**System Manual**

**on**

**Data Management System**

**for**

**Buildings Energy Efficiency Ordinance**

**for**

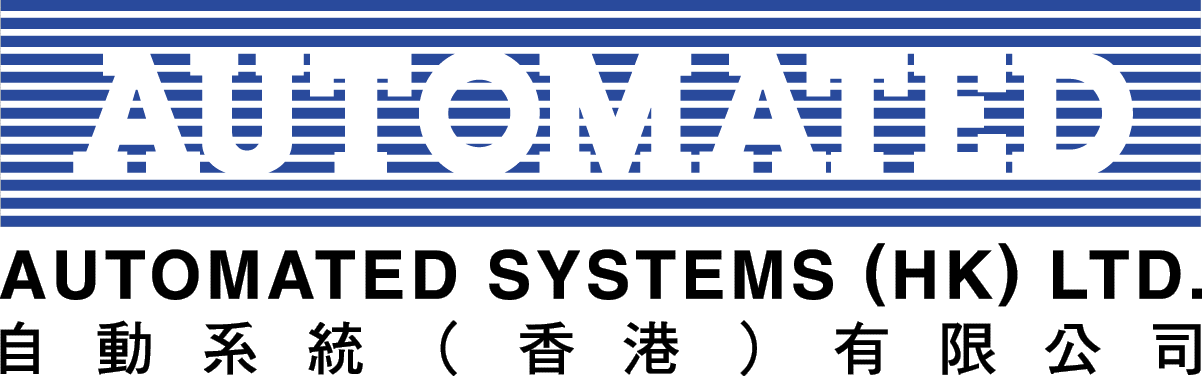
**Energy Efficiency Office**

**of**

**Electrical and Mechanical Services Department (EMSD)**



By



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| 1 | Electrical and Mechanical Services Department (EMSD) |
| 2 | Automated Systems (HK) Limited (ASL) |

|  |  |
| --- | --- |
| Prepared By:  Christine LAM  Automated Systems (HK) Ltd.  [Project Manager] | Endorsed By:  Kenneth Fung  Electrical and Mechanical Services Department  [EE/ITD/3] |
| Date: | Date: |

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# Purpose

This document provides an overview of the e-Services integration for Data Management System for Buildings Energy Efficiency Ordinance (DMS-BEEO) regarding programs, data files, equipment, clerical procedure, computer operation procedure, and etc. Reader interested in specific area may refer to the corresponding manuals (Data Manual, Program Manual, etc.)

# Scope

This document provides an overview of the e-Services integration for Data Management System for Buildings Energy Efficiency Ordinance (DMS-BEEO). It lists out in brief the programs, equipment, etc. in the system only. Details of specific areas are documented in the manuals referred to in the References section.

# References

## **Standards**

• Document Style Manual (S14)

• Documentation Standard for Implementation Phase Version 3 (S8)

## **Other References**

• System Analysis & Design Report

• Selected Technical System Option

• Program Manual

• Data Manual

• Application Operation Manual

• Application User Manual

• Computer Operating Procedures Manual

• Hardware and Software Procured, Installed and Accepted

• System Installation Plan

• System Maintenance Plan

# Definition And Convention

## **Definition**

In this document, unless the context otherwise requires, the following expressions have the following meanings:

| **Term** | **Definition** |
| --- | --- |
| BEEO | Buildings Energy Efficiency Ordinance |
| WBRS | Web-based Registration Services for online application submission. |
| DMS | Data Management System |
| REA | Registered Energy Assessor |
| COCR | Certificate of Compliance Registration |
| FOC | Form of Compliance |
| VM | Virtual Machine |

# System Summary

## **Objectives**

The Buildings Energy Efficiency Ordinance (Cap. 610) (BEEO) had been enacted in November 2010. To facilitate the application submission from public, EMSD has developed a web-based registration system (WBRS) for regulatory services divisions to receive online submissions under various EMSD legislations. It is planned that the WBRS for BEEO will be incorporated into the overall WBRS of EMSD with enhanced functions.

The objective of implementing the DMS are:

1. To facilitate automation of the process of checking, vetting and approval of submissions, and generation of reports, certificates, registers and database of buildings under Buildings Energy Efficiency Ordinance
2. To streamline the enforcement functions under the Ordinance
3. To provide internet platform for public or any relevant parties to search for status of application, registers of Certificate of Compliance Registration (COCR) and Registered Energy Assessor (REA), records of Form of Compliance (FOC) and Improvement Notice (IN), and acts as an interactive platform for disseminating energy efficiency and conservation messages to the general public
4. To integrate with Web-Based Registration Services (WBRS) to provide means for electronic application submissions to the public

## **System Functions**

### **Assignment of WBRS Records**

| **Function ID** | **Function**  **Description** | **Mode** | **Frequency** | **Requirement ID** |
| --- | --- | --- | --- | --- |
| ASS-001 | Search WBRS Records of COCR/FOC | Online/Update | (Min: 0 Avg: 1000 Max: 2000) | REQ-3001 |
| ASS-002 | View WBRS Records of EE1 | Online/Update | (Min: 0 Avg: 300 Max: 600) | REQ-3001 |
| ASS-003 | View WBRS Records of EE2 | Online/Update | (Min: 0 Avg: 300 Max: 600) | REQ-3001 |
| ASS-004 | View WBRS Records of EE3 | Online/Update | (Min: 0 Avg: 300 Max: 600) | REQ-3001 |
| ASS-005 | View WBRS Records of EE4 | Online/Update | (Min: 0 Avg: 700 Max: 1400) | REQ-3001 |
| ASS-006 | Search WBRS Records of REA | Online/Update | (Min: 0 Avg: 200 Max: 400) | REQ-2001 |
| ASS-007 | View WBRS Records of REA1 | Online/Update | (Min: 0 Avg: 200 Max: 400) | REQ-2001 |
| ASS-008 | View WBRS Records of REA3 | Online/Update | (Min: 0 Avg: 200 Max: 400) | REQ-2001 |

### **Registered Energy Assessor**

| **Function ID** | **Function**  **Description** | **Mode** | **Frequency** | **Requirement ID** |
| --- | --- | --- | --- | --- |
| REA-001 | Maintain REA Case | Online/Update | (Min: 0 Avg: 200 Max: 400) | REQ-2001  REQ-2002  REQ-2003 |
| REA-002 | Genereate REA E-Licence | Online/Update | (Min: 0 Avg: 200 Max: 400) | REQ-1004  REQ-1005  REQ-2002  REQ-2003  REQ-5004 |
| REA-003 | Maintain REA Registration | Online/Update | (Min: 0 Avg: 200 Max: 400) | REQ-2002  REQ-2003 |

### **Certificate of Compliance Registration**

| **Function ID** | **Function**  **Description** | **Mode** | **Frequency** | **Requirement ID** |
| --- | --- | --- | --- | --- |
| COCR-001 | Maintain COCR Case | Online/Update | (Min: 0 Avg: 300 Max: 600) | REQ-3001  REQ-3002  REQ-3003 |
| COCR-002 | Genereate COCR E-Licence | Online/Update | (Min: 0 Avg: 300 Max: 600) | REQ-1004  REQ-1005  REQ-3002  REQ-3003  REQ-5004 |
| COCR-003 | Maintain COCR Registration | Online/Update | (Min: 0 Avg: 300 Max: 600) | REQ-3002  REQ-3003 |

### **E-Tracking**

| **Function ID** | **Function**  **Description** | **Mode** | **Frequency** | **Requirement ID** |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |

# Equipment Configuration

This section provides the equipment configuration which describes the inter-relationship among all hardware components including communication network.

The information in this section can also be found in the Computer Operating Procedures Manual.

## **Computer Hardware & Network**

### **Network Overview**

The overall architecture of the DMS-BEEO can be illustrated by the following diagram:



The DMS system will be resided at Data Center of EMSD Headquarter. Users can access DMS using their own PC through Departmental Network. For remote users using mobile device, they can access departmental network through Virtual Private Network (VPN) and then access DMS.

### **Summary of Network Address**

| **IP** | **Host Name** | **Description** | **Machine Type (Physical/Virtual)** | **Location** |
| --- | --- | --- | --- | --- |
| 10.16.133.22 | Server01 | VMware vSphere server | Physical | 1/F Watson Centre, Kwai Chung |
| 10.16.133.23 | Server02 | VMware vSphere server | Physical | 1/F Watson Centre, Kwai Chung |
| 10.16.133.214 | beeodmsapp | Application server (production) | Virtual | Server02 |
| 10.16.133.215 | beeodmsdb | Database server (production) | Virtual | Server02 |
| 10.16.133.216 | beeodmsdev | Application server and Database server (Development) | Virtual | Server01 |

### **Production Web and Application Server**

|  |  |
| --- | --- |
| **Hardware Configuration** | **Details** |
| Host Name | BEEODMSAPP |
| Function | Production Web & Application Server |
| IP Address | 10.16.133.214 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 10.16.133.254 |
| Domain | EMSD.HKSARG |
| Processor | 2 Processors @ 3.20GHz 3.19GHz |
| RAM | 32GB |
| HDD | 299GB |

|  |  |
| --- | --- |
| **Software** | **Details** |
| OS Name | Microsoft Windows Server 2019 Standard x64 |
| OS Version | 10.0.17763 N/A Build 17763 |
| IIS | 10 |
| SSL | Certificates Installed |
| .NET Framework | Version 4.8.03761 |

### **Production Database Server**

|  |  |
| --- | --- |
| **Hardware Configuration** | **Details** |
| Host Name | BEEODMSDB |
| Function | Production Database Server |
| IP Address | 10.16.133.215 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 10.16.133.254 |
| Domain | EMSD.HKSARG |
| Processor | 2 Processors @ 3.20GHz 3.19GHz |
| RAM | 32GB |
| HDD | C : 299GB  D : 999GB |

|  |  |
| --- | --- |
| **Software** | **Details** |
| OS Name | Microsoft Windows Server 2019 Standard x64 |
| OS Version | 10.0.17763 N/A Build 17763 |
| SQL Server | Microsoft SQL Server 2017 (RTM-GDR) (KB4583456) - 14.0.2037.2 (X64) |

### **UAT/DEV Web and Application Server**

|  |  |
| --- | --- |
| **Hardware Configuration** | **Details** |
| Host Name | BEEODMSDEV |
| Function | UAT/DEV Web & Application Server |
| IP Address | 10.16.133.216 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 10.16.133.254 |
| Domain | EMSD.HKSARG |
| Processor | 2 Processors @ 3.20GHz 3.19GHz |
| RAM | 32GB |
| HDD | 1TB |

|  |  |
| --- | --- |
| **Software** | **Details** |
| OS Name | Microsoft Windows Server 2019 Standard x64 |
| OS Version | 10.0.17763 N/A Build 17763 |
| IIS | 10 |
| SSL | Certificates Installed |
| .NET Framework | Version 4.8.03761 |

### **UAT/DEV Database Server**

|  |  |
| --- | --- |
| **Hardware Configuration** | **Details** |
| Host Name | BEEODMSDEV |
| Function | UAT/DEV Database Server |
| IP Address | 10.16.133.216 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 10.16.133.254 |
| Domain | EMSD.HKSARG |
| Processor | 2 Processors @ 3.20GHz 3.19GHz |
| RAM | 32GB |
| HDD | 1TB |

|  |  |
| --- | --- |
| **Software** | **Details** |
| OS Name | Microsoft Windows Server 2019 Standard x64 |
| OS Version | 10.0.17763 N/A Build 17763 |
| SQL Server | Microsoft SQL Server 2017 (RTM-CU28) (KB5008084) - 14.0.3430.2 (X64) |

# Software Inventories

This section summarizes all software that is required for the operational running of the system.

## **Inventory of Application Programs**

The binary files containing application programs are listed below. Detailed documentation of the programs is given in the Program Manual.

|  |  |  |
| --- | --- | --- |
| **Description** | **Item** | **Location** |
| DMS-BEEO Application Main Folder | DMS-BEEO Code | D:\csudemo |
| ASP.NET AJAX Control Toolkit | AjaxControlToolkit.dll | D:\csudemo\bin |
| PDF library | itextsharp.dll | D:\csudemo\bin |
| Microsoft Report Viewer | Microsoft.ReportViewer.\*.dll | D:\csudemo\bin |
| Free PDF API | Spire.\*.dll | D:\csudemo\bin |
| A .NET library for reading and writing CSV files | CsvHelper.dll | D:\csudemo\bin |
| JSON framework for .NET | Newtonsoft.Json.dll | D:\csudemo\bin |

## **Inventory of System Software and Software Package**

|  |  |  |
| --- | --- | --- |
| **Device** | **Software** | **Version** |
| Production Web and Application Server | Microsoft Windows Server | 2019 Standard x64 10.0.17763 N/A Build 17763 |
| IIS | 10 |
| .NET Framework | Version 4.8.03761 |
| Production Database Server | Microsoft Windows Server | 2019 Standard x64 10.0.17763 N/A Build 17763 |
| Microsoft SQL Server | 2017 (RTM-GDR) (KB4583456) - 14.0.2037.2 (X64) |

# Security and Backup

## **System Control**

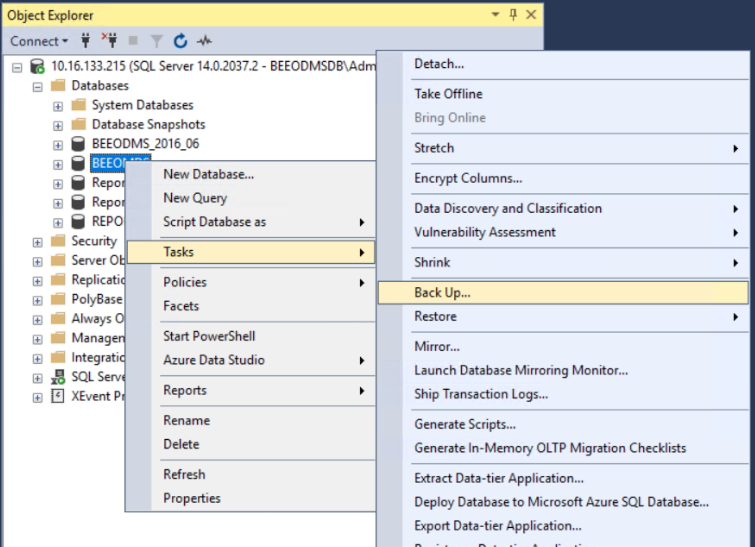
The security measures provided by DMS are:

* User name / password system login
* Encrypted password stored in the database system
* Function level access control for individual user
* All data is transferred between the user’s web browser and the system via the SSL protocol to prevent eavesdropping, tampering and forgery

## **Database Backup**

Below are the steps for manually backup the BEEODMS database.

1. Login into production database server
2. Launch SQL Server Management Studio (SSMS) and connect to production SQL Server instance.
3. Expand the Databases node in Object Explorer.
4. Right-click the database, hover over Tasks, and select Back up



1. Under Destination, confirm the path for your backup is correct. If you need to change this, select Remove to remove the existing path, and then Add to type in a new path. You can use the ellipses to navigate to a specific file.
2. Select OK to take a backup of your database.

## **System Backup**

The source code of DMS is in Azure DevOps, which is managed by version control.

## **Recovery**

The procedures to resume back to normal system configuration and the actions to be taken after restoration are documented in the T331 Disaster Recovery Drill Test Report (DR).

## **Security**

### **Physical Security**

Servers and network equipments will be protected from unauthorized access. The server equipments will be housed in locked racks in the server room designated for the EMSD Regulatory Services at EMSTF Kowloon Bay Data Centre that allows entries of authorized personnel only.

### **Access Control**

In order to ensure that system security is maintained, proper security control procedures will be imposed. There are two levels of access control:

* DMS Application – access control is done by setting up different application user accounts, allowing them to access different application functions according to their business need
* System Level – login accounts for various servers and database are kept by Administrators only for system administration purpose, such as tracing problem, backup, etc.

Details of user account and function / access right mapping are documented in the T225 Selected TSO.

### **Data Encryption**

Based on the Security Regulations, restricted data in DMS will be stored in unencrypted format while transmission of restricted data on un-trusted network will be encrypted.

Restricted data transferred between DMS servers will be protected by the Internet Protocol Security (IPsec) which is an encryption protocol for secure encrypted data transmission at the network layer. It is supported by all common operating systems such as UNIX and Windows 2008. Electronic certificates for Intranet will be used for IPsec authentication and will be provided by EMSD for both production and development purposes.

Data transferred between DMS and its interfacing systems, namely WBRS and CIG, will be protected by using Hypertext Transfer Protocol Secure (HTTPS) connections and secure web service.

Data transferred between the DMS web server and client workstations will be protected by using the Secure Sockets Layer (SSL) protocol to ensure that data sent from the application’s server pages are encrypted.

Some data, e.g. password, is to be stored in encrypted or hashed format by nature based on renowned algorithms before storing into the database.

### **Security Patches Update**

After security patches are available, Maintenance Team would perform impact analysis, make recommendation and consult EMSD before applying the patches. Other necessary actions and procedures relating to patch update will follow the same as provided in the System Maintenance Plan.

- End of Document -