2013.52 tonnes CO <sub>2</sub> e<br><br><b>用于核查排放的标准 Standards Used to Verify Emissions:</b><br><input checked="" type="checkbox"/> ISO 14064 Series : ISO 14064-1:2006<br><input type="checkbox"/> Other Requirements from GHG Registry Body:<br><br><b>核查意见 Verification Opinion:</b><br><input checked="" type="checkbox"/> Verified without Qualifications 无限定条件的核查<br><input type="checkbox"/> Verified with Qualifications 有限定条件的核查<br><input type="checkbox"/> Unable to Verify 不具备核查条件 |                      |

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| Internal review by:<br><br>刘哲 |   |                |

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GHG Emission 温室气体排放

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# 1 EXECUTIVE SUMMARY – VERIFICATION OPINION 核查结论

## 1.1 Objective 目的

Beijing Tian Run New Energy Investment Co.,Ltd (hereinafter referred to as Tianrun) has conducted verification activities in compliance with ISO 14064 series. Tianrun provides reasonable assurance that Gem (Wuhan) Urban Mining Resources Industrial Park Development Co., Ltd. reported greenhouse gas emissions from Jan. 1, 2016 through Dec. 31, 2016 are verifiable and meet the requirements of ISO14064 series. 北京天润新能投资有限公司（以下简称天润新能）依据ISO 14064系列标准实施此次核查。天润新能基于合理保证等级对格林美(武汉)城市矿产循环产业园开发有限公司提供的2016年度温室气体盘查报告书进行了核查并确认其满足ISO14064系列标准的相关要求。

## 1.2 Scope 范围

Date on site verification was completed 完成现场核查的日期: 2017年5月31日;

Reporter's Organizational Boundaries 盘查报告书之组织边界:

Financial 财务控制 or  Operational 运行控制 or  Equity Share 股权持分  
Base Year 基准年 (if applicable): 2016 年

Total Direct Emissions 直接排放总量: 143.76 Tonnes CO<sub>2</sub>-e,  
quantified separately for each GHG as below, in Tonnes of CO<sub>2</sub>-e  
CO<sub>2</sub>: 132.1548, CH<sub>4</sub>: 0.4922, N<sub>2</sub>O: 0.0000; HFCs: 0.0000, PFCs: 0.0000, SF<sub>6</sub>: 0.0000  
Percent of Direct Emissions covered by site visits 直接排放占核查现场总排放量的比例是: 6.66%

Total Energy Indirect Emissions 能源间接排放总量: 2013.52 Tonnes CO<sub>2</sub>-e,  
Percent of Energy Indirect Emissions covered by site visits 能源间接排放占核查现场总排放的比例是: 93.4%;

Total Entity-Wide Emissions Verified 经核查的总排放量: 2157.275 Tonnes CO<sub>2</sub>-e

## 1.3 Standards Used to Verify Emissions 核查准则:

- ISO 14064 Series ISO 14064-1:2006  
 Other Requirements from GHG Registry Body:

## 1.4 Verification Statement 核查声明:

- Verified without Qualification 无限定条件的核查  
 Verified with Qualification 有限定条件的核查  
Explain Qualifications 解释限定条件:  
 Unable to Verify 不具备核查条件(include reason, e.g., "due to data errors" or "due to non-compliance with the Registry's reporting requirements): NA

## 2 INTRODUCTION引言

### 2.1 Objective目的

The verification has been conducted in accordance with ISO 14064 series. As such Tianrun has undertaken the following procedures that we considered appropriate to be able to provide a high level of assurance:

天润新能基于 ISO14064 系列标准所实施的核查采用了以下程序以提供合理保证等级:

- Sample testing of source data;源数据来源的核实和抽样测试
- Confirmation that arithmetical calculations are correct;数学计算正确性的核实
- Discussions with relevant personnel in relation to systems, procedures, and controls; and 与体系、程序和控制有关的人员的面谈, 和
- Observation and review of relevant documentation.相关文件和记录观察和评审

Tianrun did not conduct any verification procedures with respect to the internal control environment and data management system of Gem (Wuhan) Urban Mining Resources Industrial Park Development Co., Ltd. as a whole. As such, no assurance is provided on any internal control environment and data management system not associated with calculating the Greenhouse Gas Emission Inventory, and preparing the GHG Emission Report.

天润新能对于格林美(武汉)城市矿产循环产业园开发有限公司的总体内部控制环境和数据管理系统不作核查, 因此对于与温室气体排放盘查和温室气体排放盘查报告书编制无关的内部控制环境和数据管理系统不提供任何保证。

Tianrun confirms that we are not aware of any actual or perceived conflict of interest in having completed this engagement.

天润新能确认在完成此项核查工作中不存在现实的和可感知的影响公正性的利害冲突。

### 2.2 Scope范围

Tianrun has been engaged to undertake a verification of Gem (Wuhan) Urban Mining Resources Industrial Park Development Co., Ltd GHG emission report. The verification has been planned and performed to provide a reasonable level assurance opinion on whether the Gem (Wuhan) Urban Mining Resources Industrial Park Development Co., Ltd. 's Greenhouse Gas Emission Inventory in the year of 2016are fairly presented, in all material aspects, in accordance with requirements as defined in the ISO 14064 series.

天润新能接受格林美(武汉)城市矿产循环产业园开发有限公司的委托对其温室气体盘查报告书实施核查。所策划和实施的核查对格林美(武汉)城市矿产循环产业园开发有限公司 2016 年度的温室气体盘查在各实质性领域是否能够在合理保证水平上符合 ISO14064 系列标准要求给出核查意见。

## 3 METHODOLOGY方法

The verification consisted of the following procedures:核查由以下程序组成

- Sample testing of source data;源数据的抽样测试
- Confirmation that arithmetical calculations are correct; 数学计算正确性的核实
- Discussions with relevant personnel in relation to systems, procedures, and controls; and 与体系、程序和控制有关的人员的面谈，和
- Observation and review of relevant documentation. 相关文件和记录观察和评审

A Verification Checklist was used during the verification procedures undertaken.在实施核查时使用了核查清单

### 3.1 Interviewed Persons接受面谈的人员

| Name | Job Title |
|------|-----------|
| 吴志刚  | 副总经理      |
| 魏琼   | 副总经理      |
| 刘颖   | 技术发展部经理   |
| 李顺   | 能源部经理     |
|      |           |
|      |           |

### 3.2 Document Reviewed文件评审

The following table outlines the documents assessed during the verification:

下表罗列了在核查时评审的文件

| Activity or Emission Source<br>活动和排放源   | Document<br>文件  |
|---|---|
| <b>Identifying Emission Sources 识别排放源</b>   |   |
| Emission Source Inventory 排放源清册   | <input checked="" type="checkbox"/> Facility Inventory 设施清册<br><input checked="" type="checkbox"/> Emission Source Inventory 排放源清册                                      |
| <b>Understanding Management Systems and Methodologies</b>   |   |
| <ul style="list-style-type: none"> <li>• Responsibilities for Implementing GHG实施盘查的职责</li> <li>• Management Plan 管理计划</li> </ul>              | <input checked="" type="checkbox"/> Organization Chart组织职责图<br><input checked="" type="checkbox"/> Greenhouse Gas Management Plan温室气体管理计划                               |
| Training 培训   | <input checked="" type="checkbox"/> Training Manual培训手册<br><input checked="" type="checkbox"/> Procedures Manual 程序手册   |
| Methodologies 方法学   | <input checked="" type="checkbox"/> Inventory Report 盘查报告   |
| <b>Verifying Emission Estimates 验证排放量</b>   |   |
| Direct Emissions from Mobile Combustion 移动源的直接排放<br>( <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Non-applicable) | <input checked="" type="checkbox"/> Fuel Purchase Records燃料采购记录<br><input type="checkbox"/> Fuel in Stock燃料存量<br><input type="checkbox"/> Vehicle Miles Traveled机动车行驶里程 |

| Activity or Emission Source<br>活动和排放源   | Document<br>文件  |
|---|---|
|   | <input checked="" type="checkbox"/> Inventory of Vehicles 机动车台帐<br><input checked="" type="checkbox"/> Emission Factors 排放系数  |
| Direct Emissions from Stationary Combustion 固定源的直接排放<br>( <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Non-applicable)   | <input checked="" type="checkbox"/> Monthly Utility Bills 设施帐单<br><input checked="" type="checkbox"/> Fuel Purchase Records 燃料采购记录<br><input checked="" type="checkbox"/> Inventory of Stationary Combustion Facilities 固定燃烧设施台帐<br><input checked="" type="checkbox"/> Emission Factors 排放系数   |
| Direct Emissions from Process Activities 工艺活动的直接排放<br>( <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Non-applicable)   | <input type="checkbox"/> Raw Material Inputs 原材料投入<br><input type="checkbox"/> Production Output 产出<br><input type="checkbox"/> Calculation Methodology 计算方法<br><input type="checkbox"/> Emission Factors 排放系数  |
| Direct Fugitive Emissions: 直接逸散排放<br><ul style="list-style-type: none"> <li>• Refrigeration Systems 制冷系统<br/>(<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Non-applicable)</li> <li>• Natural Gas Pipelines 天然气管线<br/>(<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Non-applicable)</li> <li>• Electric Transmission and Distribution 电力输送和分配<br/>(<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Non-applicable)</li> <li>• Landfills 填埋<br/>(<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Non-applicable)</li> <li>• Others: 其他<br/>(<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Non-applicable)</li> </ul> | <input type="checkbox"/> Refrigerant Purchase Records 制冷剂采购记录<br><input type="checkbox"/> Refrigerant Sales Records 制冷剂销售记录<br><input checked="" type="checkbox"/> Calculation Methodology 计算方法<br><input checked="" type="checkbox"/> Emission Factors 排放系数<br><br><input type="checkbox"/> Gas Throughput Data 气体使用数据<br><input type="checkbox"/> Calculation Methodology 计算方法<br><input type="checkbox"/> Emission Factors 排放系数<br><br><input type="checkbox"/> Sulfur Hexafluoride Purchase Records 六氟化硫采购记录<br><input type="checkbox"/> Calculation Methodology 计算方法<br><input type="checkbox"/> Emission Factors 排放系数<br><br><input type="checkbox"/> Waste-in-Place Data 废弃物台帐<br><input type="checkbox"/> Waste Landfilled 垃圾填埋<br><input type="checkbox"/> Calculation Methodology 计算方法<br><input type="checkbox"/> Emission Factors 排放系数<br><br><input type="checkbox"/> Usage of Coal 煤的使用<br><input type="checkbox"/> Emission Factors 排放系数 |
| Indirect Emissions from Electricity Use 用电间接排放<br>( <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Non-applicable)   | <input checked="" type="checkbox"/> Monthly Electric Utility Bills 月度用电帐单<br><input checked="" type="checkbox"/> Emission Factors 排放系数  |
| Indirect Emissions from Cogeneration, Imported Steam, District Heating, District Cooling,<br>( <input type="checkbox"/> Applicable <input type="checkbox"/> Non-applicable)   | <input type="checkbox"/> Monthly Utility Bills 月度设施帐单<br><input type="checkbox"/> Fuel and Efficiency Data from Supplier 供应商提供的燃料和效率数据<br><input type="checkbox"/> Emission Factors 排放系数  |

### 3.3 Sample Size 抽样规模

The number of sites visited was based on the following table:

基于下表的访问现场的数量

| Total Sites | Minimum Sample Size |
|-------------|---------------------|
| 1-5         | Actual sites        |
| 6-11        | 5                   |
| 12-26       | 6                   |
| 27-51       | 8                   |
| 51-101      | 12                  |
| 101-251     | 15                  |
| 251-501     | 20                  |
| Over 1,000  | 2%                  |

Total number of facilities 设施总数: 1

Total number of facilities visited 巡访的设施总数: 1

### 3.4 Internal Quality Control 内部控制

The draft verification report underwent a technical review before being submitted to the reporter. The technical review was performed by an internal peer reviewer qualified in accordance with Tianrun's qualification scheme for GHG verification.

## 4 VERIFICATION CHECKLIST 核查检查表

The results of the verification procedures undertaken are set out in the following Verification Checklist. All the non-conformities were described in Appendix. 核查检查表罗列了本次核查过程的结果。相关的不符合将在附录中表述。

| Verification Checklist 核查检查表  | Finding 发现<br>(Yes / No / N/A) | Note 备注 |
|---|--------------------------------|---------|
| <b>1 Reporting Boundaries 报告边界</b>  |                                |         |
| Is the Reporter's reporting boundary clearly defined? 公司报告边界是否清晰界定  | Yes                            |         |
| Does the Reporter's reporting boundary reflect its business structure? 报告边界是否反映公司的业务构架  | Yes                            |         |
| <b>2 Greenhouse Gas Emissions Sources 温室气体排放源</b>   |                                |         |
| Are all Scope 1, 2 and 3 (where required) emissions sources from within the Reporter's boundary considered? 所有各范畴排放源是否来自公司组织边界内 | Yes                            |         |



| Verification Checklist核查检查表   | Finding 发现<br>(Yes / No / N/A)                                 | Note备注   |
|---|--|--|
| <p>Does the GHG Emission Inventory consider all of the following nominated greenhouse gases?温室气体排放盘查是否考虑了下列温室气体</p> <ul style="list-style-type: none"> <li>• Carbon dioxide (CO<sub>2</sub>) 二氧化碳</li> <li>• Hydrofluorocarbons (HFCs) 氢氟化碳</li> <li>• Methane (CH<sub>4</sub>) 甲烷</li> <li>• Nitrous oxide (N<sub>2</sub>O) 氧化亚氮</li> <li>• Perfluorocarbons (PFCs) 全氟化碳</li> <li>• Sulfur hexafluoride (SF<sub>6</sub>) 六氟化硫</li> </ul> <p>If any of the above are excluded, is this justified?是否存在对上述气体的排除, 这种排除是否合理</p> | <p>Yes<br/>Yes<br/>Yes<br/>Yes<br/>N/A<br/>N/A<br/>Y<br/>Y</p> | <p>There is no PFCs SF<sub>6</sub> emission within the reporting boundary.在组织边界内没有全氟化碳和六氟化硫的排放</p> |
| <p>Are the activity levels for each emission source identified and their use clearly justified?各活动的每个排放源是否均被识别</p>  | <p>Yes</p>   |  |
| <p>Are the activity levels of each emission source supported by appropriate data and records (source data)? 各活动的每个排放源是否由合适的数据和记录支持</p>  | <p>Yes</p>   |  |
| <p>Have any activities been outsourced in the current year?当年有活动被外包吗</p>  | <p>No</p>  |  |
| <p>Have any mergers, acquisitions, or divestitures occurred during the reporting year?在盘查年中是否发生并购、或拆分<br/>If a baseline has been specified, has it been adjusted accordingly?确定的基准年是否随之调整</p>   | <p>No<br/><br/>N/A</p>   |  |
| <p><b>3 Methodology 方法学</b></p>   |  |  |
| <p>Are appropriate calculation methodologies/procedures used to manage GHG emissions at the source level?<br/>Are they appropriate given the uncertainty/risk associated with the emissions?是否应用了恰当的温室气体排放相关计算方法/程序? 这些方法/程序相对排放的不确定性/风险是合适的吗</p>   | <p>Yes<br/>Yes</p>   |  |
| <p>Are appropriate methods used to manage and implement entity-wide GHG emissions reporting programs?是否使用了合适的方法来管理和实施温室气体盘查工作</p>   | <p>Yes</p>   |  |
| <p>Have the most appropriate emission factors been used?是否使用了最合适的排放系数</p>   | <p>Yes</p>   |  |

| Verification Checklist 核查检查表   | Finding 发现<br>(Yes / No / N/A) | Note 备注  |
|--|--------------------------------|--|
| If the reporter uses alternative emission factors, are they documented and explained appropriately? 盘查方是否应用了可选的排放系数，这些系数是否在报告和清册中得到明示                                | Yes                            |  |
| <b>4 Data Calculation 数据计算</b>   |                                |  |
| Have emissions been calculated correctly by multiplying emission factors by activity levels for each emission source? 每个排放源通过活动数据乘以排放系数所得到的排放量是否计算正确                 | Yes                            |  |
| Have all emissions been converted into tonnes of CO <sub>2</sub> -e? 是否所有的排放量单位均已转化为二氧化碳吨当量  | Yes                            |  |
| Does the sum of these values represent the total emissions for the Reporter? 这些数据的综合是否代表了盘查方的总排放量  | Yes                            |  |
| Is the total quantity of emissions appropriate relative to the scale and operation of the Reporter? 所得的总排放量相对盘查方的规模和运行特点是否是合适的                                       | Yes                            |  |
| Are the current year's reported emissions significantly different from the prior year? 当年的盘查排放量是否与前一年的排放量有显著差别   | N/A                            |  |
| If the reporter has more than one facility, is the level of aggregation or disaggregation within the inventory appropriate? 如果盘查方有多个单元，在盘查中其合并或分解的程度是否是合适的           | N/A                            |  |
| Has the accumulated change in reported emissions, since the last baseline update,? Has the baseline, if any, been recalculated? 是否存在自上次基准线更新后排放量的累积变化？适宜时，基准线是否被重新计算 | Yes<br>N/A                     |  |
| Are discrepancies between your emissions estimates and the reporter's immaterial? 你对排放量的估算与盘查方的盘查结果是否有实质差异   | No                             |  |
| <b>5 Record Keeping 纪录保持</b>   |                                |  |
| Does the Reporter have a documented and effective record keeping policy? 盘查方是否有文件化的和有效的记录管理方针  | Yes                            | Documented procedures were established and implemented. 已建立和实施文件化的程序 |

| Verification Checklist 核查检查表   | Finding 发现<br>(Yes / No / N/A) | Note 备注   |
|--|--------------------------------|---|
| Are processes in place for records to be maintained? 记录流程是否被维护   | Yes                            |   |
| Are the record-keeping arrangements operational and effective? 记录保持的安排是否是可行和有效的  | Yes                            |   |
| Is a clear and transparent audit trail of documents, data and records that support any calculations, assumptions or decisions reached available? 支持所有计算、假设或决定的文件、数据和记录的审核线索是否是清晰和透明的 | Yes                            |   |
| Are relevant records maintained for the proper duration? 相关记录是否有合适的保存时间  | Yes                            |   |
| Are all relevant records that support greenhouse gas assertions available to the Verifier? 所有支持温室气体主张的记录是否可为核查人员所获取  | Yes                            |   |
| Where data has been transferred or reconciled was this done correctly? 数据的传输或接受是否做到了准确无误   | Yes                            |   |
| <b>6 Management 管理</b>   |                                |   |
| Were you able to consult with appropriate operational and management personnel? 能否与合适的操作和管理人员有效沟通  | Yes                            |   |
| Were you able to confirm key verification findings and any suggestions for improvement with the Reporter? 能否确认关键的核查发现和建议以便盘查者改进  | Yes                            |   |
| Is someone responsible for managing and reporting GHG emissions? Is that person qualified to do so? 是否有人负责温室气体盘查工作，此人是否有能力负责此项工作   | Yes<br>Yes                     |   |
| Is appropriate training provided to personnel assigned to GHG emissions reporting duties? 是否为承担温室气体盘查工作的人员提供适合的培训  | Yes                            |   |
| Are GHG data monitoring instruments properly maintained and calibrated in accordance with documented procedures? 温室气体盘查数据相关的监测仪器是否依据文件化的程序受到合适的维护和校准                                 | N/A                            | Relevant purchase bills are the major GHG data sources. 主要温室气体数据源于相关的单据 |
| Are appropriate documents created to support and/or substantiate activities related to GHG   | Yes                            |   |

| Verification Checklist 核查检查表  | Finding 发现<br>(Yes / No / N/A) | Note 备注 |
|---|--------------------------------|---------|
| emissions reporting activities, and is such documentation retained appropriately? 是否制作合适的文件以支持/证实与温室气体排放有关的活动，这些文件是否得到合适的维护。  |                                |         |
| Are the mechanisms used to measure and review the effectiveness of GHG emissions reporting programs appropriate for this purpose?   | Yes                            |         |
| <b>7 Offsets 抵消</b>   |                                |         |
| Are offsets included in the inventory? 抵消是否包含在清册中<br><small>If yes, please describe the offsets. 如是，请描述抵消</small>   | N/A                            |         |
| Have the offsets been approved by any authority? 抵消是否被批准  | N/A                            |         |
| Have the offsets been calculated correctly and converted into tonnes of CO <sub>2</sub> -e? 抵消是否已经被正确计算并转化成二氧化碳吨当量<br><small>Please describe the calculation methodology and how it was assessed. Where offsets have not been calculated correctly please assess the materiality of this discrepancy.</small> | N/A                            |         |
| Has the net total inventory been calculated correctly by subtracting the offsets from the gross total inventory? 盘查的净排放量是否已经是总排放量中扣除了抵消量而得出   | N/A                            |         |
| <b>8 Abatement Actions 减排行动</b>   |                                |         |
| What abatement actions are planned to be taken? 计划采取什么减排行动<br><small>Please describe all abatement actions listed</small>   | N/A                            |         |
| Have the abatement actions been implemented? 已实施的减排活动   | N/A                            |         |