

Current Status and Future Plans of Industrial Science Support Center (ISSC)

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(Head of ISSC, PAL)

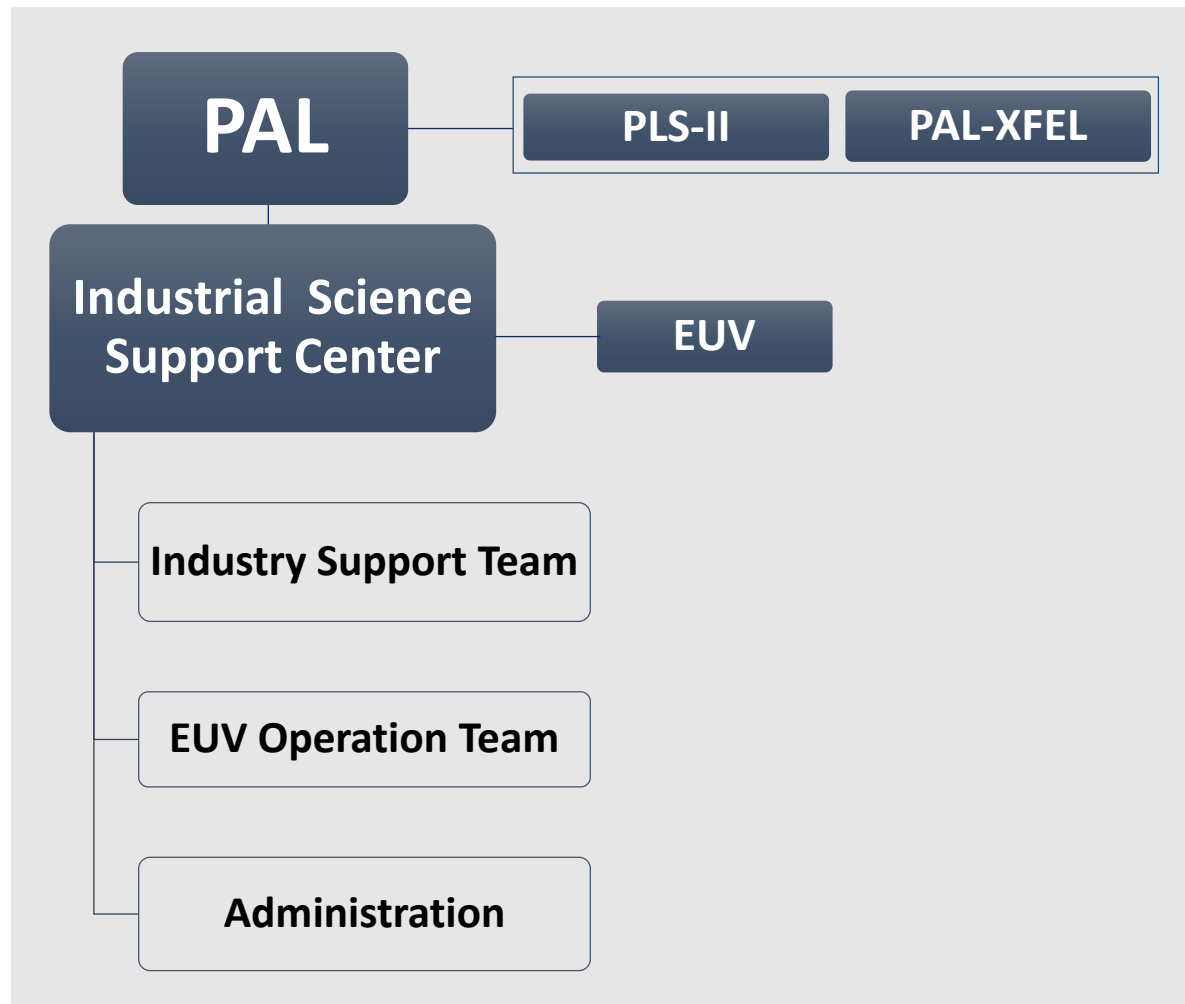
November 13, 2023



Organization & Mission of Industrial Science Support Center (ISSC)

❖ Organization

- Establishment in October 2013
- Reorganization in January 2023



❖ Mission

- PAL, dedicated to supporting the academic Science
- **Platform service** to provide synchrotron science to industry
- Connecting **industry science needs** to **staff scientists** with expertise in various research fields



Organization of Industrial Science Support Center (ISSC)

❖ Dedicated Industrial Science Support Group

- Composed of beamline scientists of PLS-II beamline department
- For national key industries; Battery materials, Biomaterials, and Semiconductor
- Necessary to be specialized and expand industrial application services to meet growing demands.

➤ Dedicated Battery Science Support Group

Experts	Techniques	Analytical Information	Beamline
Dr. D. Ahn Dr. H. Ahn	High-resolution powder Diffraction <i>In-situ</i> XRD	<i>(In-situ)</i> crystal structure & micro-structure analysis	9A, 9B
Dr. J. Lim Dr. J. H. Lim	X-ray Transmission Imaging Computed Tomography XANES Imaging	<i>(In-situ)</i> surface/interface behavior & structure analysis for battery materials, cell volume change etc.	6C, 7C
Dr. K. Lee Dr. N. Sung	<i>(In-situ)</i> X-ray Absorption Fine Structure XANES, EXAFS	<i>(In-situ)</i> chemical states and electronic and geometric local structure analysis	8C
Dr. N. Kim	Soft X-ray Nanoscopy & Absorption Scanning Transmission X-ray Microscopy	Chemical states analysis of elements with spatial resolution at the tens of nanoscale	10A
Dr. Y. Kim	X-ray Absorption Fine Structure (Tender photon energy range)	Chemical states analysis of elements with tender energy (P, S, Si)	1C

Services offered

❖ Urgent Service

- Offering urgent beamtime
- Providing data within 10 days after sample measurement at beamline

❖ Full Service

- Includes everything from experimental design, data collection, data analysis, and a detailed final report

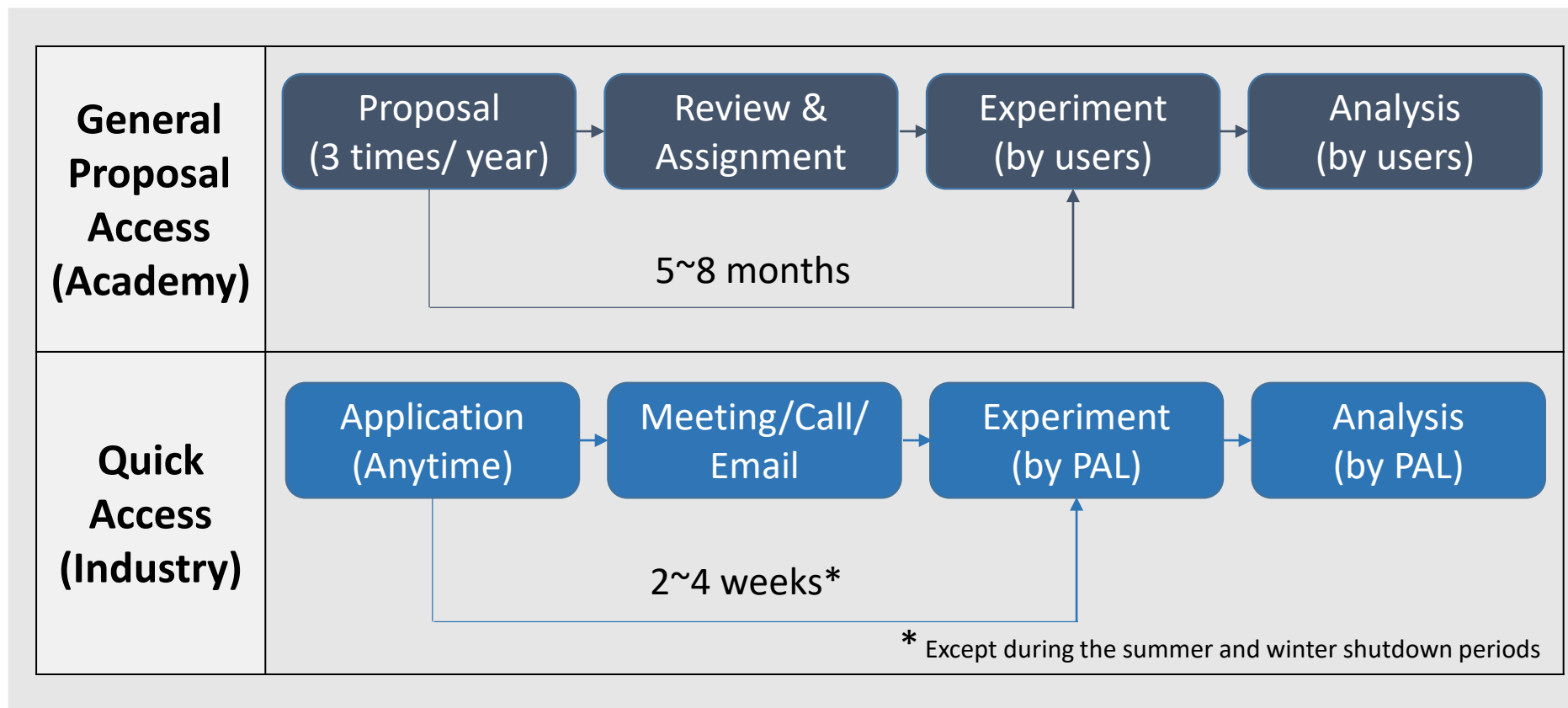
❖ Mail-in Service

- Prefer to skip the wait period of general proposal access and just send the samples for analysis

❖ On-site Service

- Prefer to skip the wait period of general proposal access
- Bring your samples and carry out your experiment

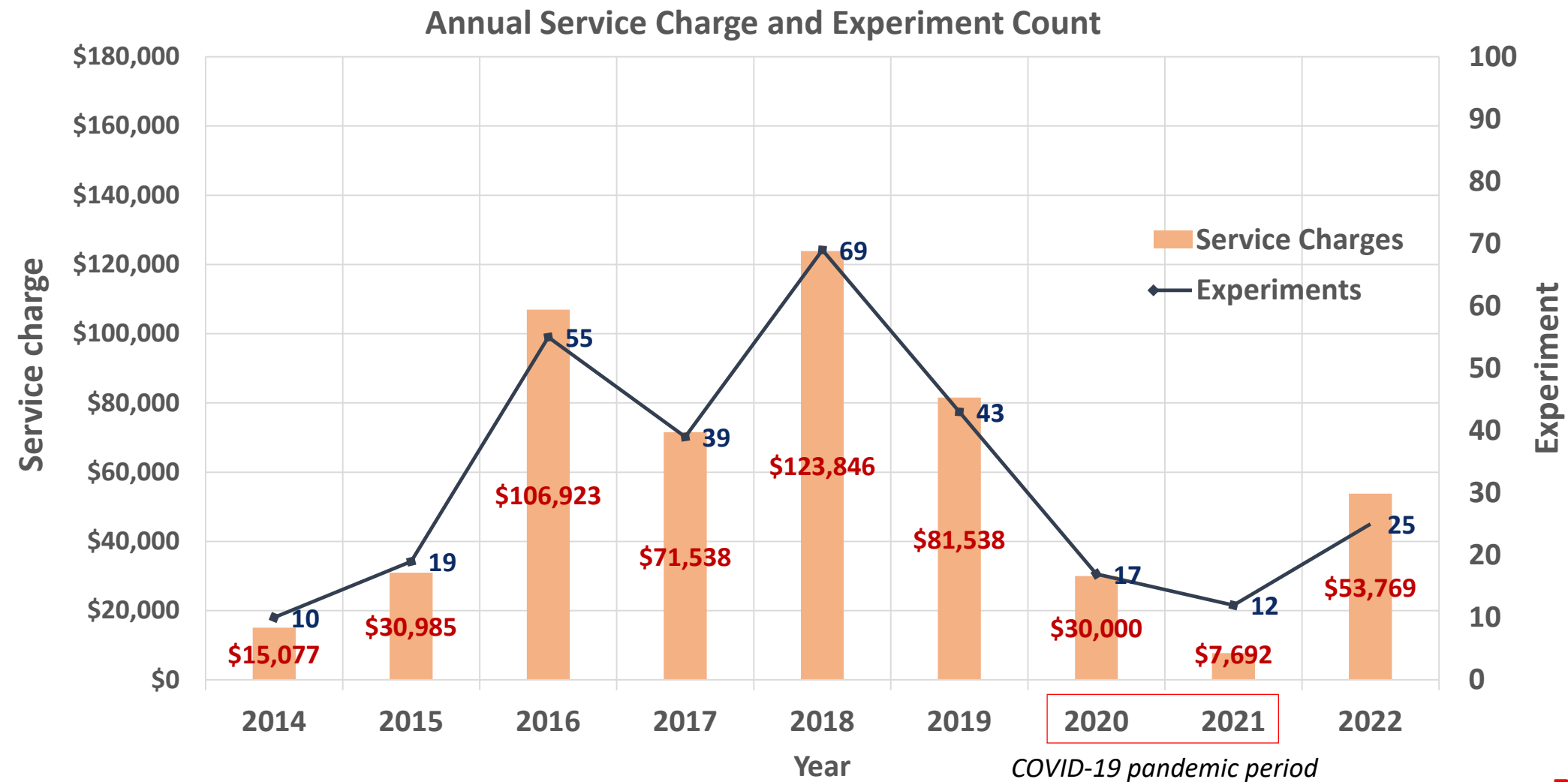
➤ Experiment Process of Academy & Industry at PLS-II



Achievement of ISSC

❖ Industrial Utilization and Achievement of ISSC Since 2014

- Depending on 1) the number of days of beamtime available to industry science
- 2) staff scientist's analytical support
- 3) industry needs



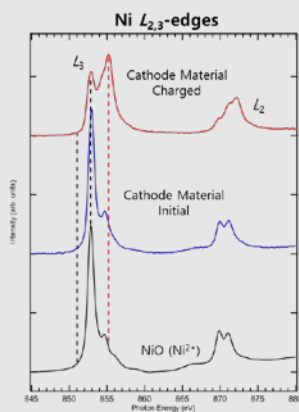
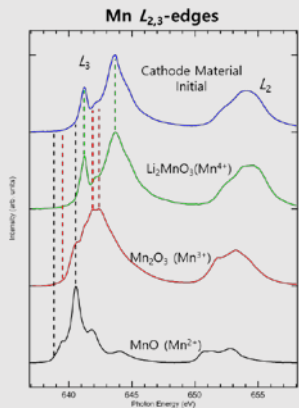
Achievement & Highlights of ISSC

❖ Industry utilization and achievements in July 2023

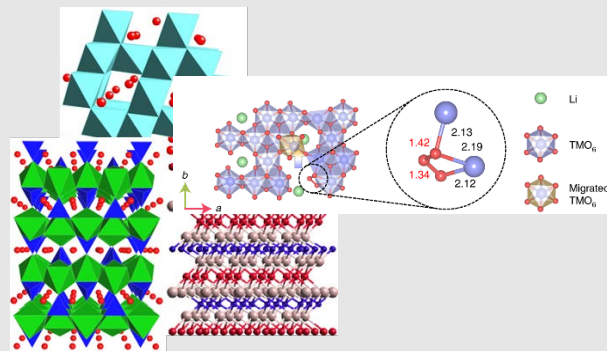
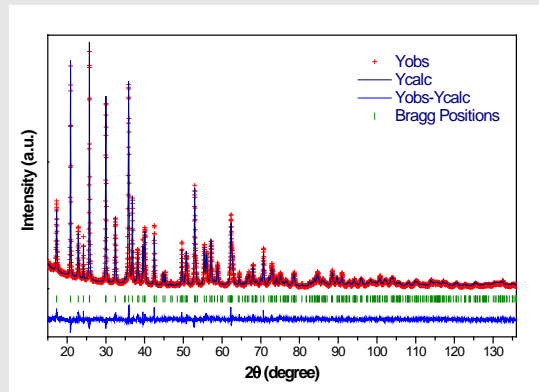
- 10 experiments (\$30,000 service charge)

Battery Industry

- Chemical/Oxidation state analysis of battery cathode materials using soft X-ray

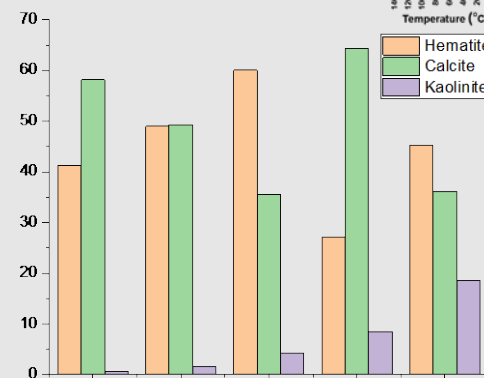
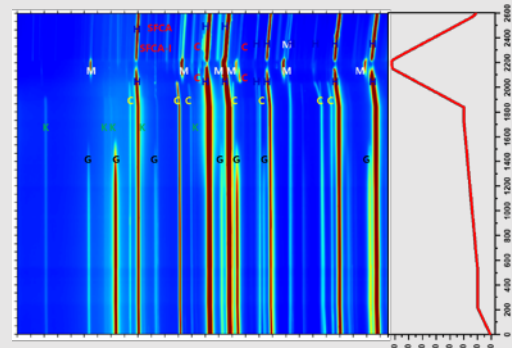


- Precise crystal structure and micro structure analysis electrode materials for rechargeable batteries using HRPD



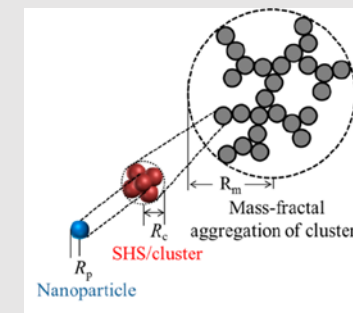
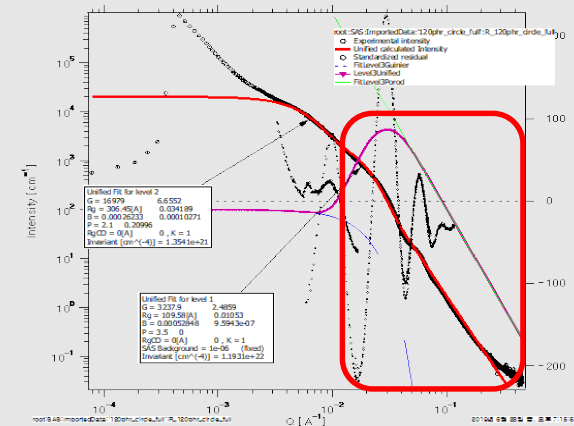
Steel Industry

- Evaluation of multiple phase transition and phase fraction according to cokes, alumina, and external air conditions using *in-situ* XRD during HT



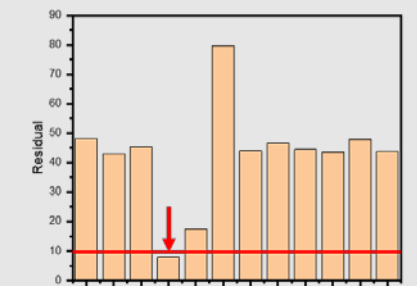
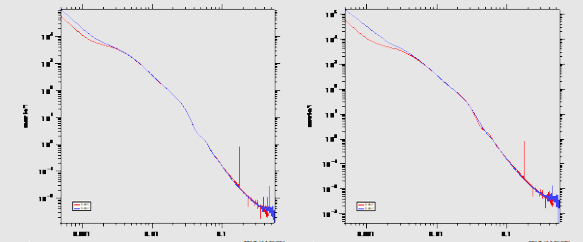
Tire Industry

- Evaluation of dispersion and single particle characteristics of Silica-Rubber Composite using SAXS



Rubber Industry

- Identification of unknown nanoparticles embedded in rubber using SAXS



Future Plans & Strategy

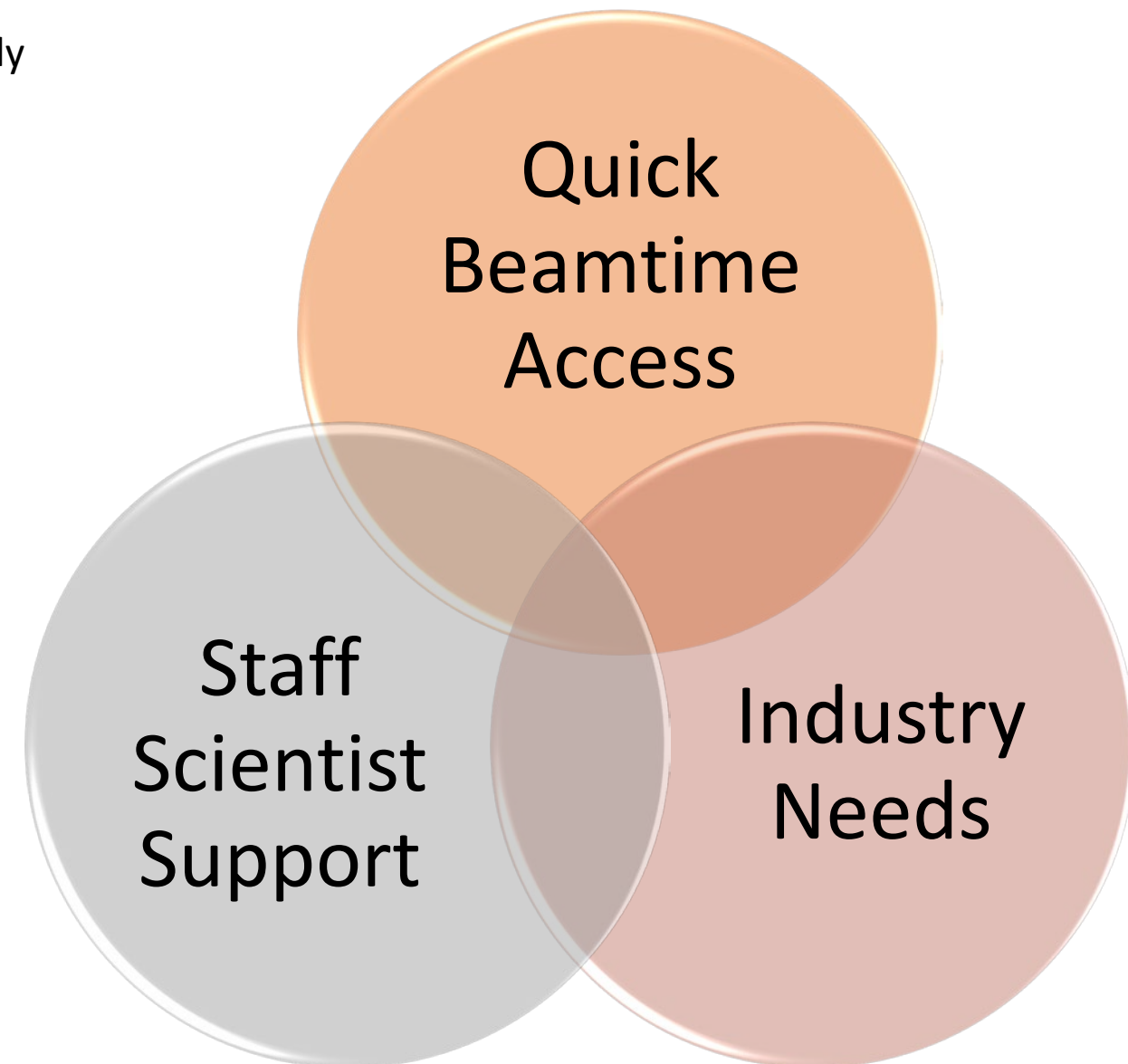
❖ Staff Scientist Support

- Industrial science support : PAL's key mission, not just ISSC's mission
- Therefore, perception change of all staff scientists and then voluntarily support not only academic user support but also industry users

❖ Industry Needs

- To cultivate industry needs and promote synchrotron science to the industry, our strategy includes corporate visits and exchanges, campaigns, and partnerships with companies.

➤ Three Elements of Expanding Industrial Science



Future Plans & Strategy

❖ Quick Beamtime for Industry Science

- It should need to increase the allocation of industry beamtime.
- Necessary to constantly persuade the government and Korean SR user's association

Current Status

- 70% Public beamtime
- 30% Maintenance beamtime (beamline maintenance, experimental technique development, **industry user support**)

Future Plan

- 65% Public beamtime
- 25% Maintenance beamtime
- **10% Industry beamtime**

Long-term Future Plan

- ??% Public beamtime
- ??% Maintenance beamtime
- **??% Industry beamtime**

User Fields using PLS-II

	Public Beamtime		Total
	Academic Science	Industry	
'21	1,825 (97.2%)	52 (2.8%)	1,871
'22	1,963 (96.4%)	73 (3.6%)	2,009

Thank You
For Your Attention

