

Assembling & Disassembling of PVC Parts Among Consumer Electric Appliances in Japan

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Boston, Massachusetts

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By Kiyoshi Ueno

* PVC: Polyvinyl chloride

Legislation and Policies to Establish a Recycling-Oriented Society in Japan

Basic Law on the Environment (Enforced 1994)

(Enforced 2001)

Fundamental Law for Establishing a Sound Material-Cycle Society (Basic framework law)

Basic principle, Responsibility of government, local authority, enterprise, citizen, National measure

Proper waste management

(Original enforced 1900)

Promotion of recycling

(Enforced 2001)

Waste Management Law

Law for Promotion of Effective Utilization of Resources (3R law)

Regulations in accordance with the characteristics of individual products

Containers and
Packaging Recycling
Law

Home Appliance
Recycling
law

Construction
Materials Recycling
Law

Food
Recycling
Law

End-of-Life-Vehicles
Recycling
Law

Green Purchasing Law (Enforced 2001)

(Promotion for procurement of recycling products by the national government on its own initiative)

Green Contracting Law (Enforced 2007)

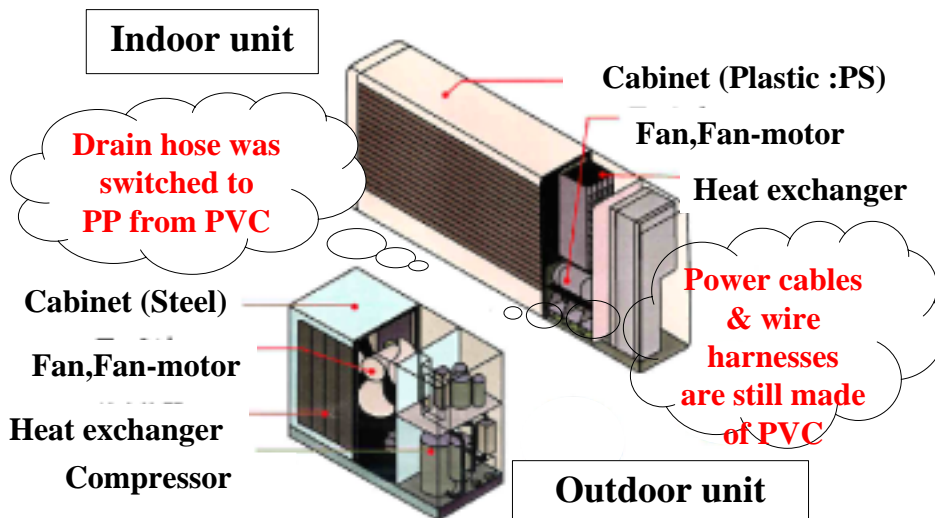
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The short history of the “*anti- PVC*” campaign

- 1996 :The fire of Düsseldorf airport terminal & rumor of NPO’s false information
- 1997 : “*anti- PVC*” campaign started in Japan
- 1997~ : “*PVC-free activities*” started among consumer product assemblers
- “*PVC-free Liquid crystal TV*” appeared in Japan.
- 2006: “*Reduced PVC use*” almost disappeared from “Environmental report” in Japan
- 2007:Still existing “*PVC-free*” in the sales pitch

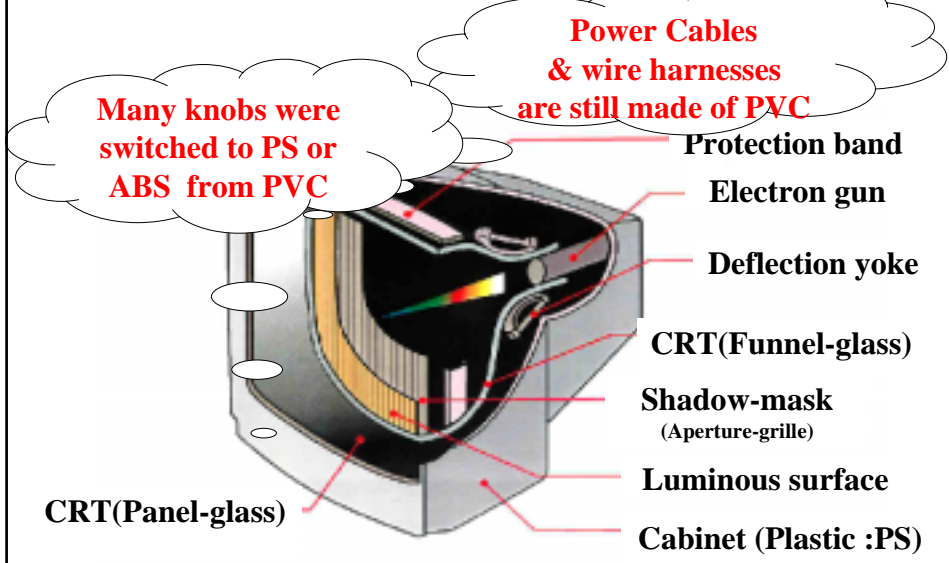
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The skeleton of a room air conditioner



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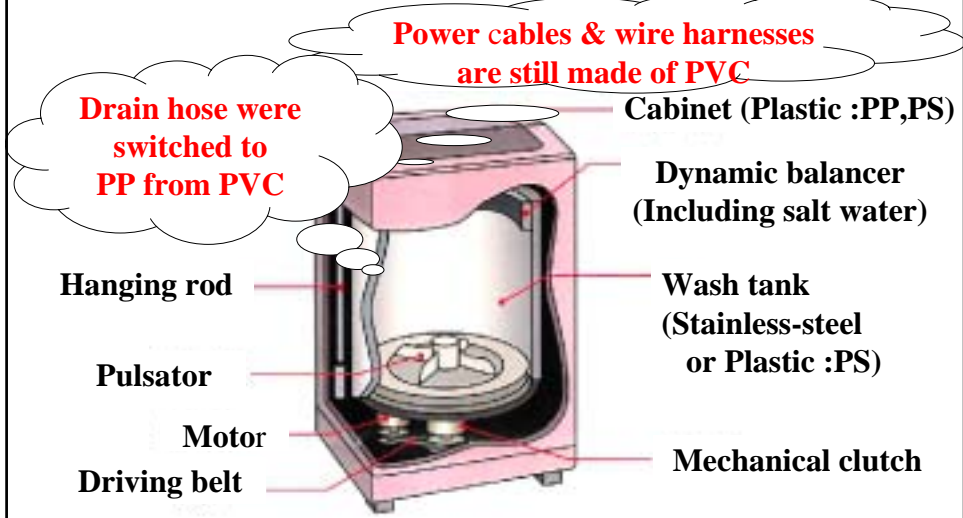
The skeleton of a color TV



**In Japan most "CRT type TVs" have been changed to "Panel type TVs"*

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The skeleton of a washing machine



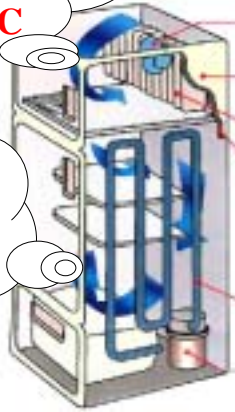
**In Japan most washing machines have been changed to "washer-dryers type" machines*

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The skeleton of a refrigerator

Power cables & wire harnesses are still made of PVC

Door gaskets are still made of PVC



- Fan
- Cabinet (Plastic: PS,ABS)
- Heat exchanger
- Urethane insulator :Poly-urethane
- Radiator
- Non Freon type Compressor

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Unfortunate examples of Latest sales copies : *“PVC-free Products”*



Quoted ; Famous Japanese & European electronics manufacture's catalogs

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Sustainable Report 2006

環境対策推進基準

項目	説明
省エネルギー	・省エネルギー設計における省エネ対策の推進 ・省エネ設計の推進 ・省エネ設計の推進 ・省エネ設計の推進
安全	・安全設計の推進 ・安全設計の推進 ・安全設計の推進 ・安全設計の推進
省資源	・省資源設計の推進 ・省資源設計の推進 ・省資源設計の推進 ・省資源設計の推進
エコマーク	・エコマークの取得 ・エコマークの取得
その他	・その他 ・その他

Safety

Green Materials

Trying to Switch from PVC

Quoted ; A famous Japanese electronics manufacture's environmental report

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Green Products certification criteria

グリーンプロダクツ認定基準

エコープロダクツ	環境性能の向上が期待される・持続可能な社会の実現への牽引となる製品						
グリーンプロダクツ	業界No.1の環境性能を実現した製品						
グリーンプロダクツ (GPP)	<table border="1"> <tr> <td>環境性能を向上した製品</td> <td> <ul style="list-style-type: none"> 環境と社会に貢献する製品 ライフサイクルでの温室効果ガス削減 </td> </tr> <tr> <td>下記の基準を満たす製品</td> <td> <ul style="list-style-type: none"> 製品寿命・製品機能 製品寿命・製品機能 ライフサイクルでの資源の節約・削減 </td> </tr> <tr> <td>業界トップレベル</td> <td> <ul style="list-style-type: none"> 製品がゼロ炭素の生産時に必要な2000年までに自製電力を使用している製品 </td> </tr> </table>	環境性能を向上した製品	<ul style="list-style-type: none"> 環境と社会に貢献する製品 ライフサイクルでの温室効果ガス削減 	下記の基準を満たす製品	<ul style="list-style-type: none"> 製品寿命・製品機能 製品寿命・製品機能 ライフサイクルでの資源の節約・削減 	業界トップレベル	<ul style="list-style-type: none"> 製品がゼロ炭素の生産時に必要な2000年までに自製電力を使用している製品
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業界トップレベル	<ul style="list-style-type: none"> 製品がゼロ炭素の生産時に必要な2000年までに自製電力を使用している製品 						
必須項目	鉛、六価クロム、六価クロム、水銀、特定有害物質規制(PBB, PBDE)の不使用						

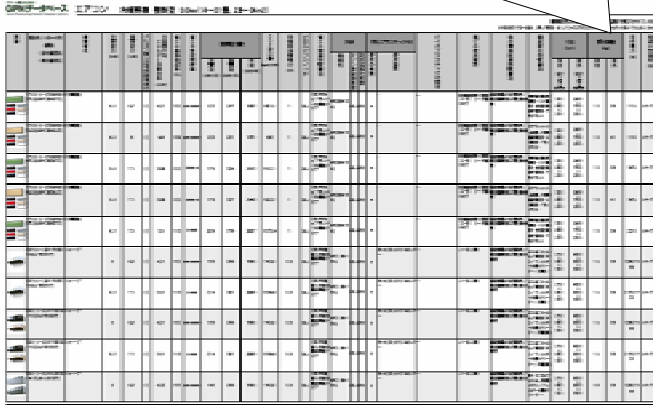
PVC-free products

Quoted ; A famous Japanese electronics manufacture's environmental report

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Publication on Web site by an NPO

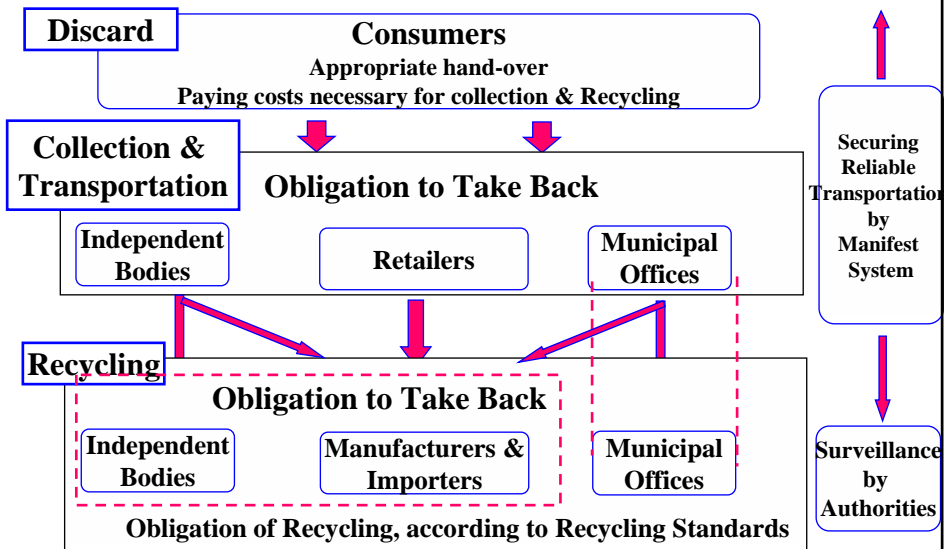
Whether PVC is used or not?



Quoted ; HP from a famous Japanese NPO (Green purchasing Network)

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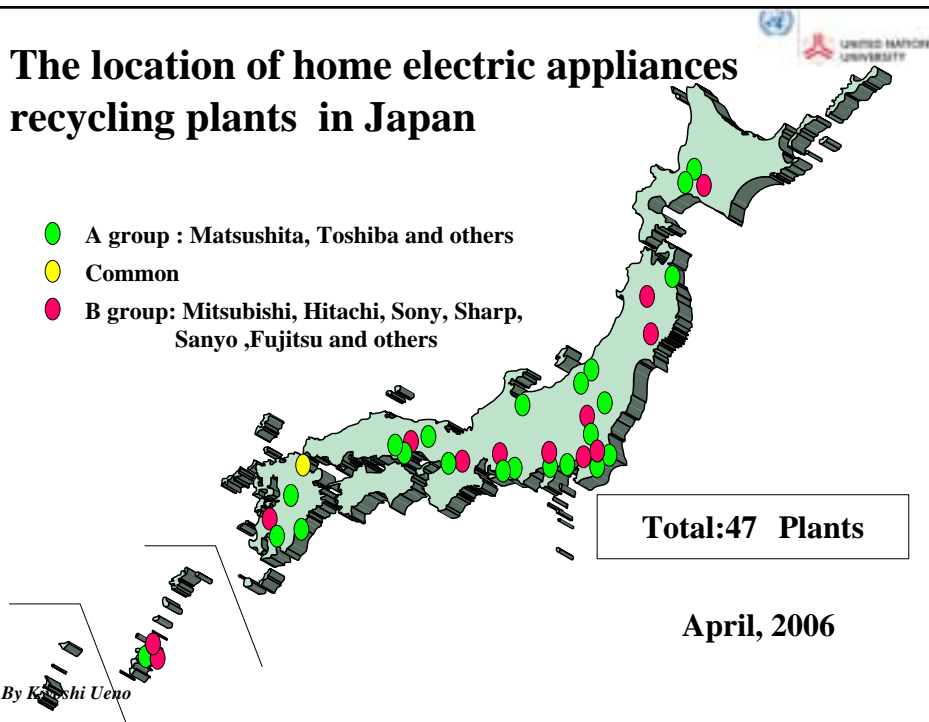
Flow of home appliances recycling law



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The location of home electric appliances recycling plants in Japan

- A group : Matsushita, Toshiba and others
- Common
- B group: Mitsubishi, Hitachi, Sony, Sharp, Sanyo ,Fujitsu and others



Janna's Typical recycling plant Hyper Cycle Systems Corporation subsidiizing of Mitsubishi Electric

Energy saving system
by using Photovoltaic
Power Generation

All air conditioning
Disassembling line



Location : Ichikawa city Chiba prefecture near Tokyo

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Cell type disassembling booth (Air conditioning and dust duct facilities)



Photo : Hyper Cycle Systems Corporation , Japan

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Air conditioning recycling facility



Air conditioner disassembling line



Refrigerator disassembling line

Photo : Hyper Cycle Systems Corporation , Japan

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Refrigerant (Freon) recovery operation from refrigerator



Photo : Hyper Cycle Systems Corporation , Japan

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Thermal insulators (Freon) from refrigerators



**The thermal insulators and
Freon recovery facility**



**Compressed Polyurethane
for volume reduction**

Photo : Hyper Cycle Systems Corporation , Japan

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Disassembling and collecting **PVC gaskets** from refrigerators at a recycling plant



Photo : Hyper Cycle Systems Corporation , Japan

By Kiyoshi Ueno

Collected **PVC gaskets** from refrigerators in recycling plant



Photo : Hyper Cycle Systems Corporation , Japan

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Drain hoses (Air conditioners and washing machines) were switched to alternative plastics **from PVC**



Unfortunately most PVC hoses are switched to other plastics

Photo : Hyper Cycle Systems Corporation , Japan

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Separating copper and PVC from power cables



Collected copper(purity:99.9%)



Separated PVC chips

Photo : Tokyo Eco-recycle Corporation (Subsidizing of Hitachi), Japan

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Plastic Material Recycling

PVC coated copper wires

Metal plates



Metal-plastics mixed shreds
(Raw material)

Plastics after milling and separation
(Not containing metal & PVC)



STOP!

Landfills, Incineration



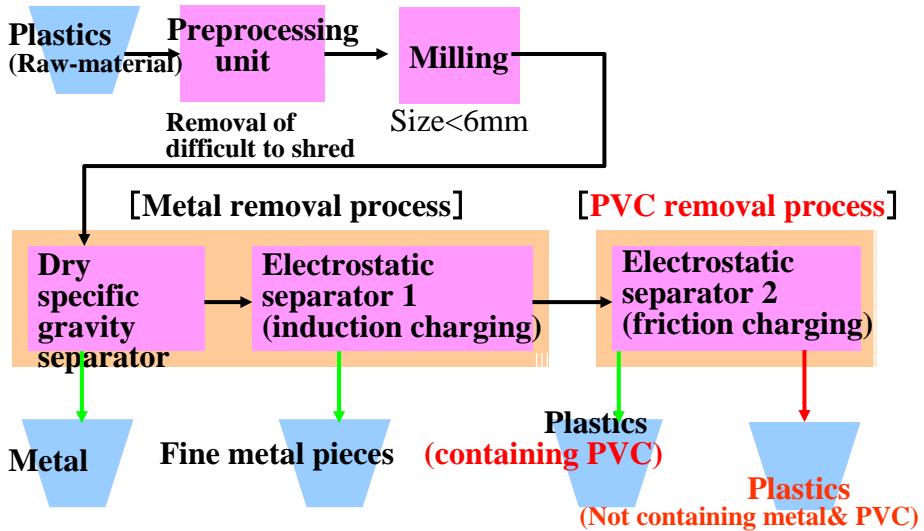
RECYCLABLE

Reductant for blast furnaces in steel plants & **material recycling**

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Photo : Hyper Cycle Systems Corporation , Japan

High-precision separation flow



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Hyper Cycle Systems Corporation : Japan

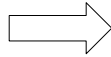
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Mixed plastics to blast furnace as an alternative material of coke



Electrostatic separator

Photo : Hyper Cycle Systems Corporation , Japan

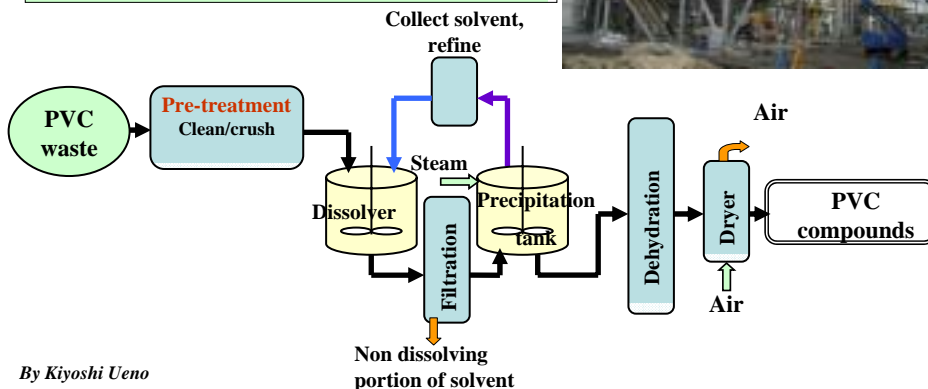


Blast furnace

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Example of PVC Recycling – Vinyloop®

Plant: constructed in Chiba Prefecture
 Joint Venture: Kobe Steel and Solvay
 Treats: agro-films, pipes, cables
 Capacity: 26,000t/y
 Subsidy: from MOE and local government
 Operation: started in April 2006



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Recycling plant tour for many people



Photo: Thanks to AEHA.

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Conclusion

- **The utility, versatility and low environmental impact characteristics of the PVC are scientifically obvious.**
- **Once wrongful rumours spread, a tremendous effort is necessary to withdraw such notions.**
- **Leading enterprises should actively use PVC and disclose fact that to the public by positively advertising the contribution of PVC to the environment.**
- **Europe, the United States, Japan and Korea must play a large role in spreading fair and accurate recognitions on PVC, and should bear significant responsibility in doing so.**

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