# Renewable Orchestrator IAM Permissions

AWS Energy Data Insights Platform | Multi-Tool Coordinator

## Overview

**Service Role:** `RenewableOrchestratorRole`

**Function Name:** `renewable-orchestrator`

**Purpose:** Coordinates multiple tool invocations for wind farm analysis, manages project lifecycle, and aggregates results

**Timeout:** 300 seconds | **Memory:** 1024 MB

## DynamoDB Permissions

**`dynamodb:PutItem`** REQUIRED

**Resources:**
- `arn:aws:dynamodb:*:*:table/ChatMessage-*`
- `arn:aws:dynamodb:*:*:table/SessionContext-*`
- `arn:aws:dynamodb:*:*:table/AgentProgress-*`

Save AI responses with artifacts, persist session context across tool invocations, and track analysis progress for transparency.

**`dynamodb:GetItem`** REQUIRED

**Resources:** Same as PutItem

Retrieve session context for multi-step workflows and check existing project state before creating new analyses.

**`dynamodb:Query`** REQUIRED

**Resources:**
- `arn:aws:dynamodb:*:*:table/SessionContext-*`
- `arn:aws:dynamodb:*:*:table/AgentProgress-*`

Query project history and progress steps for a session. Essential for maintaining context across multiple tool invocations.

**`dynamodb:UpdateItem`** REQUIRED

**Resources:** Same as PutItem

Update session context with new project information and mark progress steps as complete.

## 📦 S3 Permissions

**`s3:GetObject`** REQUIRED

**Resource:** `arn:aws:s3:::storage-bucket/renewable-projects/*`

Read existing project data and artifacts from previous analyses. Required for incremental analysis workflows.

**`s3:PutObject`** REQUIRED

**Resource:** `arn:aws:s3:::storage-bucket/renewable-projects/*`

Store aggregated analysis results and project metadata. Critical for artifact persistence and retrieval.

**`s3:ListBucket`** REQUIRED

**Resource:** `arn:aws:s3:::storage-bucket`

List objects in project directories to check for existing analyses and avoid duplicate work.

## ⚡ Lambda Invocation Permissions

**`lambda:InvokeFunction`** REQUIRED

**Resources:**

- `arn:aws:lambda:*:*:function:renewable-tools-terrain`
- `arn:aws:lambda:*:*:function:renewable-tools-layout`
- `arn:aws:lambda:*:*:function:renewable-tools-simulation`
- `arn:aws:lambda:*:*:function:renewable-tools-report`
- `arn:aws:lambda:*:*:function:renewable-tools-windrose`

Invoke specialized tool Lambdas for terrain analysis, layout optimization, wake simulation, report generation, and wind rose visualization. Core orchestration capability.

## 📊 CloudWatch Logs Permissions

**`logs:CreateLogGroup`** REQUIRED

**Resource:** `arn:aws:logs:*:*:log-group:/aws/lambda/renewable-orchestrator:*`

Standard Lambda logging permission for CloudWatch log group creation.

**`logs:CreateLogStream`** REQUIRED

**Resource:** `arn:aws:logs:*:*:log-group:/aws/lambda/renewable-orchestrator:*`

Create log streams for each orchestration workflow. Essential for debugging multi-tool coordination.

**`logs:PutLogEvents`** REQUIRED

**Resource:** `arn:aws:logs:*:*:log-group:/aws/lambda/renewable-orchestrator:*`

Write orchestration logs including tool invocation results and error details. Critical for troubleshooting.

## 📄 Complete IAM Policy JSON

```
{ "Version": "2012-10-17", "Statement": [ { "Effect": "Allow", "Action": [ "dynamodb:PutItem", "dynamodb:GetItem", "dynamodb:Query", "dynamodb:UpdateItem" ], "Resource": [ "arn:aws:dynamodb:*:*:table/ChatMessage-*", "arn:aws:dynamodb:*:*:table/SessionContext-*", "arn:aws:dynamodb:*:*:table/AgentProgress-*" ] }, { "Effect": "Allow", "Action": [ "s3:GetObject", "s3:PutObject", "s3:ListBucket" ], "Resource": [ "arn:aws:s3:::storage-bucket", "arn:aws:s3:::storage-bucket/renewable-projects/*" ] }, { "Effect": "Allow", "Action": "lambda:InvokeFunction", "Resource": [ "arn:aws:lambda:*:*:function:renewable-tools-*" ] }, { "Effect": "Allow", "Action": [ "logs:CreateLogGroup", "logs:CreateLogStream", "logs:PutLogEvents" ], "Resource": "arn:aws:logs:*:*:log-group:/aws/lambda/renewable-orchestrator:*" } ] }
```

💡 **Orchestration Pattern:** This Lambda coordinates 5 specialized tool Lambdas in sequence or parallel depending on the analysis workflow. It maintains project state across invocations and aggregates results into a cohesive response with multiple artifacts.

## 🔄 Typical Orchestration Flow

1. Receive wind farm analysis request from chat Lambda
2. Parse intent and extract parameters (location, radius, etc.)
3. Check SessionContext for existing project
4. Invoke terrain analysis tool Lambda
5. Store terrain results in S3 and DynamoDB
6. Invoke layout optimization tool Lambda (uses terrain data)
7. Invoke wake simulation tool Lambda (uses layout data)
8. Invoke report generation tool Lambda (aggregates all data)
9. Update SessionContext with project information
10. Return aggregated response with all artifacts