

「住宅・建築物省エネラベル制度の重要性について」 〈建築物〉

2016年3月3日
早稲田大学建築学科
田辺新一



IPCC（気候変動に関する政府間パネル） 第5次評価報告書

- ✓ 2010年に建築物は世界のエネルギーの
約32%を消費
- ✓ このままの状態が続けば、
2050年までに**2～3倍**になると予想

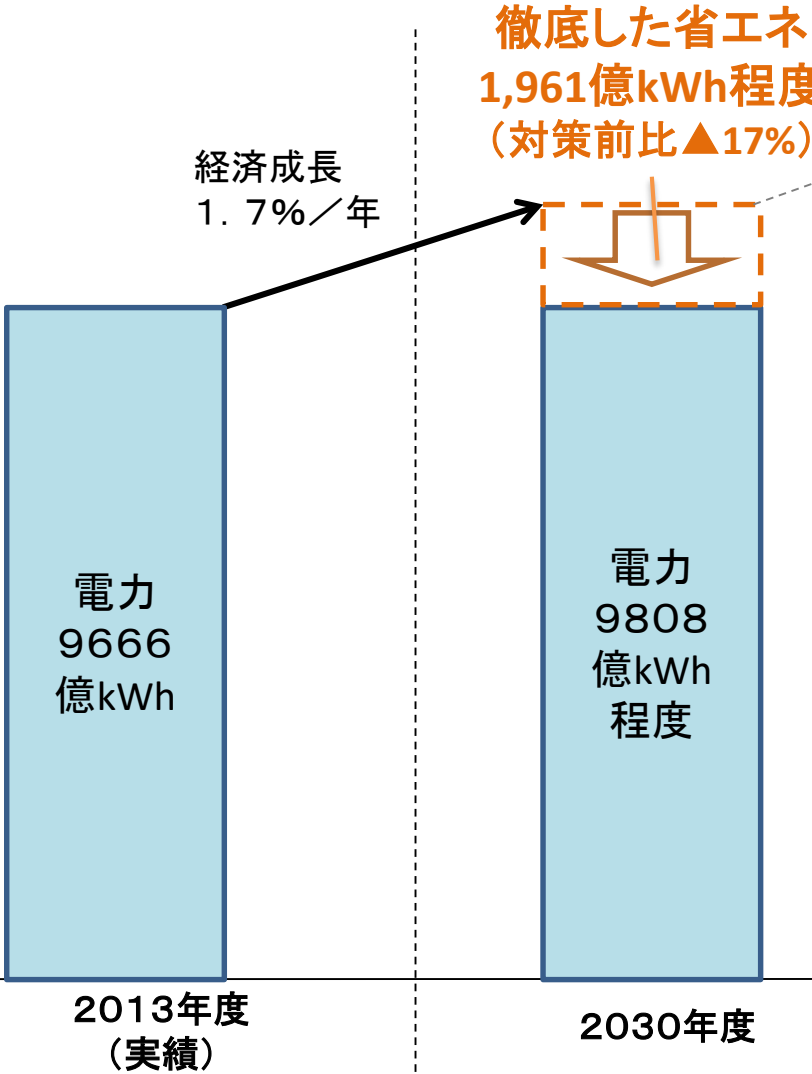
**住宅・建築は寿命が長い
ため
ロックインする前に迅速な対応が必要**

- ✓世界共通の長期目標として2°C目標のみならず1.5°Cへの言及
- ✓主要排出国を含むすべての国が削減目標を5年ごとに提出・更新すること、共通かつ柔軟な方法でその実施状況を報告し、レビューを受けること

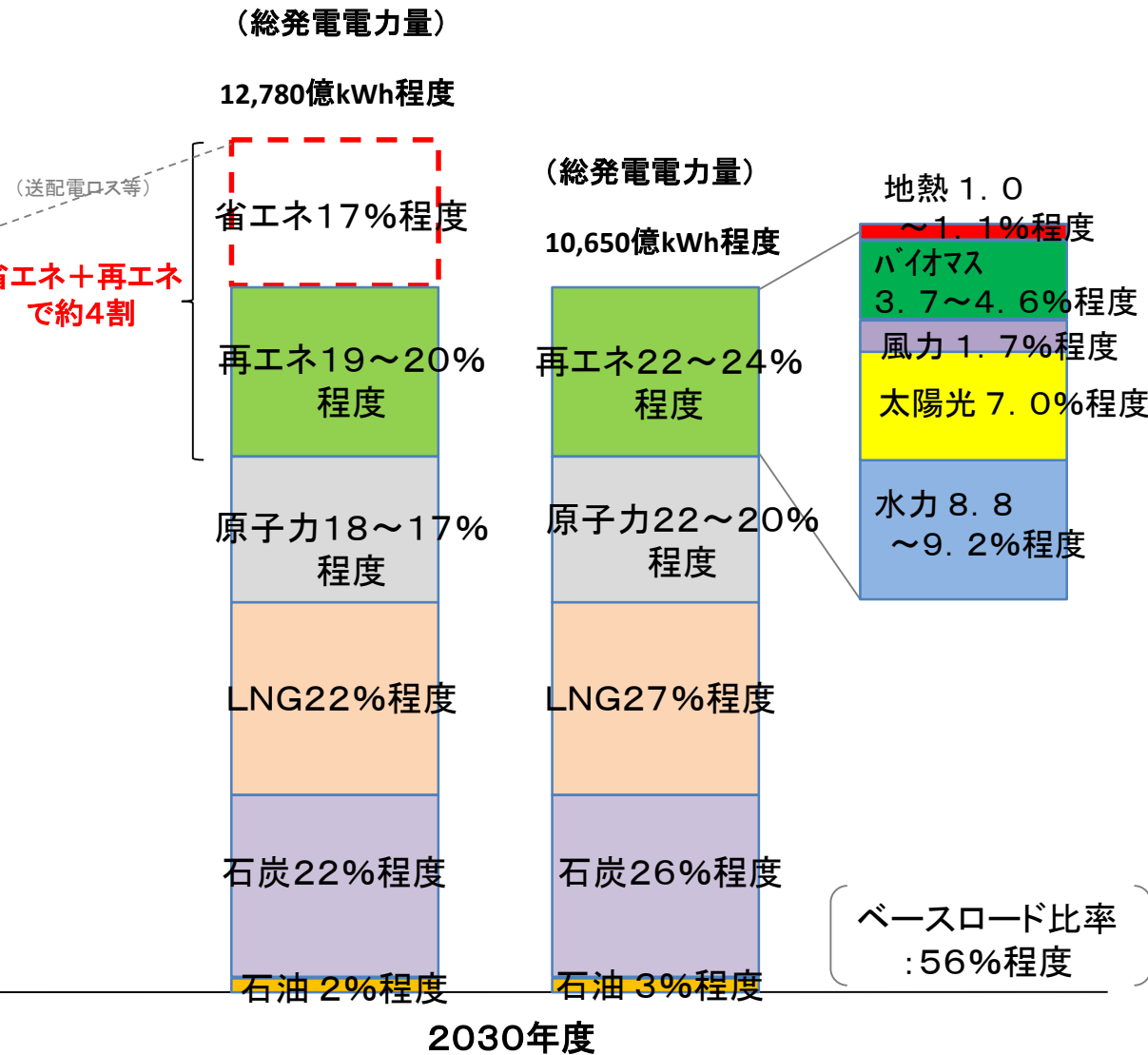
日本は、2030年までに2013年比26%の削減目標→本当に削減する必要がある

長期エネルギー需給見通しにおける電力需要・電源構成

電力需要



電源構成



省エネ目標5,035万kLの内訳は？

	2013年使用 割合	削減量	削減割合 (%)
産業部門	44.4%	1,042	21
運輸部門	23.1%	1,607	32
業務部門	18.1%	1,226	24
家庭部門	14.4%	1,160	23
		5,035	

住宅，業務部門で47%の削減 = 大きな期待

資源エネルギー庁長期エネルギー需給見通し（2015年），エネルギー白書2015から作成

» 2015年2月19日（金） 環境基本計画のあり方について（答申）

2030年までに2000年比で

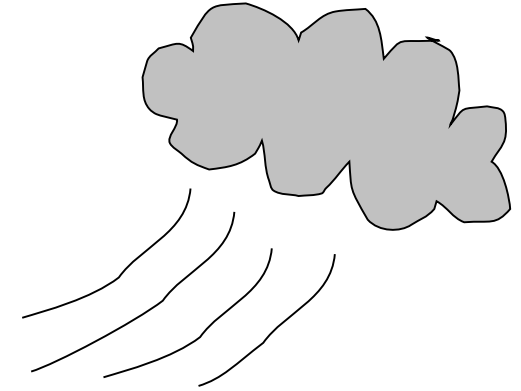
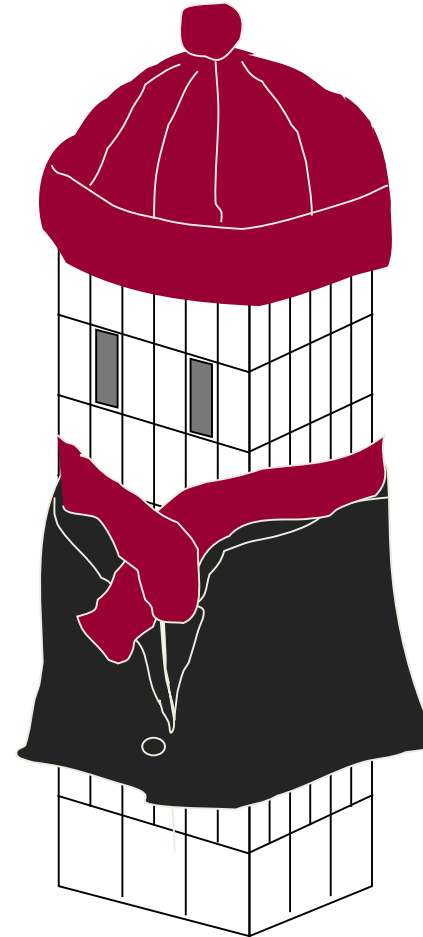
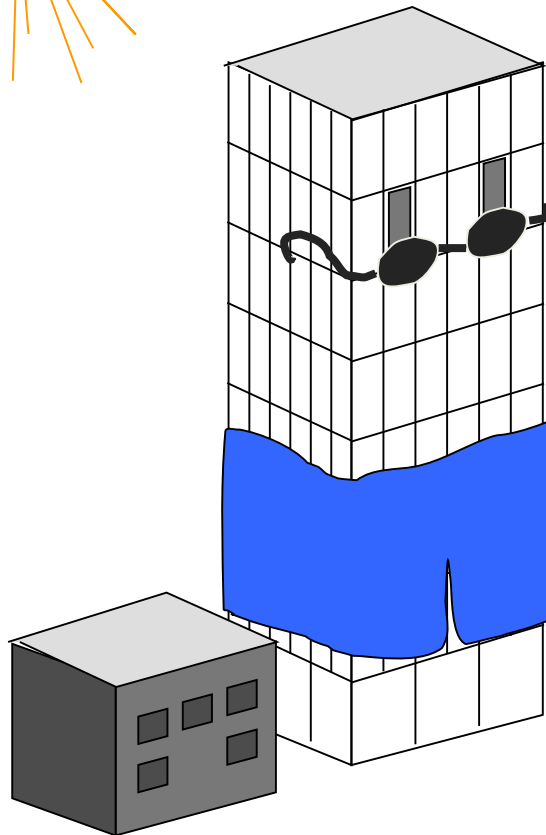
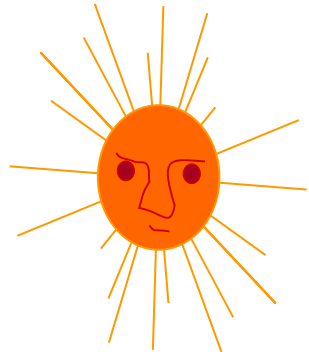
30% 温室効果ガス削減

38% エネルギー消費量削減

30% 再生可能エネルギー

- ・ 東京都は日本の約5%のCO2排出（2013年）
 - ・ 業務用が約4割と大きい
- **スマートエネルギー都市の実現**

<http://www.metro.tokyo.jp/INET/KONDAN/2016/02/DATA/40q2j101.pdf>

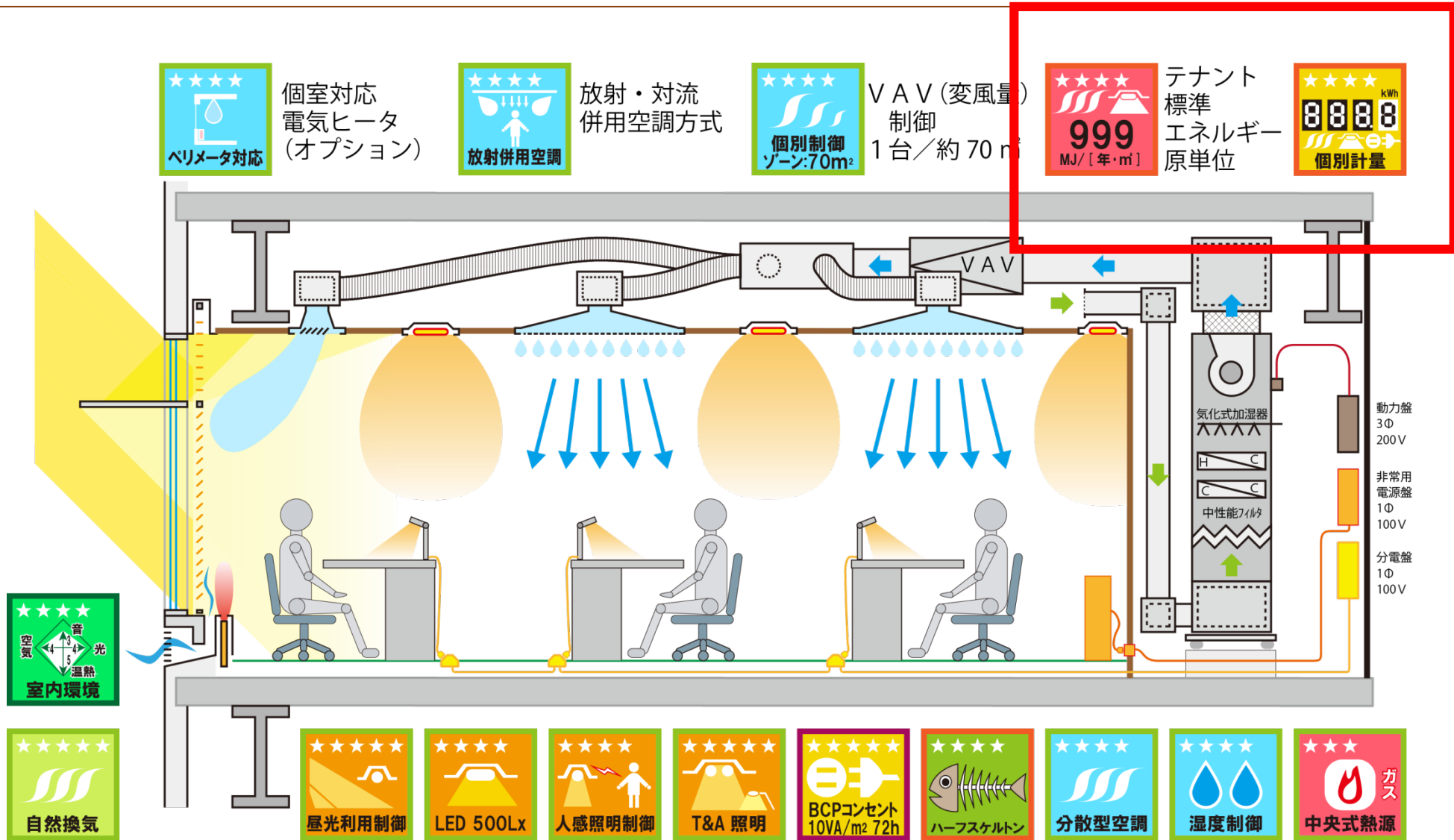


- 企業が**オフィス選び**をする**プロセス**と**ポイント**をヒアリング。
- 多くの企業のオフィス選びのプロセスは**2段階**で行われる。
第1段階：**必要条件**を提示して候補建物の絞り込みを実施
第2段階：**決定条件**に近い建物を相対評価で選定

必要条件	必要条件／決定条件	決定条件
賃料	環境配慮	外観
エリア	省エネルギー	使いやすさ
空調設備・電源容量	環境共生	共用部
耐震構造	免震・制震	喫煙室
OAフロア	BCP	リフレッシュコーナー
光ファイバー	非常時備蓄	貸し会議室
床荷重		
セキュリティ		

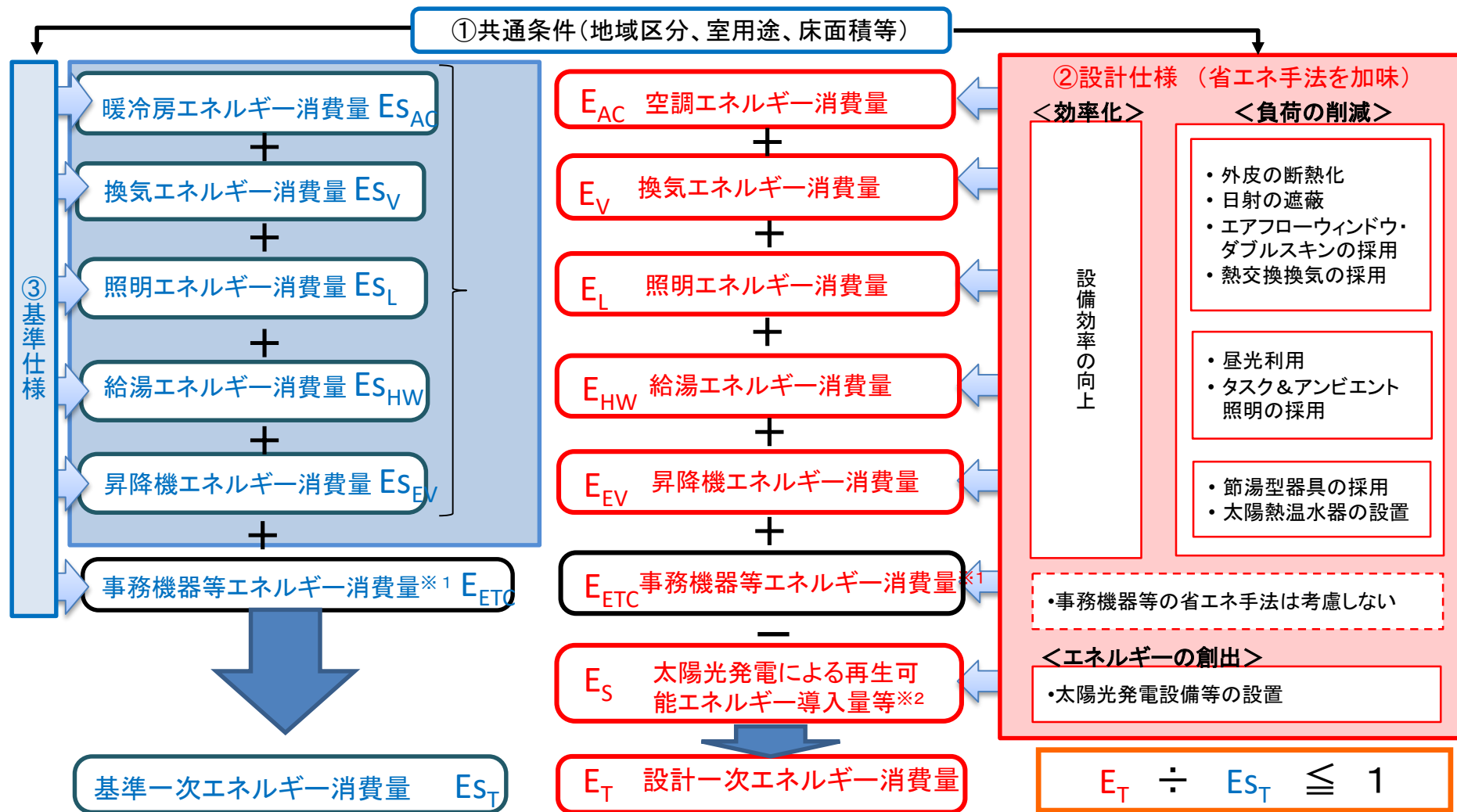
湯澤, 久保, 本堂, 堀川, 田辺, 松岡, テナント志向の建物指標の開発第1報 評価指標の必要性と評価項目の提案, 第2報 建物評価の詳細と評価結果, 日本建築学会大会学術講演梗概集, pp.27-30, 2014年

テナントオフィスのピクトグラムの提案



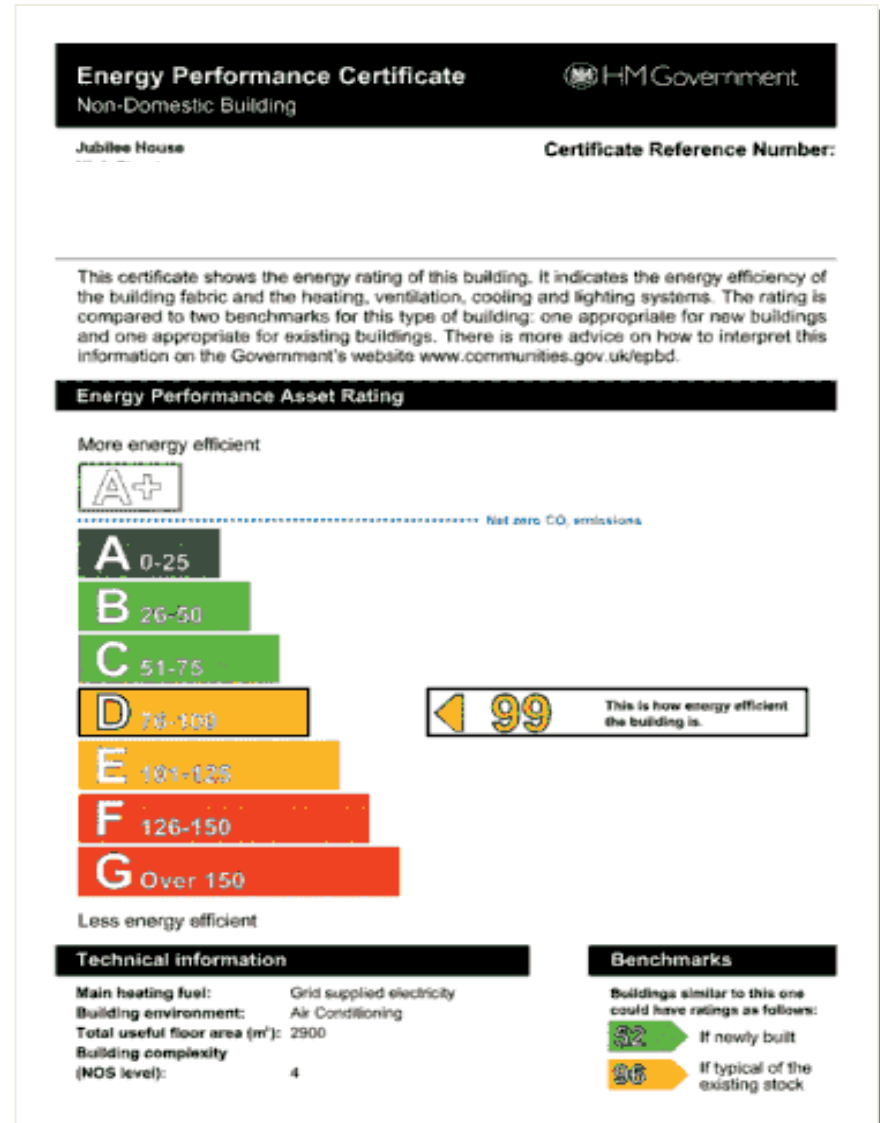
建築物の一次エネルギー消費量基準の考え方

- 評価対象となる建築物において、①共通条件の下、②設計仕様(設計した省エネ手法を加味)で算定した値(設計一次エネルギー消費量)を、③基準仕様で算定した建築設備(暖冷房、換気、照明、給湯、昇降機)に係る一次エネルギー消費量を、事務機器等に係る一次エネルギー消費量を足した値(基準一次エネルギー消費量)で除した値が1以下となることを基本とする。



- ✓ 住宅・建築物の省エネ性能評価制度 (EPC: Energy Performance Certificate) は2006年から施行されており、市場に浸透
- ✓ 新築、売買、賃貸借時に建物オーナーが取引相手に対して省エネ性能評価書を提示 (義務)
- ✓ 25の用途 (オフィスビル、店舗など)、20の活動 (執務室、倉庫など) ごとに評価
- ✓ エネルギー性能は、原則的に設計段階における予測値により評価される

注釈) ①省エネ基準で規定しているCO2排出のみ対象
②平均値は1995年までの約30年間のエネルギー消費データに基づき設定



国名	評価方法
スウェーデン	計画時の評価/運用時の評価
フィンランド	計画時の評価
イギリス	計画時の評価/運用時の評価
デンマーク	計画時の評価/運用時の評価
オランダ	計画時の評価
ベルギー	計画時の評価/運用時の評価
ポルトガル	計画時の評価
スペイン	計画時の評価
フランス	計画時の評価/運用時の評価
ドイツ	計画時の評価/運用時の評価
ポーランド	計画時の評価/運用時の評価
チェコ	計画時の評価
オーストリア	計画時の評価
イタリア	計画時の評価

A review of the implementation of the Energy Performance Certification Scheme in Europe, Marina Economidou, Expert in Energy Efficiency IEA, Paris, November 2011



0800 170 1201
07557 443 444

EPC Providers & Green Deal Advice Service

Lines Open Monday - Friday 9am - 5.30pm

[Home](#) | [About Us](#) | [EPC Explained](#) | [News](#) | [Commercial EPC](#) | [Solar PV EPC](#) | [Asbestos Surveys](#) | [Contact Us](#) | [Log in](#)

Commercial Energy Performance Certificate EPC Providers



A Commercial EPC must be in place before any commercial property is sold or let. Commercial Energy Performance Certificate surveys are more in depth than their domestic counterparts and need to be carried out by an assessor with the correct NDEA qualification.

<http://www.easyepc.org/commercial-epc.html>

DOMESTIC EPC

FROM **£49.99**



COMMERCIAL EPC

FROM **£99.99**



SAP EPC

FROM **£49.99**



DISPLAY ENERGY

FROM **£99.99**



ASBESTOS SURVEY

FROM **£149.99**



- ✓ 非住宅の評価費用は, **1~2ユーロ/m²**
- ✓ 国によっては**5ユーロ/m²**
- ✓ 費用のばらつきの原因は不明であるが,
国の経済力とは無関係
- ✓ 罰則がある国とない国がある

Book: 2016 – Implementing the Energy Performance of Buildings Directive (EPBD) , January 2016から引用

A VENDRE

01.49.54.77.88

Reference : 789162 / 06482



PARIS VIème - SAINT PLACIDE - 6 PIECES

RUE JEAN FERRANDI- RUE VAUGIRARD

Dans un immeuble en pierre de taille, au rez de chaussée, appartement composé d'une entrée, un double séjour, une salle à manger, 3 chambres, salles de bains, wc, cave. Profession libérale possible.

Prix : 1 290 000 €



* Plus d'informations
N. SIREN : 523 39 7 522

www.foncia.com

A VENDRE

01.49.54.77.88

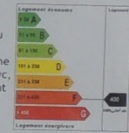
Reference : 786270 / 06520



PARIS VIè - MONTPARNASSE - 5 PIECES

Dans un immeuble ancien, sur cour au calme, au 2è étage, appartement composé d'un double séjour, une cuisine dinatoire, 3 chambres, salle de bains, wc, caves. Travaux à prévoir mais disposant d'un plan idéal.

Prix : 924 000 €



* Plus d'informations
N. SIREN : 523 39 7 522

www.foncia.com

A VENDRE

01.49.54.77.88

Reference : 808204 / 102



PARIS VIème - CHERCHE MIDI - DUPLEX

Dans un immeuble ancien, appartement en Duplex sur cour de 75m² habitable et 45m² Carrez, au 1er et dernier étage d'une agréable copropriété. Idéalement situé dans un quartier accueillant et bien desservi. Bien bénéficiant d'une belle luminosité refait à neuf et conservant les charmes de l'ancien. Aucun travaux à prévoir.

Prix : 690 000 €



* Plus d'informations
N. SIREN : 523 39 7 522

www.foncia.com

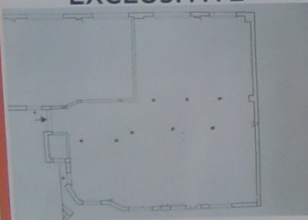
A VENDRE

01.49.54.77.88

Reference : 786522 / 06520



EXCLUSIVITÉ



PARIS VIè - MONTPARNASSE - 5 PIECES

Dans un immeuble ancien bien entretenu, plateau de 115m² plus une chambre située dans le 2ème bâtiment de 11m² actuellement louée. Profession libérale possible. Beaucoup de possibilités

Prix : 1 160 000 €



* Plus d'informations
N. SIREN : 523 39 7 522

www.foncia.com

A VENDRE

01.49.54.77.88

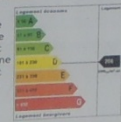
Reference : 791234 / 06520



PARIS VIème - RUE DAUPHINE - DUPLEX DERNIER ETAGE

Dans un immeuble de caractère bien entretenu, appartement de 60m² composé d'un séjour avec poutres, parquet et 3 fenêtres, une cuisine, à l'étage une suite avec salle de bains. Appartement en parfait état, au calme et très lumineux.

Prix : 798 000 €



* Plus d'informations
N. SIREN : 523 39 7 522

www.foncia.com

A VENDRE

01.49.54.77.88

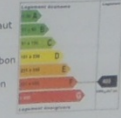
Reference : 781077 / 06524



PARIS XVème - MONTPARNASSE GRAND 2 PIECES + PARKING EN SOUS-SOL

Dans un immeuble récent de haut standing, grand deux pièces donnant sur un balcon. Appartement clair et calme, en bon état général. Nombreux rangements, cave et parking en sous-sol.

Prix : 639 000 €



* Plus d'informations
N. SIREN : 523 39 7 522

www.foncia.com



Small, illegible text block, likely a warning or instruction label.

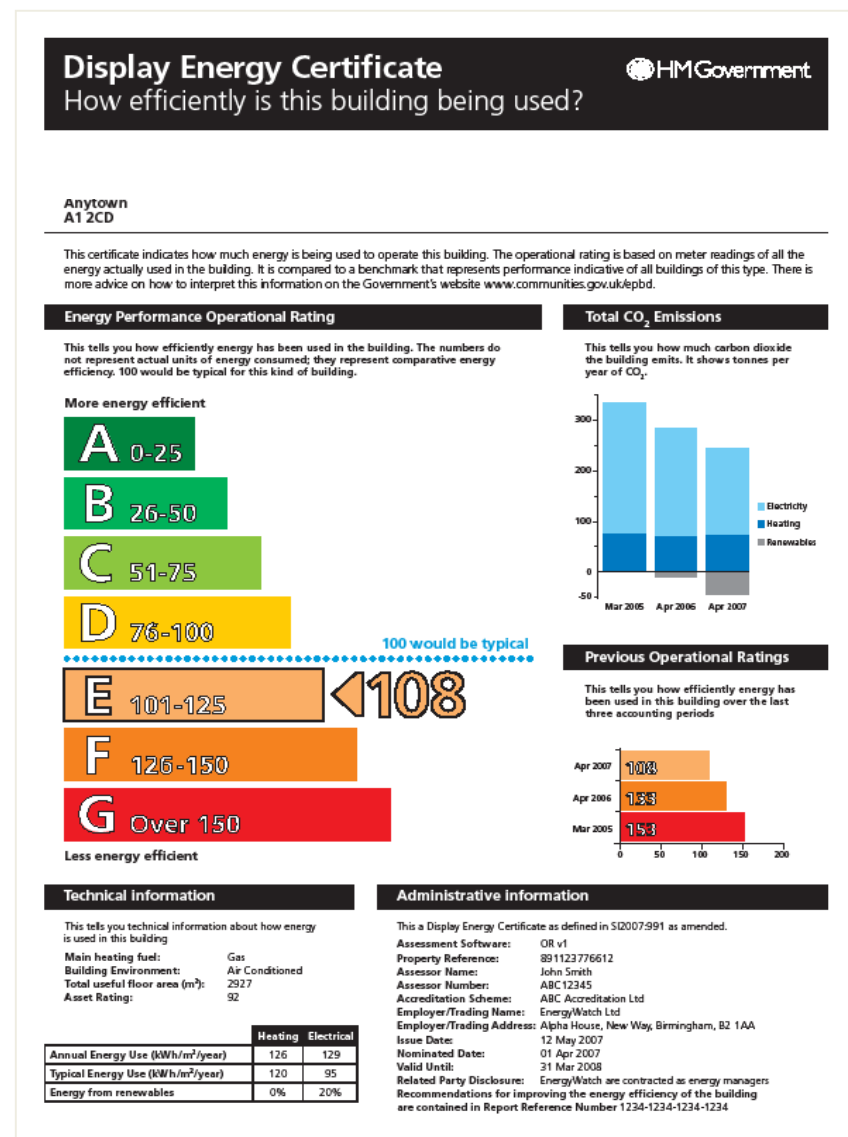
Blomberg 7462

Control panel with a dial and buttons.

- ✓ 省エネ性能表示制度 (DEC: Display Energy Certificate)は、運用時のエネルギー消費についてベンチマークにより省エネの度合いを格付けする制度(公共施設は義務)
- ✓ 建築物の運用管理の指標となる
- ✓ EPCと異なり、省エネ基準で規定していないCO2排出(OA機器、厨房など)も含めた評価

D ランク(100点): 既存建築物の平均値

- 注釈) ①省エネ基準で規定していないCO2排出も対象
 ②平均値は1995年までの約30年間のエネルギー消費データに基づき設定



Display Energy Certificate

How efficiently is this building being used?

Certificate Reference Number:
0390-1020-0887-0693-8901

Date:
Department for Environment, Food & Rural Affairs (DEFRA)
Department Name:
Building:
Location:
SARL 200

This certificate relates to the main energy is being used to operate the building. The operational rating is based on meter readings of all the energy for which use in the building. It is compared to a benchmark that represents performance indicative of all buildings of the type. There is a responsibility on you to ensure the information on the Department's website www.compendium.gov.uk/edps.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The subject is an operational rating which sets of energy consumption that represent comparative energy efficiency. The result is typical for this class of building.

More energy efficient

A 0-25

B 25-50

C 51-75

D 76-100

100 would be typical

E 101-125

F 126-150

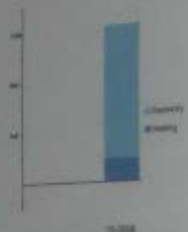
G Over 150

Less energy efficient

◀ 165

Total CO₂ Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO₂.



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods.



Technical information

The table below shows the main energy is used in the building. Data refers to the period in which meter readings.

Most heating fuel: Natural Gas
Building Envelope: Air conditioning
How much heat area (m²): 10000
Asset Rating: Not certified

Annual Energy Use (kWh/m ² /year)	Annual CO ₂ Emissions (t/m ² /year)
100	100
150	150
200	200

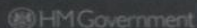
Administrative information

This is a Display Energy Certificate as defined in SI 2007/281 as amended.

Assessment Reference: ENCAL VY-04-02
Property Reference: 01/0000000
Assessor Name: M. Tucker Skirry
Assessor Number: L25A11121
Assessment Scheme: DEFRA Commission Limited
Employer/Trading Name: Defra
Team Date: 10/04/2008
Reported Date: 10/04/2008
Valid Until: 01/04/2009
Publicly Being Disclosed: I am an employee of Defra
Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

Display Energy Certificate

How efficiently is this building being used?



Department of Energy & Climate Change
3-8 Whitehall Place
LONDON
SW1A 2HH

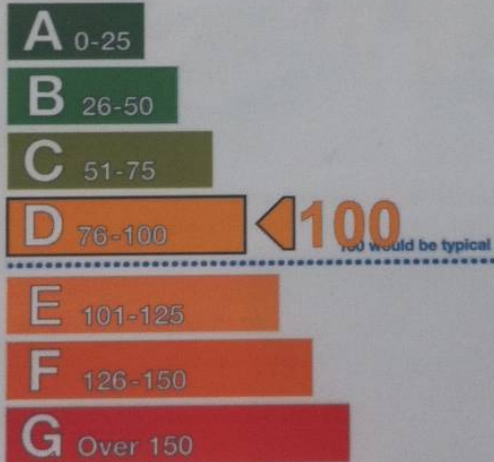
Certificate Reference Number:
9828-1014-0595-0500-2095

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient



Less energy efficient

Technical information

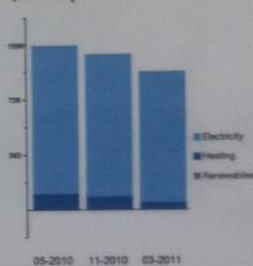
This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building Environment: Air Conditioning
Total useful floor area (m²): 10980
Asset Rating: Not available.

	Heating	Electrical
Annual Energy Use (kWh/m ² /year)	23	143
Typical Energy Use (kWh/m ² /year)	127	106
Energy from renewables	0%	0%

Total CO₂ Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO₂.



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods.



Administrative information

This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software: CLG_ORCalc_v3.5.1
Property Reference: 895908120000
Assessor Name: Damien Myers
Assessor Number: BRECS00123
Accreditation Scheme: BRE
Employer/Trading Name: Briar Associates
Employer/Trading Address: York House, High Street, Amblecote, DY8 4BT
Issue Date: 12-04-2011
Nominated Date: 31-03-2011
Valid Until: 30-03-2012
Related Party Disclosure: Not related to the occupier
Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

Display Energy Certificate

How efficiently is this building being used?



Department of Energy & Climate Change
3-8 Whitehall Place
LONDON
SW1A 2BH

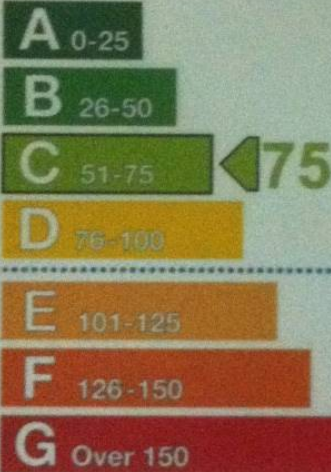
Certificate Reference Number:
0098-9532-5118-1500-8293

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret the information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed, they represent comparative energy efficiency. 100 would be typical for this kind of building.

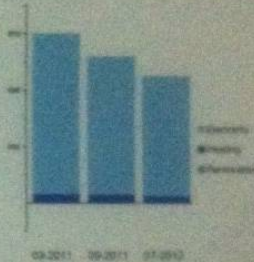
More energy efficient



Less energy efficient

Total CO₂ Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO₂.



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods.



Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building Environment: Air Conditioning
Total useful floor area (m²): 11205
Asset Rating: Not available

	Heating	Electricity
Annual Energy Use (kWh/m ² /year)	16	104
Typical Energy Use (kWh/m ² /year)	116	106
Energy from renewables	0%	0%

Administrative information

This is a Display Energy Certificate as defined in SI 2007/1881 as amended.

Assessment Software: OGLA, OPGaw, v5.0.1
Property Reference: 98505120900
Assessor Name: Mr Dennis Burns
Assessor Number: 8921306123
Accreditation Scheme: BRE Global
Employer/Trading Name: 21st Associates
Employer/Trading Address: 1st & 2nd Floor, High Street, Antwerp, 2018
Issue Date: 19-07-2012
Nomination Date: 21-07-2012
Valid Until: 20-07-2013
Related Party Disclosure: Not related to the occupier
Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report

Display Energy Certificate

How efficiently is this building being used?

© HM Government

Department of Energy & Climate Change
3-8 Whitehall Place
LONDON
SW1A 2HR

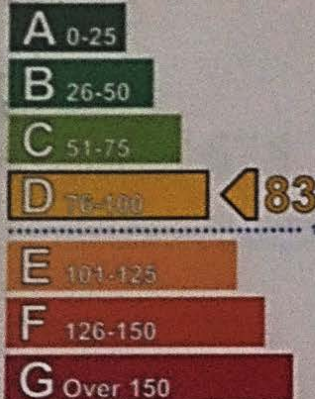
Certificate Reference Number:
0040-8950-0154-2810-5084

This certificate indicates how much energy is being used to power this building. The operational rating is based on meter readings of all the energy actually used in the building. It is intended to be a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/led

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent annual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient



Less energy efficient

Technical Information

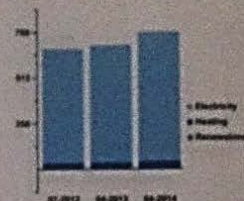
This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building environment: Air Conditioning
Total useful floor area (m²): 11268
Asset Rating: Not available

	Heating	Electricity
Annual Energy Use (kWh/m ² /year)	21	177
Typical Energy Use (kWh/m ² /year)	124	108
Energy from renewables	0%	0%

Total CO₂ Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO₂.



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods.



Administrative Information

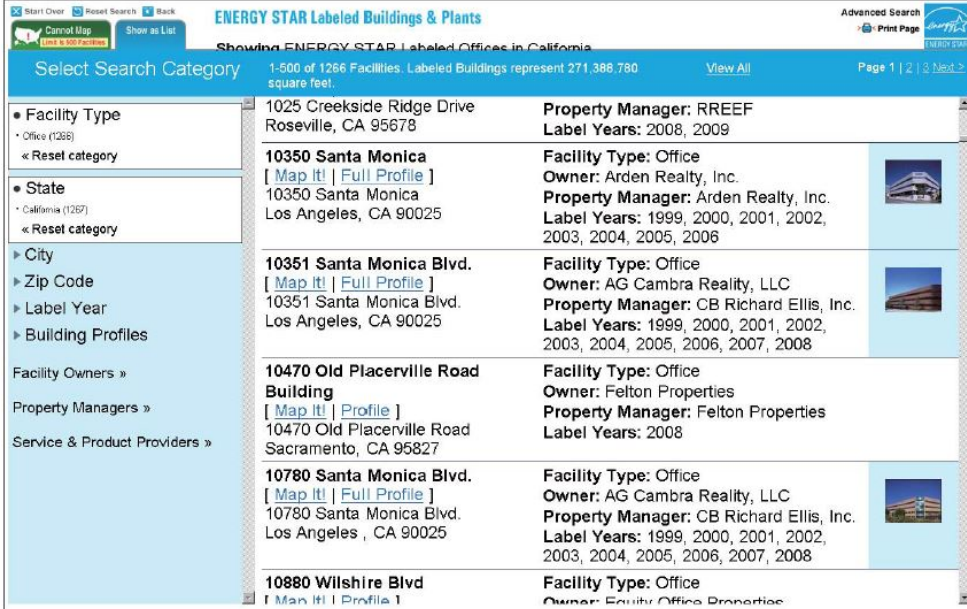
This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software: DCLG, ORCa, v3.6.2
Property Reference: 88500512020
Assessor Name: Damon Myers
Assessor Number: BRE001123
Accreditation Scheme: BRE 04084
Employer/Trading Name: Brax Associates
Employer/Trading Address: York House, High Street, Ambleside, Strourbridge, G15 4BT

Issue Date: 06-04-2014
Nominated Date: 20-04-2014
Valid Until: 29-04-2015
Related Party Disclosure: Not related to the occupier

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

- ✓ 1992年に米国の環境保護庁（EPA）と米国エネルギー省（DOE）が共同で開発した、製品、機器、住宅、業務ビルの省エネ性能ラベリング制度
- ✓ ESPMと呼ばれるエネルギー使用量の管理ツールにより建物用途・運用特性・エネルギーデータを基に評価
- ✓ 評価結果は、1～100で表示される



ENERGY STAR Labeled Buildings & Plants

Showing ENERGY STAR Labeled Offices in California

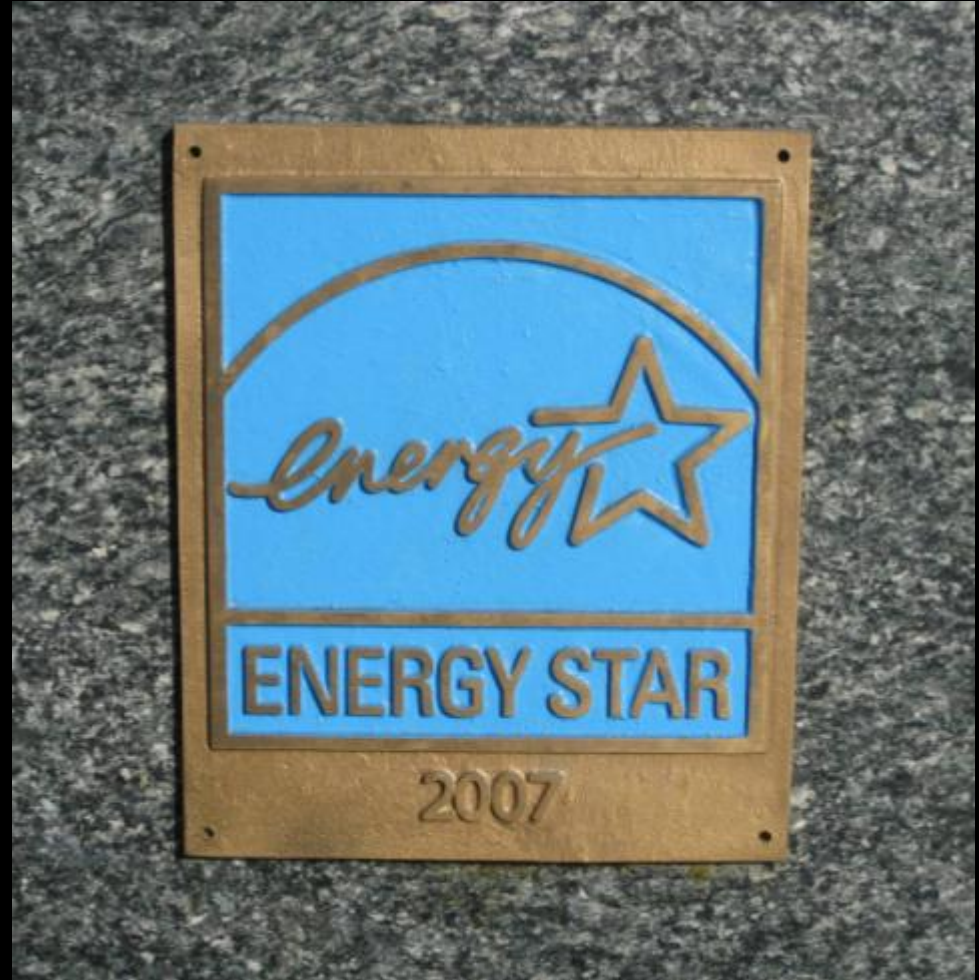
1-500 of 1266 Facilities. Labeled Buildings represent 271,388,780 square feet.

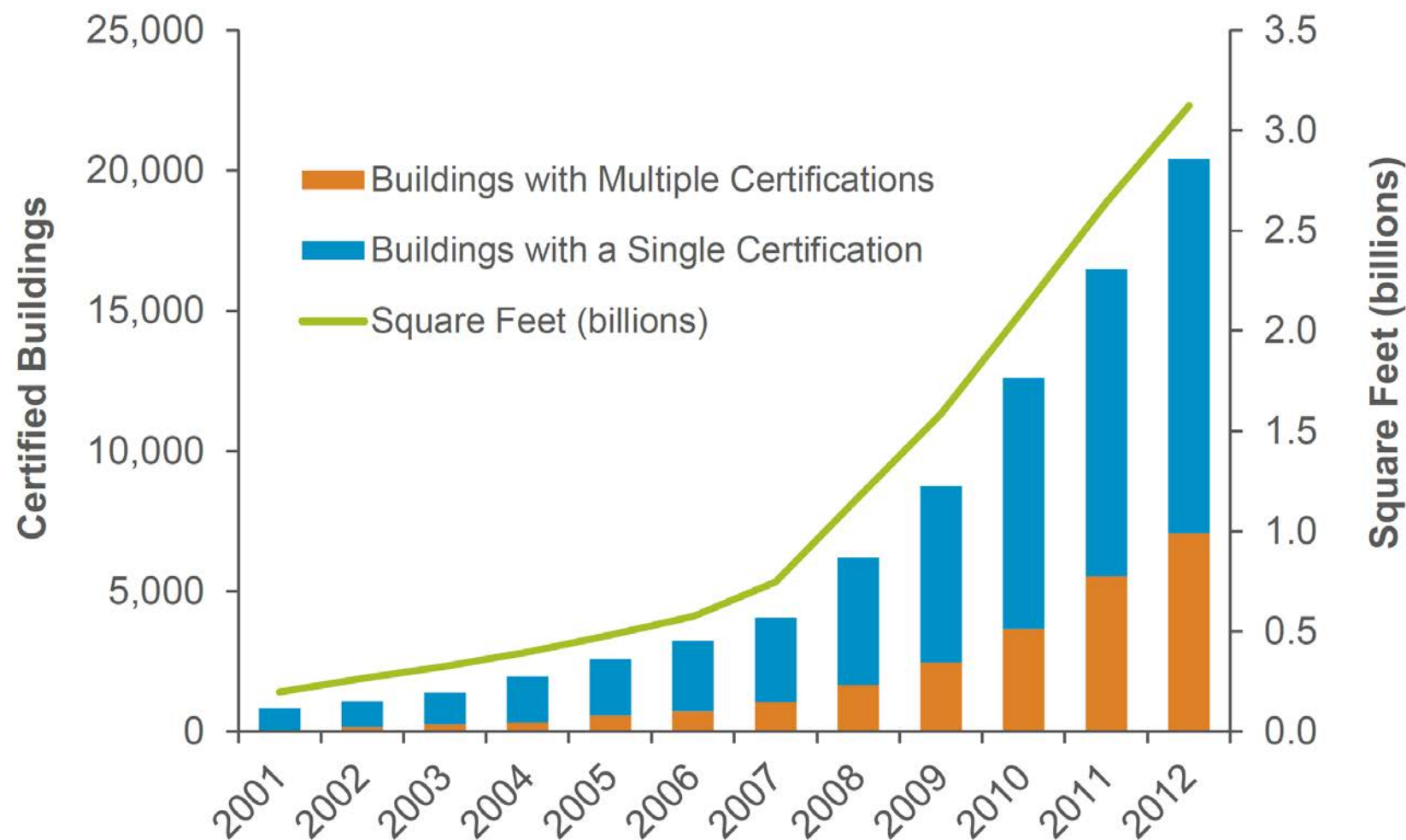
Select Search Category	Facility Information	Property Manager
• Facility Type • Office (1266) « Reset category	1025 Creekside Ridge Drive Roseville, CA 95678	Property Manager: RREEF Label Years: 2008, 2009
• State • California (1267) « Reset category	10350 Santa Monica [Map It! Full Profile] 10350 Santa Monica Los Angeles, CA 90025	Facility Type: Office Owner: Arden Realty, Inc. Property Manager: Arden Realty, Inc. Label Years: 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006
► City	10351 Santa Monica Blvd. [Map It! Full Profile] 10351 Santa Monica Blvd. Los Angeles, CA 90025	Facility Type: Office Owner: AG Cambra Realty, LLC Property Manager: CB Richard Ellis, Inc. Label Years: 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
► Zip Code	10470 Old Placerville Road Building [Map It! Profile] 10470 Old Placerville Road Sacramento, CA 95827	Facility Type: Office Owner: Felton Properties Property Manager: Felton Properties Label Years: 2008
► Label Year	10780 Santa Monica Blvd. [Map It! Full Profile] 10780 Santa Monica Blvd. Los Angeles, CA 90025	Facility Type: Office Owner: AG Cambra Realty, LLC Property Manager: CB Richard Ellis, Inc. Label Years: 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008
► Building Profiles	10880 Wilshire Blvd [Map It! Profile]	Facility Type: Office Owner: Equity Office Properties

Energy Star HPから引用

Energy Star取得建物一覧の例

LEED and ENERGY STAR





Energy Star Data Trendsから引用

http://www.energystar.gov/index.cfm?c=business.bus_energy_star_snapshot

- ✓ 米国環境保護局（USEPA）の Energy Starプログラムと協働で開発され、住宅をのぞく新築、既存の全建物を格付けする制度
- ✓ 設計時における格付け、運用時における格付けを別々に想定している
- ✓ 設計時にはエネルギー消費量の予測値を、運用時には 12～18カ月分のエネルギー消費量の実績値により評価・格付け



ASHRAE HPから引用

- ✓ Energy Star を得ている建築物は、得ていない同等の建築物より、財務的なパフォーマンスが大幅に良い。市場価値は 13.5%高く、水光熱費は 10%低く、単位面積当たりの収入は 5.9%高い, 賃料は 4.8%高い, 稼働率も 1%高い
- ✓ オーストリア. ウイーンにおけるデータ解析を行ったところ, EPC一段階の改善は, 8% 販売価格を 4.4%賃貸価格を向上させた.

UNEP FI Investor Briefing, Commercial Real Estate Unlocking the energy efficiency retrofit investment opportunity, 2014

European Commission (DG Energy), Energy Performance Certificates in Buildings and Their Impact on Transaction Prices and Rents in Selected EU Countries, 2013



- エネルギーデータのフォーマットと通信を規格化
- 顧客が自身の電力利用状況を確認できるようにし、第三者のサービスプロパイダとのデータ共有を可能にする方策

顧客は自身のポータルサイトからXMLとしてデータのダウンロードが可能
権限を与えることでサービスプロパイダもグリーンボタンデータへのアクセスが可能



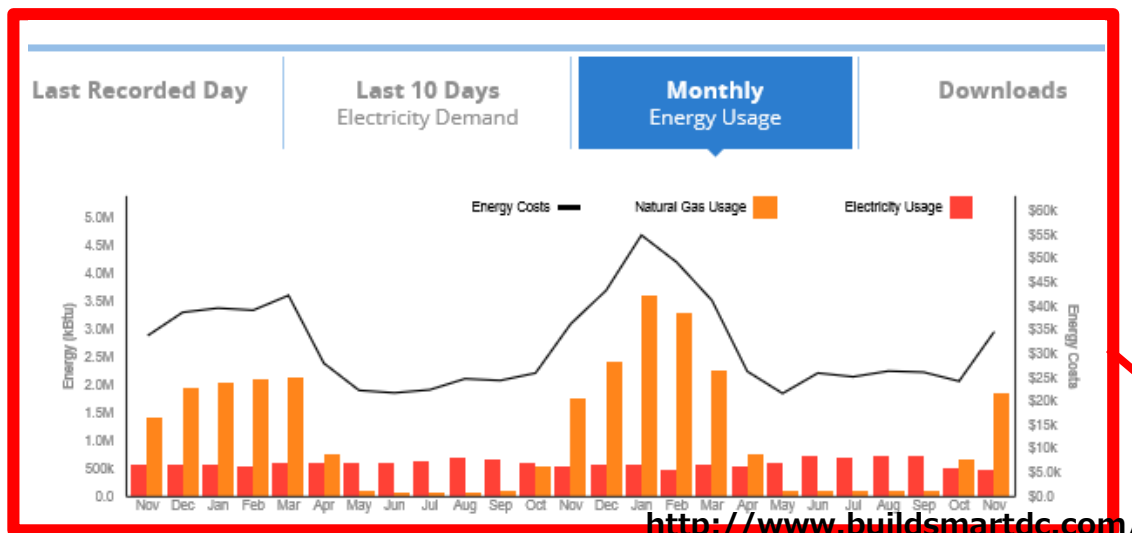


建物名

Energy Starの
レーティング

Calvin Coolidge Senior High School is committed to providing "Excellence in Education" for all students. Through program design and rich learning experiences, students will be provided many opportunities to achieve academic excellence, where each student will reach his or her highest potential. [Show More](#)

- 最新記録日
- ここ10日の電力消費量
- 月積算エネルギー消費量
- ダウンロードできるデータ

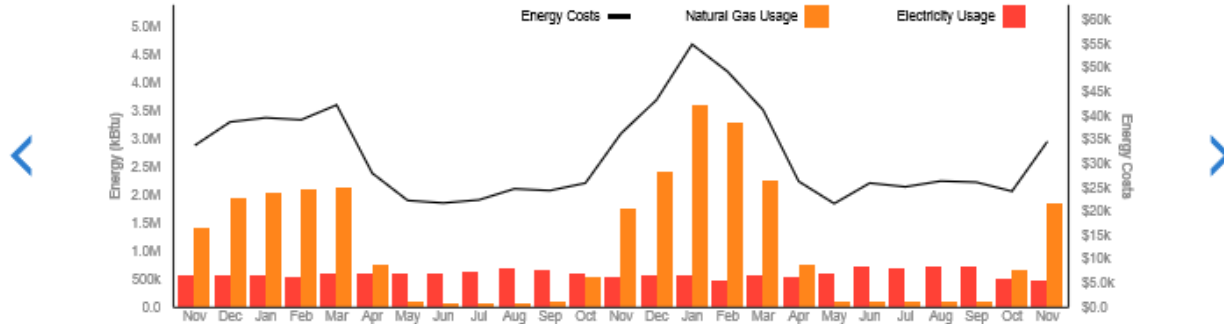


月積算エネルギー消費量

- エネルギーコスト
- ガス使用量
- 電気使用量

<http://www.buildsmartdc.com/>

Green Button(米国公共建築の事例)



BUILDING TYPE High School	SIZE (FT ²) 271,300	EUI (KBTU/SF/YR) 84
ANNUAL ENERGY COST \$399,384.34	ANNUAL GHG EMISSIONS (TONS) 2,079.3	GAS AS % OF BTUS 67.83%
GAS AS % OF ENERGY COST 37.46%		

建物情報

Data services and analytical graphics provided by



所在地