Rakennusten energiatehokkuuden EPB-standardipaketti - mitä muuttuu, miten tästä eteenpäin?

Kimmo Konkarikoski

Sisältö

- **EPBD** - Energy Performance of Buildings Direktiivi
  - toinen uusinta vireillä 2018-2020
- Standardipaketti - uusittu 2012 - 2017
  - historia, periaatteet
  - numerot muuttuvat
- Paketin ja standardien kokonaisuus, rakenne standardien liittyminen toisiinsa
- Kenelle?

Rakennusten energiatehokkuusdirektiivi EPBD ja sen tueksi laadittu standardipaketti - historia

- Direktiivi julkaistu 2002
  -energiatehokkuusvaatimukset, energiatehokkuuden laskenta
  -energiatodistukset
  -lämmitys- ja ilmastointijärjestelmien säännölliset tarkastukset
- Yli 40 standardia laadittu 2004-2007
- Direktiivi uusittu 2008-2010
  -mm. enemmän huomiota olemassa oleviin rakennuksiin
- CENSE-hanke 2007-2010 –> standardien uusimistarve
- Standardipaketti II 2013-2016
- Direktiivin uusimistarveselvitys 2015-2016 -> uusiminen 2018-2019?

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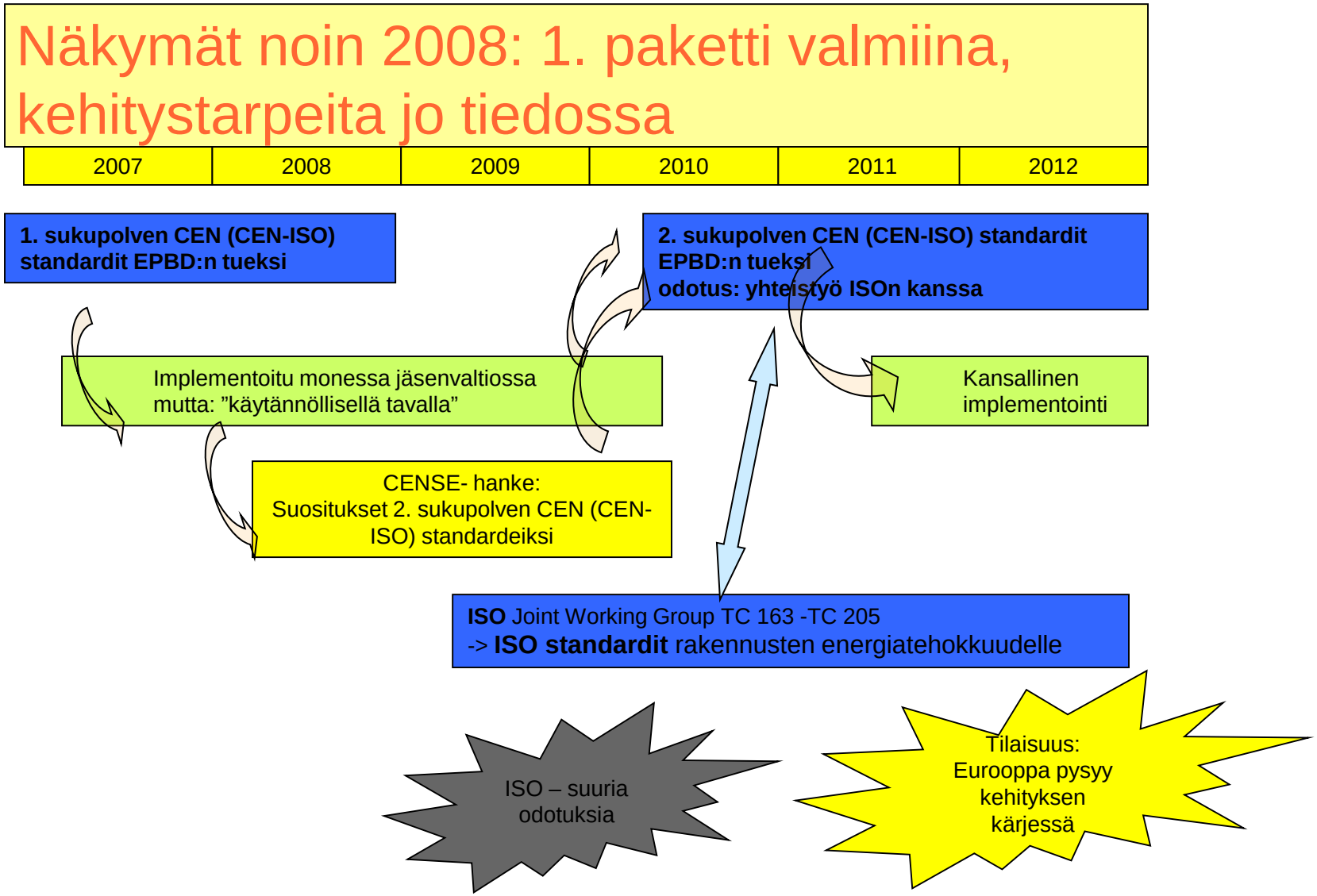
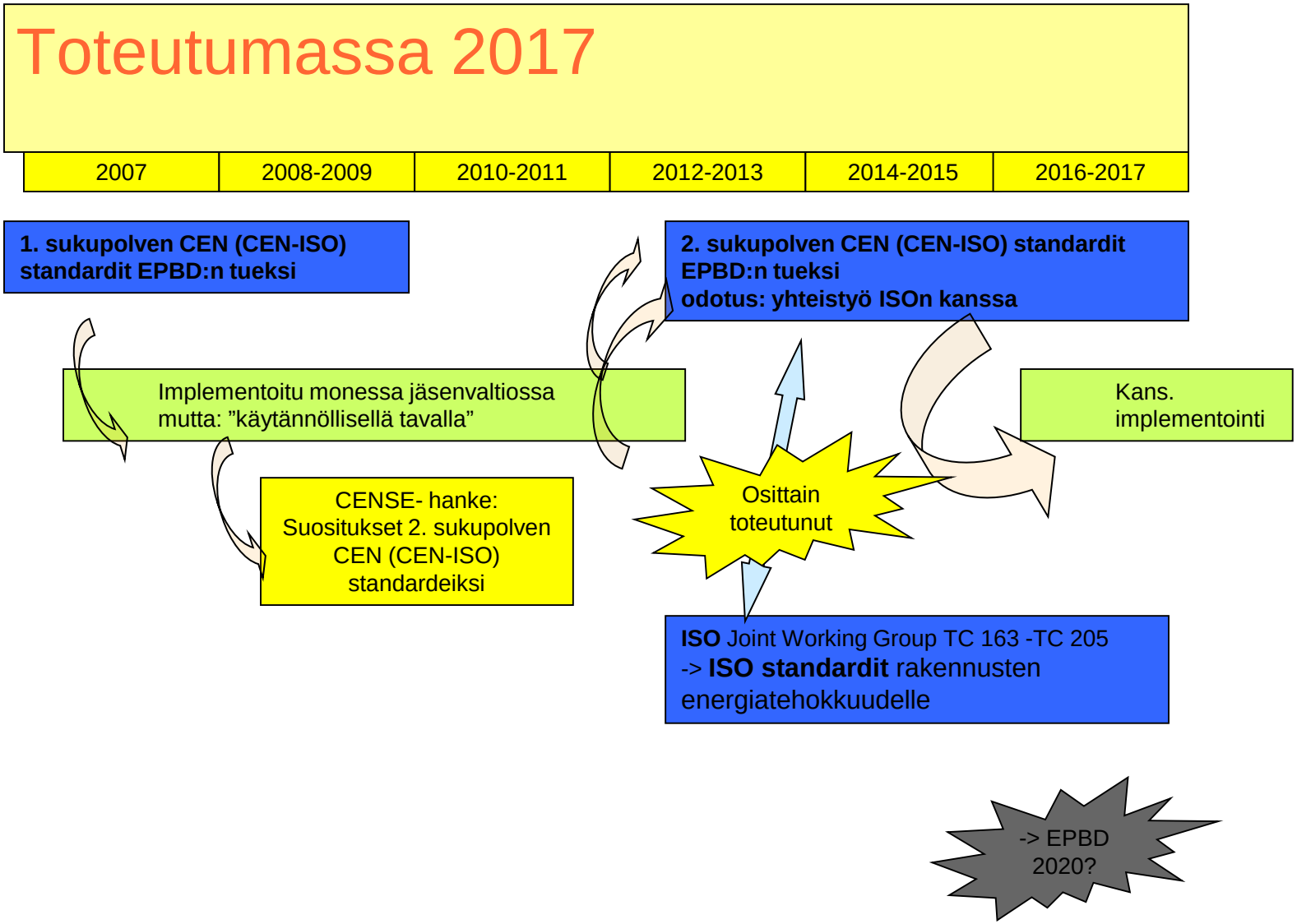
Näkymät noin 2008: 1. paketti valmiina, kehitystarpeita jo tiedossa



Toteutumassa 2017



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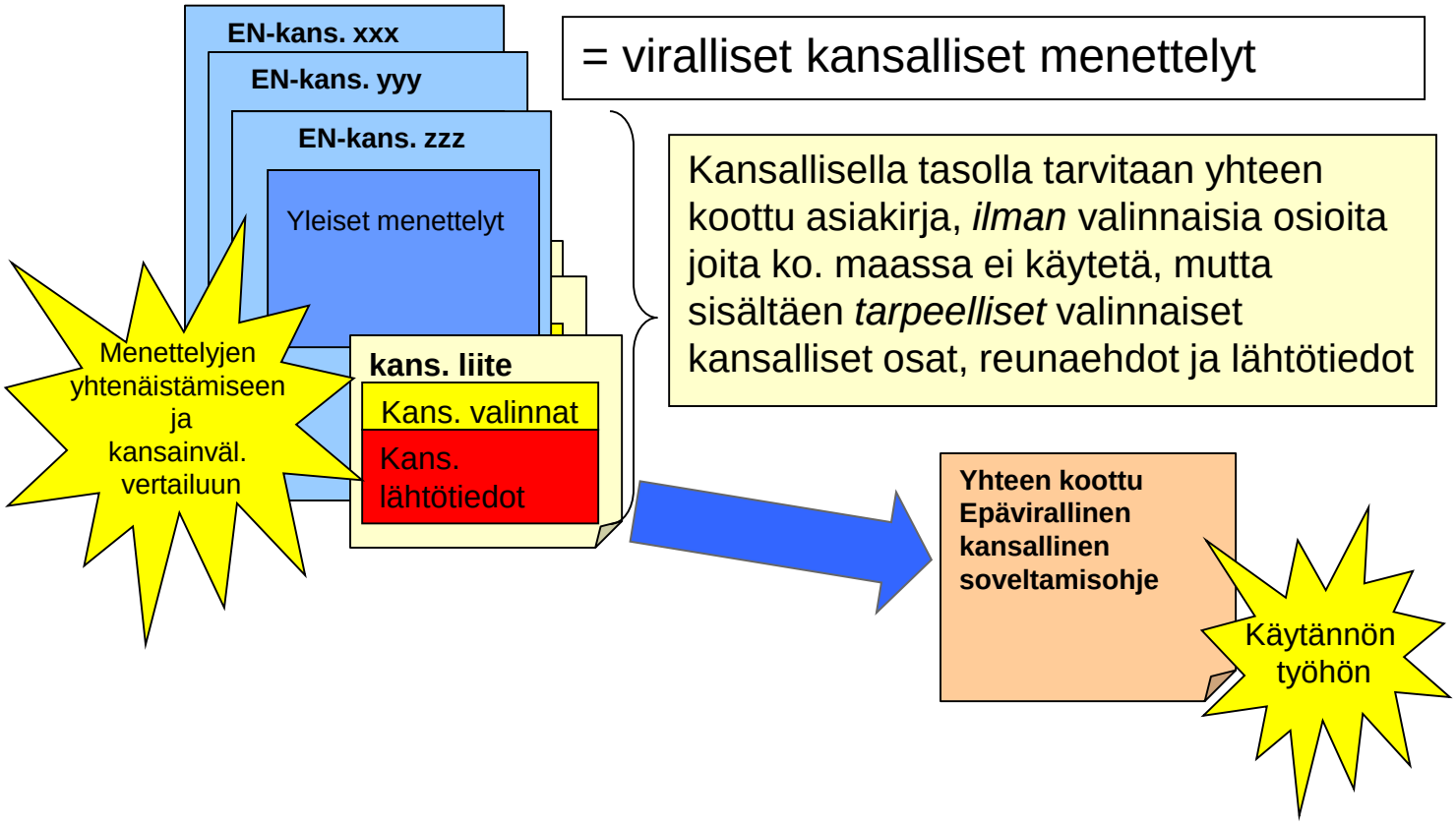
Suuntaviivoja 2. pakettiin – osittain toteutunutkin



1.ja 2. paketin erot

- Standardit 2007:
  -runsaat 40 EN-standardia ja noin 20 tukistandardia

- Standardit 2016:
  - Kaikki äänestyksessä - julkaisu 2017 kevät/kesä

    - **32 EN standardia + 31 TR (technical report)**
    - **17 EN ISO standardia + 7 TR (technical report)**

  - Lista ja tiedote EPBD- standardeista
    - http://www.metsta.fi/?we_objectID=34301
    - http://www.metsta.fi/www/fi/ajankohtaista/Uutisia/EPBD-standardit_2016_2.pdf

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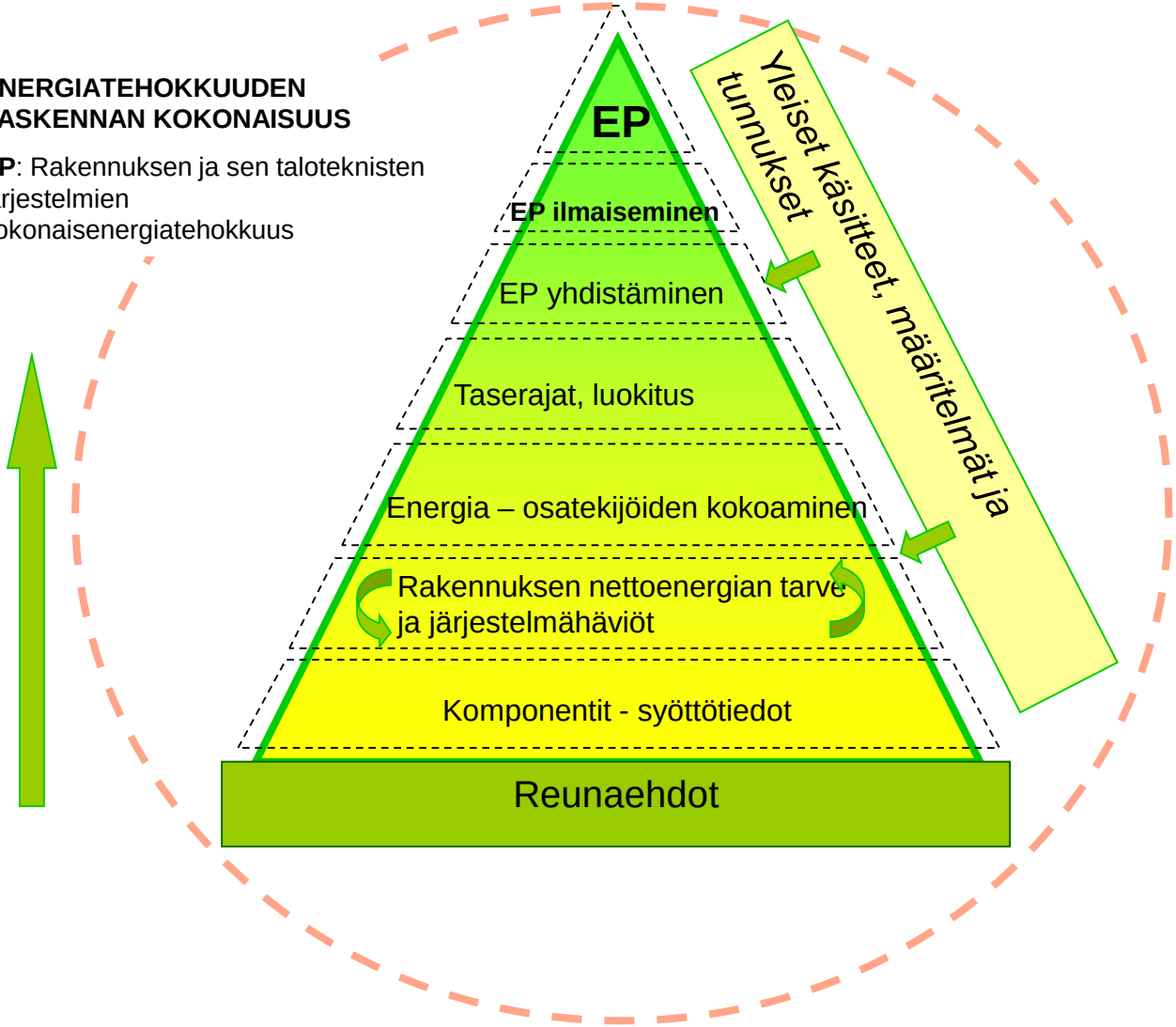
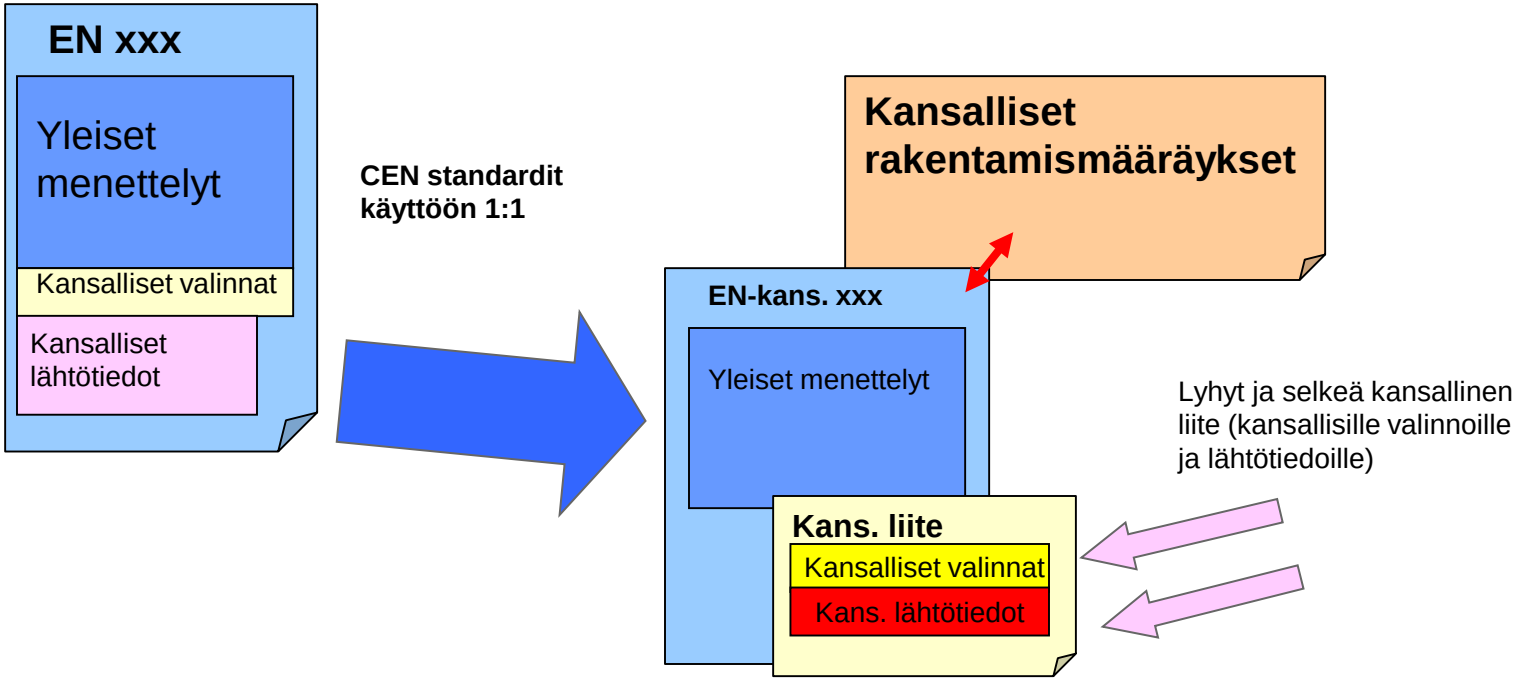
Standardien periaatteet ja rakenne
…sekä kokonaisuuden muodostuminen

ENERGIATEHOKKUUDEN LASKENNAN KOKONAISUUS

EP: Rakennuksen ja sen taloteknisten järjestelmien kokonaisenergiatehokkuus



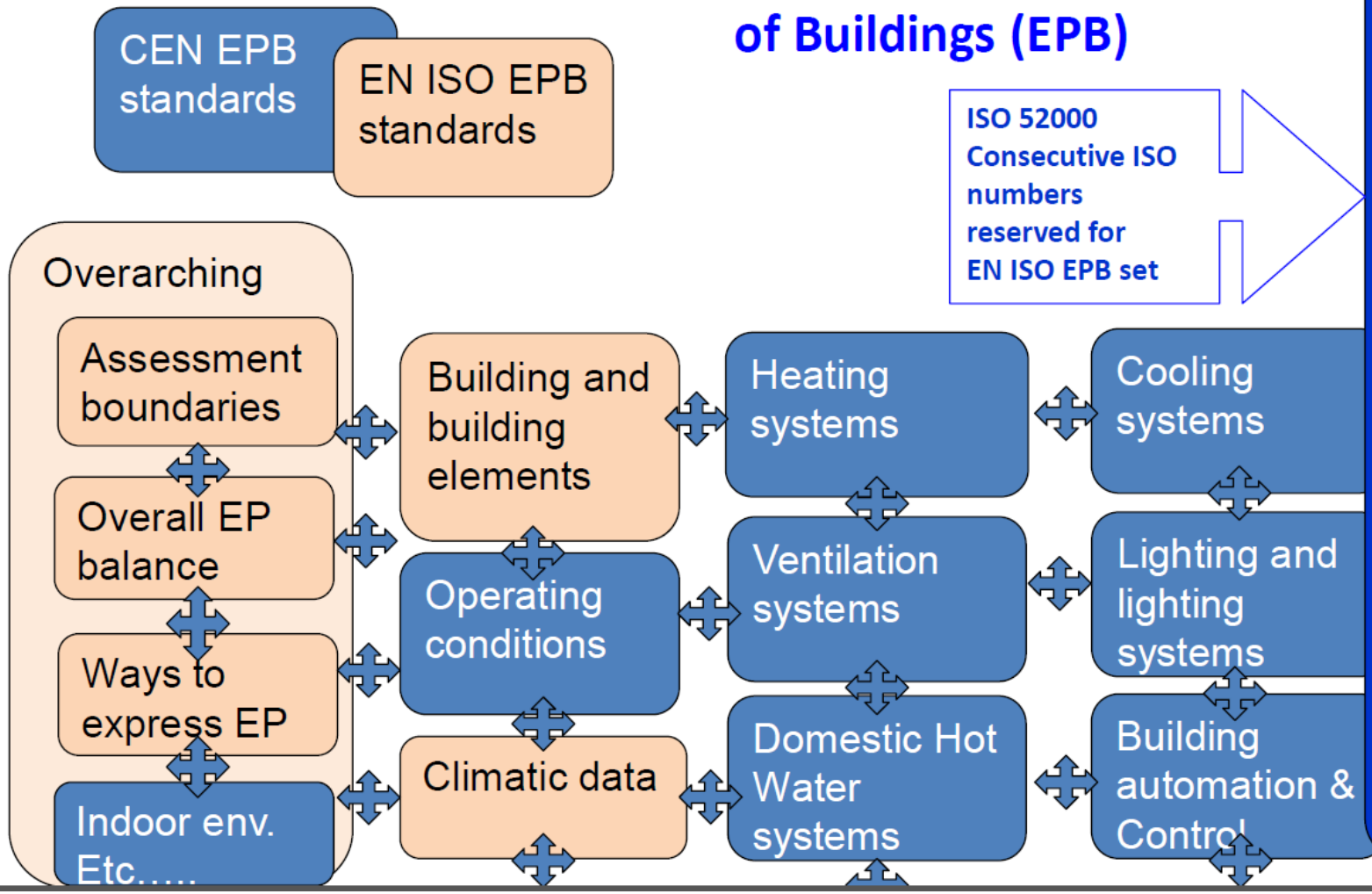
Suuntaviivoja 2. pakettiin…



Yleistä

- **Yleinen (over-arching)**
  - CEN/TC 371 Energy Performance of Buildings project group & ISO TC 163 Thermal performance and energy use in the built environment
- **Ilmastointi**
  - CEN/TC 156 Ventilation for buildings
- **Lämmitys**
  - CEN/TC 228 Heating systems and water based cooling systems for buildings
- **Rakennusautomaatio**
  - CEN/TC 247 Building automation, control and building management
- **Eristeet**
  - CEN/TC 089 Thermal performance of buildings and building components
- **Valaistus**
  - CEN/TC 169 Light and lighting systems

Global set of standards on Energy Performance of Buildings (EPB)



Slide 6

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		Overarching		Building (as such)		Technical Building Systems									
Submodule		Descriptions		Descriptions		Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot water	Lighting	Building automation & control	PV, wind, ..
sub1			M1		M2		M3	M4	M5	M6	M7	M8	M9	M10	M11
1		General	ISO 52000-1	General		General									
2		Common terms and definitions; symbols, units and subscripts	ISO 52000-1	Building Energy Needs		Needs								[a]	
3		Applications	ISO 52000-1	(Free) Indoor Conditions without Systems		Maximum Load and Power									
4		Ways to Express Energy Performance		Ways to Express Energy Performance		Ways to Express Energy Performanc e									
5		Building categories and Building Boundaries	ISO 52000-1	Heat Transfer by Transmission		Emission & control									
6		Building Occupancy and Operating Conditions		Heat Transfer by Infiltration and Ventilation		Distribution & control									
7		Aggregation of Energy Services and Energy Carriers	ISO 52000-1	Internal Heat Gains		Storage & control									
8		Building zoning	ISO 52000-1	Solar Heat Gains		Generation & control									
9		Calculated Energy Performance	ISO 52000-1	Building Dynamics (thermal mass)		Load dispatching and operating conditions									
10		Measured Energy Performance	ISO 52000-1	Measured Energy Performance		Measured Energy Performanc e									
11		Inspection		Inspection		Inspection									
12		Ways to Express Indoor Comfort				BMS									
13		External Environment Conditions													
14		Economic Calculation													

[a] The shaded modules are not applicable

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Ilmastointi - CEN TC 156

SFS - EN 16798-1	**SFS - EN 15251**	**Energy performance of buildings. Part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics. Module M1-6**	16798-2
SFS -EN 16798-3	SFS-EN 13779	Energy performance of buildings - Part 3: Ventilation for nonresidential buildings - Performance requirements for ventilation and room-conditioning systems; (revision of EN 13779)	16798-4
SFS-EN 16798-5-1	SFS-EN 15241	Energy performance of buildings - Part 5: Ventilation for buildings - Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8 - Calculation methods for energy requirements of ventilation and air conditioning systems; (revision of EN 15241) - method 1	16798-6
SFS-EN 16798-5-2	SFS-EN 15241	Energy performance of buildings - Part 5: Ventilation for buildings - Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8 - Calculation methods for energy requirements of ventilation and air conditioning systems; (revision of EN 15241) - method 2	16798-6
SFS-EN 16798-7	SFS-EN 15242	Energy performance of buildings - Part 7: Ventilation for buildings -Modules M5-1, M5-5, M5-6, M5-8 - Calculation methods for the determination of air flow rates in buildings including infiltration; (revision of EN 15242)	16798-8
SFS-EN 16798-9	SFS- EN 15243	Energy performance of buildings - Part 9 : Ventilation for buildings - Module M4-1 - Calculation methods for energy requirements of cooling systems - general	16798-10
SFS-EN 16798-13	SFS- EN 15243	Energy performance of buildings - Part 13 : Module M4-8 - Calculation of cooling systems - generation	16798-14
SFS-EN 16798-15		Energy performance of buildings - Part 15 : Module M4-7 - Calculation of cooling systems - storage – General	16798-16
SFS-EN 16798-17	SFS-EN 15239, SFS-EN 15240	Energy performance of buildings. Part 17: Ventilation for buildings . Guidelines for inspection of ventilation and air conditioning systems, Module M4-11, M5-11, M6-11, M7-11	16798-18

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Lämmitys - CEN TC 228

SFS - EN 12831-3	SFS - EN 15316-3-1	Energy performance of buildings. Method for calculation of the design heat load. Part 3: Domestic hot water systems heat load and characterisation of needs, Module M8-2, M8-3	12831-4
SFS - EN 15316-1	SFS - EN 15316-1	Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 1: General and Energy performance expression, Module M3-1, M3-4, M3-9, M8-1, M8-4	15316-6-1
SFS - EN 15316-2	**SFS - EN 15316-2-1**	**Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 2: Space emission systems (heating and cooling), Module M3-5, M4-5**	15316-6-2
SFS- EN 15316-3	SFS-EN 15316-2-3, SFS-EN 15316-3-2	Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 3: Space distribution systems (DHW, heating and cooling), Module M3-6, M4-6, M8-6	15316-6-3
SFS - EN 15316-4-1	SFS-EN 15316-3-3, SFS-EN 15316-4-1, SFS-EN 15316-4-7	Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 4-1: Space heating and DHW generation systems, combustion systems (boilers, biomass), Module M3-8-1, M8-8-1	15316-6-4
SFS - EN 15316-4-2	SFS-EN 15316-4-2	Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 4-2: Space heating generation systems, heat pump systems, Module M3-8-2, M8-8-2	15316-6-5
SFS - EN 15316-4-3	SFS-EN 15316-4-3, SFS-EN 15316-4-6	Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 4-3: Heat generation systems, thermal solar and photovoltaic systems, Module M3-8-3, M8-8-3, M11-8-3	15316-6-6

Lämmitys - CEN TC 228

SFS - EN 15316-4-4	SFS-EN 15316-4-4	Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 4-4: Heat generation systems, building-integrated cogeneration systems, Module M8-3-4, M8-8-4, M8-11-4	15316-6-7
SFS - EN 15316-4-5	SFS-EN 15316-4-5	Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 4-5: District heating and cooling, Module M3-8-5, M4-8-5, M8-8-5, M11-8-5	15316-6-8
SFS - EN 15316-4-8	SFS-EN 15316-4-8	Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 4-8: Space heating generation systems, air heating and overhead radiant heating systems, including stoves (local), Module M3-8-8	15316-6-9
SFS - EN 15316-5		Energy performance of buildings. Method for calculation of system energy requirements and system efficiencies. Part 5: Space heating and DHW storage systems (not cooling), M3-7, M8-7	15316-6-10
SFS - EN 15378-1	SFS-EN 15378	Energy performance of buildings. Heating systems and DHW in buildings. Part 1: Inspection of boilers, heating systems and DHW, Module M3-11, M8-11	15378-2
SFS - EN 15378-3		Energy performance of buildings. Heating and DHW systems in buildings. Part 3: Measured energy performance, Module M3-10, M8-10	15378-4
SFS - EN 15459-1	SFS-EN 15459	Energy performance of buildings. Heating systems and water based cooling systems in buildings. Part 1: Economic evaluation procedure for energy systems in buildings, Module M1-14	15459-2

Rakennusautomaatio - CEN TC 247

SFS - EN 12098-1	SFS-EN 12098-1	Energy Performance of Buildings. Controls for heating systems. Part 1: Control equipment for hot water heating systems. Modules M3-5, 6, 7, 8	12098-6
SFS - EN 12098-3	SFS-EN 12098-3	Energy Performance of Buildings. Controls for heating systems. Part 3: Control equipment for electrical heating systems. Modules M3-5,6,7,8	12098-7
SFS - EN 12098-5	SFS-EN 12098-5	Energy Performance of Buildings. Controls for heating systems. Part 5: Start-stop schedulers for heating systems. Modules M3-5,6,7,8	12098-8
SFS - EN 15232-1	SFS-EN 15232	Energy performance of buildings. Part 1: Impact of Building Automation, Controls and Building Management. Modules M10-4,5,6,7,8,9,10	15232-2
SFS - EN 15500-1	SFS-EN 15500	Energy Performance of Buildings. Control for heating, ventilating and air conditioning applications. Part 1: Electronic individual zone control equipment. Modules M3-5, M4-5, M5-5	15500-2
SFS - EN 16946-1		Energy Performance of Buildings. Inspection of Automation, Controls and Technical Building Management. Part 1: Module M10-11	16946-2
SFS - EN 16947-1		Energy Performance of Buildings. Building Management System. Part 1: Module M10-12	16947-2

Valaistus - CEN TC 169

SFS-EN 15193-1	SFS-EN 15193	Energy performance of buildings. Energy requirements for lighting. Part 1: Specifications, Module M9	15193-2

Yleiset - CEN TC 371 / ISO TC 163

SFS-EN ISO 52000-1	**SFS-EN 15603, ISO/TR 16344, ISO 16346**	**Energy performance of buildings -- Overarching EPB assessment -- Part 1: General framework and procedures**	**52000-2, CEN/TS 16628, CEN/TS 16629**
SFS-EN ISO 52003-1	SFS-EN 15217, ISO 16343	Energy performance of buildings -- Indicators, requirements, ratings and certificates -- Part 1: General aspects and application to the overall energy performance	52003-2
SFS-EN ISO 52010-1		Energy performance of buildings -- External climatic conditions -- Part 1: Conversion of climatic data for energy calculations	52010-2
SFS-EN ISO 52016-1	SFS-EN ISO 13790	Energy performance of buildings -- Energy needs for heating and cooling, internal temperatures and sensible and latent head loads -- Part 1: Calculation procedures	52016-2
SFS-EN ISO 52017-1	SFS-EN ISO 13791	Energy performance of buildings -- Sensible and latent heat loads and internal temperatures -- Part 1: Generic calculation procedures	52016-2
SFS-EN ISO 52018-1		Energy performance of buildings -- Indicators for partial EPB requirements related to thermal energy balance and fabric features -- Part 1: Overview of options	52018-2
SFS-EN ISO 52022-1	SFS-EN 13363-1	Energy performance of buildings -- Thermal, solar and daylight properties of building components and elements -- Part 1: Simplified calculation method of the solar and daylight characteristics for solar protection devices combined with glazing	52022-2
SFS-EN ISO 52022-3	SFS-EN 13363-2	Energy performance of buildings -- Thermal, solar and daylight properties of building components and elements -- Part 3: Detailed calculation method of the solar and daylight characteristics for solar protection devices combined with glazing	52022-2

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Eristeet - CEN TC 89 / ISO TC 163

SFS-EN ISO 6946	SFS-EN ISO 6946	Building components and building elements -- Thermal resistance and thermal transmittance -- Calculation methods	52019-2
SFS-EN ISO 10211	SFS-EN ISO 10211	Thermal bridges in building construction. Heat flows and surface temperatures. Detailed calculations	52019-2
SFS-EN ISO 13370	SFS-EN ISO 13370	Thermal performance of buildings. Heat transfer via the ground. Calculation methods	52019-2
SFS-EN ISO 13786	SFS-EN ISO 13786	Thermal performance of building components -- Dynamic thermal characteristics -- Calculation methods	52019-2
SFS-EN ISO 13789	SFS-EN ISO 13789	Thermal performance of buildings -- Transmission and ventilation heat transfer coefficients -- Calculation method	52019-2
SFS-EN ISO 14683	SFS-EN ISO 14683	Thermal bridges in building construction -- Linear thermal transmittance -- Simplified methods and default values	52019-2
SFS-EN ISO 10077-1	SFS-EN ISO 10077-1	Thermal performance of windows, doors and shutters -- Calculation of thermal transmittance -- Part 1: General	
SFS-EN ISO 10077-2	SFS-EN ISO 10077-2	Thermal performance of windows, doors and shutters -- Calculation of thermal transmittance -- Part 2: Numerical method for frames	
SFS-EN ISO 12631	SFS-EN ISO 12631	Thermal performance of curtain walling -- Calculation of thermal transmittance	

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Standardit – miksi ja kenelle

- Rakentamiseen liittyvät määräykset - *viranomaiset*
- Energiatodistukset ja järjestelmätarkastukset – *rakennusten omistajat ja käyttäjät, konsultit*
- Laskentamenetelmiä suunnitteluun – *suunnittelijat, tilaajat; ohjelmistojen kehittäjät*
- Uudistuotanto ja korjausrakentaminen - *toteutusosapuolet*
- Kuka arvioi rakennusten energiatehokkuutta?
- Kenelle on hyötyä energiatehokkaasta rakentamista?

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Lopuksi

Lisätietoa

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