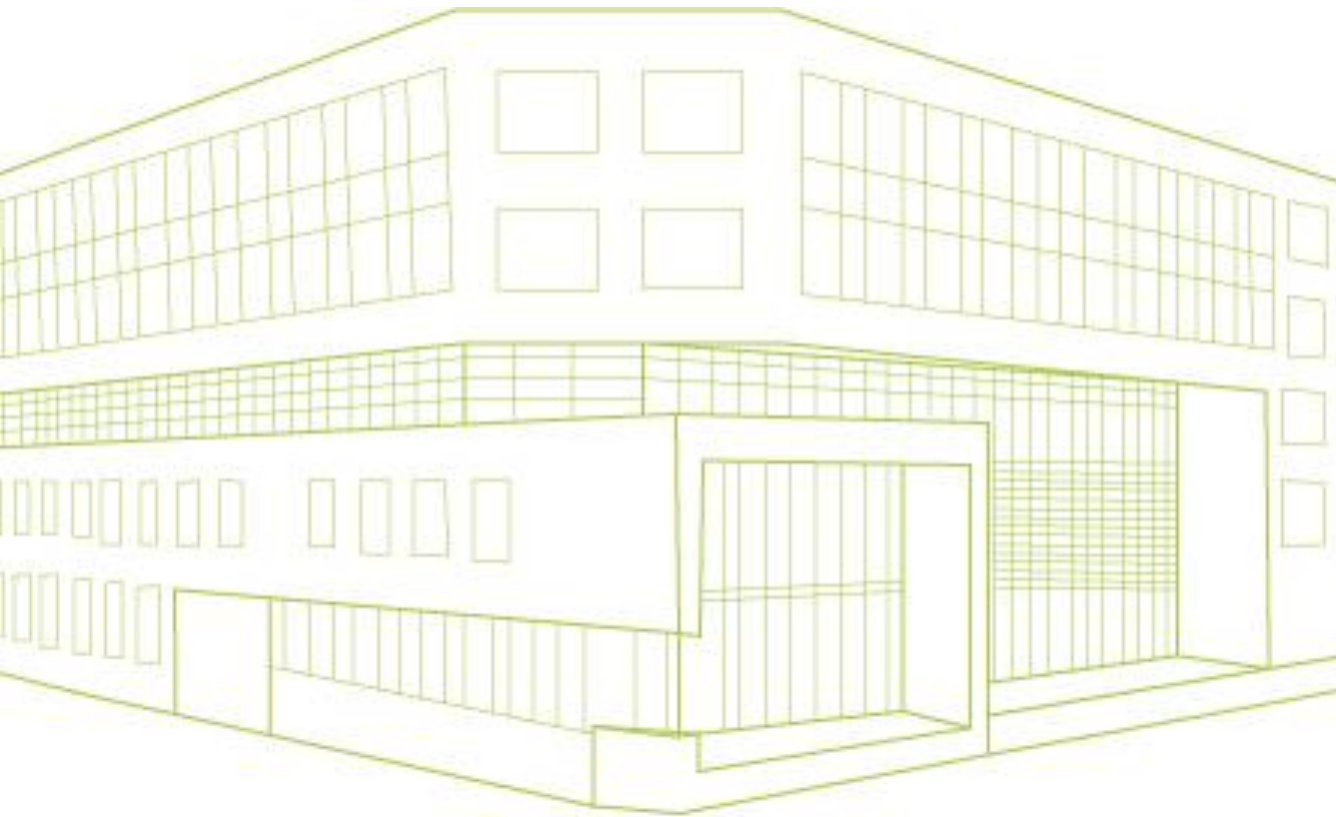


energydesign

Shanghai

Office for Sustainable Built Environment Engineering



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subsidiary company of
OSBEE GmbH
Office for Sustainable Built
Environment Engineering

Schloßstraße 84, 70176,
Stuttgart, Germany

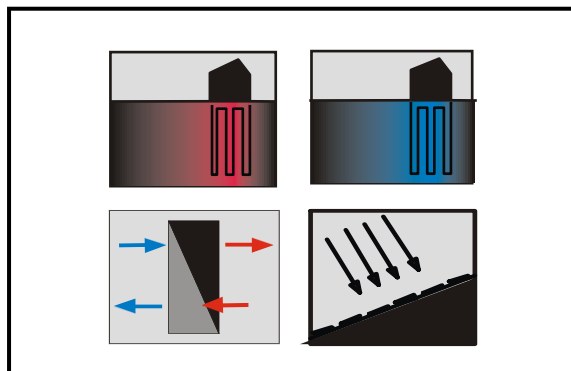
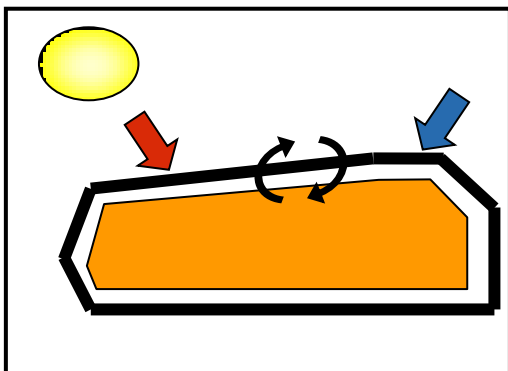
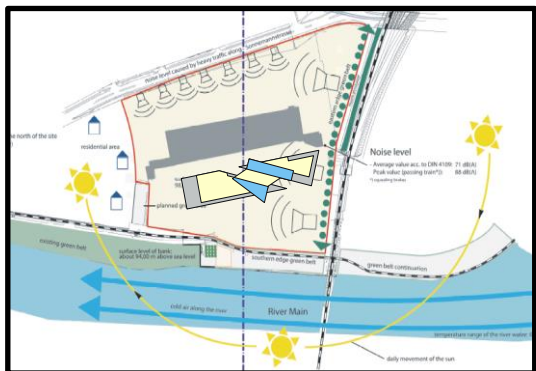
info@osbee.de

160412_Chongqing_Energy Management of Sustainable Buildings

low carbon 低碳 . high comfort 舒适 . optimal cost 经济 . certified quality 认证

通过整体设计实现价值

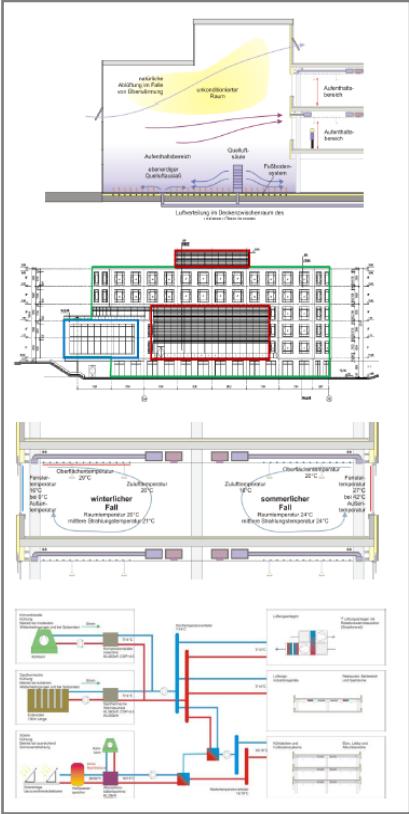
value through integration



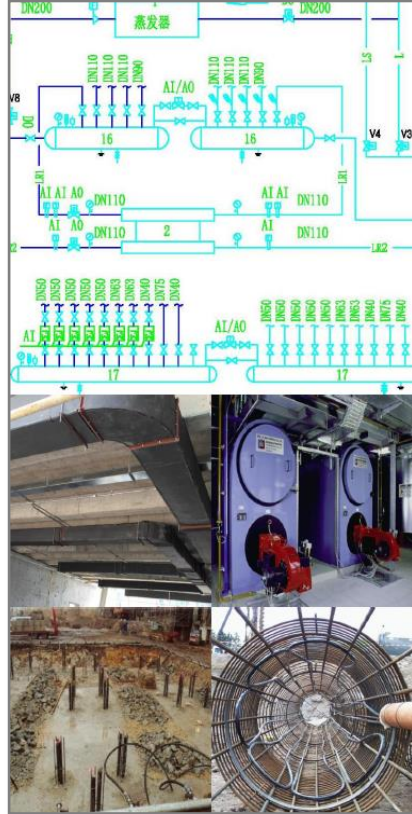
holistic energy design 整体能源设计

most economic solution for sustainable design
最经济的绿色设计方案

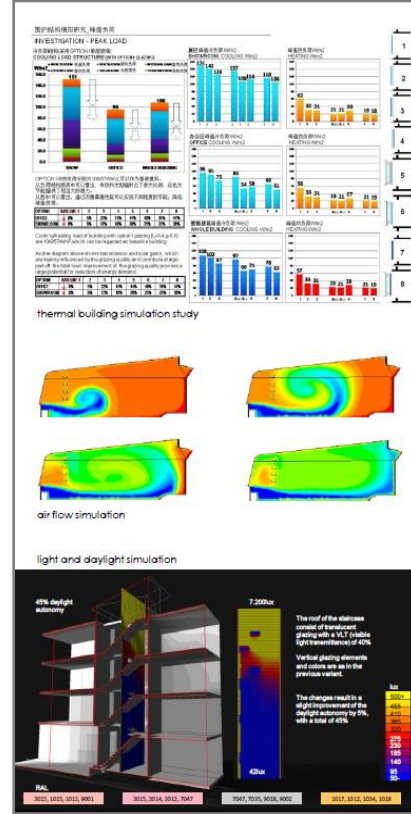
energydesign - services for holistically optimized buildings



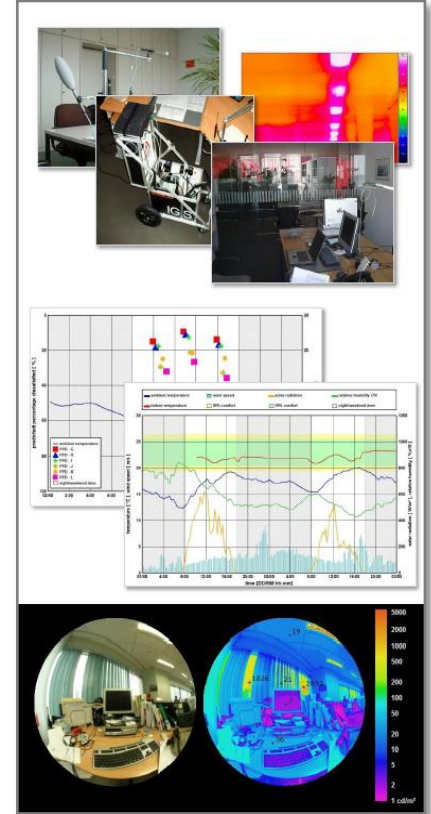
节能和可持续性方案 经济性设计的基础



设计服务
好的设计节约成本



计算机模拟研究 预先评估建筑



测试和验证

使用过程中的优化

设能建筑咨询 — 从整体上优化建筑

energydesign - services for holistically optimized buildings



LEED-NC
for New Construction and Major Renovation
适用于新建和重大改建工程

Sustainable Site	可持续场地
Prereq 1 Construction Activity Pollution Prevention	新建：施工过程污染防治
Credit 1 Site Selection	场址选择
Credit 2 Development Density & Community Connectivity	开发密度和社区连接
Credit 3 Brownfield Development	工业场地再开发
Credit 4 Alternative Transportation	替代交通方式
Credit 5 Site Development	场址开发
Credit 6 Stormwater Design	雨水设计
Credit 7 Heat Island Effect	热岛效应
Credit 8 Light Pollution Reduction	光污染控制
Water Efficiency	节水
Prereq 1 Water Use Reduction	节水策略
Credit 1 Water Efficient Landscaping	节水灌溉
Credit 5 Innovative Waste Water Technologies	创新废水处理技术
Credit 7 Water Use Reduction	节水
Energy & Atmosphere	能源与大气
Prereq 1 Fundamental Commissioning of the Building Energy Systems	新建：建筑能源系统的基础调试运行
Prereq 2 Minimum Energy Performance	新建：最低能源水平
Prereq 3 Fundamental Refrigerant Management	新建：基础制冷剂管理
Credit 1 Optimize Energy Performance	能效优化
Credit 2 On-Site Renewable Energy	现场可再生能源
Credit 3 Enhanced Commissioning	加强调试运行
Credit 4 Enhanced Refrigerant Management	加强制冷剂管理
Credit 5 Measurement & Verification	测量与验证
Credit 6 Green Power	绿色电力
Material & Resources	材料与资源
Prereq 1 Storage & Collection of Recyclables	新建：回收物品存储和收集
Credit 1 Building Reuse	建筑再利用
Credit 2 Construction Waste Management	建筑垃圾管理
Credit 3 Material Reuse	材料再利用
Credit 4 Recycled Content	回收材料
Credit 5 Regional Materials	区域材料
Credit 6 Rapidly Renewable Materials	快速可再生材料
Credit 7 Certified Wood	认证木材
Indoor Environmental Quality	室内环境质量
Prereq 1 Minimum IAQ Performance	新建：最低室内空气质量
Prereq 2 Environmental Tobacco Smoke (ETS) Control	新建：环境烟草控制
Credit 1 Outdoor Air Delivery Monitoring	室外新风监测
Credit 2 Increased Ventilation	增加通风
Credit 3 Construction IAQ Management Plan	施工室内空气质量管理计划
Credit 4 Low-Emitting Materials	低排放材料
Credit 5 Indoor Chemical & Pollutant Source Control	室内化学品及污染源控制
Credit 6 Controllability of Systems	系统可控性
Credit 7 Thermal Comfort	热舒适
Credit 8 Daylight & Views	采光和视野
Innovation & Design Process	创新与设计过程
Credit 1 Innovation in Design	在设计中创新
Credit 2 LEED Accredited Professional	LEED认证专家

Leadership in Environmental and Energy-Efficient Design (LEED)
the well-known rating scheme

能源与环境设计先锋 (LEED)
著名的评估体系



DGNB

ecological quality 生态质量	economic quality 经济质量	sociocultural and functional quality 社会文化及建筑环境质量
technical quality 技术质量		
process quality 过程质量		
site quality 场地质量		

ecological quality	生态质量
global warming potential	全球变暖潜能值 (GWP)
ozone depletion potential	臭氧消耗潜能值 (ODP)
photochemical ozone creation potential	光化学臭氧生成潜能值 (POCP)
acidification potential	酸化潜能值 (AP)
eutrophication potential	富营养化潜能值 (EP)
risk to the local environment	本地环境风险
sustainable use of resources	资源的可持续利用
micro climate	微气候
renewable primary energy demand	一次能源需求
drinking water demand and volume of waste water	饮用水需求和废水体积
noise	噪音
economic quality	经济质量
building lifecycle cost	建筑生命周期成本
healthiness for construction	施工健康性
thermal comfort in winter	冬季热舒适
thermal comfort in summer	夏季热舒适
indoor humidity	室内湿度
acoustic comfort	声学舒适
visual comfort	视觉舒适
user control possibilities	用户控制可能性
quality of outdoor space	户外空间质量
safety and risk of hazardous incidents	危险事件的安全性和风险
hazardous accessibility	危险区域的可及性
space efficiency	空间效率
substituting for construction	替代施工
public access	公众访问
single compliance	单一合规性
assurance of design quality	设计质量保证
percent for each	每项百分比
sociocultural and functional quality	社会文化及建筑环境质量
fine protection	文物保护
noise, electromagnetic fields, etc.	噪音、电磁场等
quality of building envelope & heat and humidity control	建筑围护结构质量及热湿控制
ease of cleaning and maintenance	清洁和维护的便利性
ease of dismantling and recycling	拆卸和回收的便利性
technical quality	技术质量
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systematic initiation of operation	运营的系统性启动
process quality	过程质量
risk to the micro-environment	微环境风险
relationships in the micro-environment	微环境中的关系
image and state of site and neighborhood	场地和社区的形象和状态
access to transportation	交通可达性
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access to transportation	交通可达性
proximity to use-specific facilities	proximity to use-specific facilities
connection to public services (publicity)	与公共服务的连接
site quality	场地质量
fine protection	文物保护
noise, electromagnetic fields, etc.	噪音、电磁场等
quality of building envelope & heat and humidity control	建筑围护结构质量及热湿控制
ease of cleaning and maintenance	清洁和维护的便利性
ease of dismantling and recycling	拆卸和回收的便利性
technical quality	技术质量
quality of project preparation	项目准备质量
integral planning	整体规划
optimization and complexity of planning workflow	规划工作流程的优化和复杂性
evidence of sustainability aspects in call and for awarding of tenders	招标和投标过程中的可持续性证据
creation of conditions of optimal use and management	创造最佳使用和管理的条件
construction site/operation process	施工现场/运营过程
quality of companies involved/employment	参与公司的质量/就业
quality assurance for construction process	施工过程的质量保证
systematic initiation of operation	运营的系统性启动
process quality	过程质量
risk to the micro-environment	微环境风险
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risk to the micro-environment	

Who are we?

认识我们

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Institut für Gebäude-
und Solartechnik IGS
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Synavision
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renewable
energy applications

可再生能源利用

integral
energy concepts

整合的能源理念

building
physics

建筑物理

building
services

建筑配套



通过整体设计实现价值

EnergyPLUS active house

Building Management
System (BMS)
建筑管理系统



Photovoltaics
光伏

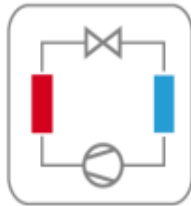
Lighting
照明 LED



Smart
Meter
智能电表



Heat pump
热泵



Battery-storage
电池蓄电

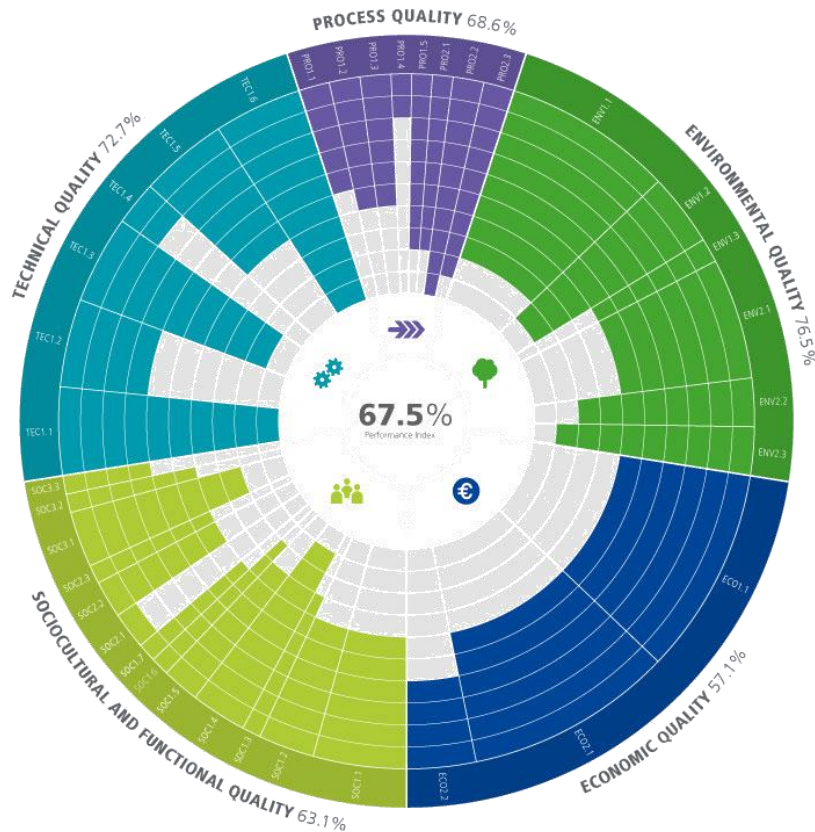


e-mobility
电动交通工具



Household appliances
家电设备





DGNB: a holistic system for practitioners of sustainable building in China

DGNB: 中国可持续建筑一体化体系的实践者

Joseph van der Elst

DGNB Auditor

energydesign (Shanghai) Co. Ltd.

设能建筑咨询(上海)有限公司

Yangpu District, Zhengyi Rd. 28, RM904

200433 Shanghai, China

杨浦区政益路28号五角丰达商务广场904室

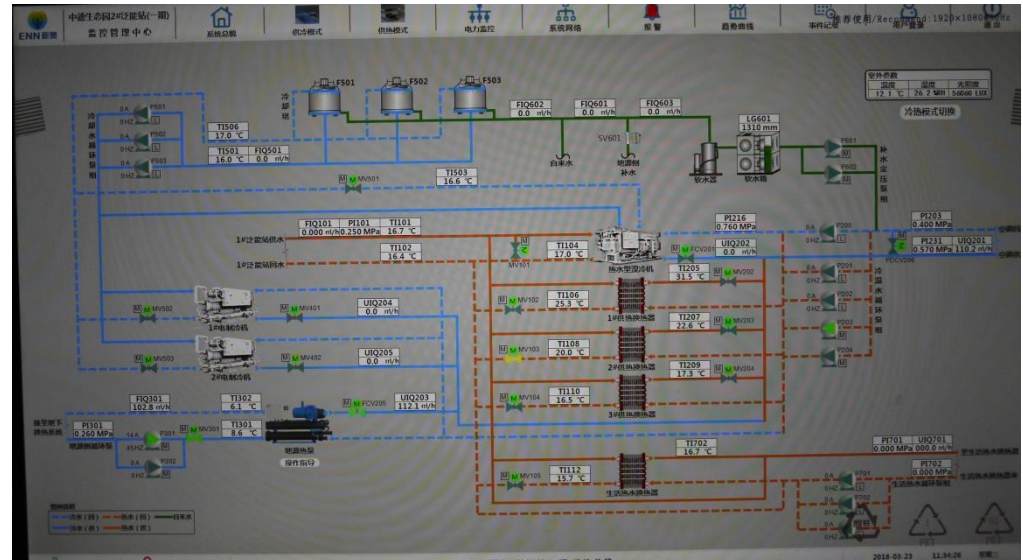
上海200433

joseph.vanderelst@energydesign-asia.com

Building Management System (BMS) Energy Management System (EMS)



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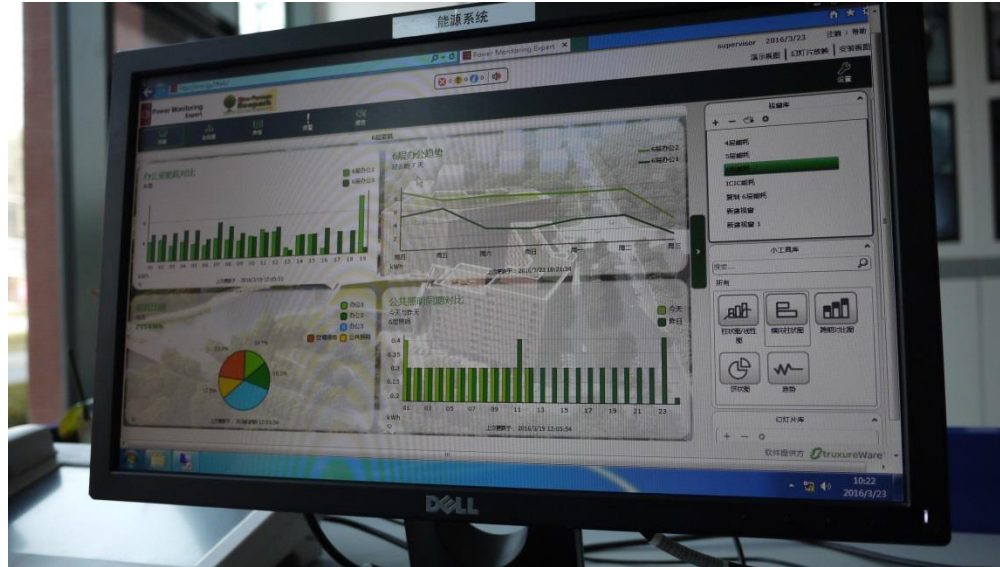


Energy Management System (EMS)

Not just an infrastructure...



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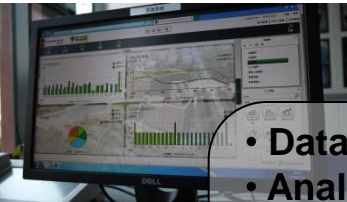


Energy Management System (EMS)

Not just an infrastructure...



- Set responsibilities through Top-Management
- Establish energy politics

- 
- Data collection
 - Analysis & documentation
 - Legal regulations
 - Energy targets
 - Energy management programs & action plan

Plan

- Implementation of measures
- Sensitising & training
- Communication (internal&external)
- Documentation
- Operational control

Do

Continuous Improvement

- Check through management (Management-Review)
- Improvement measures

Act

- Monitoring & measurements
- Compliance with legal regulations
- Nonconformity, correction & preventive measures
- Planning & structuring of documentation
- Internal audits

Check

PDCA-Cycle according to DIN EN ISO 50001

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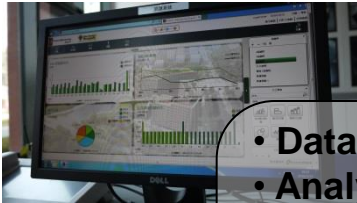
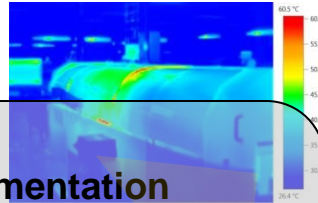
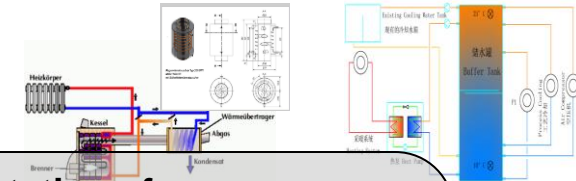
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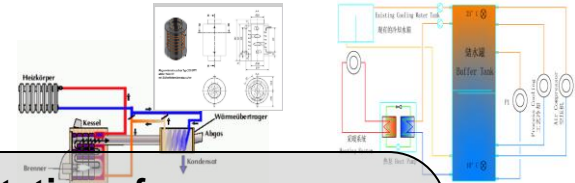
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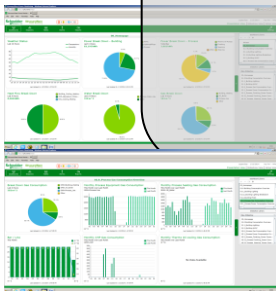
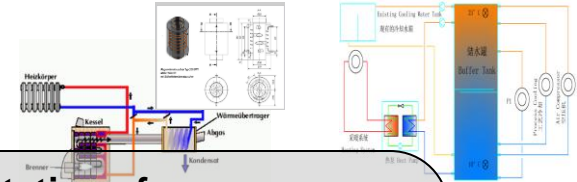
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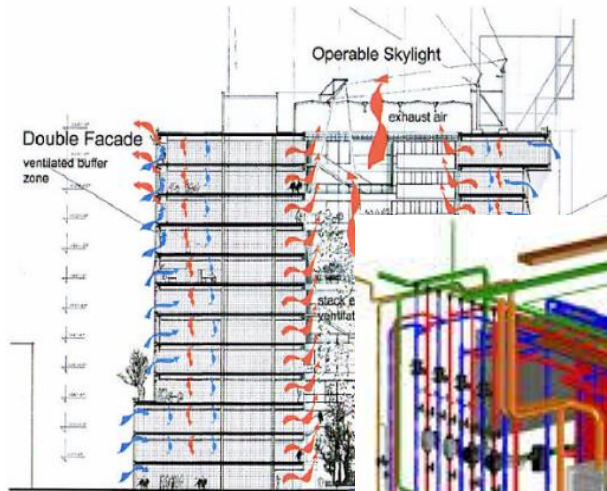


Energy management of sustainable buildings : Building Performance Check – Digital diagnosis of building operation

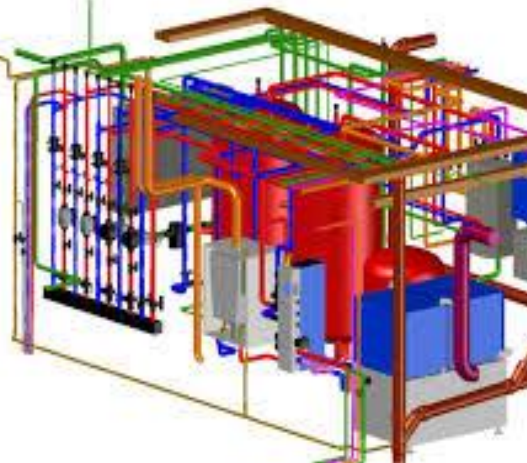


synavision GmbH, Germany
www.synavision.de

How performance gets lost: Complexity in projects



Energy Design: Conceptual Ideas



3D-Planing: complexity explodes

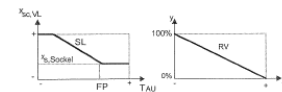
Textual(!) explanation of how it should
work

Building Management: What was the design
idea?

5.2 Funktion

Dem Heizungsverteiler im Altbau wird die Wärme aus dem Fernwärmenetz über einen Wärmeübertrager zur Verfügung gestellt. Die Vorlauftemperaturen auf dem Verteiler betragen im Auslegungsfall zwischen 75°C und 80°C. Die Wärmeversorgung des Neubaus wird von diesem Verteiler mit einer Zubringerpumpe, ohne Regelventil abgenommen. Die Pumpe wird im Schaltschrank Altbau angeschlossen.

Heizungsgruppen statische Heizung
Die Gebäudeseiten des Neubaus (Nord, Süd, West, Ost) und der Multifunktionsraum stellen je einen eigenen Regelkreis dar. Die Regelung erfolgt witterungsgeführt, jeweils über ein Dreiwegmischventil und eine Gruppenpumpe. Die Temperaturen im Auslegungsfall betragen 70°C Vorlauftemperatur und 55°C Rücklauftemperatur. Die Heizkurven können über die Sollwertparameter Sockeltemperatur (bei Stille) eingestellt werden.



Des Weiteren werden die Heizgruppen über Aussentemperaturgrenzwert Grenzwerte (einstellbar für Tag und Nachtbetrieb) unterschritten, so wird es und es wird automatisch der jeweilige Kreis der Betonkernaktivierung ge. Alle Gruppen erhalten eine Nachtabsenkung und eine Wochenendabsenkung. Die Schaltzeiten und die Heizprogramme mit den zugehörigen Parametern Ebene vom Betriebspersonal verändert werden. Für die statischen Heizkurve hinterlegt. Die Regelung der Heizkreise erfolgt in Abhängigkeit. Dem entsprechend wird die Vorlauftemperatur jedes einzelnen Heizkreises bedarf der einzelnen Gruppen ist dem Strangschemata zu entnehmen.

Die jeweilige Heizkreispumpe wird eingeschaltet, sobald das Regelventil Stellung länger als 300 s auf unter 3 % geht wird die Pumpe wieder aus eine Einschaltung für 30 s als Blockierschutzschaltung vorgesehen.

Die Zubringerpumpe dynamische Heizung ist ebenfalls im ISP 1 auf Anforderung aus dem ISP 2 Lüftung freigegeben.

Sämtliche Umwälzpumpen verfügen über einen periodischen Pumpenlauf.





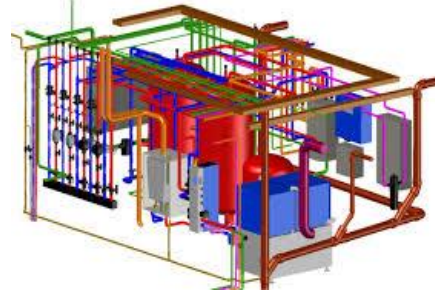
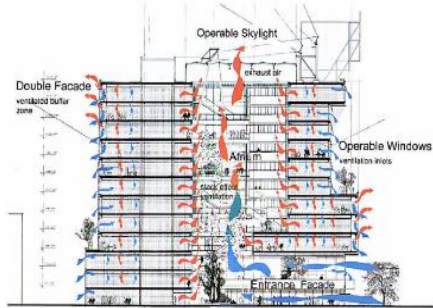
- >1,8 Mio. Commercial Buildings in Germany (1b sqm) 德国商业建筑超过180万 (10亿平方米)
- >10.000.000.000 € Annual Energy Cost 每年能量消费超过10,000,000,000 €
- **>1.000.000.000 €/year Energy Cost Wasted** 每年浪费的能源约**1,000,000,000 €**

due to a Lack of Quality in Operation of Building Services 造成浪费的原因在于建筑设备系统运行质量不过关

How we tackled the problem: Research Projects



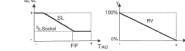
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5.2 Funktion

Dem Heizungsanforder im Abtau wird die Wärme aus dem Fernwärmenetz über einen Wärmedrucker zur Verfügung gestellt. Die Vorlauftemperaturen auf dem Verteiler betragen im Auslegungsfall zwischen 70°C und 90°C. Die Wärmenverteilung des Neubaus wird von diesem Verteiler mit einer Zubringerpumpe, ohne Regelventil abgenommen. Die Pumpe wird im Schaltstromkreis Abtau angesteuert.

Heizungsgruppen statische Heizung
Die Gebäudeteile des Neubaus (Nord, Süd, West, Ost) und der Multifunktionsraum stellen je einen eigenen Regelkreis dar. Die Regelung erfolgt wärmegeführt, zuerst über ein Dringegrundventil und eine Gruppenpumpe. Die Temperaturen im Auslegungsfall betragen 70°C Vorlauftemperatur und 65°C Rücklauftemperatur. Die Heizungen können über die Sollwertparameter Sockeltemperatur (bei 20°C AU-Temperatur) und Sollwert eingestellt werden.



Des Weiteren werden die Heizgruppen über Ausstemperaturgrenzwerte freigegeben. Werden die Grenzwerte (einstellbar für Tag- und Nachtbetrieb) unterschritten, so wird die Regelung freigegeben und es wird automatisch der jeweilige Vorsetzpunkt der Heiztemperaturerhöhung gesetzt. Alle Gruppen erhalten eine Heizabschaltung und eine Frostschutzabschaltung über ein Zubringersystem. Die Schaltzeiten und die Heizprogramme mit den zugehörigen Parametern können auf der GLT-Station von Betriebspersonal verändert werden. Für die statischen Heizgruppen wird je eine eigene Heizkurve festgelegt. Die Regelung der Heizkurve erfolgt in Abhängigkeit von der Außentemperatur. Dem entsprechend wird die Vorlauftemperatur je nach einzelnen Heizkreis geregelt. Der Wärmebedarf der einzelnen Gruppen ist dem Stützprogramm zu entnehmen.

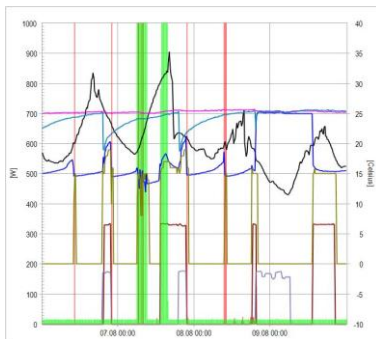
Die jeweilige Heizkreispumpe wird eingeschaltet, sobald das Regelventil über 5% öffnet. Wenn das Regelventil länger als 30 s auf unter 5% geht wird die Pumpe wieder ausgeschaltet. Es ist möglich eine Einschaltung für 30 s als Blockschuttschaltung vorgesehen.

Die Zubringerpumpe dynamische Heizung ist ebenfalls in ISIP 1.1 aufgelegt. Sie wird über eine Anforderung aus dem ISIP 1.1 Lösung freigegeben.

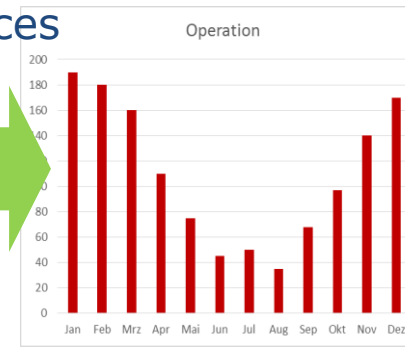
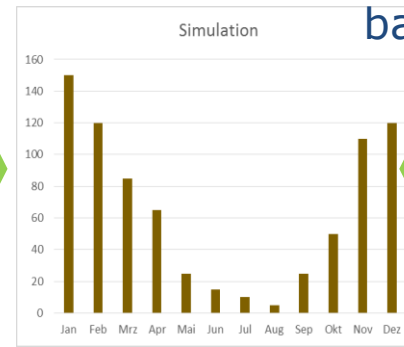
Sämtliche Umwälzpumpen verfügen über einen periodischen Pumpenlauf.



Building
Simulation



Comparison of energy
balances

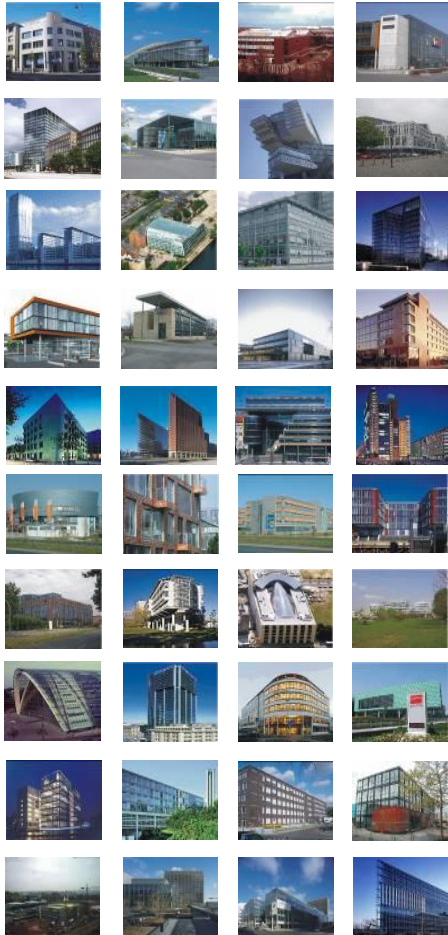


Metering devices



How we tackled the problem:

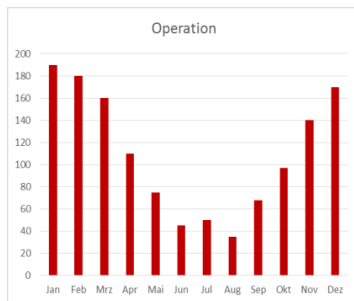
Research Projects



- Demo-buildings with in-depth analysis
- Field tests on
 - Office buildings, Schools etc.
 - Geothermal energy systems
 - Double skin facades
 - Chiller plants
 - Retrofits
 - ...
- More than 100 buildings tested!



- **Building Performance**
„as intended“ is possible
- **Quality deficits**
reduce performance by up to 30%
- Energy Monitoring is **not** the solution:
 - Too complex (experienced engineers)
 - Too slow (> 2 years)
 - Too imprecise (energy balance)
 - **Too expensive (250 T€)**

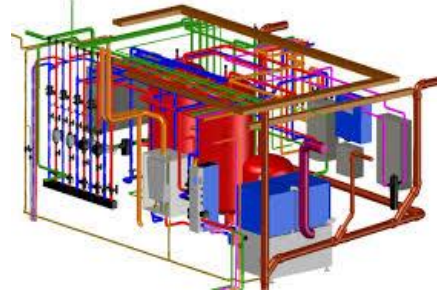




- How do we do monitoring for
- 10 buildings
- 100 buildings
- 1000 buildings
- ...?

synavision

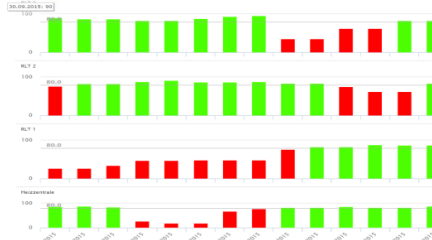
Office for Sustainable Built Environment Engineering



Sämtliche Umwälzpumpen verfügen über einen periodischen Pumpenlauf.



2. We analyze BMS data



	A	B	C	D	E	F	G	H
1		WEZ: 116R1	WEZ: 116R2	WEZ: 126R1	WEZ: 126R2	WEZ: 132R1	WEZ: 132R2	WEZ: 136
2								
3								
4		06.10.2015 00:00	72.28	71.49	72.76	71.41	71.96	71.54
5		06.10.2015 00:01	72.53	72.32	73.52	72.27	72.38	69.02
6		06.10.2015 00:02	72.53	72.84	74.35	72.39	73.39	66.88
7		06.10.2015 00:03	73.07	73.1	73.67	72.62	73.8	65.45
8		06.10.2015 00:04	73.26	72.99	73.18	72.75	74.11	64.8
9		06.10.2015 00:05	72.82	72.9	74.02	72.7	74.76	63.87
10		06.10.2015 00:06	72.39	73.06	73.37	71.89	75.49	61.62
11		06.10.2015 00:07	71.06	70.5	72.85	71.01	74.46	59.95
12		06.10.2015 00:08	69.24	67.17	72.37	70.11	72.87	59.79
13		06.10.2015 00:09	69.59	65.93	72.12	69.45	72.83	60.79
14		06.10.2015 00:10	71.85	66.26	71.74	69.16	74.42	63.49
15		06.10.2015 00:11	72.73	66.92	71.68	69.05	75.53	61.9
16		06.10.2015 00:12	70.75	66.81	71.53	69	75.53	61.63
17		06.10.2015 00:13	67.76	66.2	71.32	68.79	74.12	61.68
18		06.10.2015 00:14	66.18	65.83	71.05	68.62	72.35	62.21
19		06.10.2015 00:15	64.92	65.4	70.58	68.75	69.99	62.82
20		06.10.2015 00:16	64.32	65.1	69.89	68.53	69.55	63.04
21		06.10.2015 00:17	65.82	65.27	68.58	67.62	69.65	62.96

Key advantages of synavision performance checks



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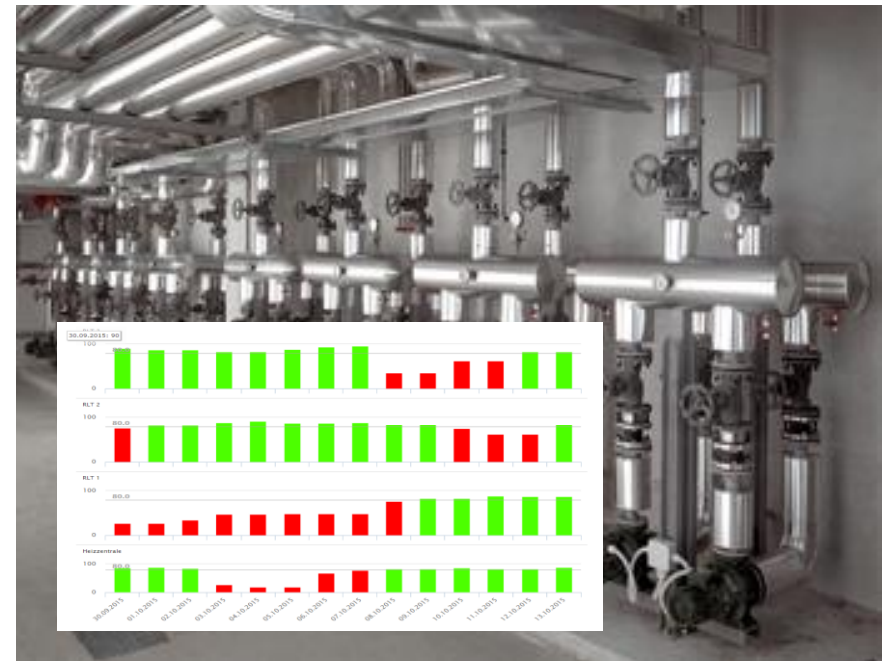


- Detailed transparency of building performance
- Automated analysis of data
- Quick reporting
- High cost effectiveness ($ROI < 1a$)
- No investment in infrastructure
- No onsite visits
- No long running contracts

Get the power of synavision digital diagnostics!



We have diagnostics for cars ...
对车辆的诊断

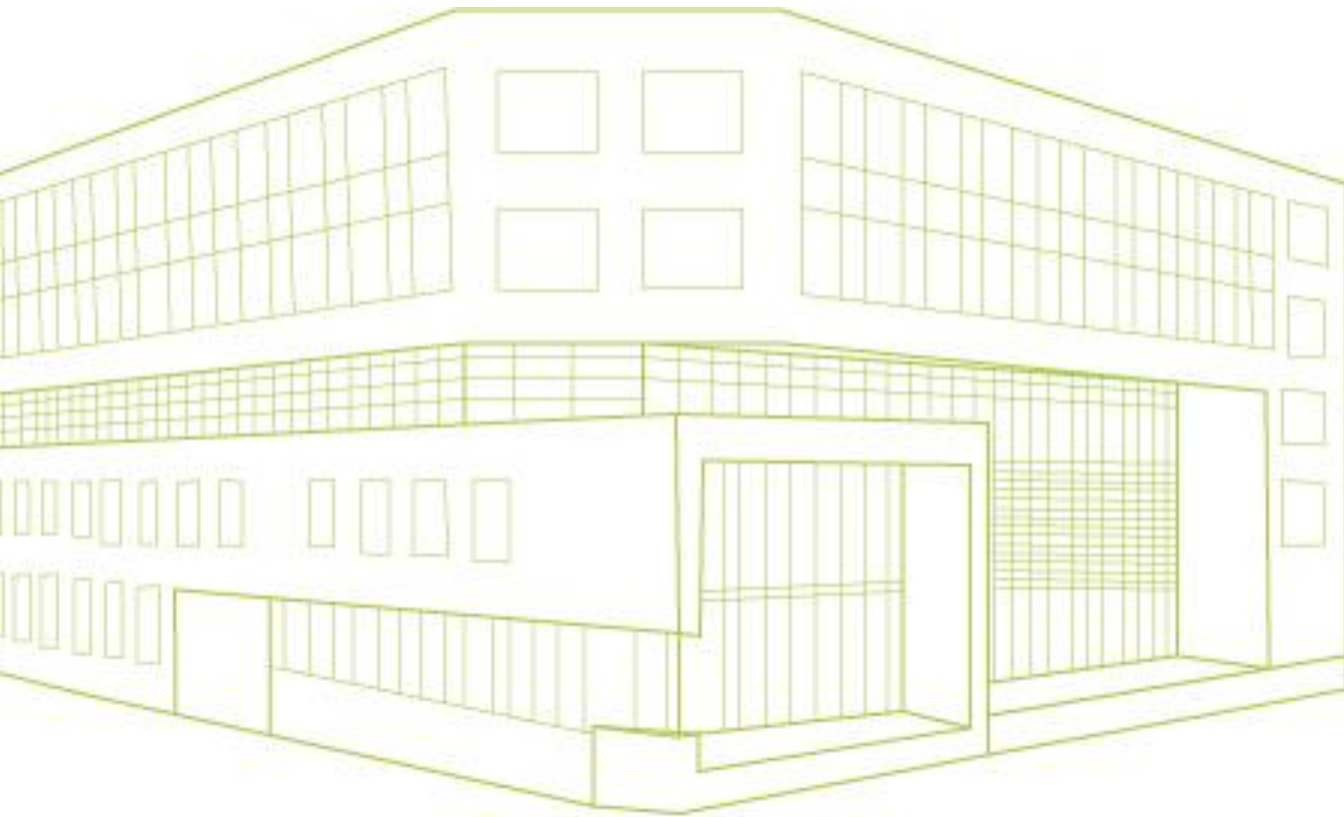


synavision brings diagnostics to buildings!
我们研发出电子诊断工具用于自动优化建筑的性能

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subsidiary company of
OSBEE GmbH
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Environment Engineering

Schloßstraße 84, 70176,
Stuttgart, Germany

info@osbee.de

全面设计更好的建筑 - *holistic concepts for better buildings*

low carbon 低碳 . high comfort 舒适 . optimal cost 经济 . certified quality 认证