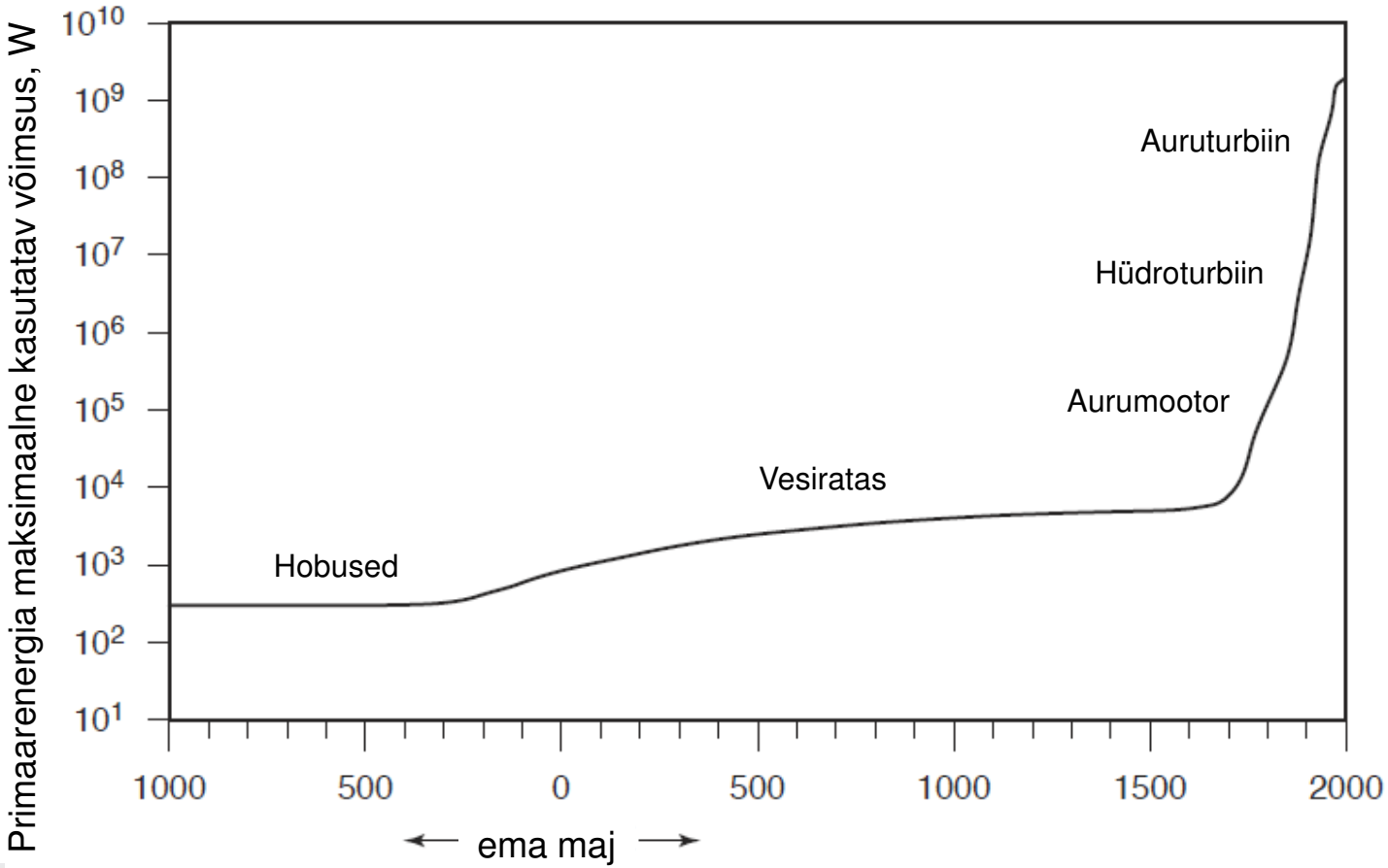
Tuleviku energeetika

Jaak Tuksam
TTÜ
Kuressaare 2015

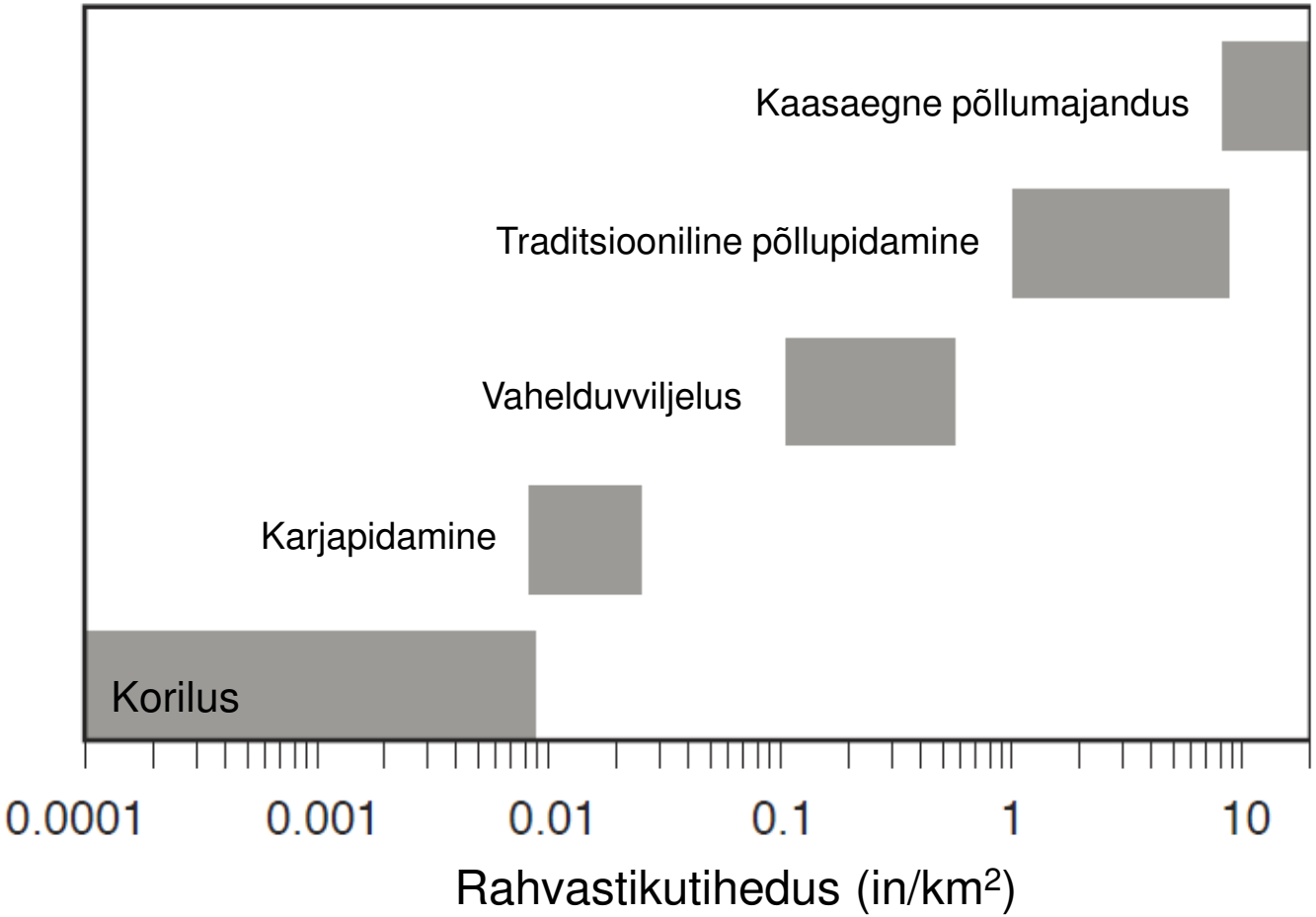
Ajalugu ja energeetika



Primaarenergia maksimaalne kasutatav võimsus

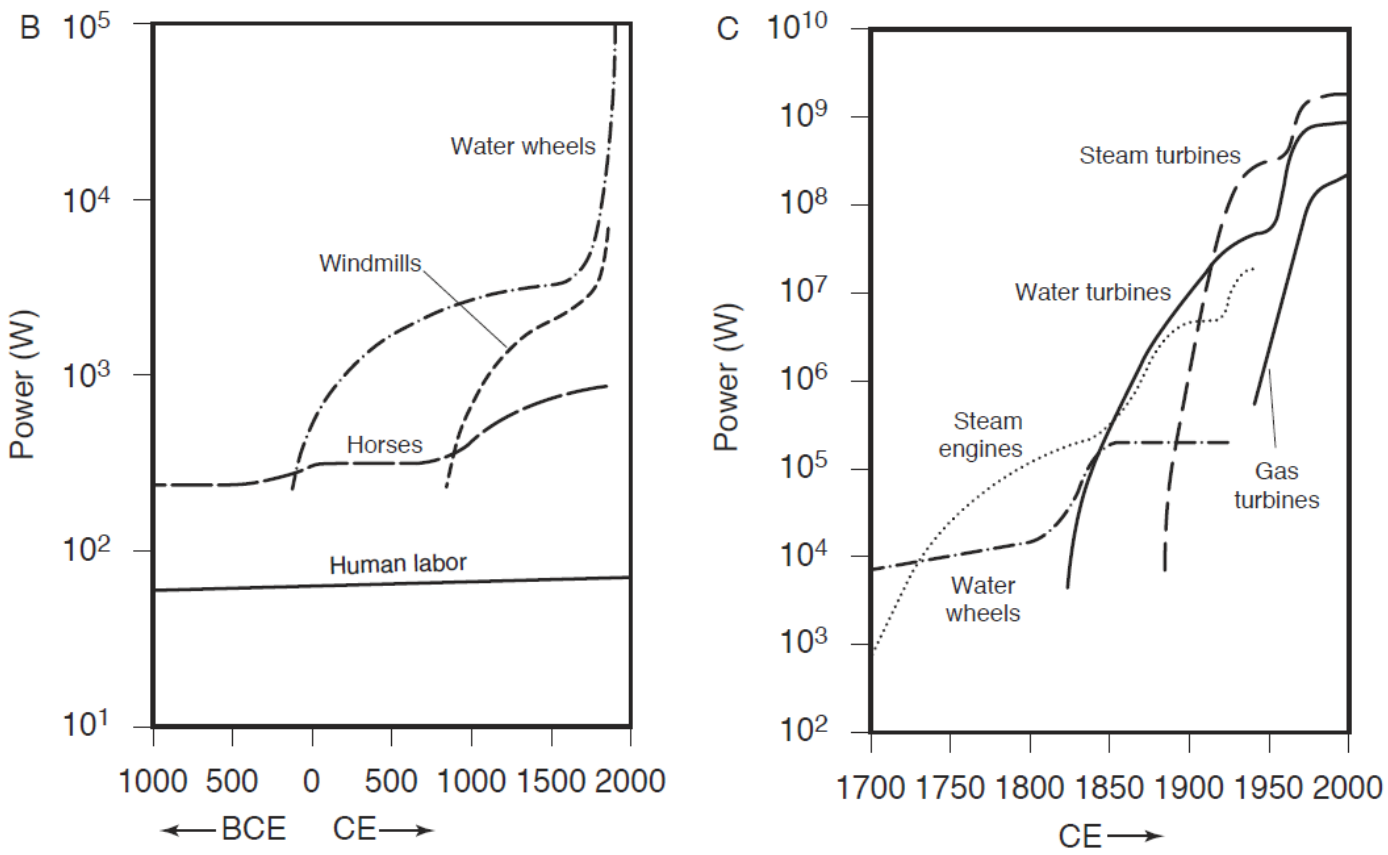
[Smil V. 2004]

Energiakasutuse efektiivsuse kasv



[Smil V. 2004]

Tehnoloogia areng



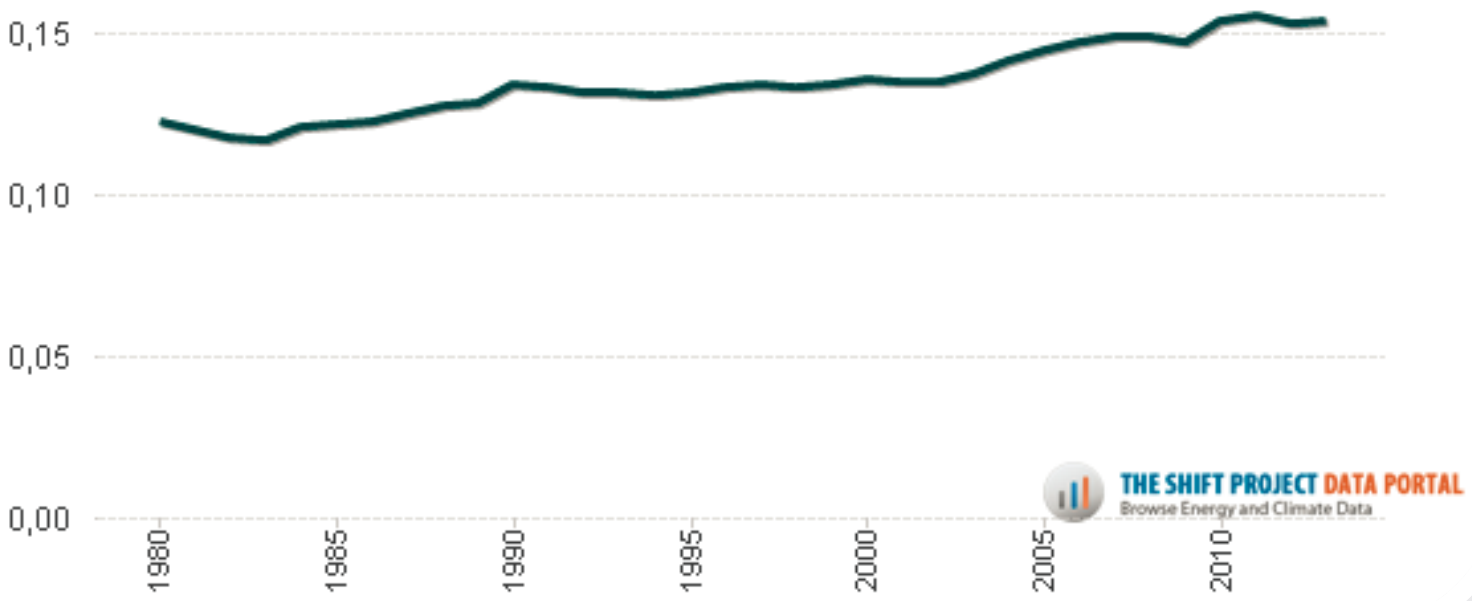
Primaarenergia maksimaalse kasutatavuse kasv üksuse kohta. [Smil V. 2004]

Ergeetika

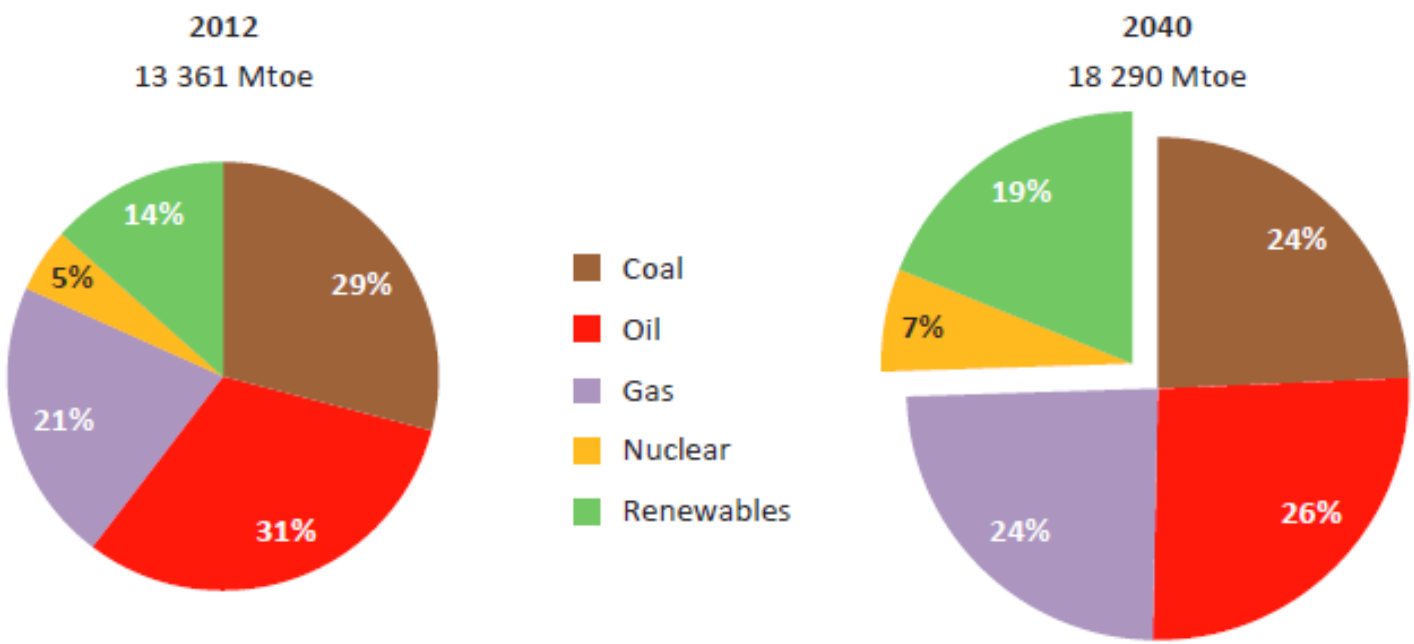
graptoliit *Rhabdinopora* sp.
TTÜ GI fotoarhiivist

http://topwalls.net/the-burning-sun/

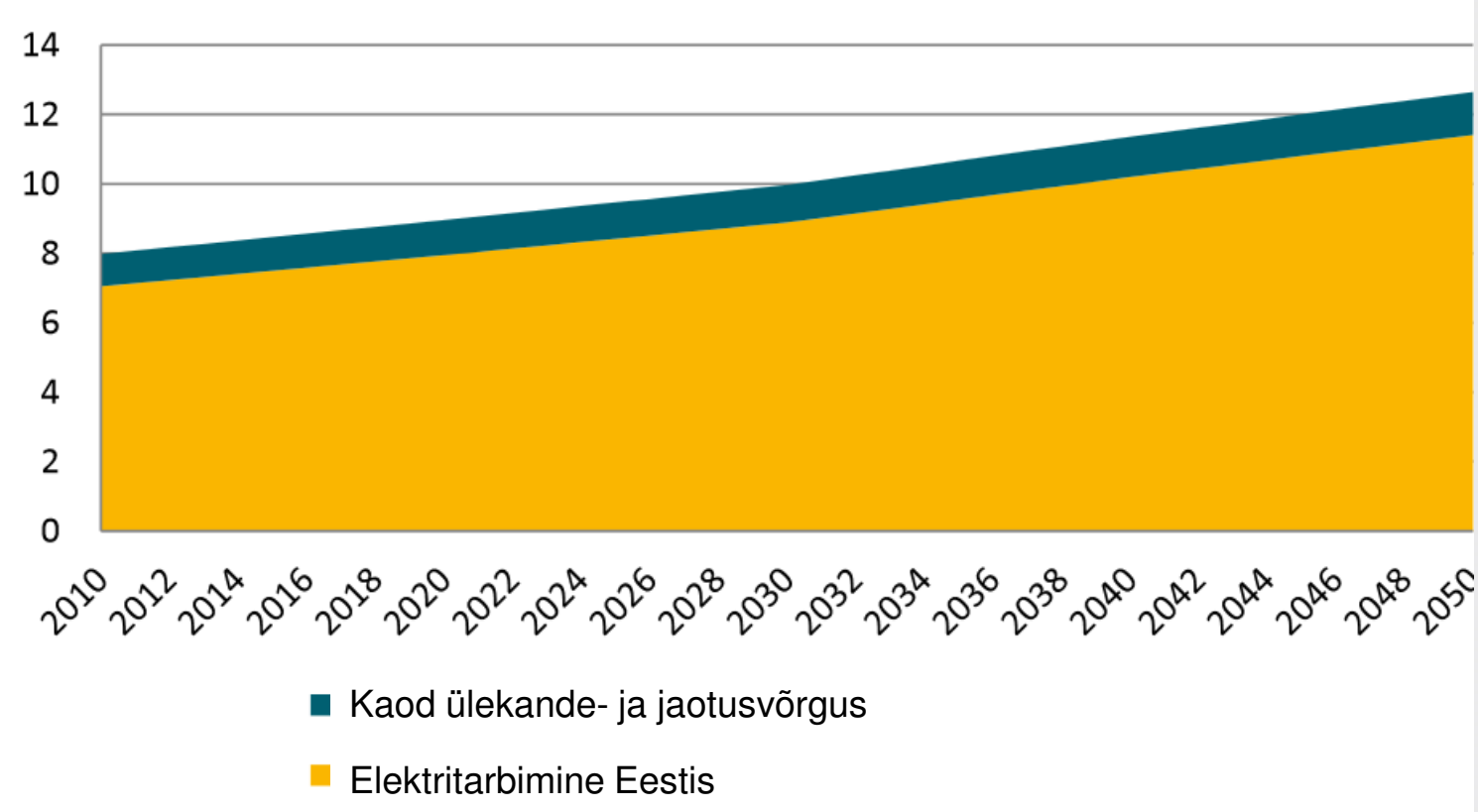
Maailma primaarenergia tarbimine Mtoe miljoni inimese kohta aastas



Tarbimise prognoos



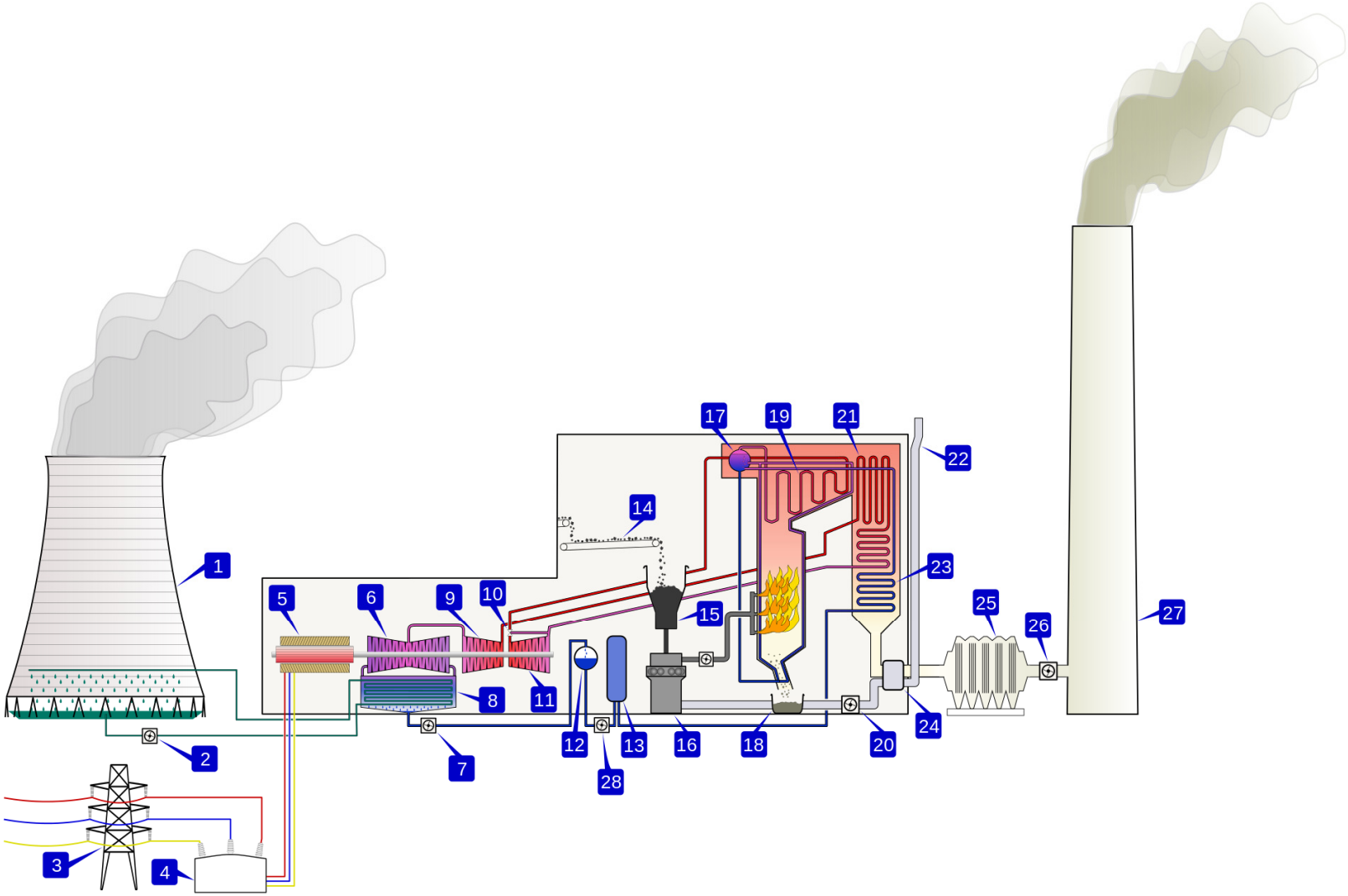
Eesti elektritarbimise prognoos



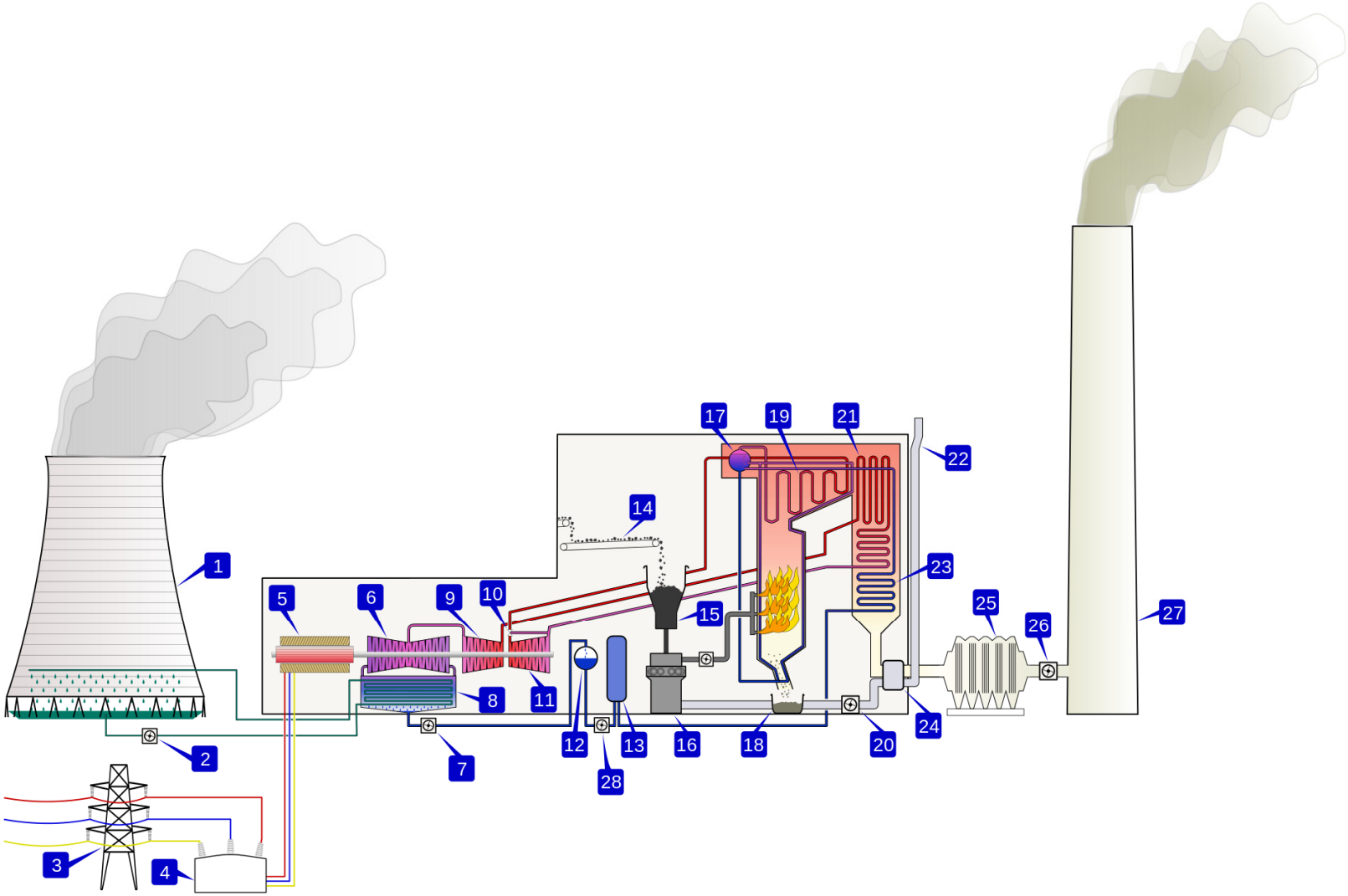
Energiatarbimine sektorite lõikes

	Energia lõpptarbimine	Kaod elektrisüsteemis	Energia kogutarbimine	Osakaal
Lõpptarbija				
Kaubandus	29	34	62	12%
Tööstus	200	66	266	51%
Kodumajapidamised	52	40	92	18%
Transport	101	2	103	20%
Kokku lõpptarbijad	382		524	
Elektrienergia	204			39%
Kaod elektrisüsteemis	142			

Tänane tehnoloogia



Homne tehnoloogia



Võimalikud auruturbiini käitajad - Tuumaenergia

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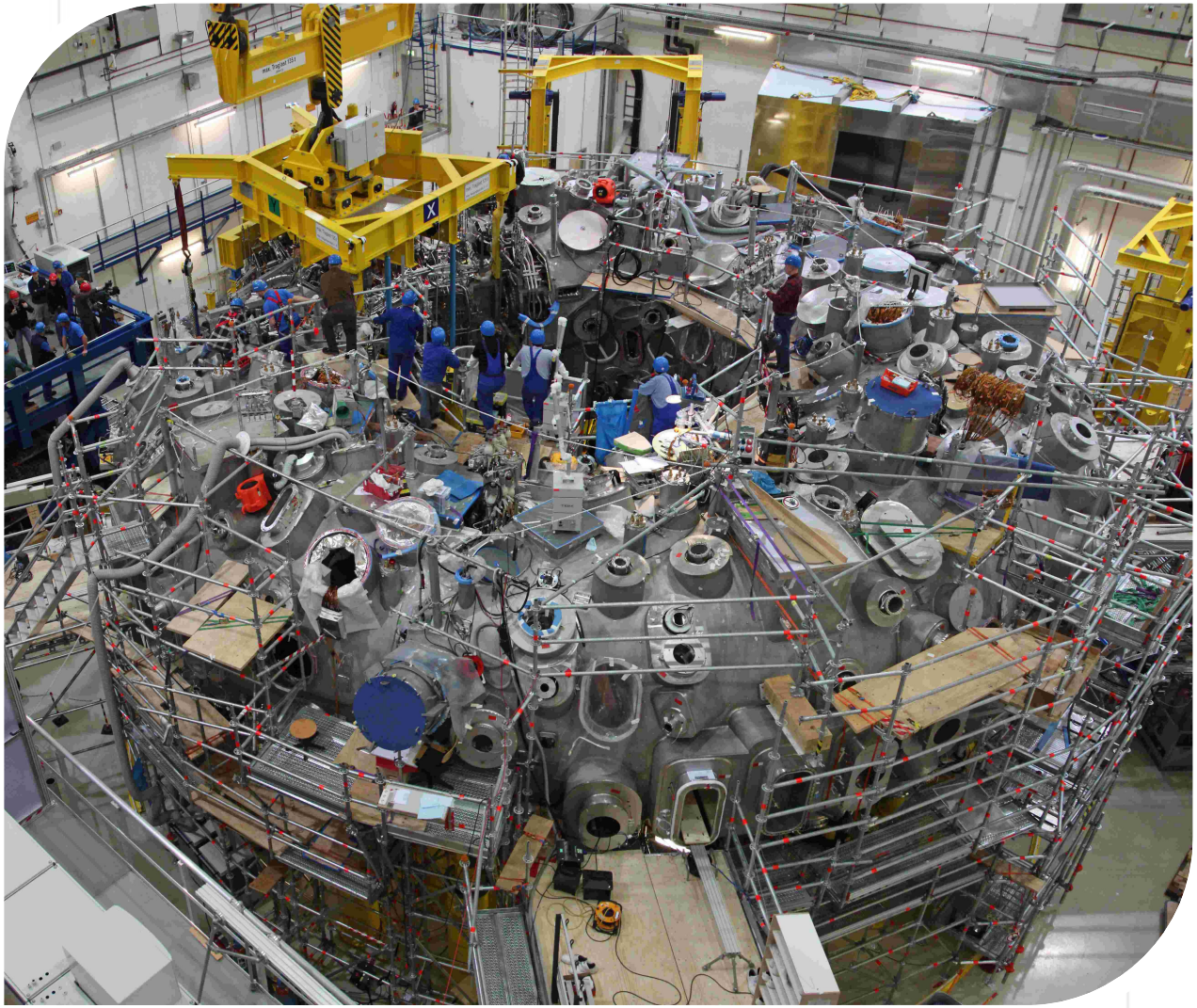
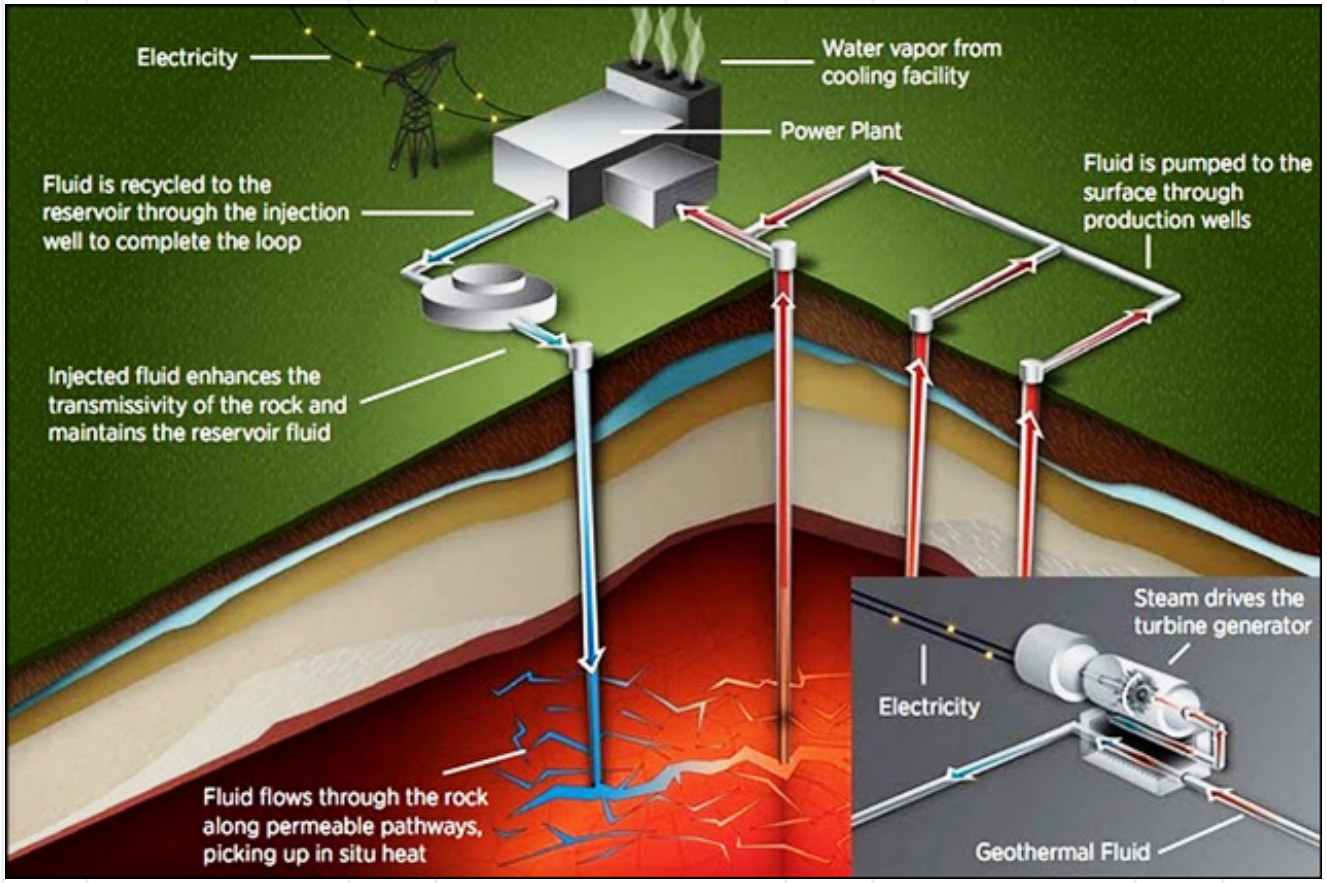
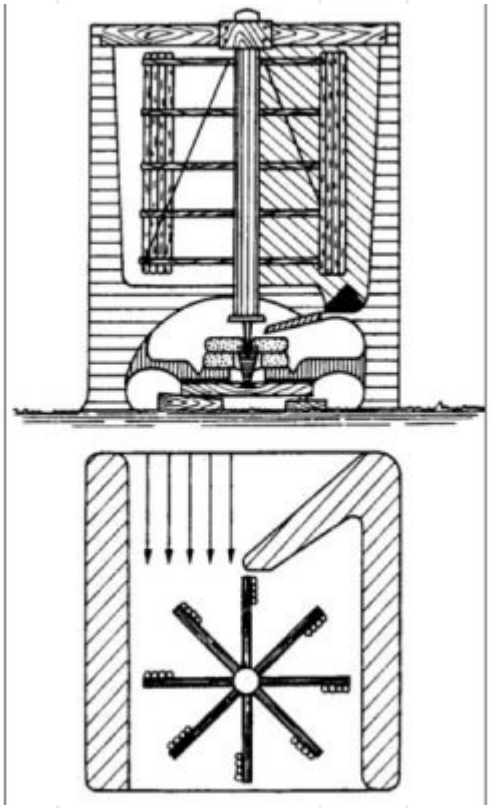


Võimalikud auruturbiini käitajad - geotermaal energia



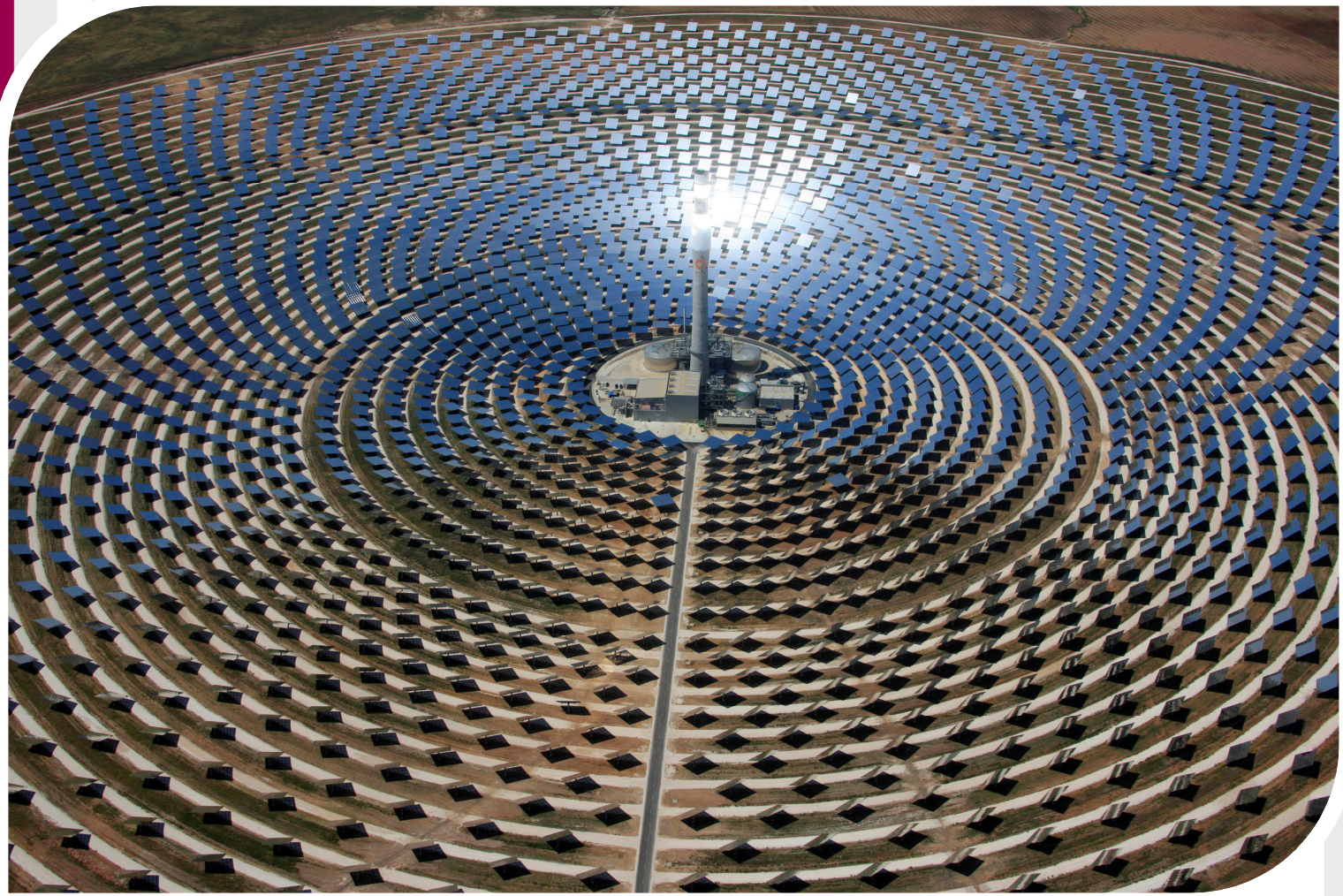
Tuuleenergia

$$P_{Wind} = \frac{1}{2} * \rho * \pi * R^2 * v^3$$



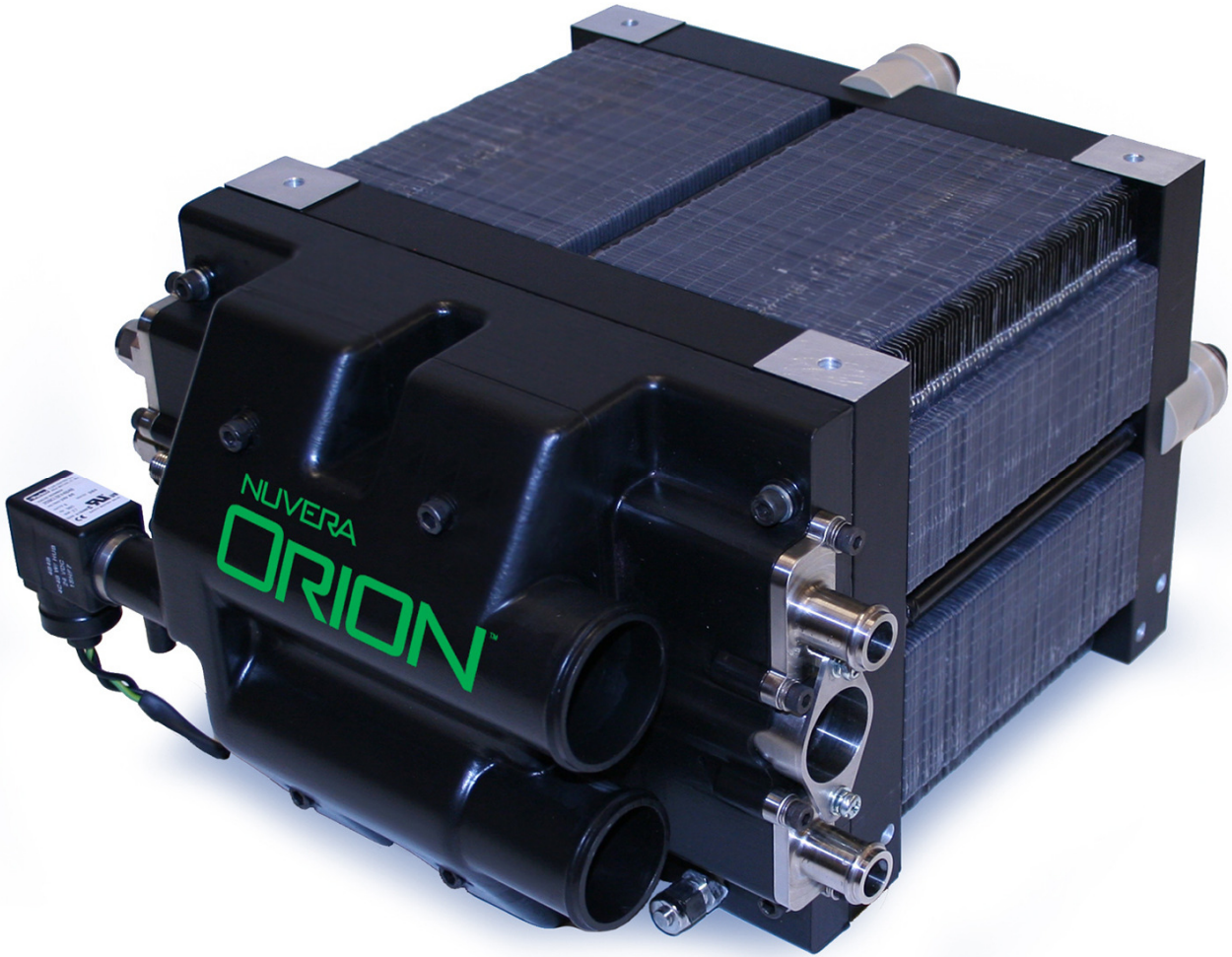
Kuidas kätte saada?

Päikeseenergia

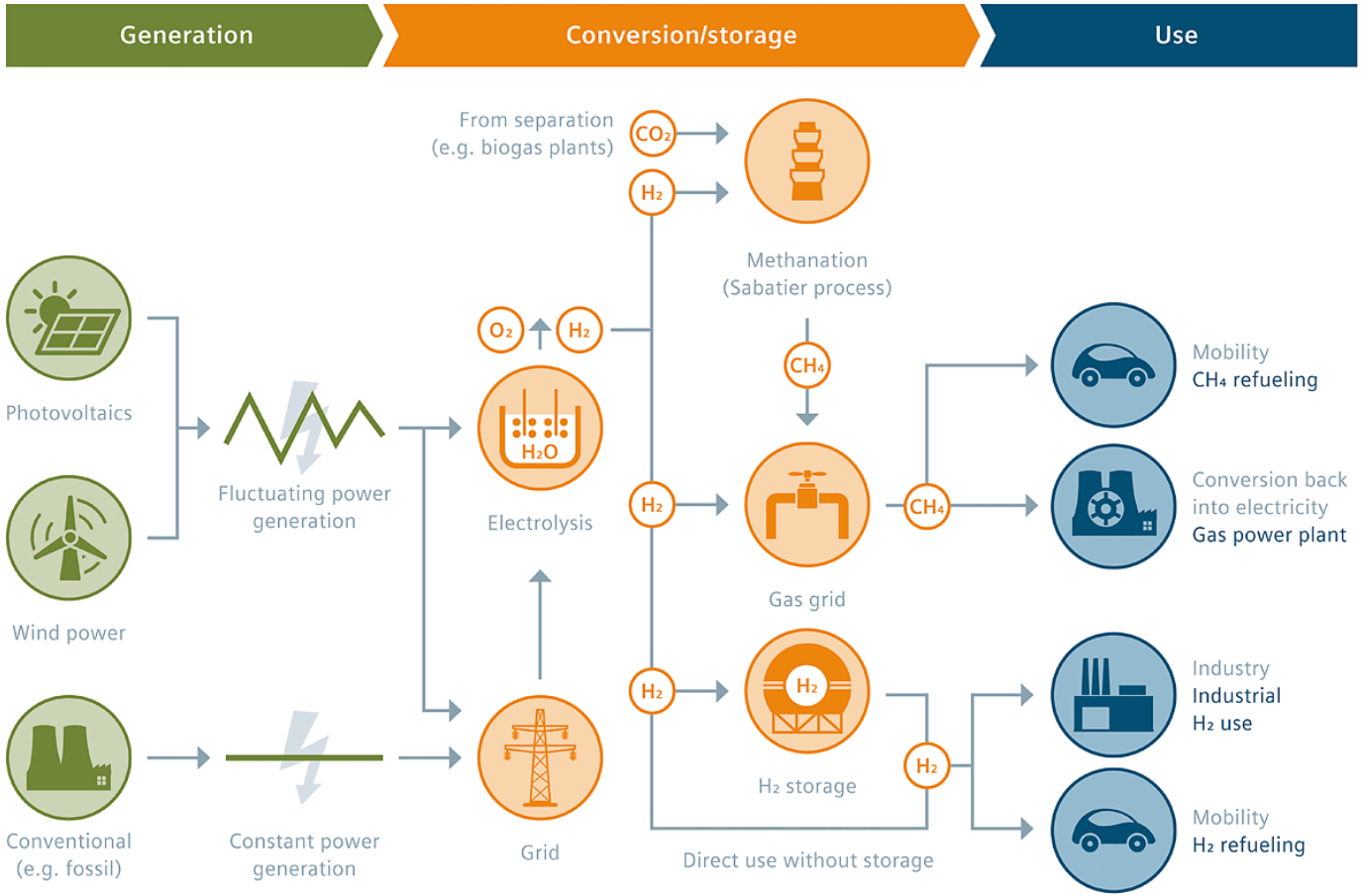


Hüdroenergia

Kütuseelemendid

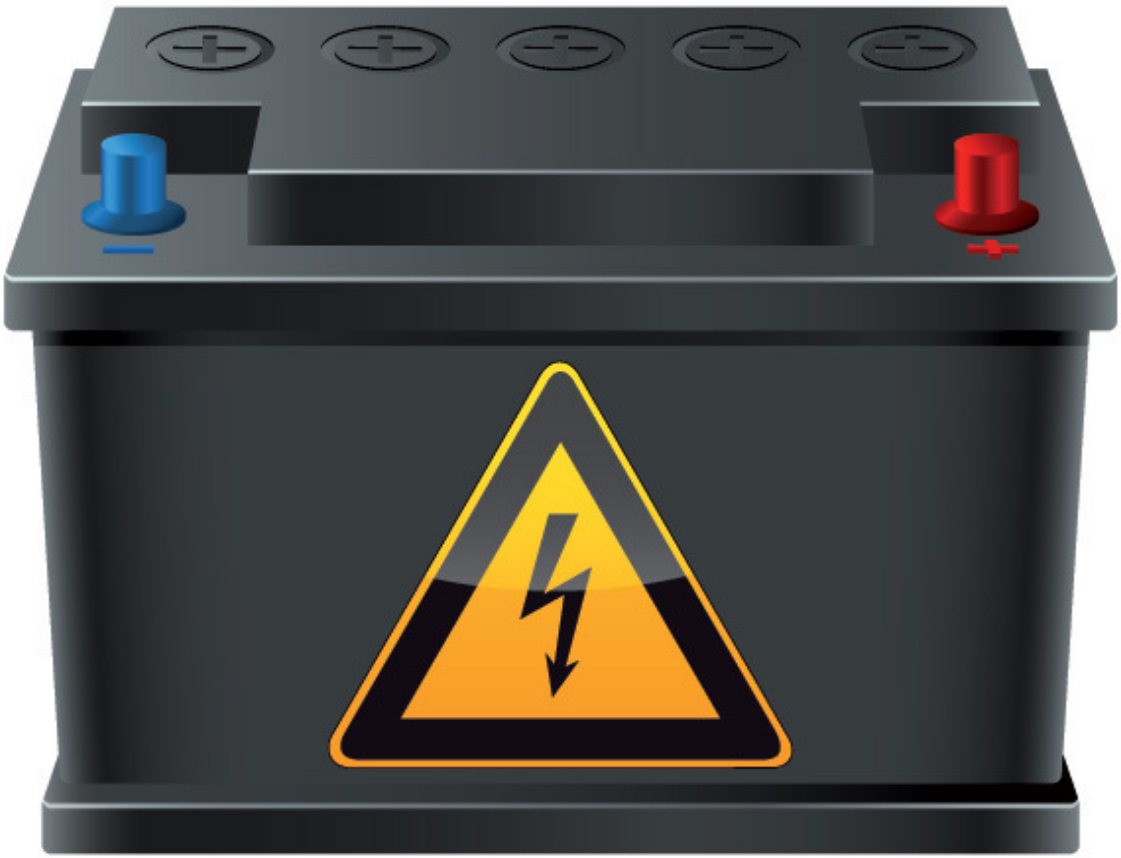


Elekter Gaasiks (Power to Gas)



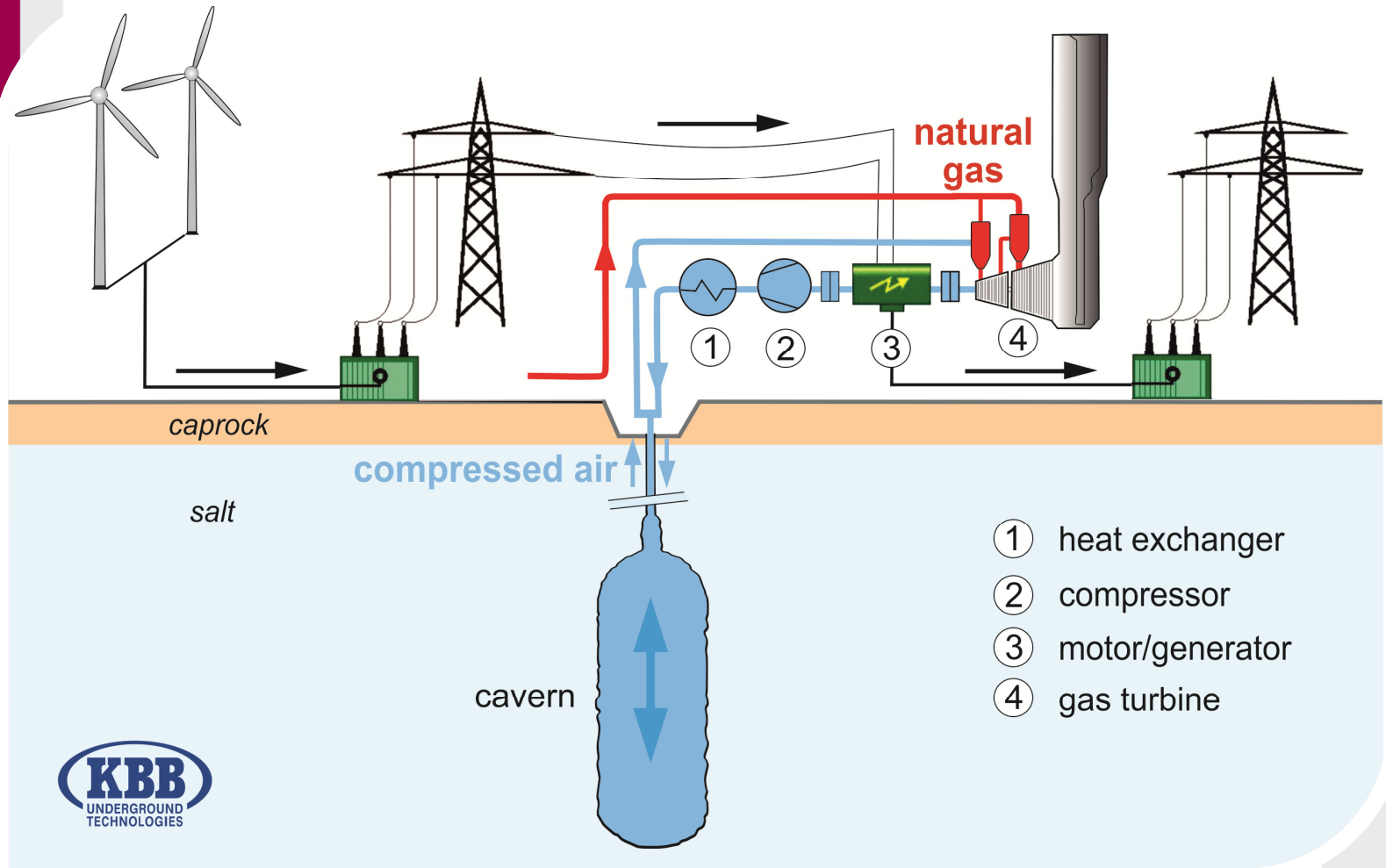
SIEMENS

Salvestamine - Akud



Salvestamine - Kondensaatorid

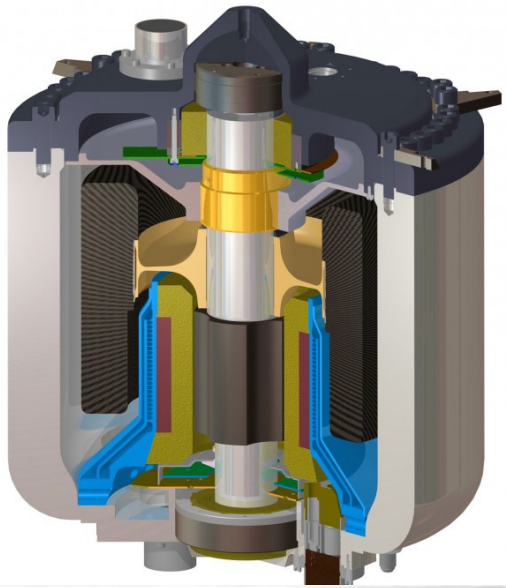
Salvestamine - Suruõhk

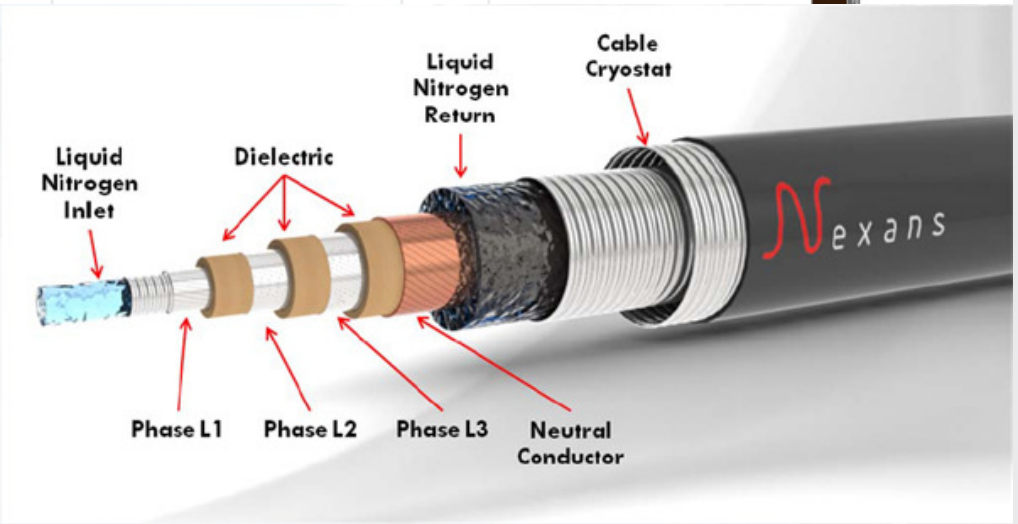


Salvestamine – pump hüdro akumulatsioonijaam

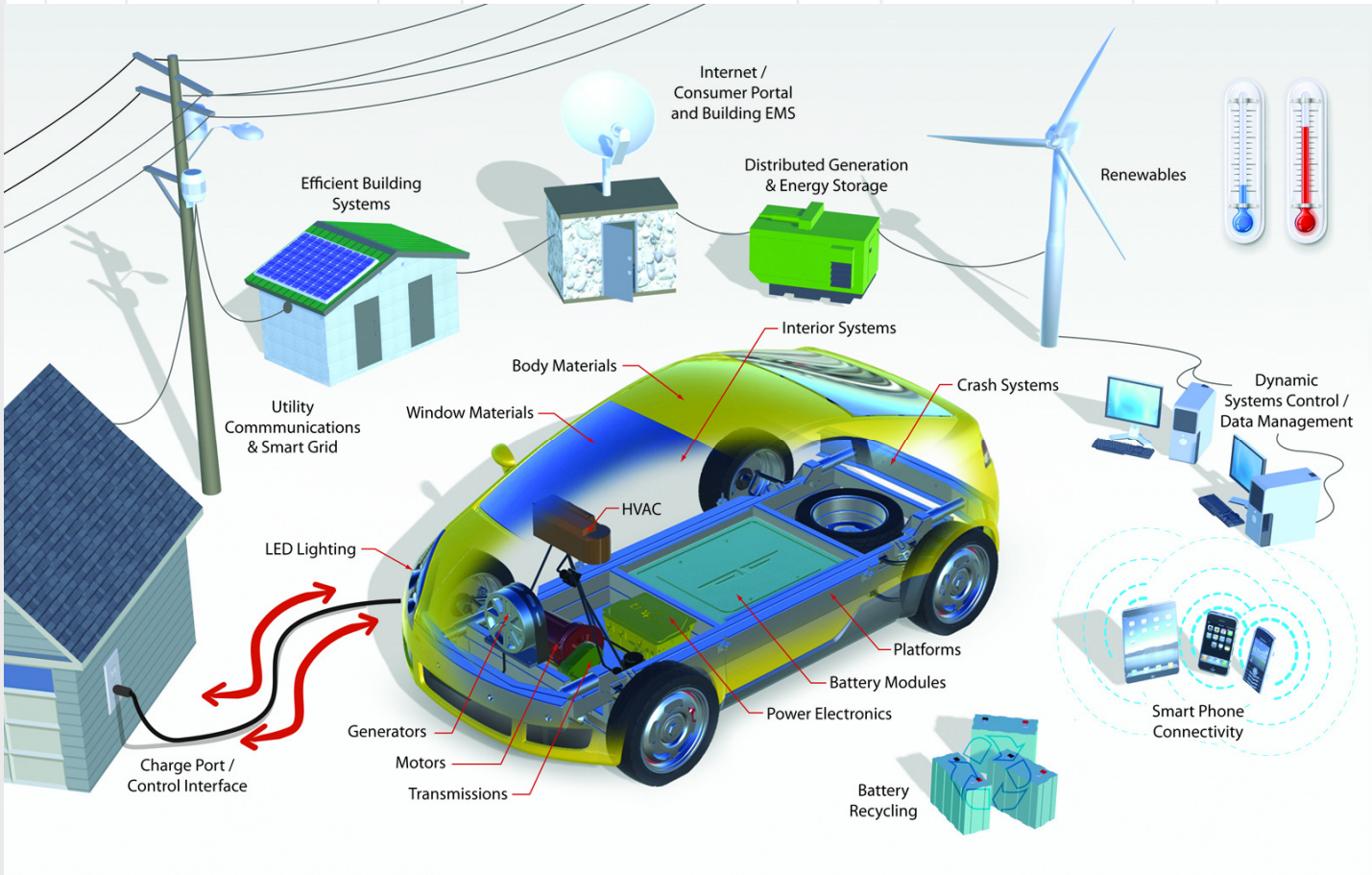
Salvestamine

- Hooratas
- Ülijuht poolid

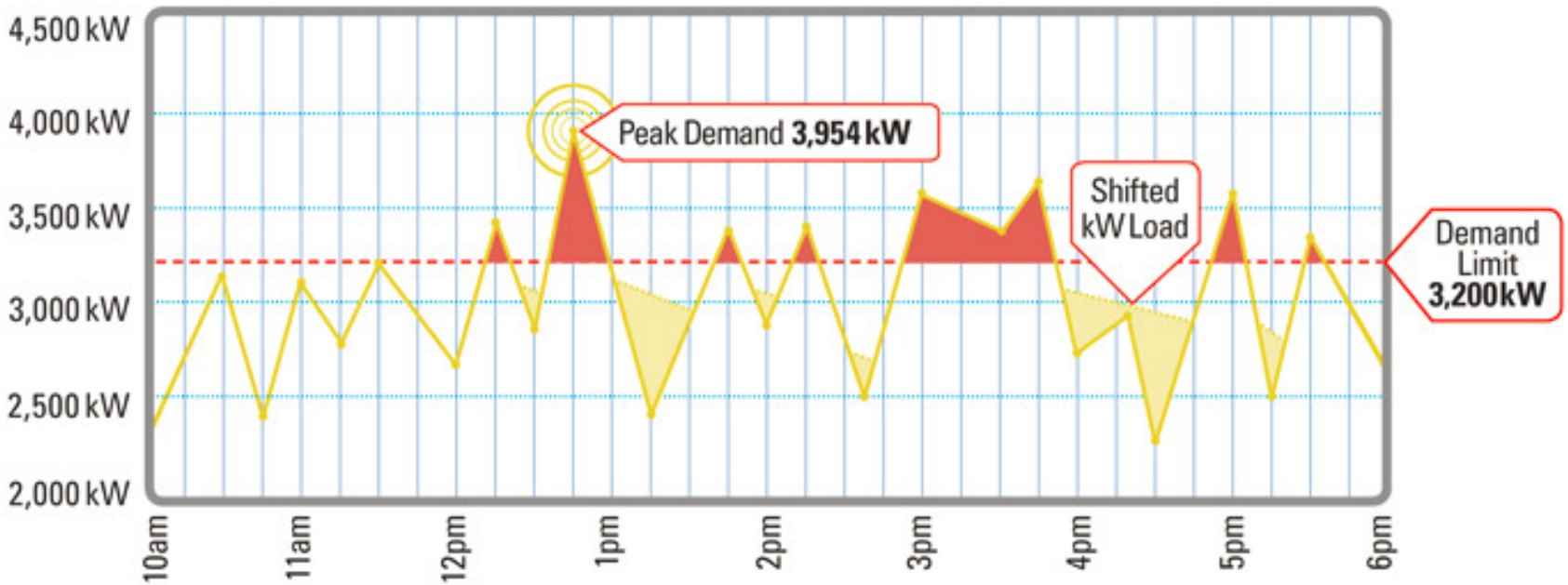




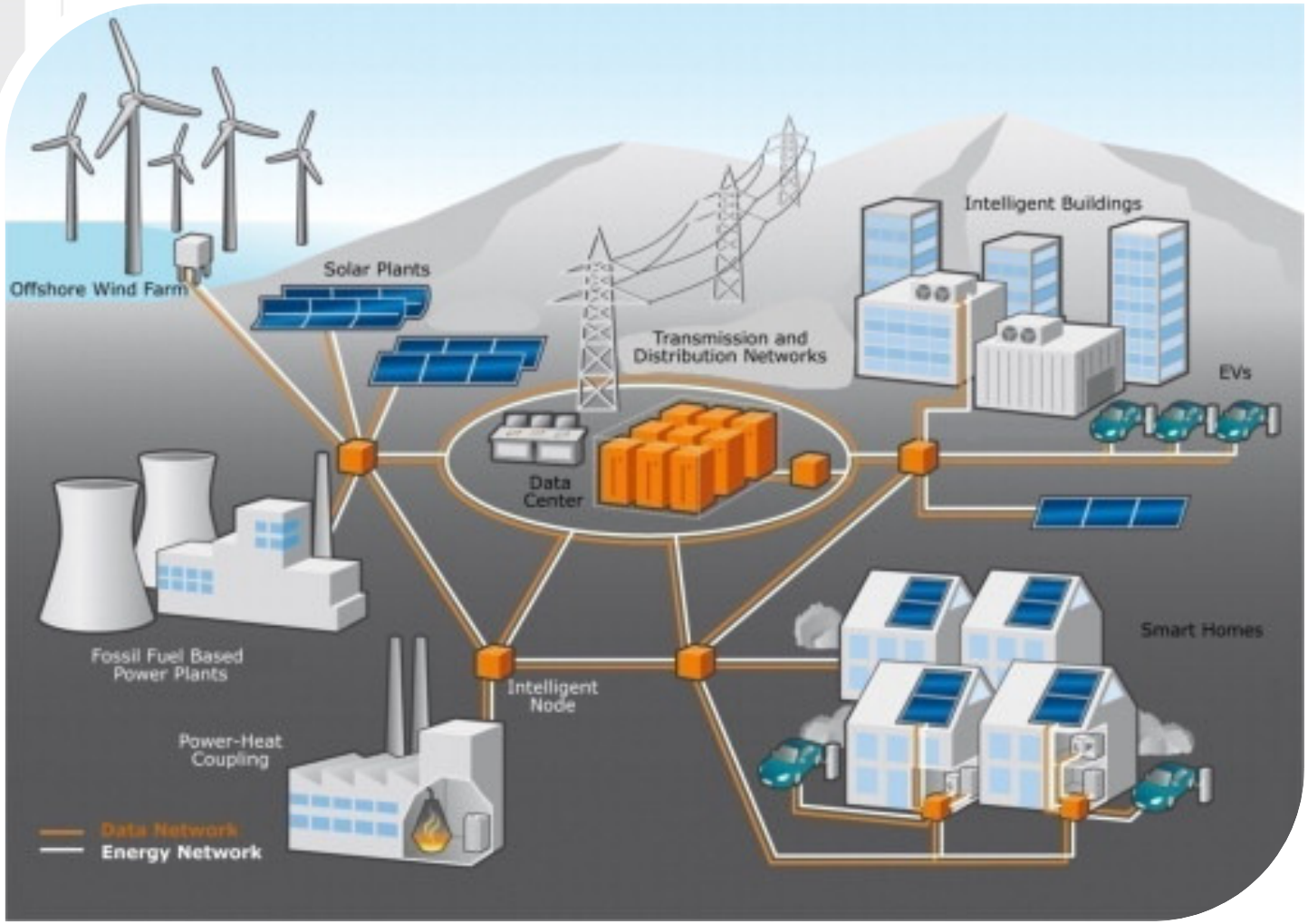
Salvestamine - elektriautod



Tarbimise juhtimine



Tarkvõrgud


Offshore Wind Farm
Solar Plants
Transmission and
Distribution Networks
Intelligent Buildings
EVs
Data
Center
Fossil Fuel Based
Power Plants
Intelligent
Node
Smart Homes
Power-Heat
Coupling
Data Network
Energy Network

Tänan!