



# INDONESIAN CLIMATE POLICY AND DATA IN CAIT INDONESIA CLIMATE DATA EXPLORER (PINDAI)

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## EXECUTIVE SUMMARY

The adoption of the Paris Agreement<sup>1</sup> marks a critical turning point for global climate action. Submitted in advance of the agreement, Indonesia’s Intended Nationally Determined Contribution (INDC) outlined its transition to a low-carbon future, committing to an unconditional emissions reduction of 29 percent by 2030 compared to the business-as-usual (BAU) scenario, and up to a 41 percent reduction with international assistance. The INDC reiterated Indonesia’s voluntary target of reducing its emissions by 26 percent against the baseline scenario in 2020. This target is nationally implemented through the Presidential Regulation of the Republic of Indonesia No. 61 Year 2011,<sup>2</sup> otherwise known as the *National Action Plan for Greenhouse Gas Emissions Reduction* (RAN-GRK). As mandated by RAN-GRK, every province in the country needs to develop a *Local Action Plan for Greenhouse Gas Emission Reduction* (RAD-GRK) as a supplement to RAN-GRK. The implementation of these mitigation action plans at the provincial level is thus critical to achieving national climate goals and to laying the foundation for more ambitious climate action beyond 2020.

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*Technical notes document the research or analytical methodology underpinning a publication, interactive application, or tool.*

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The World Resources Institute (WRI) developed the Indonesia Climate Data Explorer, or *Platform Interaktif untuk Data Iklim* (PINDAI). This is an open, bilingual (Bahasa Indonesia and English) online platform featuring Indonesian national- and provincial-level climate policy information and data, including historical and projected emissions, climate actions, and development plans. WRI created this platform to help provincial government officials (and others) measure and report high-quality emissions and to create a framework for data-driven decision making within Indonesia. The tool aims to increase public awareness and understanding of climate actions in Indonesia, and to facilitate and improve alignment between national and subnational implementation. This technical note accompanies the Indonesia Climate Data Explorer, explaining the data sources and methodological approach used for compiling the relevant data, as well as the limitations of data availability and quality.

## INTRODUCTION

Indonesia is an archipelagic country with thirty-four unique provinces where different climate actions are planned and implemented. The Indonesia Climate Data Explorer—or *Platform Interaktif untuk Data Iklim* (PINDAI)—is part of WRI’s CAIT Climate Data Explorer,<sup>3</sup> a suite of tools containing comprehensive and comparable climate policy and emissions data. The Indonesia Climate Data Explorer can help governmental and civil society actors advance effective climate policy implementation in Indonesia in a number of ways:

### 1. Understand a province’s proposed emissions reduction targets

Indonesia has thirty-four provinces, each with unique landforms and economic activities. Given this diversity, each province must adjust its climate commitment to fit its particular set of environmental and economic circumstances. The tool is intended to increase the transparency of the government’s plans and to improve understanding of the multiple dimensions of Indonesian climate action—such as mitigation activities and development plans—at the subnational level. It provides a general overview of the provinces’ emission profiles and the plans to reduce greenhouse gas emissions. The main source of data in the Indonesia Climate Data Explorer is each provincial *Local Action Plan for Greenhouse Gas Emission Reduction* (RAD-GRK).

### 2. Understand a province’s profile relative to other provinces

The Indonesia Climate Data Explorer can be used to compare a province’s climate action plans with those of other provinces to understand different approaches and aims. For example, by using the tool, users can explore information on which provinces have developed adaptation plans in addition to mitigation plans in their RAD-GRKs. In the “compare provinces” tab, users also can compare each province’s emission profile, sectoral breakdown, and primary source of emissions.

### 3. Understand a province’s development plan and how it aligns with its climate commitment

The Indonesia Climate Data Explorer allows for an evaluation of each province’s mid-term development plan in light of its climate commitment. In essence, the proposed mitigation programs in RAD-GRKs should be integrated into the *Medium Term Local Development Plans* (RPJMDs). As a document that encompasses programs and the future direction of development, RPJMDs should also indicate programs and strategies in RAD-GRKs. Using the tool, users can better understand a province’s development plan in the context of its alignment, or lack thereof, with its climate commitment. The tool presents specific mission statements and policy directions within RPJMD that support actions to reduce greenhouse gas emissions in that province. This section of the tool provides an opportunity to enhance the province’s accountability in implementing its greenhouse gas emissions reduction commitments.

## METHODOLOGY

The Indonesia Climate Data Explorer draws primarily from RAD-GRKs and RPJMDs from Indonesian national and regional government agencies, including the Secretariat of National Action Plan for Greenhouse Gas Emission Reduction (Sekretariat RAN-GRK), the National Development Planning Agency (BAPPENAS), and the Provincial Development Planning Agencies (BAPPEDA). Additional historical emissions information is derived from the Ministry of Environment and Forestry’s *Inventory System for National Greenhouse Gases* (SIGN SMART).

Under the Presidential Regulation of the Republic of Indonesia No. 61 Year 2011 (Presidential Regulation 61/2011), each province issued a RAD-GRK outlining steps to tangibly reduce greenhouse gas emissions. RAD-GRKs are submitted—no later than twelve months after the Presidential Regulation—to BAPPENAS and the Ministry of Home Affairs. The compilation of RAD-GRKs is facilitated by the Ministry of Home Affairs together with BAPPENAS and the Ministry of Forestry and Environment (formerly the Ministry of the Environment). Each province in Indonesia<sup>4</sup> developed their RAD-GRK by December 2012. The documents are reviewed by BAPPENAS and each province’s BAPPEDA, and updated taking into account provincial historical mitigation actions, the latest RPJMD and national development priorities, and Indonesia’s INDC.

The RPJMD document is submitted periodically by each province to outline the direction and concrete steps of the province’s development. If policy alignment exists, the RAD-GRK should be included as a cross-sectoral program within each RPJMD to allow funding allocation for the action plan to be estimated and secured. Each province’s RPJMD period varies, ranging usually from four to five years. In this tool, provincial RPJMDs that are in the period 2010–20 are used to correspond with the time of the development and implementation of RAD-GRKs. For a comprehensive list of various versions and titles of RAD-GRK documents, and corresponding RPJMD periods used for each province, please refer to Appendix 2.

## Provincial information

The provincial information contains a province-specific profile, including its capital city, population (in thousands), gross provincial income (million Rp),<sup>5</sup> total area (km<sup>2</sup>), and total forest land area (ha). The year chosen for quantitative information is 2010 in order to align with the base year used for emissions. For provinces with data available, emissions intensity of gross provincial product (tCO<sub>2</sub>e/million Rp) and emissions per capita (tCO<sub>2</sub>e/capita) are calculated. Basic information—including the capital city and population—are extracted from *Statistik Indonesia*, an annual report published by the Indonesian Central Bureau of Statistics (BPS).<sup>6</sup> Data on total forest land is synthesized from the Indonesian National Carbon Accounting System (INCAS) website, based on “UNFCCC—Forest Land.”<sup>7</sup> Data on provincial GDP is from a BPS website.<sup>8</sup>

## Emissions Profile

The emissions profile for each province presents historical emissions in a base year (2010), projected business-as-usual (BAU) scenario emissions in the target year (2020), as well as a target level of emissions if the reduction targets are met. Historical emissions are sourced from SIGN SMART. Projected emissions data are gathered from chapter IV, “Analysis on GHG Emissions,” from each province’s RAD-GRK document. For a detailed explanation of the structure of RAD-GRK documents, see Appendix 1. Not all provinces clearly present this information, or present it in a consistent manner in the RAD-GRK documents. The following adjustments were made in order to harmonize data across provinces:

### A. IDENTIFICATION OF BASE YEAR

As directed in RAN-GRK, 2010 is used as the historical reference point, and 2020 as a baseline reference year (for the BAU scenario). For a historical or base year emissions profile, SIGN SMART 2010 data are used. Due to incomplete data, RAD-GRK historical emissions are not used for provincial base year emissions profiles, but are included in the tool as a reference. Please see the “Limitations” section for detailed discussions of data discrepancies and quality. Most RAD-GRKs follow the same reference point as RAN-GRKs; however, some provinces use a different year due to missing or incomplete emissions inventory for 2010 during the development of their RAD-GRK. These provinces are:

- DKI Jakarta—chose base year 2005, and baseline reference year 2030<sup>9</sup>
- Jawa Timur (East Java)—chose base year 2011
- Gorontalo—chose base year 2012
- Maluku—chose base year 2012

Emissions numbers for these provinces are still included in the tool (with their base years noted in parentheses).

## B. HARMONIZATION OF UNITS

Quantitative emissions data sets were converted into million metric tons of carbon dioxide equivalent (MtCO<sub>2</sub>e). For units that are presented in measurements other than million metric tons (Mt), such as gigagram (Gg) or metric tons, we made simple conversions:

1Mt = 1,000 Gg = 1,000,000 metric tons

Greenhouse gas emissions reported in CH<sub>4</sub> or N<sub>2</sub>O are converted to CO<sub>2</sub> equivalent (CO<sub>2</sub>e) using the 100-year global warming potential (GWP) values from IPCC's *Second Assessment Report* (SAR, or AR2).<sup>10</sup> AR2 GWP values were chosen here since that measure is used in the latest Biennial Update Report (BUR) submission from Indonesia to the UNFCCC.

For numbers that lack clear units, there was no attempt to harmonize them and they were excluded.

## C. AGGREGATION OF SECTORS

As directed in the technical guidelines for RAD-GRK documents, sectoral emissions are aggregated into three categories:

- Agriculture and forestry<sup>11</sup>
- Energy, transport, and industry<sup>12</sup>
- Waste<sup>13</sup>

For provinces that only report partial information for a certain sector, a total is not provided as the inventory is incomplete. For historical emissions from SIGN SMART, we aggregated its gross land use emission and agriculture emission into category Agriculture and Forestry, energy emission into category Energy, Transport, and Industry, and waste emission into category Waste. Due to the incompleteness of the provincial industrial emission data from SIGN SMART, this sector is not included when calculating sectoral emissions and total emissions for each province. Nationally, the industry sector accounts for 36.39 MtCO<sub>2</sub>e in 2010, or 3 percent of total emissions. This three-sector aggregation is used throughout the tool for both quantitative and qualitative information. See the "Mitigation Actions" section below for detailed information.

## Box 1 | GWP values

Global warming potential is a factor describing the radiative forcing impact of 1 unit of a given greenhouse gas relative to 1 unit of CO<sub>2</sub>.

GASES	100-YEAR GWP (SAR)
Carbon Dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	21
Nitrous Oxide (N <sub>2</sub> O)	310

## Emissions Reduction Target

Indonesia's national emissions reduction target for 2020 is a reduction from BAU emissions, or a baseline scenario target. Accordingly, Indonesian provinces also use baseline scenario emissions to benchmark their emissions reductions. The emissions reduction targets are presented in one or more of the following forms:

1. Percentage reduction compared to BAU emissions (% of BAU)
2. Absolute amount of reductions (MtCO<sub>2</sub>e) from the BAU trajectory in the target year, in total and with sectoral breakdowns
3. Target level of emissions to be achieved (MtCO<sub>2</sub>e) in target year, in total, and with sectoral breakdowns.

Depending on data availability, calculations are made so that all targets are presented in all three forms. The absolute amount of reductions is used for tracking provincial progress toward the emissions reduction target; the target level of emissions is presented along with the provincial historical and BAU emissions profile in visualizations (line chart and donut chart) on the platform to provide a complete picture.

Box 2 | **Definitions related to Indonesia’s emissions reduction target**

Base year	A specific year of historical data against which emissions are compared over time. <i>Indonesia RAN-GRK uses 2010 as a base year reference point.</i>
Baseline scenario	A reference case that represents future events or conditions most likely to occur in the absence of activities taken to meet the mitigation goal.
Baseline scenario emissions	An estimate of GHG emissions or removals associated with a baseline scenario.
Baseline scenario target	Mitigation target that aims to reduce emissions by a specified quantity relative to projected baseline scenario emissions.
Target boundary	The greenhouse gases, sectors, and geographic area covered by a target.
Target level	The quantity of emissions reductions or emissions and removals within the target boundary in the target year or period that the Party commits to achieving.
Target year	The year by which the target is to be met. <i>Indonesia RAN-GRK uses 2020 as its reference year.</i>
Target year emissions	Emissions and removals in the target year(s) for all gases and sectors included in the target boundary.

Source: Kelly Levin, Jared Finnegan, David Rich, and Pankaj Bhatia. 2014. *Mitigation Goal Standard*. Washington D.C.: World Resources Institute.

**Tracking the progress toward emissions reduction targets**

Progress toward the emissions reduction target is calculated based on annual *Monitoring, Evaluation, and Reporting* (MER, or in Indonesian *Pemantauan, Evaluasi dan Pelaporan*, referred to as PEP) documents<sup>14</sup> submitted by each province to the Sekretariat RAN-GRK. The document provides an “indicated reduction” (MtCO<sub>2</sub>e) for each province, which is compared against the absolute amount of reductions (MtCO<sub>2</sub>e) as set in the reduction targets.

As of the publication of the tool, the latest information available is the 2016 implementation report of RAD-GRK by BAPPENAS, synthesizing provincial submissions. An aggregated progress toward achieving the provincial emissions reduction target is also included in the dashboard of the tool, comparing the sum of indicated reductions of each province against the sum of reductions. However, the aggregation of all the “provincial reduction targets”

will get to part—but not all—of Indonesia’s national target of 26 percent reductions against the BAU scenario. In addition to provincial efforts, mitigation activities also are conducted by ministries at the national level that fall under RAN-GRK.

**Mitigation Activities**

The provincial mitigation activities are gathered from RAD-GRK documents and categorized into three sectors: (1) agriculture and forestry; (2) energy, transport, and industry; and (3) waste.

RAD-GRK is intended to provide each province’s local mitigation plans. The *Guideline for Implementing Green-House Gas Emission Reduction Action Plan*<sup>15</sup> provides a comprehensive list of mitigation action proposals based on sectors and authorities, where each province can choose and follow the programs to be included in the RAD-GRK. This guideline is used as a reference point for listing the mitigation programs in the tool.

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## Adaptation Plans

On top of mitigation plans, very few RAD-GRKs mentioned adaptation plans. For those that did, adaptation activities include practices and functions to reduce risk as well as exploration of new opportunities to cope with the changing environment. For example, Sulawesi Tengah mentioned that their adaptation plan is the application and development of climate change adaptation technology, such as biopesticides and/or biofertilizer for horticulture and plantation crops. Gorontalo said that its plan to rehabilitate its mangrove forests both reduces greenhouse gas emissions and increases its resilience (adaptation) to the effects of climate change, such as sea level rise. When a province mentions such plans for climate change adaptation, we marked “Yes” on the “Adaptation included” indicator; otherwise, the province will be marked with no adaptation included.

## Development Plans

At the provincial level, climate-change-related policies have been set out in the local development strategy in the RPJMD documents. RAD-GRK is an integrated part of the local development strategy and is based on policies and local strategic plans. Therefore, the RAD-GRK document can serve as a guideline for provincial governments to carry out and achieve sustainable local development. In order to ensure each province’s climate commitment, there should not be any contradictions in their local development action plan. Note the different time scope these documents cover—while RAD-GRKs were developed in 2011–12 to target activities for the period from 2010 to 2020, RPJMDs have a shorter time scope, and most end in 2016–18.

Each provincial RPJMD is assessed, focusing on the vision, mission, goals, and objectives, as well as strategy and policy direction, to see if any program supports the implementation of the mitigation activities described in the corresponding RAD-GRK document. The methodology used for assessing provincial RPJMDs is explained below.

## Supportive Mission Statement in RPJMD

If a province indicates sustainable development planning and climate mitigation development planning in one of their mission statements, that information is presented as a “supportive mission statement.” For example, Sumatera Barat’s RPJMD states its fifth mission is to achieve “sustainable and environmentally sound development by conducting sustainable natural resources management.”

## Supportive Policy Direction in RPJMD in each sector

If a province mentions any strategy and policy direction that would support implementation of mitigation activity and programs in RAD-GRK, it is presented in the tool as a “supportive policy direction” for that sector. For example, Sumatera Utara indicates strategies and policy direction for “forest protection and conservation and greening of mangrove forests.” This strategy is included in the tool under “Supportive policy direction in RPJMD (agriculture and forestry).” It also mentions strategies and policy direction for “management of renewable energy (hydro, micro hydro, geothermal, solar and biomass) to the maximum,” which is included in the tool under “Supportive policy direction in RPJMD (energy, transportation, and industry).”

## Indication of challenges in RPJMD in each sector

Potential challenges in RPJMD are noted when there are any projects, programs, or approaches in the development planning that could have adverse effects on greenhouse gas reduction programs or when safeguard mechanisms are not described. For example, Jawa Timur aims to “increase exploration and exploitation to develop mining and mineral resources.” Such a program has adverse implications for greenhouse gas reduction programs, as it could lead to deforestation or destruction of other natural resources.

Table 1 | Summary of indicator and data source

INDICATOR		DATA SOURCE	
<b>Provincial Information</b>	Capital city	BPS, 2015 <sup>16</sup>	
	Population 2010 (thousands)		
	Provincial GDP 2010 (million Rp)	BPS, 2012 <sup>17</sup>	
	Area total 2010 (km <sup>2</sup> )	Indonesia Data, 2010 <sup>18</sup>	
	Total forest land area 2010 (ha)	INCAS, 2015 <sup>19</sup>	
	Emissions per capita 2010 (tCO <sub>2</sub> e/capita)	Calculations	
	Emissions intensity 2010 (tCO <sub>2</sub> e/million Rp)		
<b>Emissions Profile</b>	Base year	SIGN SMART <sup>20</sup>	
	Base year emissions (MtCO <sub>2</sub> e)	Agriculture and forestry	Provincial RAD-GRK <sup>21</sup>
		Energy, transport, and industry	
		Waste	
	Primary source of emissions in base year		
	Target year	Provincial RAD-GRK	
	Projected business-as-usual (BAU) emissions (MtCO <sub>2</sub> e)	Agriculture and forestry	
Energy, transport, and industry			
Waste			
<b>Emissions Reduction Target</b>	Reduction target (% of BAU)	Provincial RAD-GRK	
	Target level of emissions (MtCO <sub>2</sub> e)	Agriculture and forestry	
		Energy, transport, and industry	
		Waste	
Progress toward achieving 2020 provincial emissions reduction target	Provincial RAD-GRK BAPPENAS, 2016 <sup>22</sup>		
<b>Mitigation Activities</b>	Agriculture and forestry	Provincial RAD-GRK	
	Energy, transport, and industry		
	Waste		
<b>Adaptation</b>	Adaptation included (yes or no)	Provincial RAD-GRK	
<b>Development Plans</b>	RPJMD period	Provincial RPJMD <sup>23</sup>	
	Supportive mission statement in RPJMD		
	Supportive policy direction in RPJMD	Agriculture and forestry	
		Energy, transport, and industry	
		Waste	
	Indication of challenges in RPJMD	Agriculture and forestry	
Energy, transport, and industry			
Waste			

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## LIMITATIONS

Due to the varied quality of data sources for provinces, there are certain limitations of the Indonesia Climate Data Explorer, particularly on the quantitative side.

Data availability is an overall limitation in developing this tool. Although technical guidelines are provided by Sekretariat RAN-GRK, more than a third of RAD-GRKs issued in 2011–12 did not include 2010 emissions, nor did they include projected 2020 BAU emissions that are used as the baseline for reductions. Even within the document, there are some discrepancies in the data. The Sekretariat RAN-GRK reasoned that most RAD-GRKs are incomplete and are still under review,<sup>24</sup> and those revised versions of RAD-GRKs are not yet compiled in the BAPPENAS database. In order to fill data gaps from RAD-GRKs, SIGN SMART was chosen as the primary data source for each province's historical emission profile, in part because of the methodology's transparency, as well as its adherence to the common reporting format of the UNFCCC inventory reporting process. Data discrepancy also limits the ability to fill data gaps with alternative data sources. For example, the Indonesia National Carbon Accounting System (INCAS) only reports land-based emissions, while the 2016 RAD-GRK implementation report does not include agriculture-associated emissions in 2010 and 2020 BAU inventories. When comparing RAD-GRK numbers across multiple sources, such as INCAS and the Inventory System for National Greenhouse Gases (SIGN SMART), we found some contradictory data.<sup>25</sup> The Potret RAD-GRK assembled and published by Sekretariat RAN-GRK in 2012 contains general information about each provincial RAD-GRK.<sup>26</sup> However, we found that most of the numbers presented in Potret RAD-GRK did not match the actual RAD-GRK. Due to the lack of transparency in the methodology and data sources used for Potret RAD-GRK, we decided not to report emission data from Potret RAD-GRK. In addition, due to the data discrepancy and varied underlying methodology for different data sources, no attempt was made to combine data from different data sources into a single inventory.

In addition, not all RAD-GRKs are accessible by the public on the Sekretariat RAN-GRK website. During data collection, many RAD-GRK documents had to be obtained by directly inquiring to BAPPENAS through e-mail. All those documents are available for download through the download page of the platform (accessible at: <http://www.wri.org/resources/data-sets/cait-indonesia-climate-data-explorerer-pindai-data>).

Lastly, regarding the accounting methodologies and approaches used in the main data source (RAD-GRK) for the tool, we were unable to determine how land use emissions were calculated in the data sources, and thus cannot discuss the accounting approach and methodology for the land sector. In addition, due to limited capacity and time, an assessment of the adoption milestones and implementation indicators—such as budget allocated, timeline, and GHG/non-GHG effects of each mitigation activity or development plan identified in the tool—was not performed.



## ACRONYMS

ABBREVIATION	INDONESIAN	ENGLISH
BAPPEDA	Badan Perencanaan Pembangunan Daerah	Provincial Development Planning Agency
BAPPENAS	Badan Perencanaan Pembangunan Nasional	National Development Planning Agency
BAU	Business-as-usual	Business-as-usual
BPS	Badan Pusat Statistik	Statistics Indonesia
CH <sub>4</sub>	Metana	Methane
CO <sub>2</sub>	Karbon dioksida	Carbon dioxide
CO <sub>2</sub> e	Karbon dioksida Ekuivalen	Carbon dioxide equivalent
GRK	GHG Gas Rumah Kaca	Greenhouse Gas
GWP	Potensi Pemanasan Global	Global Warming Potential
INDC	Kontribusi Nasional yang Diniatkan	Intended Nationally Determined Contribution
IPAL	Instalasi Pengolahan Air Limbah	Waste Water Treatment Plant
IPLT	Instalasi Pengolahan Lumpur Tinja	Sludge Treatment Plant
MoEF	Kementerian Lingkungan Hidup dan Kehutanan	Ministry of Environment and Forestry
MtCO <sub>2</sub> e	Juta metrik ton karbon dioksida ekuivalen	Million metric tons of carbon dioxide equivalent
N <sub>2</sub> O	Nitrogen dioksida	Nitrous oxide
PDRB	Produk Domestik Regional Bruto	Gross Regional Domestic Product
PLN	Perusahaan Listrik Negara	State Electricity Company
RAD-GRK	Rencana Aksi Daerah Penurunan Gas Rumah Kaca	Local Action Plan for Greenhouse Gas Emission Reduction
RAN-GRK	Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca	National Action Plan for Greenhouse Gas Emission Reduction
RPJMD	Rencana Pembangunan Jangka Menengah Daerah	Local Medium-Term Development Plan
SANIMAS	Sanitasi Berbasis Masyarakat	Sanitation by Communities
TPA	Tempat Pembuangan Akhir	Landfill
TPST	Tempat Pembuangan Sampah Terpadu	Integrated Waste Disposal Site
UNFCCC	Konvensi Kerangka Kerja PBB tentang Perubahan Iklim	United Nations Framework Convention on Climate Change

## APPENDIX 1. STRUCTURE OF RAD-GRK DOCUMENT

The structure of RAD-GRKs follows the process and sectoral breakdown contained in RAN-GRKs (top-down approach). Additionally, it takes into account the characteristics and emissions potential, the administrative authority, and the sectoral areas and development priority of the region (bottom-up approach).<sup>27</sup> During the development of a RAD-GRK, there is an active interaction

between national technical agencies (Sekretariat RAN-GRK) and regional technical agencies (BAPPEDA) and international institutions in the form of workshops and meetings for technical assistance. The presentation of a RAD-GRK is in the form of a report book consisting of seven chapters. The structure is shown below (Table A-1).

Table A-1 | **Structure of a RAD-GRK<sup>28</sup>**

SUBSTANCE	DESCRIPTION
<b>CHAPTER RAD-GRK: I</b> INTRODUCTION 1.1. Background 1.2. Goal 1.3. Output 1.4. Legal basis 1.5. Timeline of development	This chapter spells out background, goals for RAD-GRK development, expected outputs, and the legal basis related to climate change as a mandate to provincial governments for developing a RAD-GRK and the timeline of its development.
<b>CHAPTER RAD-GRK: II</b> LOCAL PROFILE & GHG EMISSION PROBLEMS 2.1. Local profile and characteristics 2.2. Local priority programs 2.3. GHG emission problems	This chapter explains the local general profile and characteristics, policies, strategic plan, local priority programs, GHG emission sources/absorption potential available in the provincial areas, along with the problems faced.
<b>CHAPTER RAD-GRK: III</b> DIVISION OF AFFAIRS & SCOPE 3.1. Division of affairs 3.2. Local scope	This chapter explains concisely the division of affairs both in sectoral and administrative regions as inputs to determine local scope. The determination of the scope is based on the analysis presented in chapter II.  In this chapter, provincial governments determine sectors/subsectors and activities, as well as the administrative regions that have GHG emissions sources and potential for GHG emission reductions.
<b>CHAPTER RAD-GRK: IV</b> ANALYSIS ON GHG EMISSION 4.1. Development of baseline BAU of GHG emissions 4.2. Proposed mitigation actions and estimated emission reduction 4.3. Priority scale	This chapter explains the GHG emissions baseline, proposed GHG emissions reduction (mitigation), and estimated emissions reduction from mitigation. Based on considerations such as levels of GHG emissions reduction and required costs as well as other criteria, development of priority scale is carried out.  The analysis is based on sectoral methodology set by each related ministry/agency (working group) at the national level (and also refers to international methodologies), as well as the Guideline for Administration of GHG Inventory to be set by the Ministry of Environment/KLH (with reference to IPCC inventory guidelines).  By using the analysis results, provincial governments set a target number of local GHG emission reductions (by sector or combination of sectors) that contributes to the achievement of national GHG emissions reduction targets.
<b>CHAPTER RAD-GRK: V</b> STRATEGY OF RAD-GRK IMPLEMENTATION 5.1. Mapping of institutions and division of roles 5.2. Identification of funding sources 5.3. Development of implementation schedule	This chapter explains the implementation strategy of selected mitigation actions, including implementing agencies, funding sources, and implementation schedule.
<b>CHAPTER RAD-GRK: VI</b> MONITORING AND EVALUATION	In this chapter, provincial governments develop monitoring and evaluation plans for the implementation of GHG emissions reduction activities contained in RAD-GRKs. BAPPEDA (local development planning agency) reports the monitoring results to related agencies both at the provincial and central levels.
<b>CHAPTER RAD-GRK: VII</b> CLOSING	This chapter is a summary, containing suggestions and rules for RAD-GRK implementation.
<b>CHAPTER RAD-GRK: ANNEX</b> Matrix of RAD-GRK	The matrix contains a list of local mitigation actions by sector, an estimated number of GHG emissions reductions, the estimated cost and cost sources, a time schedule of implementation, and the focal point/manager of activity implementation.

## APPENDIX 2. LIST OF RAD-GRK DOCUMENTS AND RPJMD PERIOD

Table A-2 | List of RAD-GRK documents and corresponding RPJMD period

PROVINCE	ORIGINAL TITLE	YEAR	RPJMD PERIOD
<b>Aceh</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca (RAD-GRK) Aceh 2012–2020	October 2012	2012–17
<b>Sumatera Utara</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Sumatera Utara 2010–2020	September 2012	2009–13
<b>Sumatera Barat</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Sumatera Barat 2012–2020	10 October 2012	2010–15
<b>Riau</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Riau (RAD GRK)	December 2012	2014–19
<b>Jambi</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca (RAD GRK) Provinsi Jambi	10 August 2012	2010–15
<b>Sumatera Selatan</b>	Dokumen Rencana Aksi Daerah Gas Rumah Kaca (RAD-GRK) Sumatera Selatan	5 October 2012	2013–18
<b>Bengkulu</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Bengkulu 2012–2020	14 December 2012	2011–15
<b>Lampung</b>	Rencana Aksi Daerah Gas Penurunan Emisi Gas Rumah Kaca (RAD-GRK) Provinsi Lampung	5 December 2012	2015–19
<b>Kepulauan Bangka Belitung</b>	RAD-GRK Provinsi Kepulauan Bangka Belitung 2012–2020 No title page	No signing date	2012–17
<b>Kepulauan Riau</b>	Provinsi Kepulauan Riau Rencana Aksi Daerah (RAD) Penurunan Emisi Gas Rumah Kaca 2012	No signing date	2010–15
<b>DKI Jakarta</b>	No title page	No signing date	2013–17
<b>Jawa Barat</b>	No title page	No signing date	2013–18
<b>Jawa Tengah</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Jawa Tengah Tahun 2010–2020	10 September 2012	2013–18
<b>Daerah Istimewa Yogyakarta</b>	Pekerjaan Penyusunan Rencana Aksi Daerah (RAD) Penurunan Emisi Gas Rumah Kaca	No signing date	2012–17
<b>Jawa Timur</b>	Penyusunan Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca (RAD-GRK) Provinsi Jawa Timur	No signing date	2009–14
<b>Banten</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Banten Tahun 2010–2020	No signing date	2012–17
<b>Bali</b>	Draft Rencana Aksi Daerah Gas Rumah Kaca Provinsi Bali	No signing date	2013–18
<b>Nusa Tenggara Barat</b>	NTB Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca	December 2012	2013–18
<b>Nusa Tenggara Timur</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Nusa Tenggara Timur 2012–2020	10 December 2012	2013–18
<b>Kalimantan Barat</b>	Kalimantan Barat RAD-GRK No title page	No signing date	2013–18
<b>Kalimantan Tengah</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Kalimantan Tengah 2010–2020	November 2012	2010–15
<b>Kalimantan Selatan</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Kalimantan Selatan (Laporan RAD GRK Provinsi Kalimantan Selatan Tahun 2012)	No signing date	2011–15

Table A-2 | **List of RAD-GRK documents and corresponding RPJMD period (continued)**

PROVINCE	ORIGINAL TITLE	YEAR	RPJMD PERIOD
<b>Kalimantan Timur</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Kalimantan Timur	2012	2013–18
<b>Kalimantan Utara</b>	No RAD GRK document	No RAD GRK document	No RPJMD document
<b>Sulawesi Utara</b>	Dokumen Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca (RAD-GRK) Sulut 2012	No signing date	2010–15
<b>Sulawesi Tengah</b>	No title page	No signing date	2011–16
<b>Sulawesi Selatan</b>	Dokumen Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca (RAD-GRK) Sulut 2012	10 December 2012	2013–18
<b>Sulawesi Tenggara</b>	No title page	No signing date	2013–18
<b>Gorontalo</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Gorontalo	October 2012	2012–17
<b>Sulawesi Barat</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca RAD-GRK Provinsi Sulawesi Barat	No signing date	2012–16
<b>Maluku</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Maluku Tahun 2010–2020	6 December 2012	2014–19
<b>Maluku Utara</b>	No title page	No signing date	2014–19
<b>Papua Barat</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca Provinsi Papua Barat 2013–2020	No signing date	2012–16
<b>Papua</b>	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca (RAD GRK) Tahun 2012–2020	4 December 2012	2013–18

## ENDNOTES

1. UNFCCC (United Nations Framework Convention on Climate Change). 2015. "Adoption of the Paris Agreement." Accessible at: <[http://unfccc.int/documentation/documents/advanced\\_search/items/6911.php?preref=600008831](http://unfccc.int/documentation/documents/advanced_search/items/6911.php?preref=600008831)>. (Accessed May 13, 2016.)
2. President of the Republic of Indonesia. 2011. "Presidential Regulation of the Republic of Indonesia No. 61 Year 2011 on the National Action Plan for Greenhouse Gas Emission Reduction." Accessible at: <[http://forest-climatecenter.org/files/2011-09-20 Presidential Regulation No 61 on The National Action Plan for Greenhouse Gas Emission Reduction.pdf](http://forest-climatecenter.org/files/2011-09-20%20Presidential%20Regulation%20No%2061%20on%20The%20National%20Action%20Plan%20for%20Greenhouse%20Gas%20Emission%20Reduction.pdf)>. (Accessed May 7, 2016.)
3. CAIT Climate Data Explorer is a free and open online platform made up of a suite of tools containing comprehensive and comparable climate and emissions data. CAIT stands for Climate Analysis Indicators Tool. Accessible at: <<http://cait.wri.org>>.
4. At the time the presidential regulation was enacted in 2011, there were only thirty-three provinces in Indonesia. North Kalimantan, established in 2013, did not develop its own RAD-GRK and combined its local action plan with East Kalimantan.
5. All monetary amounts are in Indonesian Rupiah (Rp) unless otherwise indicated.
6. BPS (Badan Pusat Statistik, Statistics Indonesia). 2015. "Statistik Indonesia 2015." Jakarta: BPS.
7. Government of Indonesia, Ministry of Environment and Forestry. 2012. "UNFCCC—Forest Land, Indonesian National Carbon Accounting System." Accessible at: <<http://www.incas-indonesia.org/>>. (Accessed May 10, 2016.)
8. BPS (Badan Pusat Statistik, Statistics Indonesia). 2012. "Produk Domestik Regional Bruto Berdasarkan Harga Berlaku per Provinsi." Accessible at: <<http://data.go.id/dataset/produk-domestik-regional-bruto-berdasarkan-harga-berlaku-per-provinsi>>. (Accessed April 30, 2016.)
9. DKI Jakarta developed their RAD-GRK documents before the issuance of Presidential Regulation 61/2011, thus there was no guidance on which year to use for base year and baseline at that time.
10. IPCC (Intergovernmental Panel on Climate Change). 2007. "Direct Global Warming Potentials." Accessible at: <[https://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/ch2s2-10-2.html](https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html)>. (Accessed May 17, 2016.)
11. BAPPENAS (Badan Perencanaan Pembangunan Nasional, National Development Planning Agency). 2015. "Pedoman Umum, Petunjuk Teknis dan Manual Perhitungan Pemantauan, Evaluasi dan Pelaporan (PEP) Pelaksanaan RAN RAD-GRK Bidang Berbasis Lahan." Jakarta: BAPPENAS.
12. BAPPENAS (Badan Perencanaan Pembangunan Nasional, National Development Planning Agency). 2015. "Pedoman Umum, Petunjuk Teknis dan Manual Perhitungan Pemantauan, Evaluasi dan Pelaporan (PEP) Pelaksanaan RAN RAD-GRK Bidang Berbasis Lahan." Jakarta: BAPPENAS.
13. BAPPENAS (Badan Perencanaan Pembangunan Nasional, National Development Planning Agency). 2015. "Pedoman Umum, Petunjuk Teknis dan Manual Perhitungan Pemantauan, Evaluasi dan Pelaporan (PEP) Pelaksanaan RAN RAD-GRK Bidang Berbasis Lahan." Jakarta: BAPPENAS.
14. RAD-GRKs have been implemented for five years in thirty-three provinces in Indonesia. The newly formed province of Kalimantan Utara (North Kalimantan) will prepare its RAD-GRK document in 2016. The PEP RAD-GRK 2010–14 shows that in 2010–12, most of the thirty-three provinces had submitted the report. However, only twenty-six provinces submitted the report in 2013, and twenty-two in 2014.
15. BAPPENAS (Badan Perencanaan Pembangunan Nasional, National Development Planning Agency). 2011. "Guideline for Implementing Local Action Plan for Greenhouse Gas Emission Reduction (RAD-GRK)." Accessible at: <[http://www.sekretariat-rangrk.org/images/documents/Buku\\_Pedoman\\_Pelaksanaan\\_Rencana\\_Aksi\\_Penurunan\\_Emisi\\_GRK\\_English.pdf](http://www.sekretariat-rangrk.org/images/documents/Buku_Pedoman_Pelaksanaan_Rencana_Aksi_Penurunan_Emisi_GRK_English.pdf)>. See Annex 1 in the document for complete list of mitigation activities suggested by BAPPENAS to be included in RAD-GRK. (Accessed May 10, 2016.)
16. BPS (Badan Pusat Statistik, Statistics Indonesia). 2015. "Statistik Indonesia 2015." Jakarta: BPS.
17. BPS (Badan Pusat Statistik, Statistics Indonesia). 2012. "Produk Domestik Regional Bruto Berdasarkan Harga Berlaku per Provinsi." Accessible at: <<http://data.go.id/dataset/produk-domestik-regional-bruto-berdasarkan-harga-berlaku-per-provinsi>>. (Accessed April 30, 2016.)
18. Indonesia Data. n.d. "Daftar Provinsi dan Luas Wilayah Indonesia Tahun 2010." Accessible at: <<http://indonesiadata.co.id/>>. (Accessed April 30, 2016.)

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19. Government of Indonesia, Ministry of Environment and Forestry. 2012. "UNFCCC—Forest Land, Indonesian National Carbon Accounting System." Accessible at: <<http://www.incas-indonesia.org/>>. (Accessed May 10, 2016.)
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  21. See Appendix 2 for comprehensive list reference of RAD-GRK documents for each province.
  22. BAPPENAS (Badan Perencanaan Pembangunan Nasional, National Development Planning Agency). 2016. "Laporan Pelaksanaan Perpres No.61/2011 Tentang Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca Tahun 2015." Jakarta: BAPPENAS.
  23. BAPPENAS (Badan Perencanaan Pembangunan Nasional, National Development Planning Agency). 2016. "Musyawarah Perencanaan Pembangunan Nasional 2016." Accessible at: <<http://musrenbangnas.bappenas.go.id/>>. (Accessed May 13, 2016.)
  24. Setiawan, Budhi. Personal Interview. April 20, 2016.
  25. Government of Indonesia, Ministry of Environment and Forestry. 2012. "Indonesian National Carbon Accounting System." Accessible at: <<http://www.incas-indonesia.org/>>. (Accessed May 10, 2016.)
  26. Sekretariat RAN-GRK. "Sekretariat RAN-GRK." Accessible at: <<http://www.sekretariat-rangrk.org>>. (Accessed May 13, 2016.)
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  28. BAPPENAS (Badan Perencanaan Pembangunan Nasional, National Development Planning Agency). 2011. "Guideline for Implementing Local Action Plan for Greenhouse Gas Emission Reduction (RAD-GRK)." Accessible at: <[http://www.sekretariat-rangrk.org/images/documents/Buku\\_Pedoman\\_Penyusunan\\_RAD\\_GRK\\_English.pdf](http://www.sekretariat-rangrk.org/images/documents/Buku_Pedoman_Penyusunan_RAD_GRK_English.pdf)>. (Accessed May 10, 2016.)

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