Sustainable Materials & Energy Efficiency

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Environmental excellence

Leading the industry with sustainable products

Sustainable Materials

- Bromine-free
- Chlorine-free
- Mercury-free
- Arsenic-free

Sustainable Design

- Dematerialization
- Recycled material use
- Energy Star

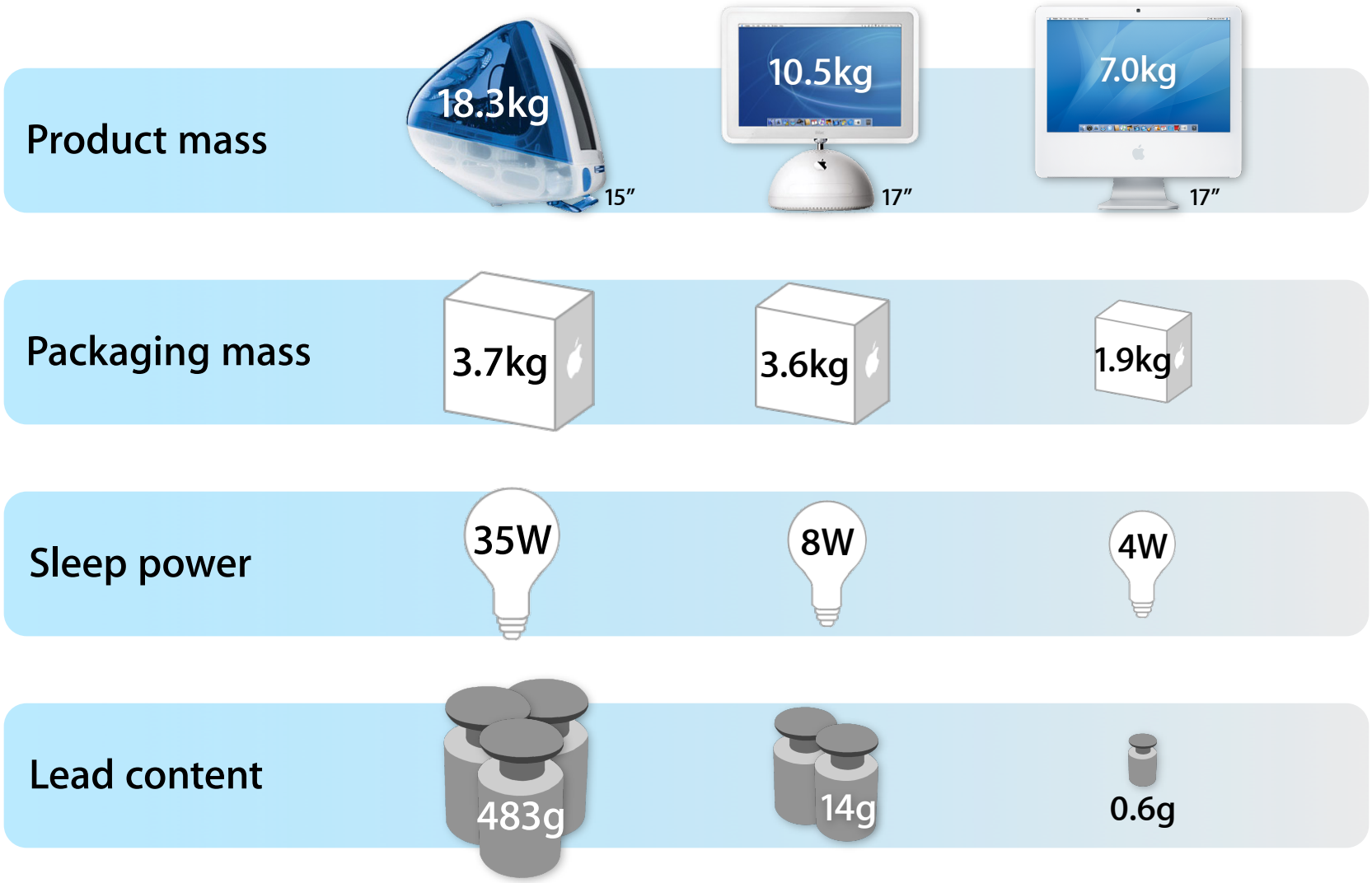
Recycling Programs

- Comprehensive take-back programs

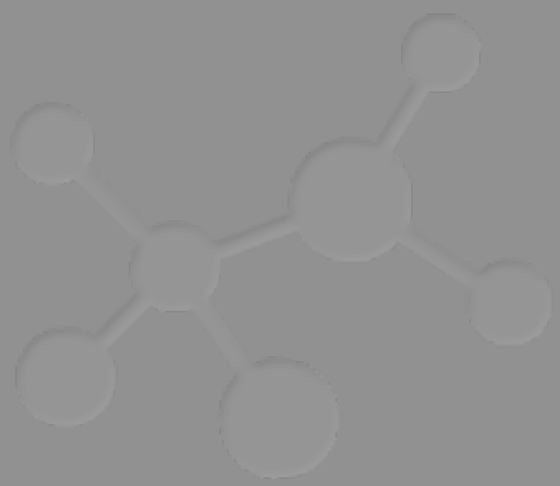
Carbon Neutrality

- zero life-cycle emissions

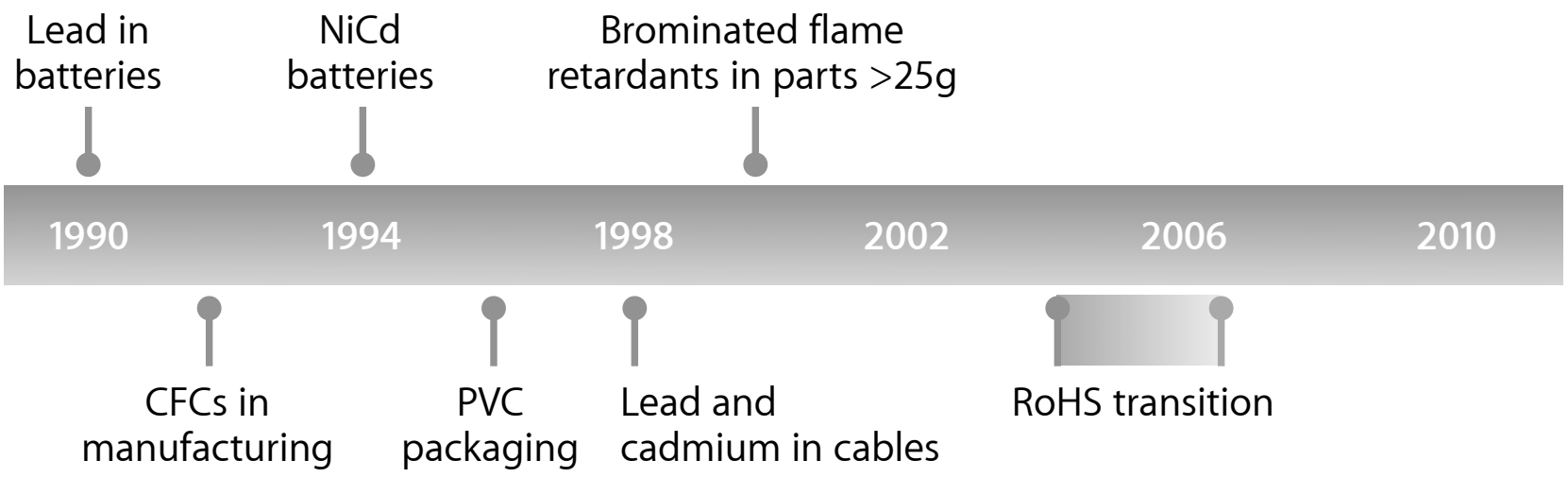
Record of continuous improvement

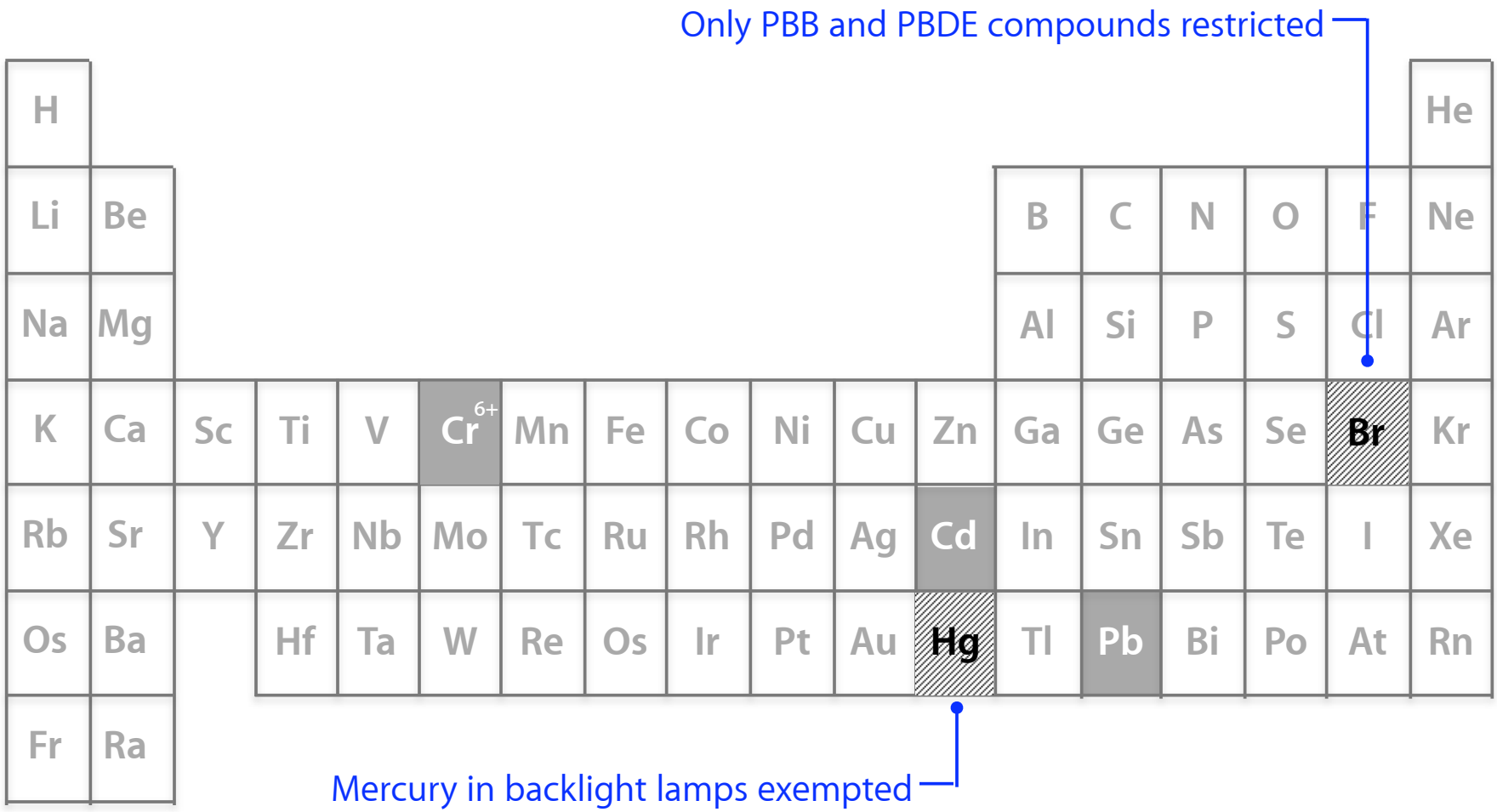


Sustainable materials



History of substance restrictions




Only PBB and PBDE compounds restricted
H
He
Li
Be
B
C
N
O
F
Ne
Na
Mg
Al
Si
P
S
Cl
Ar
K
Ca
Sc
Ti
V
Cr 6+
Mn
Fe
Co
Ni
Cu
Zn
Ga
Ge
As
Se
Br
Kr
Rb
Sr
Y
Zr
Nb
Mo
Tc
Ru
Rh
Pd
Ag
Cd
In
Sn
Sb
Te
I
Xe
Os
Ba
Hf
Ta
W
Re
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Ir
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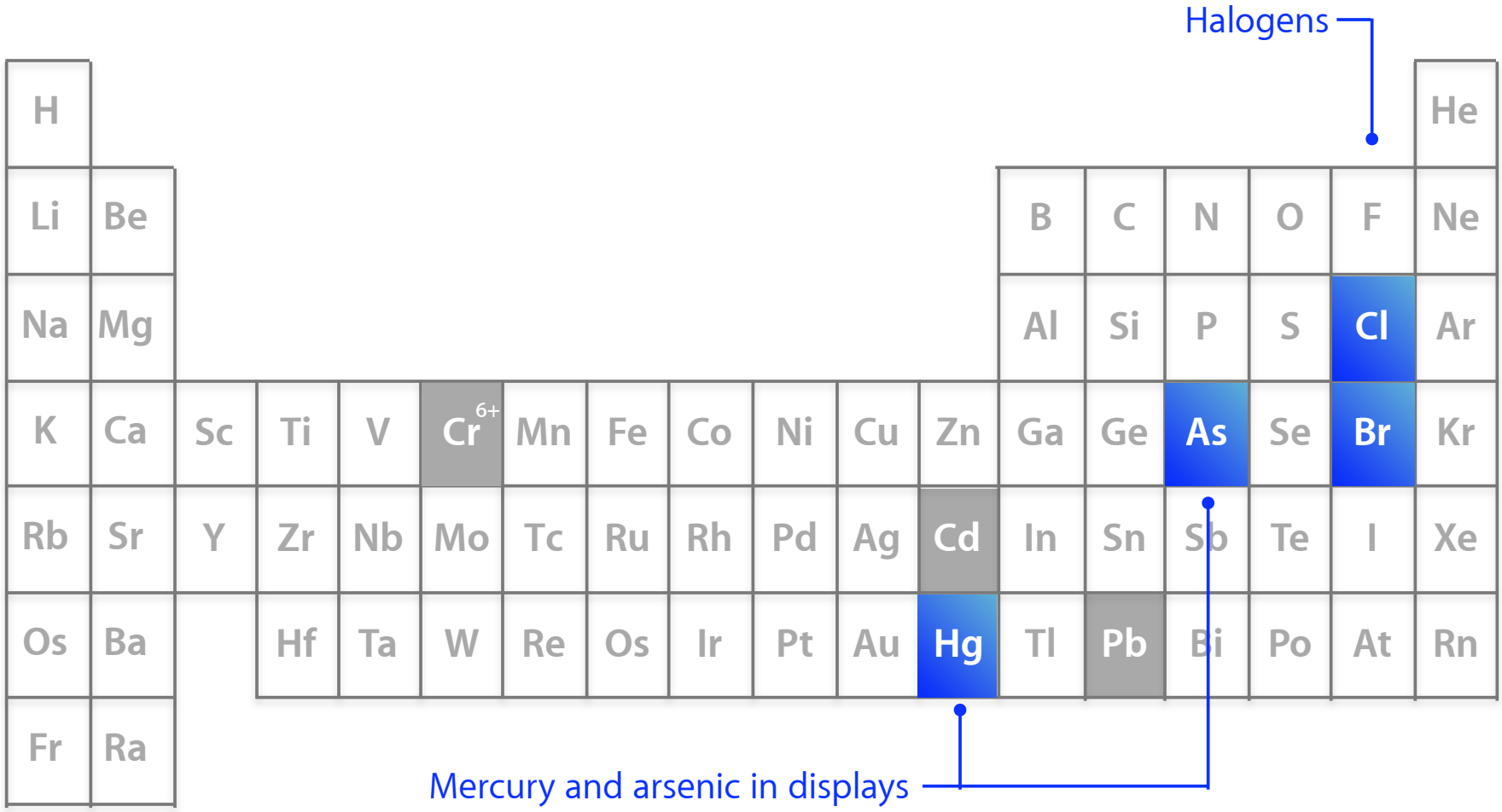
Au
Hg
Tl
Pb
Bi
Po
At
Rn
Fr
Ra
Mercury in backlight lamps exempted


Halogens
H
He
Li
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B
C
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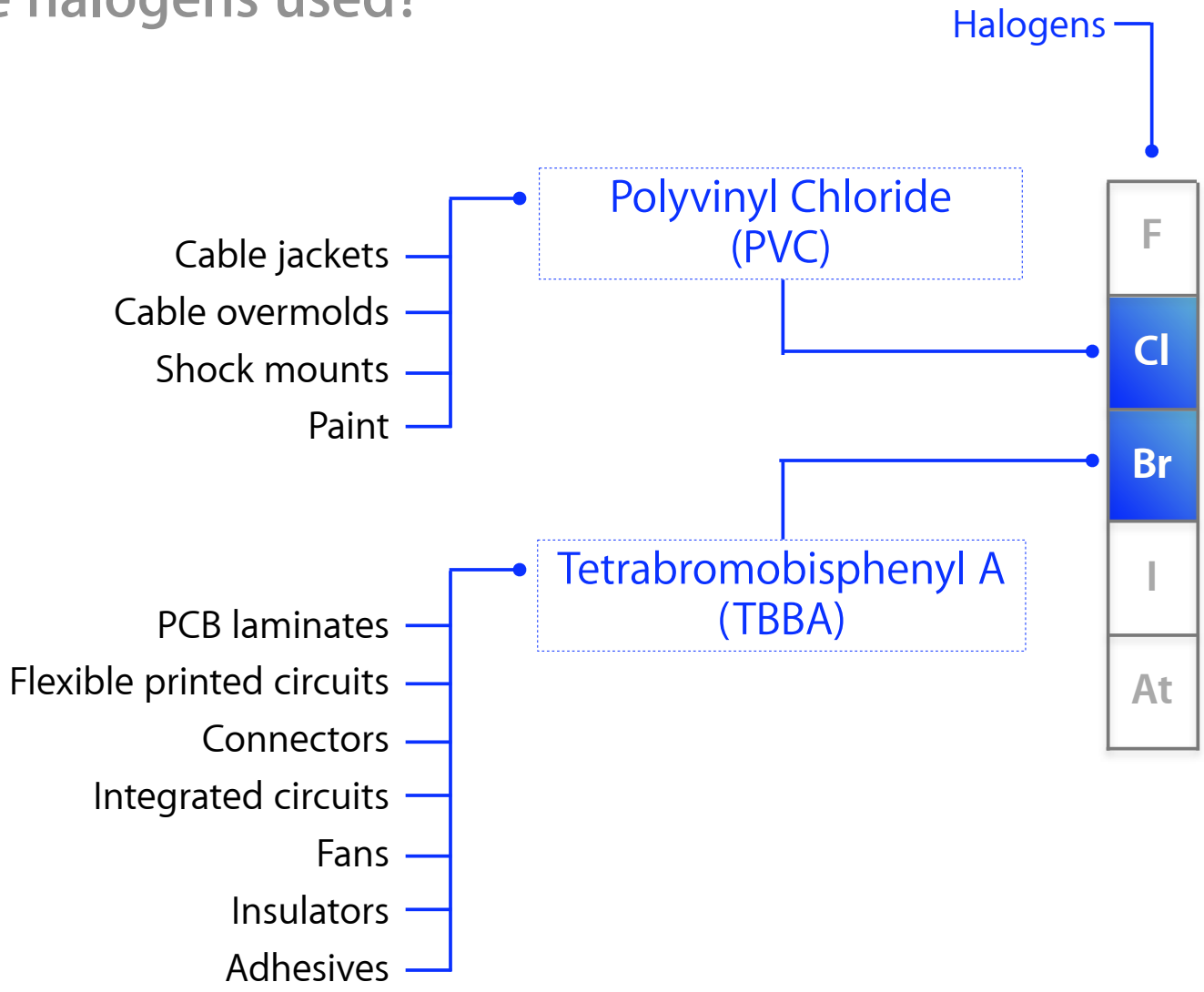
F
Ne
Na
Mg
Al
Si
P
S
Cl
Ar
K
Ca
Sc
Ti
V
Cr6+
Mn
Fe
Co
Ni
Cu
Zn
Ga
Ge
As
Se
Br
Kr
Rb
Sr
Y
Zr
Nb
Mo
Tc
Ru
Rh
Pd
Ag
Cd
In
Sn
Sb
Te
I
Xe
Os
Ba
Hf
Ta
W
Re
Os
Ir
Pt
Au
Hg
Tl
Pb
Bi
Po
At
Rn
Fr
Ra
Mercury and arsenic in displays

Halogen-free

Where are halogens used?



Toxicology

Chlorine and bromine

Vinyl chloride monomer, some stabilizers, plasticizers known hazards

Stabilizers and plasticizers can leach out when land-filled

Dioxin gases generate in fires or improper incineration

Some evidence suggesting bioaccumulation

EU risk assessment reports, “no health effects of concern” for TBBA

Mercury and arsenic

As — LCD display glass — Up to 4% arsenic oxide in glass

Hg — cold cathode fluorescent lamps (CCFL)

MacBook or MacBook Pro

20-inch iMac

30-inch Cinema HD Display

Activities

Implementation steps

Implementation

Prototyping

Technology qualification and testing

Halogen-Free Procedure

Halogen-Free Spec

Halogen-Free Web

Supply Chain

Notification

Part level status tracking and verification

Halogen-Free Supplier Forum

IPC Standard HF Materials

Products

Displays
MLB laminate is Br-free

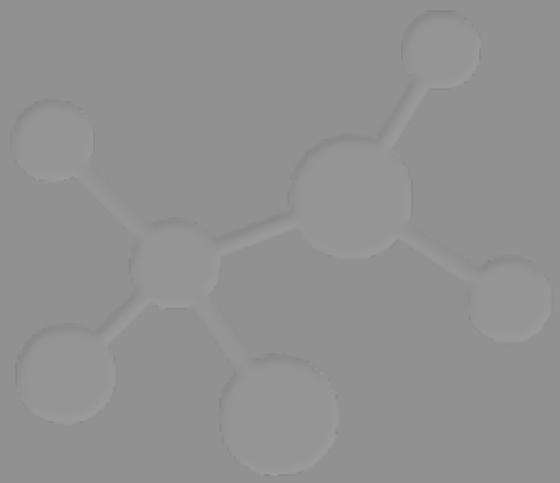
iPod
MLB laminate is Br-free
>3M Shipped

15" Portable
Mercury-free display

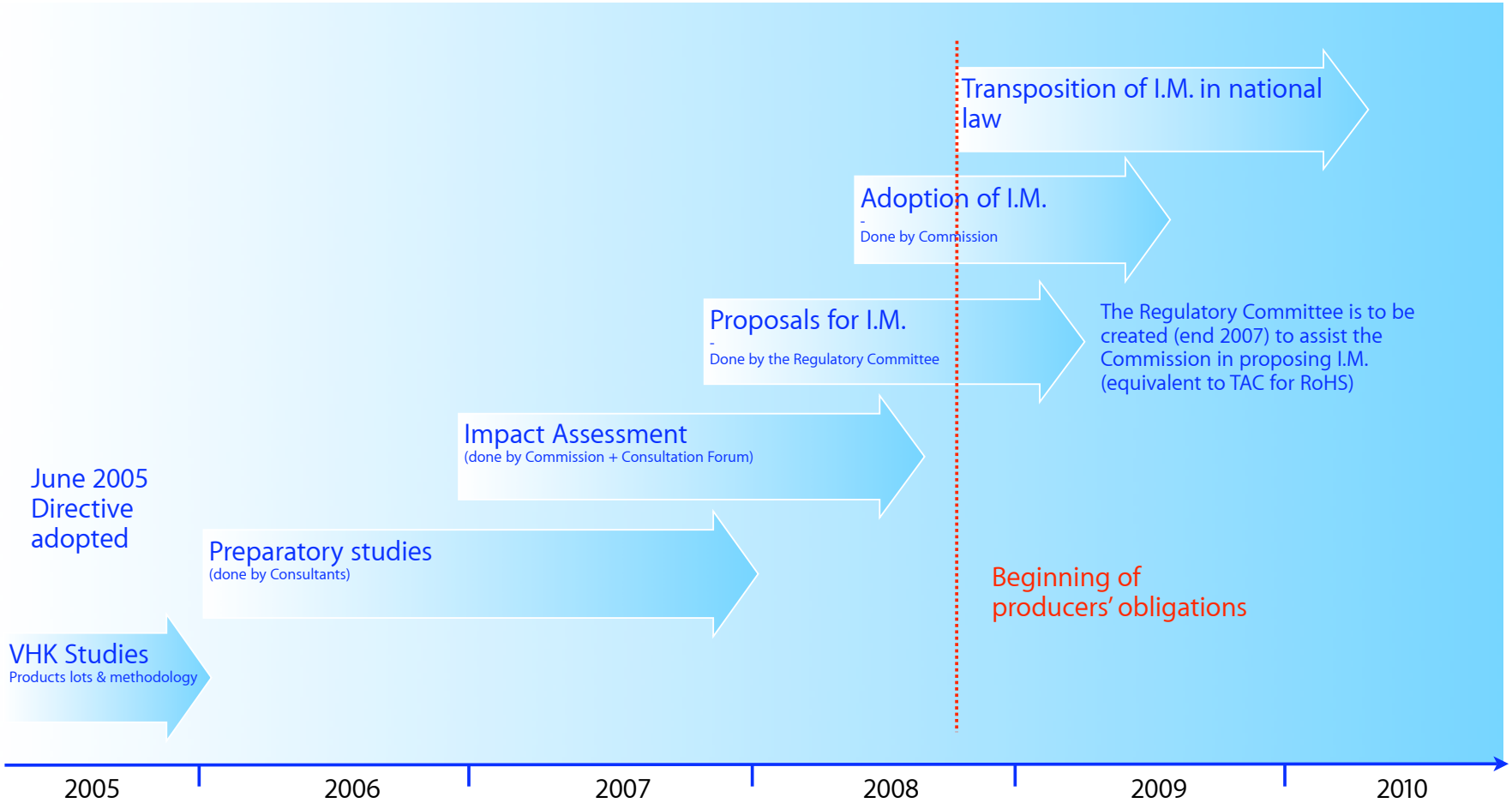
In Development
end 2008: All products to ship PVC & Br-free

2. Energy Efficiency

Preparing for EuP



Implementation Milestones



Preparatory Studies - 2006

1	Boilers and combi-boilers
2	Water heaters
3	Personal Computers and Computer Monitors
4	Imaging equipment: copiers, faxes, printers...
5	Consumer electronics: televisions
6	Standby and off-mode losses of EuPs
7	Battery Chargers and external power supplies
8	Office lighting
9	(Public) street lighting
10	Residential room conditioning appliances
11	Electric motors 1-150 kW, water pumps
12	Commercial refrigerators and freezers
13	Domestic refrigerators and freezers
14	Domestic dishwashers and washing machines

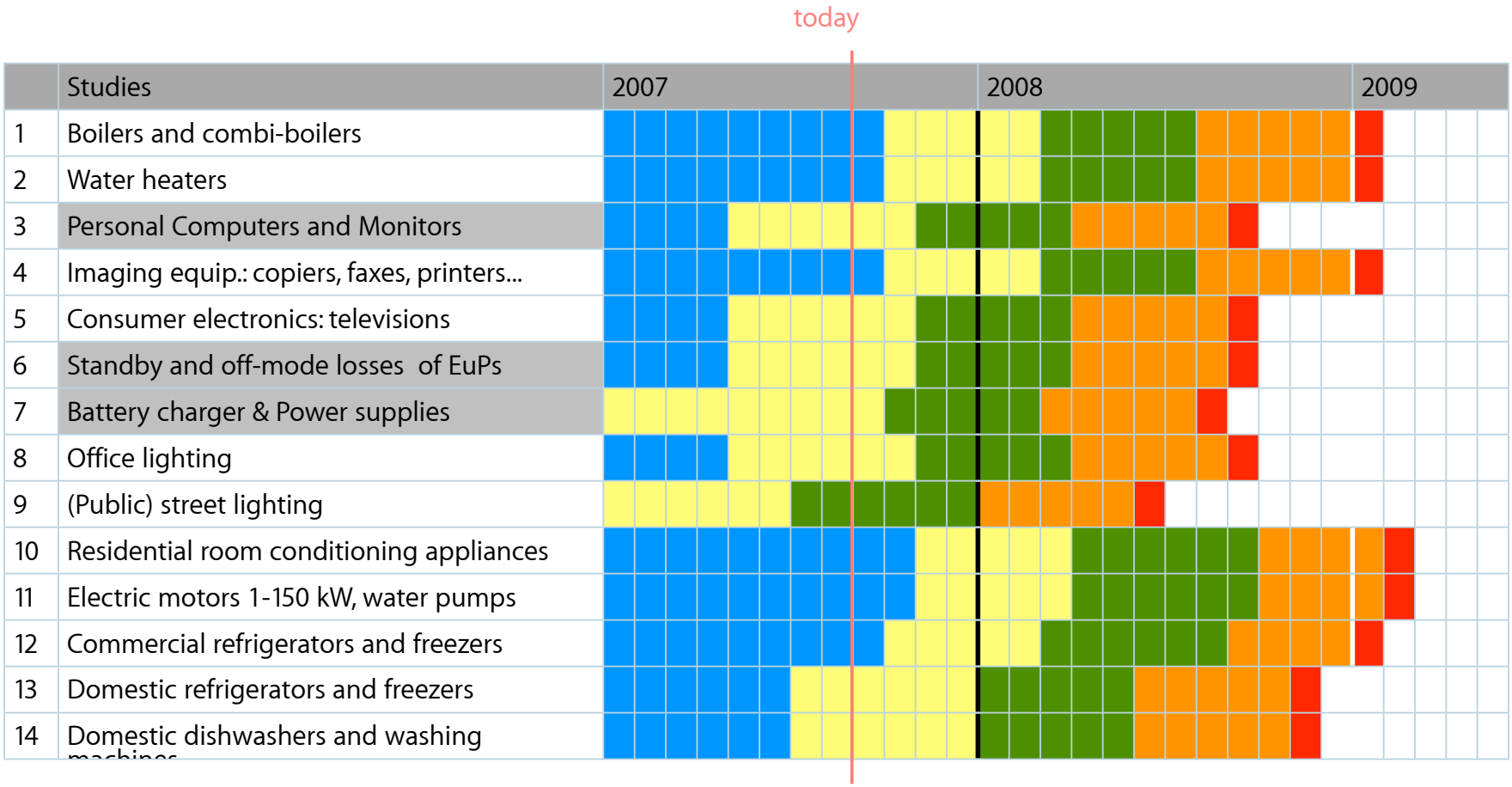
Preparatory Studies - 2007

15	solid fuel small combustion installations
16	laundry driers
17	vacuum cleaners
18	Set top box (split in simple and complex set to box)
19	Domestic lighting

Network data equipment to be covered by additional preparatory studies in 2008.

Investigation study completed September 2007 covers 25 product groups

Planning for the adoption of I.M.



Final date for Adoption by the Commission can be extended by 4 to 12 months

study phase | impact assessment I & Consultation Forum | impact ass. II and vote by the Committee | Commission adoption phase | adoption by the Commission

Compliance Scenario

EuP

Is the EuP covered by an I.M.?

No

Yes

Check the conformity assessment procedure

Carry out tests
Gather relevant documentation

Issue a declaration of conformity
CE marking on product

Existing internal CE conformance procedure may need to adapt to new requirements

LOT 3: PCs and Monitors

IVFs Proposed requirements for an I.M

Proposed Mandate	Scope	Requirements	Useful Reference	Expected
High efficiency power supply	portables, desktop, monitors	Internal PS: 80 % efficiency at 20%, 50%, 80 % and 100% of rated output and power factor > 0.9 of rated output External PS: 85 % minimum efficiency	80 Plus CA CEC E* EPS	2009
Power management enabled	portables, desktop	Power management enabled OOB. 15min to screen off 30min to computer sleep (S3 state)		2009
Power consumption information	portables, desktop, monitors	Power consumption data on product label + web site		2009
Idle	monitors	1680x1050 pixels <50W 1920x1200 pixels <65W 2560x1600 pixels <115W Mandatory minimum requirement, at same level as future E*	E* 4.1	2009 2011
Sleep/ Standby	portables, desktop, monitors	WOL off / WOL on / Standby 1.7W, 4.0W / 2.4W 4.7W / 1W 2W 2W / / 1W	E*4.0 E* 4.1	2009

LOT 3: PCs and Monitors

IVFs Proposed requirements for labeling

Portable, Desktop, Monitors
power consumption (kWh/yr) idle mode (W per m2 for displays)
power consumption (W) sleep mode
power consumption (W) off mode
content of restricted substances such as mercury and lead (ppm)
web URL for information on energy efficiency, environment, end of life treatment

x 21 Languages

LOT 6 - Standby & Off mode losses

IZMs Proposed requirements for an I.M.

Product specific requirements (LOT3) trump horizontal requirements (LOT6)

IZM proposes a 2 tier approach

'Hard off' capability not proposed

	Tier 1 2010	Tier 2 2012
Off mode for rated output <10W	1 W	0.5 W
Off mode for rated output >10W	1 W	0.75 W
Passive standby	2 W	1 W
Network standby by "Type 1" (inter device network)	3 W	1 W
Network standby by "Type 2" (telephony, computer, TV network)	4 W	1 W
Network standby by "Type 3" (High speed network)	10 W	5 W

Energy efficiency information better suited to user manual and website than product label

LOT 7 - EPSs and Battery Chargers

BIOs recommendations

Recommends to have I.M for EPS but not for battery chargers (lack of data for such products)

BIO recommends to use existing legislation such as Californian CEC Tier II as I.M.

Summary & Recommendations

Sustainable materials and EuP

Identify your relevant preparatory study and schedule for data collection

Plan towards Energy Star compliance and CEC requirements

Engage in benchmark activities for idle workload development

Prepare for conformity assessment, documentation and labeling requirements covering Energy Efficiency of portables, desktops, monitors and EPS by 2009