2022
ESG高峰會 環境、社會、治理

永續資訊揭露案例
-- 台積電、三星、英特爾

【主講人】

周國華　國立屏東大學會計學系副教授

指導單位 | 金融監督管理委員會 Financial Supervisory Commission R.O.C

主辦單位 | 財團法人 會計研究發展基金會 ACCOUNTING RESEARCH AND DEVELOPMENT FOUNDATION

內容順序

1. 周老師及團隊自介，半導體產業分析及XBRL教學網站
2. SASB及ISSB永續準則對半導體產業的規範
3. ISSB制定的XBRL永續資訊分類標準(半導體產業部分)
4. 台積電、三星及Intel的XBRL格式永續資訊
   a. 三家公司簡介
   b. 三家公司的ISSB永續資訊(XBRL格式個別文件)
   c. 使用XBRL dashboard綜覽三家公司永續資訊
   d. 三家公司碳排放及能源來源比較(XBRL dashboard)
   e. 活動指標的揭露難處

周老師的ESG研究團隊

- 周國華老師：屏大會計系副教授，會計研究發展基金會XBRL委員會委員，證交所及櫃買中心TIFRS財務報告分類標準維護計畫主持人。
- 蘇佳成助理：成大會計系碩士班， TIFRS財務報告分類標準維護計畫助理。
- 王若芸助理：屏大會計系大二生。

周老師半導體產業分析教學網站

周老師近期寫的幾篇半導體產業分析文章

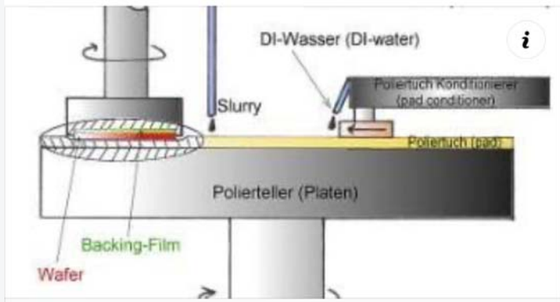
11:02

半導體產業討論區 (元件物理與製程、...

周國華分享了 1 條連結。
6月6日 ·

半導體化學機械研磨 (簡稱 CMP) 技術，可以將晶圓 (wafer) 的表面研磨成像鏡面一樣光滑，是晶圓製造商 (例如環球晶) 及晶片製造商 (例如台積電) 都會用到的製程技術。

CMP 製程會用到研磨液、研磨墊及鑽石碟三種材料。我整理了三種材料的全球…… 顯示更多



vocus.cc
半導體化學機械研磨 (CMP) 材料供應商名單彙整 | Kuohua - vocus

參考指引 4 • 產業分析與歷史故事
半導體化學機械研磨 (CMP) 材料供應商名單彙整
查看完整...

藍世寅和其他 549 人　70 次分享

讚　留言　分享

首頁　朋友　社團　通知　功能表

11:03

半導體產業討論區 (元件物理與製程、...

周國華分享了 1 條連結。
5月31日 ·

全球半導體設備供應商營收排名前五大的公司依序為美商應材、荷蘭 ASML、日商東京威力科創 (TEL)、美商柯林研發 (Lam Research)、美商科磊 (KLA)。我整理了這五家公司過去七個季度 (2019Q4 及 2020Q4 至 2022Q1) 客戶國別佔營收比例的數據，和大家分享。

vocus.cc
全球五大半導體設備供應商客戶國別佔營收比例分析_2022 版 | Kuohua - vocus

參考指引 4 • 產業分析與歷史故事
全球五大半導體設備供應商客戶國別佔營收比例分析_2022 版
查看完整...

藍世寅和其他 562 人　71 次分享

讚　留言　分享

首頁　朋友　社團　通知　功能表

11:03

半導體產業討論區 (元件物理與製程、...

周國華分享了 1 條連結。
4月28日 ·

《台積電的主要原物料供應商名單》

我在去年四月底根據台積 2020 年報的資料做過一次整理，並在本社群發表。這是根據台積 2021 年報作的更新。

vocus.cc
台積電的主要原物料供應商 | Kuohua - vocus

參考指引 4 • 產業分析與歷史故事
《台積電的主要原物料供應商名單》
查看完整參考...

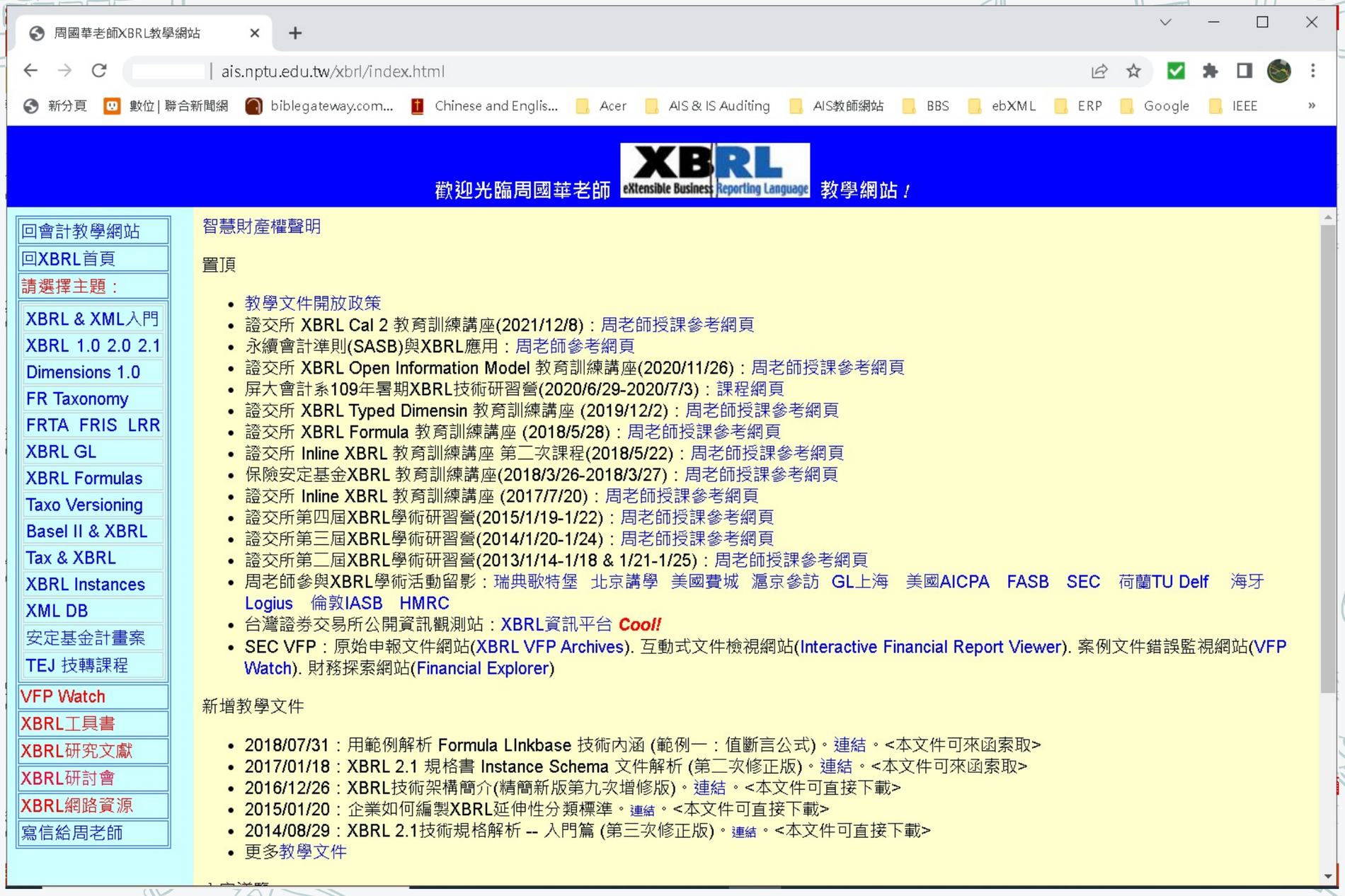
藍世寅和其他 404 人　83 次分享

讚　留言　分享

首頁　朋友　社團　通知　功能表

◆◆永續資訊揭露案例

周老師XBRL教學網站



◆◆永續資訊揭露案例

SASB 的產業揭露指標類別

- SASB準則涵蓋11個大產業別，及77個次產業別。
- SASB準則把產業別指標分為以下兩大類：
  - 會計指標(accounting metric)：提供總量衡量(例如溫室氣體總排放量)。
  - 活動指標(activity metric)：提供相對規模衡量(例如總生產量)。
- 以台積電和聯電為例，台積電的整體規模遠大於聯電，把會計指標和活動指標一起看，就可以比較兩家企業每單位生產量的排放情況。

ISSB 的產業揭露指標類別

- ISSB是由IFRS基金會成立的ESG準則機構，承繼SASB的準則及方法，並持續訂定新規範。
- ISSB涵蓋的產業別從SASB的77個減少為68個。
- ISSB 把產業別指標分為以下兩大類：
  - 永續揭露指標(sustainability disclosure metric)：即原SASB的會計指標。
  - 活動指標(activity metric)：與SASB的活動指標相同。

SASB 的半導體產業揭露指標

- 會計指標包含以下9大項：
  - 溫室氣體排放量
  - 製造業能源管理
  - 水資源管理
  - 廢棄物管理
  - 員工健康與安全
  - 招聘和管理全球技術熟練的勞動力
  - 產品生命週期管
  - 原料來源
  - 智慧財產保護及競爭行為
- 活動指標包含以下2項：
  - 生產總量
  - 產品自行製造百分比

SASB 的半導體產業9大項會計指標細節

Topic 揭露主題	Accounting Metric 會計指標
Greenhouse Gas Emission (G)溫室氣體排放量	G1. Greenhouse Gas Emissions Disclosure溫室氣體排放量揭露
	G2. Global Scope 1 Emissions全球範疇 1 排放
	G3. amount of total emissions from perfluorinated compounds全氟化合物的總排放量
	G4. Scope 1 Emissions, Long-term And Short-term Strategy, Targets And Performance Analysis範疇 1 排放、長期和短期策略、目標和績效分析
Energy 製造業能源管理 Management in	E1. Energy Management in Manufacturing Disclosure製造業能源管理的揭露
	E2. Total energy consumed總能源消耗量
	E3. (1) percentage grid electricity, (2) percentage renewable(1) 電網電力百分比，(2) 可再生能源百分比
Water Management (W) 水資源管理	W1. Water Management Disclosure 水資源管理揭露
	W2. Water Withdrawn 取水量
	W3. Water Consumed 用水量
	W4. Water Withdrawn, Percentage In Regions With High Or Extremely High Baseline Water Stress取水率，在基線水壓力高或極高的地區的百分比
	W5. Water Consumed, Percentage In Regions With High Or Extremely High Baseline Water Stress用水量，基線水壓力高或極高的地區的百分比
Waste Management (A)廢棄物管理	A1. Waste Management Disclosure廢棄物管理揭露
	A2. Amount of hazardous waste from manufacturing製造過程中產生的危險廢棄物量
	A3. The percentage of hazardous waste recycled危險廢棄物回收率
	A4. Frameworks Used To Define Hazardous Waste, And Amounts Of Waste Defined用於定義危險廢棄物的架構和定義的廢棄物量
Employee Health & Safety 員工健康與安全	E1. Employee Health And Safety Disclosure員工健康與安全揭露
	E2. Efforts To Assess, Monitor, And Reduce Exposure Of Workforce To Human Health Hazards努力評估、監測和減少勞動力對人類健康危害的暴露
	E3. Total amount of monetary losses as a result of legal proceedings associated with employee health and safety violations由於與員工健康和安全違規相
	E4. Describe the nature, context, and any corrective actions taken as a result of the monetary losses描述因金錢損失而採取的性質、背景和任何糾正措
Recruiting & Managing a Global & Skilled Workforce	R1. Labor Conditions Disclosure勞動條件揭露
	R2. Percentage of employees that are (1) foreign nationals and (2) located offshore(1) 外籍員工和 (2) 在海外的員工百分比
	R3. Potential Risks Of Recruiting Foreign Nationals Or Offshore Employees, And Management Approach To Addressing Risks招聘外籍員工或離岸員工的
Product Lifecycle Management (P)產品生命週期管理	P1. Product Lifecycle Management Disclosure產品生命週期管理揭露
	P2. Percentage of products by revenue that contain IEC 62474 declarable substances包含 IEC 62474 應申報物質的產品的收入百分比
	P3. Efforts to minimize usage of these substances.努力減少這些物質的使用
	P4. Processor energy efficiency at a system-level for: (1) servers, (2) desktops, and (3) laptops　系統級處理器能效：(1) 伺服器、(2) 桌上型電腦和 (3)
	P5. Efforts To Design For New And Emerging Usage Patterns With Respect To Energy Efficiency In All Product Categories努力為所有產品類別的能源效
Material Sourcing (M)原料來源	M1. Materials Sourcing Disclosure原料來源揭露
	M2. Management Of Risks Associated With Use Of Critical Materials與使用關鍵原料相關的風險管理

另外還有[智慧財產保護及競爭行為]這一大項...

ISSB 的半導體產業揭露指標

- 永續揭露指標從SASB的9大項縮減為以下4大項：
  - 溫室氣體排放量
  - 製造業能源管理
  - 水資源管理
  - 產品生命週期管理
- 活動指標維持和SASB一樣的2項：
  - 生產總量
  - 產品自行製造百分比

XBRL：ESG資訊的揭露工具

- XBRL 是可延伸企業報告語言(eXtensible Business Reporting Language)的簡稱。
- XBRL 自2000年問世以來，因其可將財務數據以高度結構化的方式表達，利於軟體直接擷取及分析，已迅速成為全球主要國家金融監理文件的申報標準。近年並已大幅擴展至非財務領域之應用。
- SASB在2021年8月公布對應整套SASB準則的XBRL分類標準；ISSB也在2022年5月公布對應S1及S2這兩套ISSB準則草案的XBRL分類標準。

ISSB半導體產業的XBRL表達連結結構

Presentation Link

Role Type List | Arcrole Type List | Element Declaration Table | Query Table | Table Link | Generic Resource Table | Dimension

Presentation Link | Definition Link | Calculation Link | Label Link | Reference Link | Content Model

XLink Role: All

Arcrole: All

Element	order	system id (all)
[850400] Industry Metrics - Technology & Communications - Semiconductors (TC-SC)		
Semiconductors Industry [Abstract]		
Semiconductors Industry, Sustainability Disclosure Metrics [Abstract]	10	pre_im_1_2022-05-25.xml
Greenhouse Gas Emissions Disclosure [Abstract]	10	pre_im_1_2022-05-25.xml
Greenhouse Gas Emissions Disclosure [Text Block]	10	pre_im_1_2022-05-25.xml
TC-SC-110a.1 [Abstract]	20	pre_im_1_2022-05-25.xml
TC-SC-110a.2 [Abstract]	30	pre_im_1_2022-05-25.xml
Energy Management in Manufacturing Disclosure [Abstract]	20	pre_im_1_2022-05-25.xml
Energy Management in Manufacturing Disclosure [Text Block]	10	pre_im_1_2022-05-25.xml
TC-SC-130a.1 [Abstract]	20	pre_im_1_2022-05-25.xml
Water Management Disclosure [Abstract]	30	pre_im_1_2022-05-25.xml
Water Management Disclosure [Text Block]	10	pre_im_1_2022-05-25.xml
TC-SC-140a.1 [Abstract]	20	pre_im_1_2022-05-25.xml
Product Lifecycle Management Disclosure [Abstract]	40	pre_im_1_2022-05-25.xml
Product Lifecycle Management Disclosure [Text Block]	10	pre_im_1_2022-05-25.xml
TC-SC-410a.1 [Abstract]	20	pre_im_1_2022-05-25.xml
TC-SC-410a.2 [Abstract]	30	pre_im_1_2022-05-25.xml
Semiconductors Industry, Activity Metrics [Abstract]	20	pre_im_1_2022-05-25.xml
TC-SC-000.A [Abstract]	10	pre_im_1_2022-05-25.xml
Production, Units	10	pre_im_1_2022-05-25.xml
TC-SC-000.B [Abstract]	20	pre_im_1_2022-05-25.xml
Production, Percentage From Owned Facilities	10	pre_im_1_2022-05-25.xml

ISSB半導體產業的XBRL定義連結(維度表格)結構

Definition Link

Role Type List | Arcrole Type List | Element Declaration Table | Query Table | Table Link | Generic Resource Table | Dimension

Presentation Link | Definition Link | Calculation Link | Label Link | Reference Link | Content Model

XLink Role: All

Arcrole: All

Element	arcrole	order	system ...	cont...
[850400b] Industry Metrics - Technology & Communications - Semiconductors (TC-SC) - Energy Consumed, Percentage [Table]				
Energy Consumed, Percentage [Abstract]				
Energy Consumed, Percentage [Table]	all (*)	10	def_im_...	scenario
Energy Source [Axis]	hypercube-dim...	10	def_im_...	
Energy Consumed, Percentage [Line Items]	domain-memb...	20	def_im_...	scenario
[850400c] Industry Metrics - Technology & Communications - Semiconductors (TC-SC) - Global Scope 1 Emissions [Table]				
Gross Scope 1 Greenhouse Gas Emissions [Abstract]				
Gross Scope 1 Greenhouse Gas Emissions [Table]	all (*)	10	def_im_...	scenario
Pollutant [Axis]	hypercube-dim...	10	def_im_...	
Gross Scope 1 Greenhouse Gas Emissions [Line Items]	domain-memb...	20	def_im_...	scenario
[850400f] Industry Metrics - Technology & Communications - Semiconductors (TC-SC) - Processor Energy Efficiency At System-level [Tab				
Processor Energy Efficiency At System-level [Abstract]				
Processor Energy Efficiency At System-level [Table]	all (*)	10	def_im_...	scenario
Product Type [Axis]	hypercube-dim...	10	def_im_...	
Processor Energy Efficiency At System-level [Line Items]	domain-memb...	20	def_im_...	scenario
[850400g] Industry Metrics - Technology & Communications - Semiconductors (TC-SC) - Product Revenue, Percentage [Table]				
Product Revenue, Percentage [Abstract]				
Product Revenue, Percentage [Table]	all (*)	10	def_im_...	scenario
Product Type [Axis]	hypercube-dim...	10	def_im_...	
Product Revenue, Percentage [Line Items]	domain-memb...	20	def_im_...	scenario

案例公司：台積電、三星、Intel 簡介

- 台積電：全球最大半導體晶圓代工企業，2022Q1市佔率高達53.6%。
- 三星電子：全球最大半導體記憶體製造商，及第二大晶圓代工企業。三星另有液晶面板、手機、家電..等部門。
- Intel：桌機及筆電CPU的霸主，x86指令集架構的源生地，近年亦積極尋求重回晶圓代工市場。

案例分析資料說明：

- 以下案例分析資料，均取材自三家公司網站提供的PDF格式永續報告書(2020版)內容。
- 本團隊依照ISSB制定的永續揭露XBRL分類標準，編製三家公司XBRL格式永續報告書案例文件。
- 本團隊使用日本Fujitsu公司開發的XWand軟體，進行上述XBRL案例文件編製作業。SASB及ISSB也是使用XWand軟體制定XBRL分類標準。
- XWand軟體有dashboard功能，可以將個別公司或多家公司的XBRL資料整合展示。

台積電、三星、Intel 的 ISSB 報告 (XBRL格式原始檔)

ISSB_TC-SC_TSMC.xml

```
77  <ifrs-sds:GreenhouseGasEmissionsDisclosureTextBlock
    contextRef="From20200101To20201231">By taking
    tangible actions, the Company has effectively
    reduced 4.2 million metric tons of direct CO2e
    emissions (Scope 1), of which fluorinated GHG
    emissions per suppliers to work together toward
    creating a sustainable supply chain. Using
    renewable energy is the primary unit product were
    reduced considerably by 68% in 2020, more than two
    times the target set by the World Semiconductor
    Council.
    </ifrs-sds:GreenhouseGasEmissionsDisclosureTextBlock>
78  <ifrs-sds:GrossScope1GreenhouseGasEmissions decimals
    ="0" contextRef="From20200101To20201231" unitRef=
    "MetricTonnesOfCO2Equivalent">2450354
    </ifrs-sds:GrossScope1GreenhouseGasEmissions>
79  <ifrs-sds:GrossScope1GreenhouseGasEmissions decimals
    ="0" contextRef=
    "Context_Duration_PerflourinatedCarbonsMember"
    unitRef="MetricTonnesOfCO2Equivalent">664974
    </ifrs-sds:GrossScope1GreenhouseGasEmissions>
80
    <ifrs-sds:Scope1EmissionsLongTermAndShortTermStrategy
    TargetsAndPerformanceAnalysisTextBlock contextRef=
    "From20200101To20201231">Targets:
81  In July 2020, TSMC officially joined the RE100. We
    committed to 100% renewable energy in global
    operations and zero direct CO2 emissions from
    electricity consumption by 2050.
82  Performance:
83  1. All facilities and subsidiaries completed
    emissions inventory and third-party verification.
84  2. Introduced optimized process parameters in
    accordance with the manufacturing specifications of
    the Intelligent Engineering Center.
85  3. All 12-inch fabs are now using optimized carbon
    reduction technology – remote plasma dissociation of
    Nitrogen Trifluoride (NF3).
86  4. 6-inch and 8-inch fabs are using Nitrogen
    Trifluoride(NF3)/Octafluorobutane(C4F8).
87  5. In 2020, TSMC replaced and installed roughly 1,684
    local abatement facilities for fluorinated GHGs and
    nitrous oxide, and acquired two new green building
    certificates.
88  6. Introduced optimized process parameters in
    accordance with the manufacturing specifications of
    the Intelligent Engineering Center.
```

ISSB_TC-SC_SAMSUNG.xml

```
62  <ifrs-sds:GreenhouseGasEmissionsDisclosureTextBlock
    contextRef="From20200101To20201231">In 2020, we saw
    an increase in GHG emissions compared to 2019, as
    we expanded the operation of our new emiconductor
    production line and product output.Recorded 3.2
    tonnes of CO□e/KRW 100 million, a 5.1%  increase
    from 2019.
    </ifrs-sds:GreenhouseGasEmissionsDisclosureTextBlock
63  <ifrs-sds:GrossScope1GreenhouseGasEmissions decimals
    ="-3" contextRef=
    "Context_Duration_PerflourinatedCarbonsMember"
    unitRef="MetricTonnesOfCO2Equivalent">3322000
    </ifrs-sds:GrossScope1GreenhouseGasEmissions>
64  <ifrs-sds:GrossScope1GreenhouseGasEmissions decimals
    ="-3" contextRef="From20200101To20201231" unitRef=
    "MetricTonnesOfCO2Equivalent">5726000
    </ifrs-sds:GrossScope1GreenhouseGasEmissions>
65
    <ifrs-sds:Scope1EmissionsLongTermAndShortTermStrateg
    TargetsAndPerformanceAnalysisTextBlock contextRef=
    "From20200101To20201231">Targets：
66  In the short term, we consider carbon prices (prices
    of carbon credit), extreme weather, and adoption of
    highly-efficient technology as potential issues,
    while we see securing carbon credit and saving energy
    cost as opportunities. In the mid term, we expect
    changes in consumption patterns and an increase in
    the use of renewable energy to be opportunities while
    we perceive physical changes such as the rise in
    temperature as a long-term risk.
67  Performance：
68  Relative to 2008, we were able to reduce annual
    energy usage by an average of 32% and for the past
    three years we have been continuously decreasing the
    amount of GHG emissions during product use phase.
69  Strategy：
70  Develop strategies for eco-conscious products,
    including energy reduction technology and efficiency
    improvement.
    </ifrs-sds:Scope1EmissionsLongTermAndShortTermStrategy
    argetsAndPerformanceAnalysisTextBlock>
71
    <ifrs-sds:EnergyManagementInManufacturingDisclosureT
    xtBlock contextRef="From20200101To20201231">As a
    result, relative to 2008, we were able to reduce
    annual energy usage by an average of 32% and for
    the past three years we have been continuously
```

ISSB_TC-SC_INTEL.xml

```
62  <ifrs-sds:GreenhouseGasEmissionsDisclosureTextBlock
    contextRef="From20200101To20201231">The percent
    reduction will be measured from our 2019 full-year
    emissions. Our combined Scope 1 and Scope 2 GHG
    emissions in 2019 were 2.88 million metric tonnes
    of CO2e.
    </ifrs-sds:GreenhouseGasEmissionsDisclosureTextBlock>
63  <ifrs-sds:GrossScope1GreenhouseGasEmissions decimals
    ="-4" contextRef="From20200101To20201231" unitRef=
    "MetricTonnesOfCO2Equivalent">1970000
    </ifrs-sds:GrossScope1GreenhouseGasEmissions>
64  <ifrs-sds:GrossScope1GreenhouseGasEmissions decimals
    ="-4" contextRef=
    "Context_Duration_PerflourinatedCarbonsMember"
    unitRef="MetricTonnesOfCO2Equivalent">960000
    </ifrs-sds:GrossScope1GreenhouseGasEmissions>
65
    <ifrs-sds:Scope1EmissionsLongTermAndShortTermStrategy
    TargetsAndPerformanceAnalysisTextBlock contextRef=
    "From20200101To20201231">Targets:
66  We have tracked our Scope 1 and Scope 2 emissions
    over the past two decades against a science-based
    reduction target of 80% from 2000 levels by 2050.
67  We are committed to driving reductions through our
    2030 RISE goals, as well as through collaboration
    with others in the semiconductor and other
    manufacturing industries. Drive a 10% reduction in
    our absolute Scope 1 and 2 carbon emissions as we
    grow, informed by climate science.
68  Performance:
69  Since 2000, our Scope 1 and 2 emissions have
    decreased by about 28% on an absolute basis, even as
    we expanded our manufacturing capacity significantly.
70  Strategy:
71  In 2021, we will continue to take action on emissions
    reduction strategies focused on emissions abatement,
    continued investments in renewable electricity,
    process and equipment optimization, and energy
    conservation.
    </ifrs-sds:Scope1EmissionsLongTermAndShortTermStrategyT
    argetsAndPerformanceAnalysisTextBlock>
72
    <ifrs-sds:EnergyManagementInManufacturingDisclosureTe
    xtBlock contextRef="From20200101To20201231">In
    September 2020, we also became a member of RE100, a
    global coalition of businesses committed to 100%
    renewable electricity use.
```

台積電 的 ISSB 報告 (XBRL Dashboard)

Table

[850400] Industry Metrics - Technology & Communications - Semiconductors (TC-SC)

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Page

Semiconductors Industry [...

					Semiconductors Industry [Abstract]																				
					Semiconductors Industry, Sustainability Disclosure Metrics [Abstract]																				Semiconductors Industry, Activity Metrics [Abstract]
					Greenhouse Gas Emissions Disclosure [Abstract]				Energy Management in Manufacturing Disclosure [Abstract]				Water Management Disclosure [Abstract]						Product Lifecycle Management Disclosure [Abstract]				TC-SC-000.A [Abstract]
					Greenhouse Gas Emissions Disclosure [Text Block]	TC-SC-110a.1 [Abstract]		TC-SC-110a.2 [Abstract]	Energy Management in Manufacturing Disclosure [Text Block]	TC-SC-130a.1 [Abstract]		Water Management Disclosure [Text Block]	TC-SC-140a.1 [Abstract]				Product Lifecycle Management Disclosure [Text Block]	TC-SC-410a.1 [Abstract]		TC-SC-410a.2 [Abstract]	Production, Units
						Gross Scope 1 Greenhouse Gas Emissions [Abstract]	Gross Scope 1 Greenhouse Gas Emissions	Scope 1 Emissions, Long-term And Short-term Strategy, Targets And Performance Analysis [Text Block]		Energy Consumed, Percentage [Abstract]	Energy Consumed		Water Withdrawn	Water Consumed	Water Withdrawn, Percentage In Regions With High Or Extremely High Baseline Water Stress	Water Consumed, Percentage In Regions With High Or Extremely High Baseline Water Stress		Product Revenue, Percentage [Abstract]	Efforts To Minimize Usage Of IEC 62474 Declarable Substances [Text Block]	Efforts To Design For New And Emerging Usage Patterns With Respect To Energy Efficiency In All Product Categories [Text Block]	
						Gross Scope 1 Greenhouse Gas Emissions [Line Items]				Energy Consumed, Percentage [Line Items]								Product Revenue, Percentage [Line Items]			
						Gross Scope 1 Greenhouse Gas Emissions				Energy Consumed, Percentage								Product Revenue, Percentage			
I...	Energy ...	Product ...	Poll...	Peri...																			
2330	Energy Source [Domain]	Product Type [Domain]	Pollutant [Domain]	2020-01-01 - 2020-12-31	By taking tangible actions, the Company has effectively reduced	2450354	2450354	Targets: In July 2020, TSMC officially joined the RE100	Purchased 1,230 GWh of renewable energy, Renewable Energy C	-	60908400	In 2020, Fab 15A and Fab 15B broke records again by obtaining Platinu	77257000	72255000	0.04	0.01		0.0016		Externally, we are leading the world in high-performance, energy	12400000
			Perflourinate	2020-01-01	-	664974	664974	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Products Containi	Pollutant [D	2020-01-01	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0016	-	-	-
	Renewable Energ	Product Type [D	Pollutant [D	2020-01-01	-	-	-	-	-	0.073	-	-	-	-	-	-	-	-	-	-	-
	Grid Electricity [	Product Type [D	Pollutant [D	2020-01-01	-	-	-	-	-	0.95	-	-	-	-	-	-	-	-	-	-	-

◆◆永續資訊揭露案例

三星電子 的 ISSB 報告 (XBRL Dashboard)

Table

[850400] Industry Metrics - Technology & Communications - Semiconductors (TC-SC)

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Semiconductors Industry [...

				Semiconductors Industry [Abstract]																
				Semiconductors Industry, Sustainability Disclosure Metrics [Abstract]																
				Greenhouse Gas Emissions Disclosure [Abstract]					Energy Management in Manufacturing Disclosure [Abstract]				Water Management Disclosure [Abstract]				Product Lifecycle Management Disclosure [Abstract]		
Ide...	Pollut...	Energy S...	Period	Greenhouse Gas Emissions Disclosure [Text Block]	TC-SC-110a.1 [Abstract]		TC-SC-110a.2 [Abstract]		Energy Management in Manufacturing Disclosure [Text Block]	TC-SC-130a.1 [Abstract]			Water Management Disclosure [Text Block]	TC-SC-140a.1 [Abstract]			Product Lifecycle Management Disclosure [Text Block]	TC-SC-410a.1 [Abstract]	TC-SC-410a.2 [Abstract]	
					Gross Scope 1 Greenhouse Gas Emissions [Abstract]	Gross Scope 1 Greenhouse Gas Emissions	Scope 1 Emissions, Long-term And Short-term Strategy, Targets And Performance Analysis [Text Block]			Energy Consumed, Percentage [Abstract]	Energy Consumed			Water Withdrawn	Water Consumed			Efforts To Minimize Usage Of IEC 62474 Declarable Substances [Text Block]	Efforts To Design For New And Emerging Usage Patterns With Respect To Energy Efficiency In All Product Categories [Text Block]	
					Gross Scope 1 Greenhouse Gas Emissions [Line Items]					Energy Consumed, Percentage [Line Items]										
					Gross Scope 1 Greenhouse Gas Emissions					Energy Consumed, Percentage										
005930	Pollutant [Domain]	Energy Source [Domain]	2020-01-01 - 2020-12-31	In 2020, we saw an increase in GHG emissions compared to 2019,	5726000	5726000	Targets： In the short term, we consider carbon prices (pric	As a result, relative to 2008, we were able to reduce annual energ	-	104486400	We discuss the water resource related agenda in our EHS Counci	142294000	109201000	We have introduced programs throughout the product lifecycle, to	We also support improvements of facilities, such as the local exha	Home Appliances： Our BESPOKE refrigerator line-
		Grid Electricity [D	2020-01-01 - 2020-12-31	-	-	-	-	-	0.79	-	-	-	-	-	-	-	-	-	-	-
		Renewable Energy	2020-01-01 - 2020-12-31	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-
	Perflourinated	Energy Source [D	2020-01-01 - 2020-12-31	-	3322000	3322000	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intel 的 ISSB 報告 (XBRL Dashboard)

Table

[850400] Industry Metrics - Technology & Communications - Semiconductors (TC-SC)

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Semiconductors Industry [...

Identifier	Energy ...	Pollutant...	Period	Semiconductors Industry [Abstract]														
				Semiconductors Industry, Sustainability Disclosure Metrics [Abstract]														
				Greenhouse Gas Emissions Disclosure [Abstract]				Energy Management in Manufacturing Disclosure [Abstract]			Water Management Disclosure [Abstract]			Product Lifecycle Management Disclosure [Abstract]				
				Greenhouse Gas Emissions Disclosure [Text Block]	TC-SC-110a.1 [Abstract]		TC-SC-110a.2 [Abstract]	Energy Management in Manufacturing Disclosure [Text Block]	TC-SC-130a.1 [Abstract]		Water Management Disclosure [Text Block]	TC-SC-140a.1 [Abstract]		Product Lifecycle Management Disclosure [Text Block]	TC-SC-410a.1 [Abstract]	TC-SC-410a.2 [Abstract]		
					Gross Scope 1 Greenhouse Gas Emissions [Abstract]	Gross Scope 1 Greenhouse Gas Emissions	Scope 1 Emissions, Long-term And Short-term Strategy, Targets And Performance Analysis [Text Block]		Energy Consumed, Percentage [Abstract]	Energy Consumed		Water Withdrawn	Water Consumed		Efforts To Minimize Usage Of IEC 62474 Declarable Substances [Text Block]	Efforts To Design For New And Emerging Usage Patterns With Respect To Energy Efficiency In All Product Categories [Text Block]	
					Gross Scope 1 Greenhouse Gas Emissions [Line Items]				Energy Consumed, Percentage [Line Items]									
					Gross Scope 1 Greenhouse Gas Emissions				Energy Consumed, Percentage									
0000050863	Energy Source [Domain]	Pollutant [Domain]	2020-01-01 - 2020-12-31	The percent reduction will be measured from our 2019 full-year emi	1970000	1970000	Targets: We have tracked our Scope 1 and Scope 2 emissi	In September 2020, we also became a member of RE100, a globa	-	38000000	Our 2020 absolute water use increased 10% as we continued to gr	52300000	12900000	The increase in annual and lifetime emissions compared with 20		1. Intel achieved 100% adoption of Modern Standby on notebook		
		Perflourinated Ca	2020-01-01 - 2020-12-31	-	960000	960000	-	-	-	-	-	-	-	-	-	-	-	-
	Grid Electricity [	Pollutant [Domai	2020-01-01 - 2020-12-31	-	-	-	-	-	0.83	-	-	-	-	-	-	-	-	-
	Renewable Energ	Pollutant [Domai	2020-01-01 - 2020-12-31	-	-	-	-	-	0.82	-	-	-	-	-	-	-	-	-

台積電、三星、Intel 的 ISSB 報告彙整 (XBRL Dashboard)[舊]

Table

[850400] Industry Metrics - Technology & Communications - Semiconductors (TC-SC)

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Semiconductors Industry [...

Semiconductors Industry [Abstract] — Semiconductors Industry, Sustainability Disclosure Metrics [Abstract]; Semiconductors Industry, Activity Metrics [Abstract]

Ident...	Energy...	Pol...	Period	Product Type [A...	Greenhouse Gas Emissions Disclosure [Abstract]: Greenhouse Gas Emissions Disclosure [Text Block]	Greenhouse Gas Emissions Disclosure [Abstract]: TC-SC-110a.1 [Abstract]: Gross Scope 1 Greenhouse Gas Emissions [Abstract]: Gross Scope 1 Greenhouse Gas Emissions [Line Items]: Gross Scope 1 Greenhouse Gas Emissions	Greenhouse Gas Emissions Disclosure [Abstract]: TC-SC-110a.1 [Abstract]: Gross Scope 1 Greenhouse Gas Emissions	Greenhouse Gas Emissions Disclosure [Abstract]: TC-SC-110a.2 [Abstract]: Scope 1 Emissions, Long-term And Short-term Strategy, Targets And Performance Analysis [Text Block]	Energy Management in Manufacturing Disclosure [Abstract]: Energy Management in Manufacturing Disclosure [Text Block]	Energy Management in Manufacturing Disclosure [Abstract]: TC-SC-130a.1 [Abstract]: Energy Consumed, Percentage [Abstract]: Energy Consumed, Percentage [Line Items]: Energy Consumed, Percentage	Energy Management in Manufacturing Disclosure [Abstract]: TC-SC-130a.1 [Abstract]: Energy Consumed	Water Management Disclosure [Abstract]: Water Management Disclosure [Text Block]	Water Management Disclosure [Abstract]: TC-SC-140a.1 [Abstract]: Water Withdrawn	Water Management Disclosure [Abstract]: TC-SC-140a.1 [Abstract]: Water Consumed	Water Management Disclosure [Abstract]: TC-SC-140a.1 [Abstract]: Water Withdrawn, Percentage In Regions With High Or Extremely High Baseline Water Stress	Water Management Disclosure [Abstract]: TC-SC-140a.1 [Abstract]: Water Consumed, Percentage In Regions With High Or Extremely High Baseline Water Stress	Product Lifecycle Management Disclosure [Abstract]: Product Lifecycle Management Disclosure [Text Block]	Product Lifecycle Management Disclosure [Abstract]: TC-SC-410a.1 [Abstract]: Product Revenue, Percentage [Abstract]: Product Revenue, Percentage [Line Items]: Product Revenue, Percentage	Product Lifecycle Management Disclosure [Abstract]: TC-SC-410a.1 [Abstract]: Efforts To Minimize Usage Of IEC 62474 Declarable Substances [Text Block]	Product Lifecycle Management Disclosure [Abstract]: TC-SC-410a.2 [Abstract]: Efforts To Design For New And Emerging Usage Patterns With Respect To Energy Efficiency In All Product Categories [Text Block]	TC-SC-000.A [Abstract]: Production, Units
0000050863	Energy Source [Domain]	Pollutant [Domain]	2020-01-01 - 2020-12-31	Product Type [Domain]	The percent r eduction will be measured f rom our 2019	1.97	1.97	Targets: We have trac ked our Scop e 1 and Scop	In September 2020, we also became a me mber of RE10	-	38000000	Our 2020 abso lute water use increased 10% as we continu	52300000	12900000	-	-	The increase in annual an d lifetime e missions co	-		1. Intel achieved 100% adoption of Modern Stan dby on notebook	-
		Perflourinat	2020-01-01 -	Product Type [Domain]	-	0.96	0.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grid Electricity	Pollutant [D	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.83	-	-	-	-	-	-	-	-	-	-	-
	Renewable Ener	Pollutant [D	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.82	-	-	-	-	-	-	-	-	-	-	-
005930	Energy Source [Domain]	Pollutant [Domain]	2020-01-01 - 2020-12-31	Product Type [Domain]	In 2020, we s aw an increas e in GHG em issions compa	5726	5726	Targets： In the short t erm, we cons ider carbon p	As a result, rel ative to 2008, we were able t o reduce annu	-	104486400	We discuss the water resourc e related agen da in our EHS	142294000	109201000	-	-	We have intr oduced prog rams throug hout the pro	-	We also supp ort improvem ents of facilit ies, such as th	Home Appliance s： Our BESPOKE refrigerator line-	-
		Perflourinat	2020-01-01 -	Product Type [Domain]	-	3322	3322	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2330	Energy Source [Domain]	Pollutant [Domain]	2020-01-01 - 2020-12-31	Product Type [Domain]	By taking tan gible actions, the Company has effectivel	2450354	2450354	Targets: In July 2020, TSMC offici ally joined th	Purchased 1,2 30 GWh of re newable energ y, Renewable	-	60908400	In 2020, Fab 1 5A and Fab 15 B broke recor ds again by ob	77257000	72255000	0.04	0.01		0.0016		Externally, we a re leading the w orld in high-perf ormance, energy	12400000
				Products Containing IEC	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0016	-	-	-
		Perflourinat	2020-01-01 -	Product Type [Domain]	-	664974	664974	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grid Electricity	Pollutant [D	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.95	-	-	-	-	-	-	-	-	-	-	-
	Renewable Ener	Pollutant [D	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.073	-	-	-	-	-	-	-	-	-	-	-

代碼：2330:台積電，005930:三星，0000050863:Intel

◆◆永續資訊揭露案例

台積電、三星、Intel 的 ISSB 報告彙整 (XBRL Dashboard)[新]

Table

[850400] Industry Metrics - Technology & Communications - Semiconductors (TC-SC)

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Semiconductors Industry [...

					Semiconductors Industry [Abstract]																							
					Semiconductors Industry, Sustainability Disclosure Metrics [Abstract]																							Semiconductors Industry, Activity Metrics [Abstract]
					Greenhouse Gas Emissions Disclosure [Abstract]				Energy Management in Manufacturing Disclosure [Abstract]			Water Management Disclosure [Abstract]					Product Lifecycle Management Disclosure [Abstract]					TC-SC-000.A [Abstract]	
Ident...	Energy...	Pollut...	Period	Product Type [A...	Greenhouse Gas Emissions Disclosure [Text Block]	TC-SC-110a.1 [Abstract]		TC-SC-110a.2 [Abstract]	Energy Management in Manufacturing Disclosure [Text Block]	TC-SC-130a.1 [Abstract]		Water Management Disclosure [Text Block]	TC-SC-140a.1 [Abstract]				Product Lifecycle Management Disclosure [Text Block]	TC-SC-410a.1 [Abstract]		TC-SC-410a.2 [Abstract]	Production, Units
						Gross Scope 1 Greenhouse Gas Emissions [Abstract]	Gross Scope 1 Greenhouse Gas Emissions	Scope 1 Emissions, Long-term And Short-term Strategy, Targets And Performance Analysis [Text Block]		Energy Consumed, Percentage [Abstract]	Energy Consumed		Water Withdrawn	Water Consumed	Water Withdrawn, Percentage In Regions With High Or Extremely High Baseline Water Stress	Water Consumed, Percentage In Regions With High Or Extremely High Baseline Water Stress		Product Revenue, Percentage [Abstract]	Efforts To Minimize Usage Of IEC 62474 Declarable Substances [Text Block]	Efforts To Design For New And Emerging Usage Patterns With Respect To Energy Efficiency In All Product Categories [Text Block]	
						Gross Scope 1 Greenhouse Gas Emissions [Line Items]				Energy Consumed, Percentage [Line Items]								Product Revenue, Percentage [Line Items]			
						Gross Scope 1 Greenhouse Gas Emissions				Energy Consumed, Percentage								Product Revenue, Percentage			
0000050863	Energy Source [Domain]	Pollutant [Domain]	2020-01-01 - 2020-12-31	Product Type [Domain]	The percent reduction will be measured from our 2019 full-year	1970000	1970000	Targets: We have tracked our Scope 1 and Scope 2	In September 2020, we also became a mem	-	38000000	Our 2020 absolute water use increased 10% as we	52300000	12900000	-	-	The increase in annual and lifetime emissions co	-		1. Intel achieved 100% adoption of Modern Standby on not	-
		Perflourinated	2020-01-01 -	Product Type [Domain]	-	960000	960000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Renewable Ener	Pollutant [Don	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.82	-	-	-	-	-	-	-	-	-	-	-	-
	Grid Electricity	Pollutant [Don	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.83	-	-	-	-	-	-	-	-	-	-	-	-
005930	Energy Source [Domain]	Pollutant [Domain]	2020-01-01 - 2020-12-31	Product Type [Domain]	In 2020, we saw an increase in GHG emissions compared to 2019,	5726000	5726000	Targets： In the short term, we consider carbon pric	As a result, relative to 2008, we were able t	-	104486400	We discuss the water resource related agenda in o	142294000	109201000	-	-	We have introduced programs throughout the pro	-	We also support improvements of facilities, such as the l	Home Appliances： Our BESPOKE refrigerator l	-
		Perflourinated	2020-01-01 -	Product Type [Domain]	-	3322000	3322000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Renewable Ener	Pollutant [Don	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-
	Grid Electricity	Pollutant [Don	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.79	-	-	-	-	-	-	-	-	-	-	-	-
2330	Energy Source [Domain]	Pollutant [Domain]	2020-01-01 - 2020-12-31	Product Type [Domain]	By taking tangible actions, the Company has effectively reduced	2450354	2450354	Targets: In July 2020, TSMC officially joined the	Purchased 1,230 GWh of renewable energy	-	60908400	In 2020, Fab 15A and Fab 15B broke records agai	77257000	72255000	0.04	0.01		0.0016		Externally, we are leading the world in high-performance, e	12400000
				Products Containing IEC	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0016	-	-	-	
		Perflourinated	2020-01-01 -	Product Type [Domain]	-	664974	664974	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grid Electricity	Pollutant [Don	2020-01-01 -	Product Type [Domain]	-	-	-	-	-	0.95	-	-	-	-	-	-	-	-	-	-	-	-

代碼：2330:台積電，005930:三星，0000050863:Intel

◆◆永續資訊揭露案例

台積、三星 及 Intel 碳排放量比較 (XBRL Dashboard)

Table

[850400c] Industry Metrics - Technology & Communications - Semiconductors (TC-SC) - Global Scope 1 Emissions [Table] (Dimension)

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Identifier | Pollutant [Axis] | Period

	0000050863		005930		2330	
	Pollutant [Member]	Pollutant [Domain]	Pollutant [Member]	Pollutant [Domain]	Pollutant [Member]	Pollutant [Domain]
Gross Scope 1 Greenhouse Gas E...	Perflourinated Carbons		Perflourinated Carbons		Perflourinated Carbons	
	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31
Gross Scope 1 Greenhouse Gas Emissions						
Gross Scope 1 Greenhouse Gas Emissi						
Gross Scope 1 Greenhouse Gas Em	960000	1970000	3322000	5726000	664974	2450354

代碼：2330:台積電，005930:三星，0000050863:Intel

碳排放量：三星 > 台積 > Intel

台積、三星 及 Intel 能源來源比較 (XBRL Dashboard)

Table

[850400b] Industry Metrics - Technology & Communications - Semiconductors (TC-SC) - Energy Consumed, Percentage [Table] (Dimension)

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Page

Identifier | Energy Source [Axis] | Period

	0000050863		005930		2330	
	Energy Source [Domain]		Energy Source [Domain]		Energy Source [Domain]	
	Grid Electricity [Member]	Renewable Energy [Member]	Grid Electricity [Member]	Renewable Energy [Member]	Grid Electricity [Member]	Renewable Energy [Member]
Energy Consumed, Percentage [...	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31	2020-01-01 - 2020-12-31
Energy Consumed, Percentage [Abstract]						
Energy Consumed, Percentage [Line I						
Energy Consumed, Percentage	0.83	0.82	0.79	0.14	0.95	0.073

代碼：2330:台積電，005930:三星，0000050863:Intel

電網電力佔能源比例：台積(0.95) > Intel (0.83) > 三星(0.79)

再生能源佔能源比例：Intel (0.82) > 三星(0.14) > 台積(0.073)

活動指標在揭露上的難處

- ISSB對半導體產業設有兩個活動指標，但在實際應用上有其難處：
  - 生產總量：台積電有揭露約當12吋晶圓的生產總量，三星和Intel可能因為產品線複雜，未能提供足以代表公司生產總量的數據。
  - 產品自行製造百分比：三家公司都未提供此數據。台積是純晶圓代工公司，「產品」都是別人的；三星和Intel業務型態複雜，兩家都有做晶圓代工，但自家產品也分別找聯電和台積代工，自製百分比可能屬於不方便揭露的商業機密。

Any questions?

You can find me at:

周國華老師信箱：kuohua@mail.nptu.edu.tw

周老師教學網站：http://www.ais.nptu.edu.tw

Thank You

意見調查

QR code

（本會收到您的投影片後，將會加上問卷QR碼）